

Megaproject Review in the Megaprogram Context: Examining Alberta Bitumen Development

by

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Dissertation Submitted In Partial Fulfillment of the
Requirements for the Degree of
Doctor of Philosophy

in the

School of Resource and Environmental Management
Faculty of Environment

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SIMON FRASER UNIVERSITY

Spring 2013

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Abstract

In recent decades northern Alberta has come to be one of the world's most important sources of new oil production. There are 175 billion barrels of bitumen under development, and government and developers are rapidly expanding their capacity to produce it, often through the construction of megaprojects. Both the federal and Alberta governments have review processes in place to scrutinize proposals for new projects. It is the aim of this thesis to examine how such processes should be conducted, to evaluate the federal and Alberta processes, and to identify means with which these processes might be improved.

Megaprojects, and the 'megaprograms' that megaprojects may exist within as they do in the case of bitumen development, pose numerous challenges to project review. Therefore a robust project review process is necessary to ensure that only sound development proceeds and the public interest is protected. Twenty-two sets of 'good practices' are identified.

The good practices are used as a measuring stick to evaluate the existing federal and Alberta review processes. The results of the evaluation are multi-faceted but can be summed up as concerning. Bitumen development is shaping Canadian society today, yet the federal and Alberta processes for reviewing proposals has serious shortcomings.

To help inform the good practices, particularly with respect to sound methodology in impact assessment, a cost-benefit analysis of the Kearl bitumen mine is undertaken. The case study concludes that the project could be an overall net social cost to society, in large part because of the high costs of the project and its greenhouse gas damages. It is concluded that cost-benefit analysis is highly useful to project review and should be used in either its traditional form, or in a modified way, though always in respect of its limitations.

Eighty three recommendations for the federal and Alberta governments are identified to help improve the process for the review of bitumen megaproject proposals. Many

recommendations revolve around the need for the governments to fill in gaps with respect to cumulative effects management and planning of the bitumen megaprogram.

Keywords: megaproject; environmental assessment; impact assessment; cost-benefit analysis; oil sands; tar sands

Acknowledgements

In 2006 I wanted a challenge – what I was doing at the time was not giving me what I needed. I have to admit, now, in 2013, that I got what I asked for, and more. This thesis has been one of the biggest challenges in my life.

While of course overcoming the massive challenge of this ‘megathesis’ required me to dig deep many times, it also relied heavily on the support of many, many others who took the time to listen, offer words of encouragement, dig into the issues at hand and provide advice and feedback, and to get me out and away from the computer to refresh my mind. Without a doubt the most important person helping me through this massive endeavour was my senior supervisor, Dr. Tom Gunton. I must ensure that Tom understands how appreciative I am for all of his help, guidance, and encouragement. His help was invaluable. I must also thank my two other supervisors – Dr. Murray Rutherford, and Dr. Duncan Knowler. Both of these gentlemen were extremely helpful when asked, and like Tom, I must acknowledge their efforts at providing guidance and reviewing thesis materials. As well, I must thank my internal and external examiners – Dr. Sean Markey and Dr. Kevin Hanna – for their helpful questions and comments. The thesis is better because of their efforts and ideas.

My parents, Tom and Margo, and brother and sister, Alex and Aubrey, deserve great recognition, as do their kids and partners. They have all supported me in many ways through this, probably in ways they don’t realize, and I thank them very much for that. I must also thank my friends for all of their support over the years, especially María de los Angeles Medína, Steve St. Hilaire, Dr. Adrian Jones, Tracey Saxby, and Lauralie Pellerin.

Many, many people helped directly in terms of the content of this thesis. Thanks very much to the following individuals for help organizing my visits to Fort McMurray, Edmonton, and Calgary and engaging with me on the issues on my visits there: Carl Johnson (Gemini Corporation), Brent Winder (E-T Energy), Brian Harschnitz (Japan Oil Sands Canada), Kyle Reiling (Strathcona County), Miranda Beaton and her co-worker

(Fort McKay First Nation), Diane Slater (Fort McMurray Chamber of Commerce), Tom Abraham (Butterfield & Robinson), and Jason Switzer and his colleagues (Cenovus).

Thanks for advice on aspects of cost-benefit analysis to Dr. Marvin Shaffer (Simon Fraser University), Dr. Aidan Vining (Simon Fraser University), Dr. Andre Plourde (University of Alberta), Paul Precht (Paul Precht Energy Economics Ltd.), Dr. Andrew Leach (University of Alberta), Robin MacLeod, Dr. Ali Abdelrahman (Alberta Employment and Immigration) and Gillian Kerr (AENV).

Thanks for help regarding the survey to Eric Kimmel (ERCB), Simon Dyer (Pembina Institute), Ken Bannister (ERCB), Susan Tiede (CEA Agency), Scott Clausen (Natural Resources Canada), Sean Broadbent (Simon Fraser University), Steve Conrad (Simon Fraser University), Dr. Chad Day (Simon Fraser University), Dr. Ken Calbick, Brook Land-Murphy (SFU), Timo Makinen (Shell), Aurelie Verge Marion (Golder), Roy Vermillion (Athabasca Tribal Council), Kendra Ramdanny (Canadian Boreal Initiative), Chris Powter (AENV and University of Calgary), Mark Kavanagh (Alberta Utilities Commission), Myles Kitigawa (Toxics Watch Society), Neil Symington (Suncor), Garry Mann (Nexen), Bob Phillips and Lloyd Visser (ConocoPhillips Canada), Stacy Schorr (Encana), John Cowan (Transport Canada), Stuart McMillan (Parks Canada), Jennifer Sharness (Foreign Affairs and International Trade Canada), Scott Millar (AESRD), and one anonymous person. I would also like to thank very much the many individuals that participated in the survey and shared their time and insight (their identities are confidential).

I would like to extend my great thanks to the following individuals that provided other assistance: Eric Kimmel (ERCB), Ken Schuldhaus (ERCB), Ken Bannister (ERCB), Tom Keelan (ERCB), Simon Tudiver (Yale University), Sherene Khaw (Alberta Treasury Board), Dr. Mark Jaccard (Simon Fraser University), Dr. Randall Peterman (Simon Fraser University), Dan Woynillowicz (Pembina Institute), Dr. Alex Clapp (Simon Fraser University), Colin Beddoes, Dr. Chad Day (Simon Fraser University), Dr. Ken Calbick, John Brownlee, Scott Clausen (Natural Resources Canada), Julie Lefebvre (AESRD), Dr. Jim Tanner, Brenda Poole Bellows (ERCB), Bob Dunbar (Strategy West), Dr. Robin Gregory, Steven Kennett, and attendees of talks I've given in Squamish, Calgary,

Regina, Fort McMurray, and Vancouver who have asked good questions and helped me clarify my understanding of the issues.

I'd also like to thank the administrative staff at REM at Simon Fraser University for all their help with a wide variety of requests, including Bev Hunter, Iris Schischmanow, Laurence Lee, and Elissa Phillips.

I'd like to thank the ERCB for providing access to a variety of project application and other material.

Lastly, but in no way in the least, I'd like to thank the following funding sources with supported me through this research: the Social Sciences and Humanities Research Council, Simon Fraser University (President's PhD Scholarship), Sustainable Prosperity (University of Ottawa), the Waterhouse Graduate Fellowship in Organizational Change and Innovation, and the Jake McDonald Memorial Scholarship. I also would like to thank Lee Failing and my other colleagues at Compass Resource Management for their patience working with me while I finished this thesis.

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List of Acronyms

AENV	Alberta Environment
AESRD	Alberta Environment and Sustainable Research Development
bbf	Barrel
Beaufort Sea HPTP	Beaufort Sea Hydrocarbon Production and Transportation Proposal
bpd	barrels per day
CAPEX	capital costs
CAPP	Canadian Association of Petroleum Products
CBA	cost-benefit analysis
CCEMA	Climate Change and Emissions Management Act
CCEMF	Climate Change and Emissions Management Fund
CDN	Canadian dollars
CEA Agency	Canadian Environmental Assessment Agency
CEAA	Canadian Environmental Assessment Act
CEMA	Cumulative Environmental Management Association
CERI	Canadian Energy Research Institute
CO ₂ e	carbon dioxide equivalent
DFO	Department of Fisheries and Oceans
EA	environmental assessment
EconIA	economic impact analysis
EIA	environmental impact assessment
EPEA	Environmental Protection and Enhancement Act
ERCA	Energy Resources Conservation Act
ERCB	Energy Resources Conservation Board
EUB	Alberta Energy Utilities Board
FEARO	Federal Environmental Assessment Review Office
FTOR	Final Terms of Reference
GCOS	Great Canadian Oil Sands
GDP	gross domestic product
GHG	greenhouse gas

GP	good practice
IRB	independent review body
JRP	joint review panel
MOU	Memorandum of Understanding between AESRD and ERCB
MPMO	Major Projects Management Office
Mt	Megaton
NGO	non-governmental organization
NO _x	nitrogen oxide
NPV	net present value
NSB	net social benefit
NTFOSS	National Task Force on Oil Sands Strategies
OPEX	operating costs
OSCA	Oil Sands Conservation Act
PADD	Petroleum Administration Defense District
PAH	polycyclic aromatic hydrocarbon
PM _{2.5}	particulate matter (2.5 microns)
PTOR	Proposed Terms of Reference
PY	person-year
RAMP	Regional Aquatics Monitoring Program
SAGD	steam assisted gravity drainage
SEA	strategic environmental assessment
SO ₂	sulphur dioxide
SO _x	sulphur oxide
t	Tonne
TOR	terms of reference
USD	US dollars
VOC	volatile organic compound
WTI	West Texas Intermediate

1. Introduction

In northern Alberta one of the most significant industrial developments in Canadian history is underway. One hundred and seventy five billion barrels of bitumen – the third largest oil reserves in the world – are under rapid development.¹ Production is now around 1.5 million barrels per day (bpd), more than double what it was in 2000 and more than four times what it was in 1990 (CAPP 2011c), and is forecast to increase to more than 3 million bpd by 2020 (e.g., ERCB 2011a). Canada is now 6th place in terms of global oil production, up from 9th place in 2000 (US EIA Undated). In short, Canada has become one of the world's major oil centres.

Given this scale of development it is important that governments in Canada have an effective process in place to ensure that development is done right – to make sure that development serves the country's economic interests, but also its social and environmental interests. It is the aim of this thesis to examine this topic – to explore the nature of this process, whether this process has the ingredients necessary to properly manage development, and identify means with which the process can be improved.

1.1. Overview of the Resource

Bitumen exists in three deposits in north-eastern Alberta that together cover about 142,000 km² (Figure 1.1). Development began in the Fort McMurray area, starting with the Great Canadian Oil Sands (GCOS, now Suncor) mine in 1967, and this area remains the epicentre of development. Cold Lake is also important as it was here that *in situ* (i.e., in place) techniques of extraction were developed by Imperial Oil in the 1980s,

¹ I use the term 'bitumen' in this thesis instead of the terms 'tar sands' and 'oil sands'. Both of these terms are heavily politicized, the former often associated with critics of development, the latter with proponents of development.

a set of techniques that are expected to allow the majority of the bitumen which is too deep to mine to be developed.

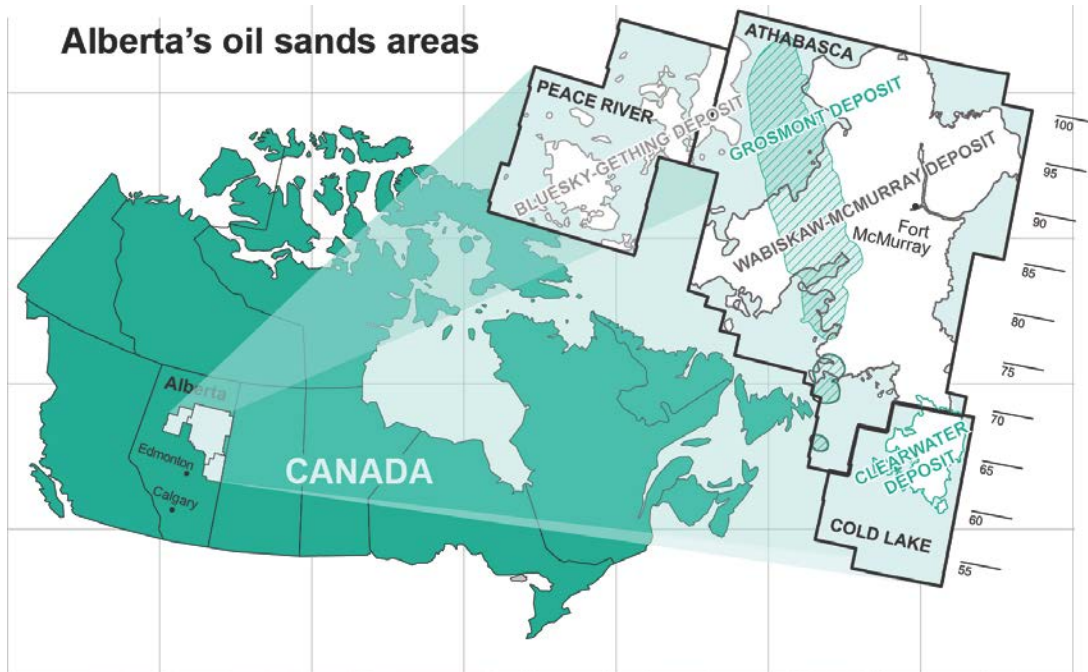


Figure 1.1. Map of Bitumen Deposits

Source: Used with permission from ERCB (2011a).

Alberta bitumen formed under pressure and heat millions of years ago from the remnants of sea life (ERCB Undated-d). Over time the oil migrated and saturated sands near the earth's surface where bacteria fed on the lighter hydrocarbon chains, leaving behind the thick, molasses-like bitumen that today lies intermixed with sand, clay, and water. In contrast to conventional oil, which exists in liquid form and requires only that reservoirs holding it and naturally under pressure are tapped and the oil refined to produce refined petroleum products like gasoline and diesel, bitumen requires more involved extraction techniques as well as upgrading before it can be refined.

To date most bitumen has been extracted through open pit mining, a technique that is only possible when bitumen lies within 100m of the surface. Mining involves scooping up bitumen ore using massive shovels into the world's largest dump trucks which then deposit the ore into crushers. The crushed ore is then mixed with water and 'hydrotransported' via pipeline to an extraction plant. There, through hot water

separation, the bitumen is separated from water and sediment. The bitumen is then sent to an upgrader and the remainder – the tailings – are put in settling ponds and treated for reclamation. The process of upgrading uses physical and chemical processes to remove carbon, heavy metals, and other contaminants and add hydrogen to produce synthetic crude oil which can then be refined like conventional oil.

Deep bitumen deposits are developed using *in situ* methods of extraction. Some bitumen is produced *in situ* using conventional cold pumping methods, but most is produced using some form of heat to separate the bitumen from sediment underground and enable pumping to the surface. The most common *in situ* methods are steam assisted gravity drainage (SAGD) and cyclic steam stimulation, both of which use steam injection for heat. Other *in situ* techniques include vapour extraction (in which a solvent is injected to enable well production), toe-to-heel air injection (in which combustion is used to heat the bitumen underground), water flooding, and heating with electricity.

1.2. Global Emergence of Alberta Bitumen

The first known users of bitumen in Alberta were Aboriginal peoples who accessed it from surface deposits along the Athabasca and other rivers in the region and used the bitumen to seal canoes and ward off mosquitoes (OSDC and Alberta Undated). Europeans first learned of its existence in the early 1700s. In 1788, Alexander MacKenzie wrote:

at about 24 miles from the fork (of the Athabasca and Clearwater Rivers) are some bituminous fountains into which a pole of 20 feet long may be inserted without the least resistance... The bitumen is in a fluid state and when mixed with gum, the resinous substance collected from the spruce fir, it serves to gum the Indians' canoes. In its heated state it emits a smell like that of sea coal (Syn crude 2006).

It didn't take long for Europeans to see the potential.

In the late 19th century the Geological Survey of Canada began exploring the region. Robert Bell of the Geological Survey of Canada wrote in 1884 that

the banks of the Athabasca would furnish an inexhaustible supply of fuel... the material occurs in such enormous quantities that a profitable means of extracting oil...may be found (OSDC and Alberta Undated 1).

These sentiments were shared by many, and great efforts ensued to develop this oil (Box 1.1).

Between the late 1800s and the 1960s, numerous inventors, investors, and governments attempted to convert the immense bitumen deposits into a commercial energy business (Finch 2007). Technical problems, fires, and the Depression frustrated their efforts, despite promotion by the federal and Alberta governments and the fuel needs of the two world wars. In the 1950s the Alberta and Canadian governments even seriously considered an American idea to detonate a nuclear bomb underground as a means to develop the resource. It was during this time that Sidney Ells (employed by the federal Department of Mines), Karl Clark (employed by the Alberta Research Council), and R.C. Fitzimmons (an entrepreneur who opened up the Bitumount plan)

Box 1.1. Key Events in the History of Bitumen Development

- | | |
|------|---|
| 1875 | Geological Survey of Canada considers commercial viability of bitumen |
| 1910 | First <i>in situ</i> experiments |
| 1913 | Sidney Ells, employed by the federal Department of Mines, begins experimenting with bitumen in the laboratory |
| 1915 | Bitumen shipped to Ottawa to pave Wellington Street |
| 1925 | Karl Clark first separates bitumen from ore in a laboratory |
| 1930 | First attempt at commercial production with Bitumount plant |
| 1945 | Abasands plant built in Fort McMurray |
| 1950 | Blair Report is released and promotes bitumen as profitable |
| 1953 | Sun Company establishes GCOS |
| 1959 | Project Cauldron plan to detonate nuclear bomb underground suggested by American geologist |
| 1964 | Syncrude consortium formed |
| 1967 | GCOS begins producing bitumen |
| 1978 | Syncrude begins production |
| 1983 | Imperial Oil's Cold Lake <i>in situ</i> project begins production |
| 1992 | Bucketwheels are phased out in favour of shovels and trucks |
| 1997 | Generic royalty regime adopted by Alberta government |
| 1999 | Bitumen projects and heavy oil wells produce as much oil as conventional wells in Canada |
| 2004 | Daily production of bitumen reaches one million barrels |

Sources: Finch (2007), Suncor Energy (Undated-b), McKenzie-Brown et al. (1993), Anonymous (2009b), University of Alberta (Undated).

developed the hot water separation technique that forms the basis of today's bitumen mining industry.

In 1953, US-based Sun Oil incorporated GCOS and in 1963 invested \$240 million into GCOS. This was the largest single private investment in Canadian history at the time and reportedly called "the biggest gamble in history" (Suncor Energy Undated-b). Commercial production of bitumen began in 1967 with the opening of the 45,000 bpd GCOS plant. In 1978 the Syncrude mine opened, in 1979 GCOS was renamed Suncor, and in 1983 Imperial Oil began successfully using *in situ* techniques to extract bitumen from the deeper Cold Lake deposit.

Development expanded slowly over the 1980s, hindered like the rest of the Alberta oil patch by declines in the price of oil, until two events in the mid-90s spurred rapid development. In 1995 the bitumen industry released a report calling on government to remove economic barriers to development in order to "create maximum net wealth and employment from energy and mineral resources in the oil sands" (NTFOSS 1995 37). The Alberta government listened and in 1997 introduced the 'generic royalty regime' which created attractive fiscal terms for companies investing in bitumen production. The second critical event was global recognition of the bitumen as a viable source of oil. In 2002 the authoritative *Oil & Gas Journal* recognized, for the first time, that Alberta's bitumen was commercially viable oil, and consequently increased Canada's proved oil resources from 4.9 to 180 billion barrels. The US Energy Information Administration quickly followed suit. Canada shot into 2nd place in terms of global oil reserves behind Saudi Arabia, and the Organization of Petroleum Exporting Countries' share of world oil reserves was cut by more than 10% (Dunbar 2010a).²

By 2002 more oil was produced in Alberta from bitumen than conventional sources in the province, and today bitumen production composes more than half of Canada's total oil production (CAPP 2011c Figure 1.2). Production continues to grow: bitumen production is already sizeable on a global scale, but industry and government plan to continue to expand production greatly over the next few decades.

² Since 2011 Venezuela has been in second place and Canada in third place.

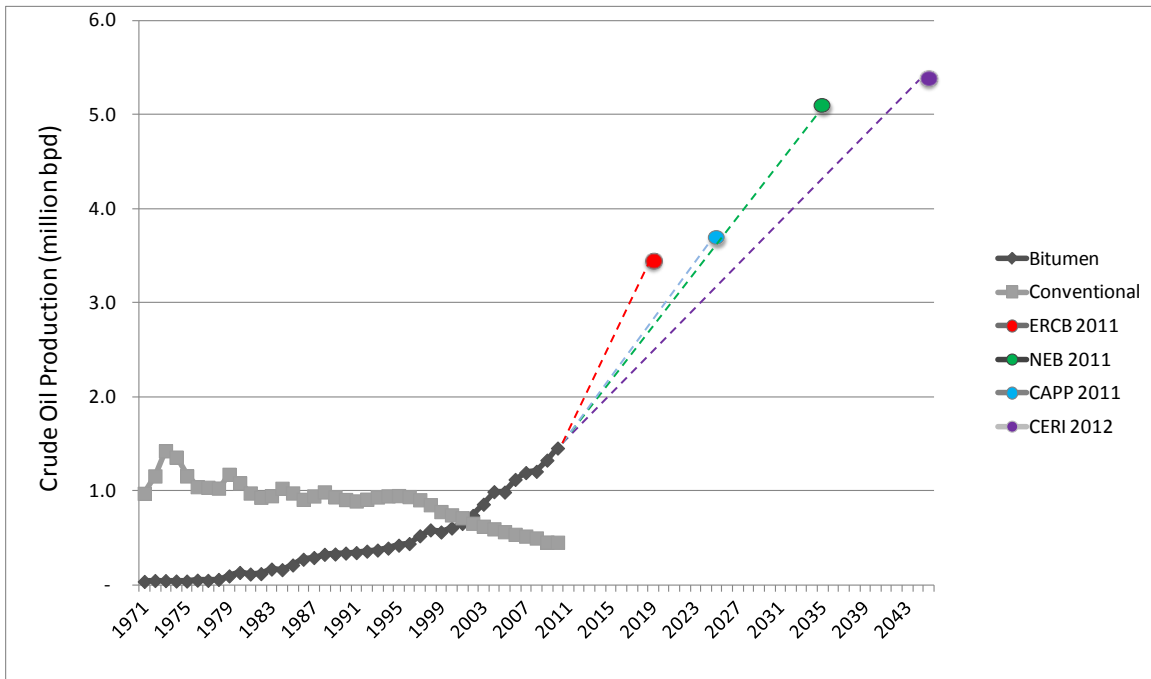


Figure 1.2. Historic and Forecasted Alberta Crude Oil and Bitumen Production

Historical data from CAPP (2011c). Bitumen forecasts are represented by coloured dots.

Sources: NEB (2011), ERCB (2011a), CAPP (2011a), and CERI (Millington et al. 2012).

1.3. Economic Benefits and Environmental Impacts

Bitumen development entails mines, *in situ* production facilities, upgraders, pipelines, railway upgrades, electricity generation projects, highway expansions, community infrastructure and residential development, marine port and tanker development, and refinery conversions, and all of this costs a lot. Over \$119 billion had been invested in extraction facilities and upgraders alone by 2009 (CAPP Undated) and according to the Canadian Energy Research Institute (CERI), a research body funded by industry and government, \$253 billion more is planned (Honarvar et al. 2011). CERI estimates that bitumen development over the 2010 to 2035 period will contribute \$2.1 trillion in GDP in Canada, 11.7 million person-years of employment, and \$766 billion in government revenue (Honarvar et al. 2011). CERI writes that

the recent spate of publicity surrounding environmental impacts has overshadowed the fact that Canada's petroleum industry is a significant contributor to the country's GDP (Howard et al. 2009 1).

The Canadian Association of Petroleum Producers (CAPP), an industry lobby group, shares this view, and argues that bitumen is a "vital source of secure energy supply and economic growth across Canada and North America" (CAPP 2011b 2).

A growing number of critics argue, however, that the environmental impacts of development are so serious that development should be slowed or even stopped. The greenhouse gas (GHG) emissions of the industry are a major complaint. Environment Canada predicts that by 2020 bitumen-related GHGs will be the largest source of emissions growth in Canada (Table 1.1)(EC 2011a). Critics are also very concerned about water use and the capacity of the Athabasca River ecosystem to withstand water withdrawals in the face of climate change (e.g., Schindler, Donahue, and Thompson 2007). Another issue is loss and alteration of wildlife habitat. Timoney and Lee (2009) estimate that habitat loss from bitumen mining alone will translate to a permanent loss of between 58,000 and 402,000 birds. These environmental impacts, as well as concerns with air and water pollution, led the United Nations to declare Alberta's bitumen development area one of the world's 100 hotspots of environmental degradation (UNEP Undated).

Table 1.1. Canadian GHG Emission Trends, 2005 to 2020

Economic Sector	2005 (Mt CO ₂ e)	2020 (Mt CO ₂ e)	Change, 2005 to 2020 (Mt CO ₂ e)	Growth
Transportation	164	180	16	10%
Electricity	126	95	-31	-25%
Oil and Gas – conventional	84	74	-10	-12%
Oil and Gas – bitumen	30	92	62	207%
Oil and Gas – petroleum refining	19	17	-2	-11%
Oil and Gas – pipelines	20	16	-4	-20%
Emissions-intensive Trade Exposed Industries	80	81	1	1%
Buildings	80	86	6	8%
Agriculture	74	78	4	5%
Waste and Others	54	66	12	22%
<i>Total</i>	<i>731</i>	<i>785</i>	<i>54</i>	<i>7%</i>

Data from EC (2011a).

The negative impacts of rapid bitumen development are not just environmental, but also economic and social. Most recently, critics including federal New Democratic Party leader Thomas Mulcair argue that development is causing Dutch disease in Canada – inflation in the Canadian dollar hurting manufacturing sectors in Ontario and Quebec (e.g., Bimenyimana and Vallee 2011, Cohen 2012). Altogether, bitumen development has become one of the most controversial topics in Canada.

1.4. Extraordinary Development

While proponents and critics argue over whether bitumen development is good or bad, they do agree that bitumen development is extraordinary. In its response to the Government of Alberta's request for a short-term action plan to address issues associated with development, the Oil Sands Ministerial Strategy Committee labelled bitumen one of the largest industrial sites in the world (Alberta 2006a) (“the Radke Report”). In an international speech, Prime Minister Stephen Harper exclaimed that

digging the bitumen out of the ground, squeezing out the oil and converting it into synthetic crude is a monumental challenge. It requires vast amounts of capital, Brobdingnagian technology and an army of skilled workers. In short, it is an enterprise of epic proportions, akin to the building of the pyramids or China's Great Wall. Only bigger (The Dominion 2007 3).

In an article in the *San Francisco Chronicle*, reporter Robert Collier referred to bitumen development as the “biggest oil boom in North American history” (2007). In their report on pollution from bitumen development, Hatch and Price (2008 2) labelled bitumen development “the most destructive project on earth” and “the biggest capital project anywhere on Earth and the biggest energy undertaking anywhere”.

The most compelling label is from Petr Cizek who calls bitumen development a “gigaproject”, referring to the many production and upgrading megaprojects operating and planned, the natural gas development planned to fuel bitumen development, the many pipelines planned to link all of these pieces together across North America, and the hundreds of billion dollars in investment (Cizek 2006). Cizek (2008) argues that bitumen development “has the potential to cause the world's largest landscape and

ecological disturbance second only to the ongoing deforestation of the Brazilian Amazon” and that it is much bigger than the proposed Bering Strait transportation link touted as the “biggest project in history” (2, 13).

Each of these labels is interesting, but the salient point from a public interest perspective is that extraordinary, in this case, means that severe caution is warranted. The history of large-scale development indicates that, despite growing global experience, large-scale projects tend to perform poorly and sometimes even fail economically, environmentally, and in terms of public support (Flyvbjerg, Bruzelius, and Rothengatter 2003, Morris and Hough 1987, Samset 2003, Lovallo and Kahneman 2003). To manage the risk of large-scale bitumen development it seems only reasonable that the governments of Alberta and Canada have a robust system in place to ensure that only good project proposals get approved, bad proposals get rejected, and development is properly managed.

1.5. Project Review as a Key Management Tool

Governments need to ensure that only good projects are built (Warrack 1993), but what are good projects? Good projects are economically viable but also enhance (or at least don't degrade) other factors of well-being, such as environmental quality, community life, and cultural health. Project review – defined here as the government process of examining proposals for new projects, also known as project appraisal, project evaluation, and environmental assessment (EA) – is a key tool that governments have to ensure that development is sound and protective of the public interest.

In essence, project review is about rational decision-making. Proposals for new projects are submitted, and through project review, governments (and others) examine a project's advantages and disadvantages and decide if the proposal should be allowed to go ahead. The process begins when a proponent first communicates interest in developing a project, either through public announcement, initial contact with government, or formal application for approval. Thereafter, the process typically includes a regulatory review comprised of analyses, meetings, consultations, or other activities required, performed or commissioned by government. Next a decision is made

about whether or not the project should be approved, and terms and conditions of approval may be issued to the project's developer. With approval in hand, the proponent can begin constructing the project. Permitting with respect to project details and follow-up activities, such as monitoring of environmental impacts, then typically ensues, supported by regulatory enforcement. At a minimum, project review involves the project's proponent(s) and elected and non-elected members of government. Typically, though, this process also involves representatives of other stakeholders, such as Aboriginal and environmental groups.³

1.6. Problems in Project Review

There is no shortage of critiques of the current process for the review of bitumen project proposals. Critics aren't just concerned with what decisions are being made in this review process, but how these decisions are being made. Concerns include:

- ambiguity in the "public interest" decision-making criterion used by Alberta's Energy Resources Conservation Board (ERCB)(e.g., Hierlmeier 2008a),
- the ERCB's dual mandate of protecting the public interest while at the same time supporting the development of the province's energy resources (e.g., Nikiforuk 2008),
- how cumulative effects are assessed (e.g., Kennett 2007), and
- complexity and lack of transparency (e.g., Vlavianos 2007a).

Naturally the question arises: is the current project review process sound? Though the Alberta Oil Sands Consultations process called for both the Alberta and federal governments to "undertake a thorough, transparent review of legislation, policies, and institution structures" (Alberta 2007c 29), to date there has been no comprehensive

³ In this dissertation I use the term 'stakeholder' to refer to all actors that have a stake in the outcome of a decision. This usage does conflict at times with how the term is used in particular policy arenas in which a smaller subset of actors are called stakeholders (such as non-governmental organizations (NGOs)) and other actors (such as government, industry, and Aboriginal groups) are not.

review of the process for the review of bitumen project proposals.⁴ This thesis attempts to fill in this gap.

1.7. Scope and Objectives for Research

Given the significance of bitumen development to Canada, the history of failure in large-scale projects around the world, and the evidence of problems in the current project review process, it is very important that the bitumen project review process be examined well. The intent of my thesis is, therefore, to critically examine the bitumen project review process and determine if the current process for the review of proposals for new, individual bitumen projects has the capacity to facilitate sound development and protect the public interest. The focus here is not on government planning for, or management of, bitumen development as a whole, but on project review, the process that is used to examine proposals for new, individual large-scale bitumen projects. Certainly there is a need to ensure that planning and management of development as a whole is sound – issues which are explored in chapters 2, 3, 5, and 8 of this thesis – but a detailed examination of such activities is beyond the scope of this thesis. This thesis is focused on how proposals for new individual large-scale bitumen projects are reviewed.

Accordingly, there are three objectives to this research (Box 1.2). The objectives are to identify good practices for the review of bitumen project proposals, identify the strengths and weaknesses of the current review process, and to identify ways to improve the project review process. As explained in Chapter 3, it is more appropriate to talk of ‘good’ practices instead of ‘best’ practices.

The methods used in this thesis include:

- a literature review of the nature of

Box 1.2. Objectives of Research

1. Identify good practices for the review of bitumen project proposals.
2. Identify the strengths and weaknesses of current process for the review of bitumen project proposals.
3. Identify means to improve the bitumen project review process.

⁴ Vlavianos (2007b) provides an excellent review of a wide range of issues with the current bitumen regulatory framework but does not examine the full range of project review issues.

megaprojects and a synthesis of defining characteristics of megaprojects as identified in this literature;

- a description of bitumen development in reference to megaproject characteristics;
- an identification of the challenges that megaprojects and megaprograms pose to project review;
- an identification of good practices for project review based on a review of the EA and megaproject literature and the results of a survey of experts across Canada;
- a description of the bitumen project review process;
- an evaluation of the bitumen project review process based on survey results of experts in bitumen project review and a literature review;
- a case study application of the method of cost-benefit analysis (CBA) to bitumen development and an evaluation of the method based upon the case study experience, relevant literature, and personal observations using criteria identified in the good practice component of the research; and
- development of recommendations for improving the bitumen project review process.

Studies of good practices in project review are common but this thesis advances the field in three important ways. First, I examine the challenges to project review that exist when large-scale projects are proposed, including the challenges that exist when there is a broader program of development underway as is the case with bitumen. Few studies of good practices in project review to date put much attention towards context, and none systematically explore the challenges that exist in the review of massive projects – none begin by asking what problems need to be confronted in the first place. This examination of challenges provides perspective, and thus provides a foundation, for the design of good practices. The second important step that I take is that I synthesize two bodies of literature in the course of constructing the good practices: the EA literature, and the megaproject literature. To date there has been little cross-fertilization across these literatures. Third, I test a commonly-known but little-used (in project review) method of impact assessment – CBA – specifically with respect to what contributions it can make to project review and how it might best be used in this context.

This research is most applicable to guiding project review in the bitumen development context, but its contributions are also applicable outside of northern Alberta.

1.8. Structure of Thesis

In Chapter 2 I examine the context for the study and the special challenges that must be addressed in the review of bitumen project proposals. I review the literature on megaprojects, examine the nature of bitumen development, and I then consider Cizek's gigaproject label. I conclude this chapter by identifying the challenges that project review and project reviewers must confront when assessing megaprojects and I conclude that its best to consider bitumen development as a whole as a 'megaprogram'.

In Chapter 3 I develop good practices for megaproject review in the megaprogram context. For this chapter I draw upon the EA and megaproject literatures, a survey of project review experts that I conducted, and my own observations of what is necessary to address the challenges identified in Chapter 2.

In Chapter 4 I describe the current bitumen project review process. I describe the federal and Alberta review processes, and how the two operate together. I use the recently completed review of the Imperial Oil / Exxon Kearl mine project to illustrate the processes. As is made clear in Chapter 4 and carried through the rest of the thesis, I do not review the current processes for the review of pipeline projects but solely the processes for the review of bitumen production and upgrading projects.

In Chapter 5 I evaluate the current bitumen project review process. I use the good practices developed in Chapter 3 as the 'measuring stick' for the evaluation, and I draw the data for the evaluation from a survey of experts involved in bitumen project reviews, relevant critical literature, and my own observations.

In Chapter 6 I present a case study application of CBA to the Kearl project to illustrate the capabilities of this impact assessment method in the project review context. I explore CBA because in Chapter 3 I identify CBA as an important method of impact assessment but in Chapter 5 I find that CBA is not used to assess bitumen project

proposals even despite Alberta policy requiring its use. A key question is, therefore, what role CBA should play in project review?

In Chapter 7 I try to answer this question of what role CBA should play in project review by evaluating the method in terms of its usefulness to project review. Chapter 7 is a structured evaluation of CBA to shed light on the appropriate role of CBA in project review. In this chapter I also explore various hypotheses that attempt to explain why CBA is little used.

In Chapter 8 I summarize the findings of the study and present recommendations to improve the bitumen project review process and make it more capable of facilitating sound development and protecting the public interest.

The structure of the thesis is shown in Figure 1.3.

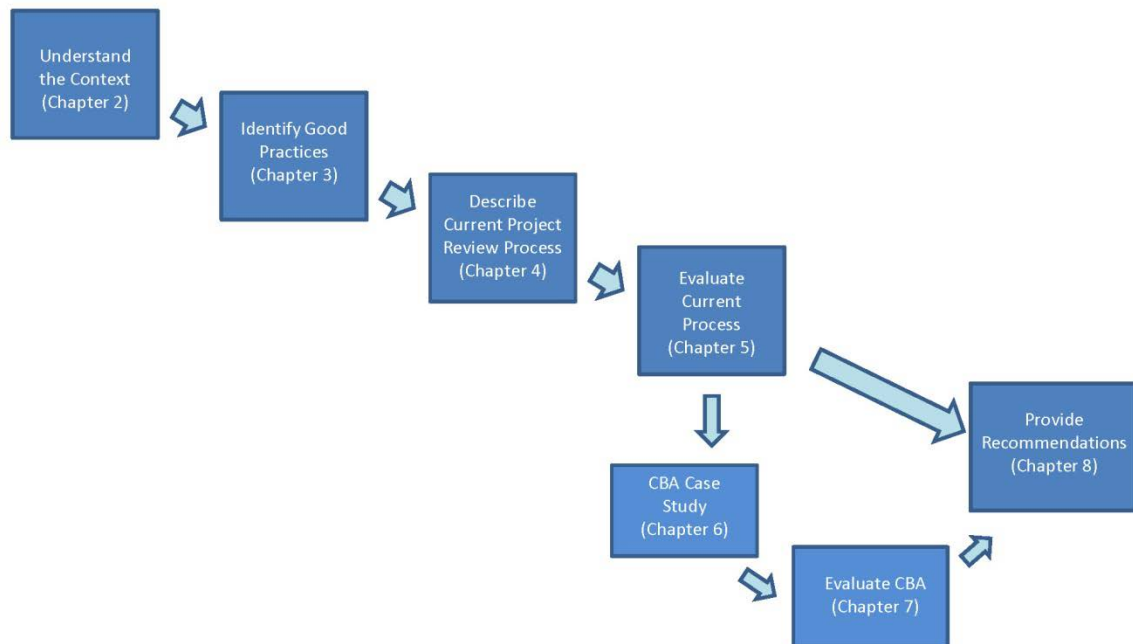


Figure 1.3. Structure of Thesis

This thesis satisfies the interdisciplinary requirement of the School of Resource and Environmental Management at Simon Fraser University by examining two of the three core disciplines of Resource and Environmental Management: resource policy and planning, and ecological economics. Chapters 2, 3, and 5 focus on the first of these

core disciplines by developing a better understanding of project review in the megaproject and megaprogram contexts, and Chapters 6 and 7 focus on a key method of ecological economics – CBA – and its relevance to sound decision-making.

2. Challenges in Reviewing Bitumen Project Proposals

2.1. Introduction

In this chapter I explore challenges to governments conducting reviews of bitumen project proposals. The rationale for identifying challenges is to provide a foundation for identifying good practices of project review, the underlying assumption being that there are different challenges to project review depending on the nature of the projects being reviewed, and that by identifying the challenges that exist with bitumen development I am able to provide a more appropriate list of good practices for project review. This foundation in context is something not seen in much of the good practices literature (see section (s.) 3.1).⁵

To begin to explore the challenges of bitumen project review I use the ‘megaproject’ literature as my starting point. Megaprojects are a development phenomenon that has been the subject of a moderate level of academic inquiry, and this provides a reference point from which to go forward and identify the challenges that bitumen projects pose to project review. In this chapter I first settle some ambiguous terminology concerning ‘major projects’ and ‘megaprojects’. Next I examine the generic characteristics of megaprojects, and stepping from this I examine bitumen development with respect to each megaproject characteristic. In the process I conclude that there is validity to labelling bitumen development atypically large in scale, and I conclude that it makes the most sense to label bitumen development a *megaprogram*. Next I explore the challenges that megaprojects and megaprograms pose to the review of individual projects. It is this section on challenges that lays much of the foundation for Chapter 3 in

⁵ Throughout this thesis, references to sections in the thesis include the section number and, where necessary for clarity, the chapter number. All references to sections of laws are followed by the name or acronym of the law.

which I present good practices for the review of individual bitumen project proposals. The final section of the present chapter on staple theory provides further grounding to the nature of megaprojects and the challenges they pose to project review.

2.2. Major Projects and Megaprojects

Two terms are commonly used to distinguish projects that are larger and more socially-significant than conventional, everyday projects: “major project” and “megaproject.” In Canada the term major project was used by the Major Projects Task Force, a government and industry group formed in the late 1970s to implement \$440 billion worth of industrial development. The Major Projects Task Force defined major projects as being identifiably distinct, having a capital cost of \$100 million or more, and having a significant impact on the economy due to the scale of investment, employment, and technology involved (Blair and Carr 1981). Today in Canada the term major project is used widely. In British Columbia everything from \$35 million condominium towers to \$2 billion hydroelectric dams is called a major project (BC MJTI 2011), while the federal government manages all projects that require more involved environmental assessment through the Major Projects Management Office (MPMO). In the UK, the Major Projects Association defines major projects as those that

pose special challenges... are larger, more complex and offer greater risks and reward... through their impact on the people and organisations who use them... [they pose] significant challenges in successfully accomplishing [them]... they combine complexity with time pressures and often touch on sensitive political and environmental concerns (Undated 5).

Steinberg (1987) extends the term major project to include the US Apollo space program, the Brazilian nuclear power program, and the Egyptian Aswan Dam. To Steinberg, what defines major projects is their political and symbolic value. The term major project is thus applied to a wide variety of endeavours, from housing to space projects, but importantly to those projects that are large, expensive, and special in some way.

The term megaproject is typically used with more discrimination. According to Altshuler and Luberoff (2003), the term megaproject was adopted simultaneously in the late 1970s by Bechtel Corporation (who worked on a variety of very large projects around the world such as the Channel Tunnel) and governments in Canada when the Major Projects Task Force existed. Knight (1990) says that the Major Projects Task Force in Canada didn't use the term megaproject but that many of the projects planned at the time were considered megaprojects. According to Knight, major projects had capital costs between \$100 million and \$1 billion and megaprojects cost over \$1 billion. The term megaproject is most often applied to large natural resource development and infrastructure projects, but it is also sometimes applied to projects as wide ranging as sporting events, the NASA space program, and the internet (Table 2.1). As with major projects, a recurring theme with megaprojects is their profound impacts on society.

Table 2.1. Examples of Megaprojects Identified in the Literature from around the World

Name	Location	Reference
1988 Winter Olympic Games	Calgary, Alberta, Canada	Warrack (1993)
Channel Tunnel	UK and France	Flyvbjerg (2003), Stough (1997)
Denver International Airport	Denver, Colorado, USA	Szyliowicz (1995)
Gautrain Urban Rail	Johannesburg, South Africa	van der Westhuizen (2007)
Hibernia Offshore Oil Project	Offshore Newfoundland, Canada	Knight (1990)
Internet	global	Flyvbjerg (2003)
Lion's Gate Bridge	Vancouver, BC, Canada	Warrack (1993)
Øresund Bridge	Denmark and Sweden	Flyvbjerg (2003)
MAGLEV train	Germany	Flyvbjerg (2003)
NASA Space Program	USA	Stough (1997)
Northeast Coal Project	BC, Canada	Knight (1990)
Red Dog Zinc Mine	Alaska, USA	Storey (2003)
St. Lawrence Seaway	Eastern Canada	Warrack (1993)
Syncrude Expansion	Fort McMurray, Alberta, Canada	Knight (1990)
Thai Water Grid Irrigation Project	Thailand	Molle (2008)
Three Gorges Dam	Hubei Province, China	Flyvbjerg (2003)

Given the ambiguity in the terminology, but also the preoccupation of those who use the two terms have with the special significance of large-scale projects, it would be useful to have one term to distinguish between conventional projects and their grander and more special cousins. As the term megaproject is more charged and connotative than the term major project I use the former when referring to projects of a massive scale with societal significance.

2.3. Defining Characteristics of Megaprojects

A review of the literature on megaprojects reveals several common characteristics (Box 2.1). The most obvious is that megaprojects are huge. Megaprojects are physically extraordinary, very expensive, take a long time to plan and build, and are intended to last a long time and functionally outperform existing projects (e.g., produce more, move more people, etc.). Typically a megaproject is defined as costing more than \$1 billion (Warrack 1993, Knight 1990, Stough and Haynes 1997), taking more than a decade to develop (in some cases several decades), employing hundreds to thousands of people during construction, and having functional lives of decades or more.

Box 2.1. Defining Characteristics of Megaprojects

1. Huge
2. Massive and widespread impacts
3. Novelty
4. Symbolism
5. Societal significance
6. Public and private involvement
7. Complexity

However, baselines shift, and what matters most is the significance of projects in the context of the regions in which they are developed (Warrack 1993, Stough and Haynes 1997). A mine of only moderate size by global standards placed in a remote rural area that has never had such development previously is huge in relative terms. In contrast, in Alberta, bitumen projects that are massive by global standards are approved every few years, and thus in Alberta a project has to be absolutely massive to stand out. Scale is relative to place and time. Indeed, often the most important defining characteristics of megaprojects are qualitative.

One such characteristic of megaprojects is their atypically large, geographically and temporally widespread economic, environmental, and social impacts (Capka 2004, Warrack 1993, Stough and Haynes 1997). These impacts stem from the scales of megaprojects but cannot solely be understood quantitatively. Megaprojects can change the whole structure of government budgets by injecting massive sums of revenue, and they can have market effects so large that the prices of goods change. Environmental impacts can range from local sacrifice zones to long-term pollution legacies, and social impacts can range from boom-and-bust cycles across regions to outright removal of the ability of traditional peoples to practice their cultures. Citing their tendency to bring about landscape, aesthetic, and social change, Gellert and Lynch (2003) describe megaprojects as “creative destruction” through the transformation of landscapes “rapidly, intentionally, and profoundly” (15-16). Large hydroelectric projects around the world such as Québec’s James Bay Project and China’s Three Gorges Dam demonstrate this characteristic clearly. Importantly, megaprojects often cause impacts that go beyond the local and the near-term. While Stough and Haynes (1997) frame megaprojects in terms of their ability to impact a region’s economy and social organization in the present day, they stress that it

is the inability to bind projects into the geographic space of the community and into the time horizon of a single generation that makes them megaprojects (388).

A third characteristic of megaprojects is that they tend to be novel in some way. Megaprojects often use innovative technology and thus tend to involve unique designs, engineering, and architecture (Knight 1990, Blair and Carr 1981, Steinberg 1987, Morris and Hough 1987, Flyvbjerg 2009). The Sydney Opera House and the Concorde airplane project are classic examples. In these cases the driving concepts behind the projects demanded that new technology be developed. In other cases megaprojects become vehicles through which emerging technologies are put to use (Stough and Haynes 1997). Consequently, but due also to the fact that megaprojects are intended to fill special roles, megaprojects tend to be single purpose in that they can’t be used in other ways for other things, indivisible in that they can’t easily be broken up and used in part if their original intended purpose is unworkable, and irreversible in the sense that

development costs are sunk (Barclay 2009, de Bruijn and Leijten 2008a, Stough and Haynes 1997).

A fourth characteristic of megaprojects is their symbolism – their social and cultural significance and the emotional responses they provoke. According to Knight (1990) and Warrack (1993), early megaprojects in Canada were grounded in the national psyche – the vastness of the country, the pioneering past, a perception of resource wealth, and a belief in Canada's engineering prowess. In the 1970s, Prime Minister Pierre Trudeau said that the then-proposed Mackenzie Valley pipeline was

expensive, but so was the Canadian Pacific Railway a century ago. Is it too big a project for Canada? Only in the view of those who have lost faith in what Canada is all about (Laxer 1974 100).

Hall (1980) argues that the Concorde and the Sydney Opera House projects were developed in large part to instill national pride and gain international prestige. According to Steinberg (1987), the US Apollo space program was a patriotic response to the Soviet Sputnik, and in Israel the Lavi Combat Aircraft and Mediterranean-Dead Sea Canal projects served to inspire Israelis, affirm their self-image, achieve catharsis, propel myth, instill national pride, and gain international stature. According to Van der Westhuizen, the South African Gautrain was not just to move people around for the 2010 soccer World Cup but to showcase South Africa as the “pre-eminent modern African state” (2007 333). Megaprojects are often marketed to voters and taxpayers in symbolic terms, but in other cases megaprojects become symbols which address, reinforce, shape, and/or propel a region's or even a whole nation's cultural and psychological disposition.

In most cases megaproject symbolism is underlain by basic societal objectives like economic growth and security (Stough and Haynes 1997). As Cocklin and Kelly (1992) contend, many megaprojects in the 1970s and 80s were responses to energy and economic concerns:

commonly, the strategy for exploiting domestic fuel supplies was based on large, capital-intensive projects. It was believed that not only would such developments release nations from the vulnerable position in which they had found themselves during the 1970s, but that they would also

stimulate economic development at a time when many Western economies were flagging (41).

Megaprojects have functional purposes, such as producing energy or moving people, but they are also meant to propel society forward.

A sixth defining characteristic of megaprojects is that both government and many private actors tend to be involved, and often interdependently. For governments, megaprojects can help them achieve policy objectives and make political gains (Knight 1990), and consequently, governments often act as 'promoters'. In Canada, for example, resource megaprojects have been championed as means to develop hinterlands and promote economic development (Blair and Carr 1981). Governments can develop megaprojects themselves, or, if there are political obstacles related to government participation in the marketplace, government can partner with private developers. However, as megaprojects often pose the threat of a wide range of politically-sensitive negative impacts, governments are often compelled to maintain close oversight and thus often act as 'managers' of development (Warrack 1993, Stough and Haynes 1997, Flyvbjerg, Bruzelius, and Rothengatter 2003, Knight 1990, Blair and Carr 1981). In most megaprojects private developers also must partner with governments or other developers because of the difficulty financing expensive, complex, and risky projects (Flyvbjerg, Bruzelius, and Rothengatter 2003, Warrack 1993, Stough and Haynes 1997, Knight 1990). A wide range of other private actors, such as non-governmental organizations (NGOs) and landowners, also tend to get involved as promoters and critics.

A seventh characteristic of megaprojects is their complexity. The engineering that goes into megaprojects is often very complex, often due to the technological novelty of megaprojects (de Bruijn and Leijten 2008a). A second complexity is regulatory. Megaprojects usually undergo some form of government review and often require permits and approvals from multiple jurisdictions and authorities. This regulatory process is often a complex back-and-forth negotiation between competing and evolving interests (Szyliowicz and Goetz 1995). This all translates into management complexity – coordinating actors, addressing design hurdles, and passing through the regulatory steps, all within budget and time constraints.

2.4. Bitumen Development from the Megaproject Perspective

2.4.1. *Huge*

Alberta bitumen lies in an area of over 142,000 km², about half of the area of the United Kingdom. The deposit contains an estimated initial volume in-place of 1.8 trillion barrels of bitumen, and 170 billion barrels of remaining established reserves (ERCB 2011a).⁶ Alberta bitumen is the largest reserve of technologically and economically available oil in the world after Saudi Arabia and Venezuela (Alberta 2011a).

The individual projects operating, in construction, and planned for bitumen development are of a variety of sizes, but many can easily be labelled as huge. Many of these projects cost well over a billion dollars, employ a thousand people or more to construct, and take a decade or more to build. For example, the Kearl bitumen mine, presently under construction, is projected to cost almost \$30 billion (2010 CDN) and forecasted to require almost 10,000 person-years of employment to construct (Imperial Oil 2005). Kearl's origins can be traced to mineral lease acquisitions in the 1950s. When built out to full size in the next decade or so, Kearl will produce 345,000 bpd for 50 years or more (Imperial Oil 2011a), a production capacity comparable to the biggest bitumen mines in existence today. What is even more impressive is that Kearl is but one of many such bitumen projects.

There are currently eight mining projects in operation run by four different operators with a combined bitumen production capacity of about 1.1 million bpd (Dunbar 2011).⁷ Twenty two additional mining projects are currently planned (Dunbar 2011).⁸ By 2008 about 530 km² of surface area was disturbed by mining; the total potential surface mineable area is 3,500 km² (Lee et al. 2008). Current mining technology uses tailing ponds which have become some of the largest physical alterations to the landscape in

⁶ Remaining established reserves are the proportion of oil resource that is technically and economically exploitable.

⁷ Some of these 'projects' are expansions of existing mines or debottlenecking activities.

⁸ Some of these 'projects' are expansions or debottlenecking, and not all planned projects may go ahead.

the region other than the mines themselves. By 2008 there were 5.5 billion m³ of tailings contained in tailings ponds covering 121 km² (Lee et al. 2008). One of the earthen dams holding up the tailings ponds is considered the second largest dam in the world after China's Three Gorges Dam (Nikiforuk 2008).

To get at the bitumen that is too deep for mining there are 35 *in situ* projects in operation run by 17 different operators with a combined production capacity of 784,000 bpd (Dunbar 2011).⁹ One hundred and twenty six more *in situ* projects are planned (Dunbar 2011). By 2008, 5,500 km² of land had been cleared for *in situ* development, and 56,000 km of roads had been built for *in situ* development alone (Lee et al. 2008). Schneider and Dyer (2006) estimate that if all deep bitumen reserves are developed through existing *in situ* technology, 21% of the Alberta land base – 138,000 km², or an area the size of the US state of Florida – will be altered. Figure 2.1 presents one interpretation of planned *in situ* development in the Cold Lake area.

Many of the existing mining and *in situ* production facilities are integrated with upgraders which are refinery-like facilities that themselves often embody the characteristics of megaprojects. At present about 1.2 million barrels of bitumen (about 65% of bitumen extracted) is upgraded at eight upgraders in Canada run by five operators (Dunbar 2011, 2010b). Seven of the existing upgraders in Canada are in the Fort McMurray area and one is near Edmonton. The rest of the bitumen is exported via pipeline for upgrading in the US. By mid-2010, 28 additional upgrading projects were being planned for Alberta (Dunbar 2011).¹⁰ Many of the planned upgraders will be integrated with production facilities but some will be third-party and will buy bitumen from producers and sell their synthetic crude oil to refineries.

⁹ Note that many of these *in situ* 'projects' are additional phases to existing projects or debottlenecking.

¹⁰ Upgrading projects include completely new facilities but also expansions and debottlenecking. Upgrader capacity is given in terms of output, not bitumen input.

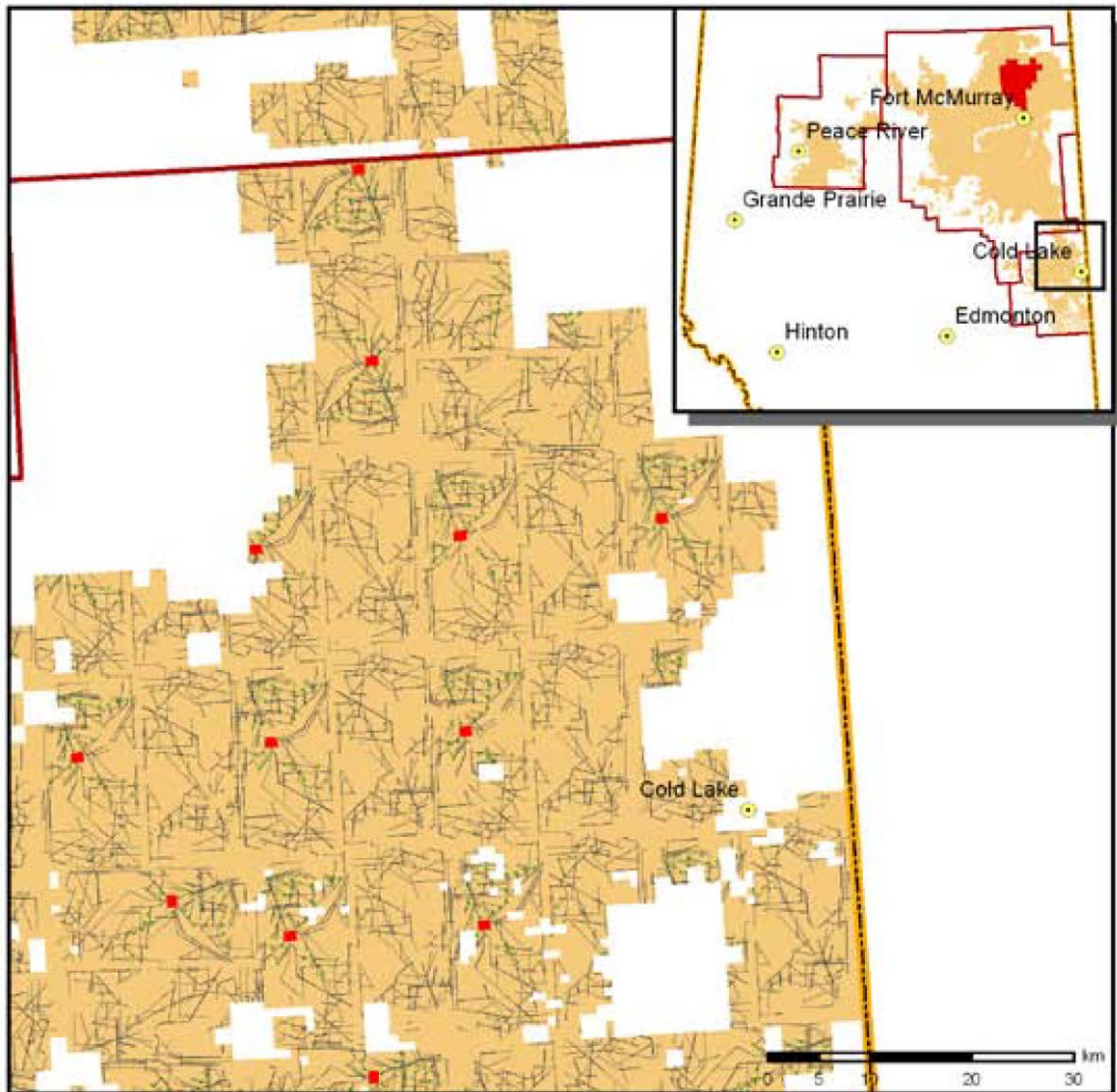


Figure 2.1. Projected In Situ Development for Cold Lake Area

Source: Used with permission from Lee et al. (2008).

The primary market for synthetic crude oil today are refineries in Canada and in US Petroleum Administration for Defence Districts (PADD) II and IV (the Rocky Mountain and Midwest states) (CAPP 2008). Canada is currently the top oil exporter to the US, and is expected to remain so for some time; CAPP (2008) expects synthetic crude oil and raw bitumen mixtures¹¹ to continue to find markets across North America

¹¹ Bitumen by itself is too viscous to be transported by pipeline so it must be mixed with diluents – either condensate, crude oil, or synthetic crude oil.

for many years to come. However, markets beyond North America may expand if the Enbridge Northern Gateway or other pipeline-tanker projects are approved.

There are also numerous plans for refinery expansions and retooling in Canada, the US, and elsewhere, and similarly for upgrading projects outside of Canada. According to one report, over two-thirds of all planned refining capacity expansion in the US – the equivalent of 1.9 million bpd in capacity – is for processing bitumen (Wakefield 2008).

The principal means of getting bitumen to market is via pipeline. Pipelines also serve to import natural gas and diluent to the bitumen production area of Fort McMurray. Several companies' pipeline networks criss-cross North America, and Enbridge's system is the world's longest (CAPP 2008). There are numerous crude oil and diluent pipelines planned for North America, including proposals for large controversial new lines connecting the bitumen region to the US and the BC coast such as the TransCanada Keystone XL project and the Enbridge Northern Gateway project (CAPP 2012). Figure 2.2 displays current and planned oil pipelines in North America as of June 2011. The majority of pipelines are *de facto* a part of bitumen development given declining conventional oil production in North America, rapid growth in bitumen production, and increasing integration between Canadian and US oil markets.

Two ports in Canada are presently shipping bitumen and receiving diluent. The Westridge terminal in Burnaby, BC is a component of Kinder Morgan's Transmountain pipeline system and serves as an export point for western Canadian crude. The port at Kitimat, BC currently receives limited tanker shipments of condensate from Latin America and Asia and is planned as an export and import point for bitumen-related shipments via the Enbridge Northern Gateway project.

To supply bitumen development with its necessary inputs there are numerous other energy and resource projects operating and planned. Bitumen production – particularly *in situ* facilities – demands large volumes of natural gas, and as such development of Arctic and unconventional gas is planned as well as a pipeline through the Mackenzie Valley to transport the gas. Numerous electricity projects – including

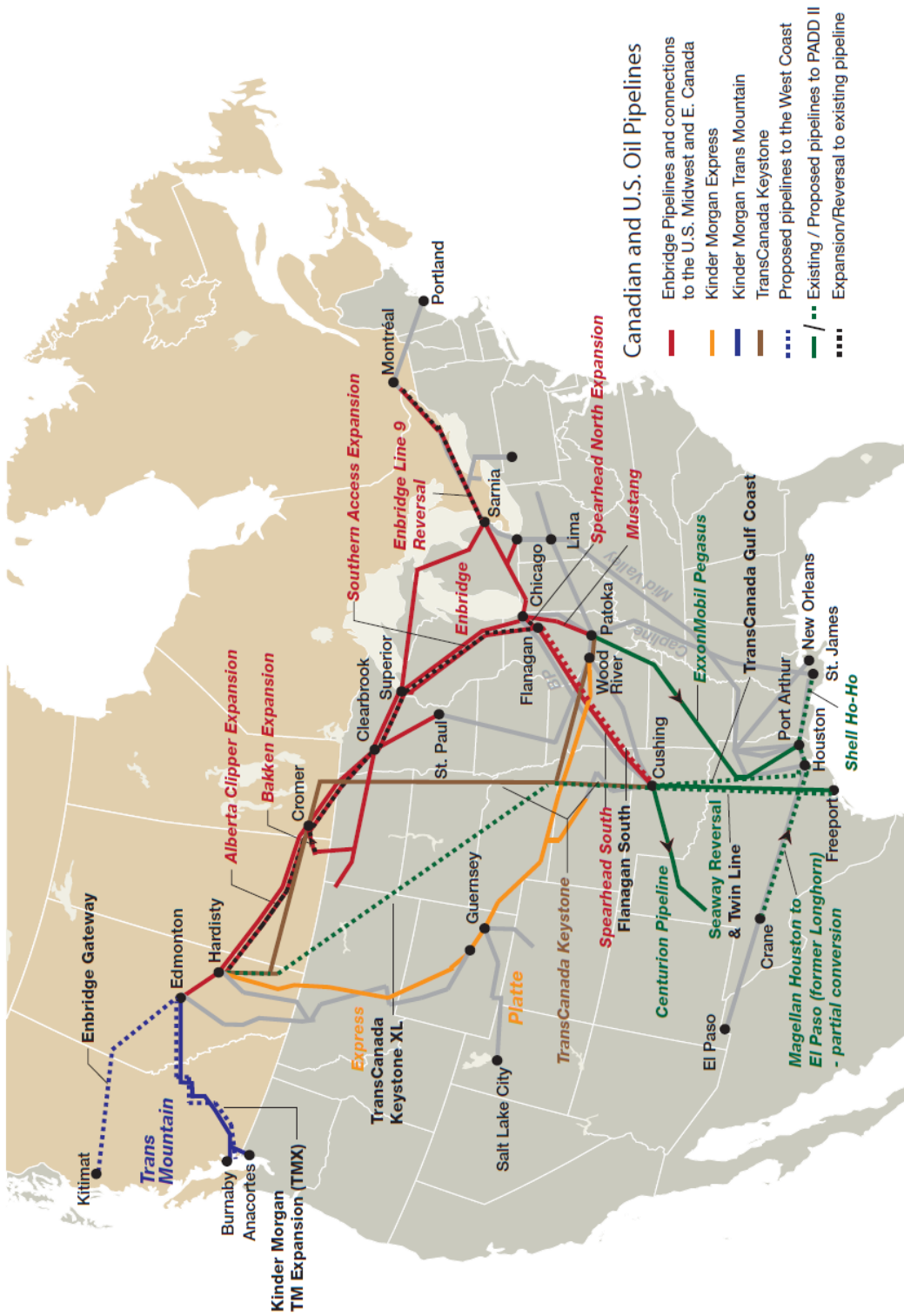


Figure 2.2. Existing and Planned Oil Pipelines in North America

Source: Used with permission from CAPP (2012).

nuclear and hydro – are also planned. According to Nikiforuk (2008), the largest limestone quarry in Canada is also in operation in the Fort McMurray area to supply development with building materials.

To provide for the many people working, living, and transiting through the Fort McMurray and Edmonton areas, as well as all the equipment moving to and from the area, municipal and transportation infrastructure development is expanding. Rail, highway, residential, sewage treatment, and recreational facility projects are under development. The population of Fort McMurray, the epicentre of development, has grown from 36,000 in 1999 to 104,000 in 2010 (RMWB 2011). The annual growth rate between 2000 and 2010 was over 7% (RMWB 2011).

The physical nature of bitumen development is extensive and massive. One conception of the range of activity associated with bitumen development is presented in Figure 2.3.

Compared to the ‘typical’ megaproject, bitumen development as a whole is much more geographically spread. Furthermore, unlike a typical megaproject, it is unclear what bitumen development will entail as time progresses, especially if development shifts to resources lying in the Grosmont limestone formation, the so-called oil limestone (e.g., Roche 2006). Unlike many megaprojects, bitumen development is spatially and physically indiscrete – development is evolving and it is unclear where or what bitumen development will be in the coming decades.

As for cost, hundreds of billions of dollars has been invested in bitumen development so far. Industry data indicate that over \$119 billion CDN had been invested by 2009 on mines, *in situ* facilities, and upgraders (CAPP Undated) and Honarvar et al. (2011) identify \$253 billion CDN more in planned investment. Israelson (2008) reports that \$32 billion USD has been invested on pipelines in western Canada, and that pipeline companies and US refiners plan on investing \$31 billion USD between now and 2015. EIP (2008) estimates that US refiners plan to invest \$53 billion USD to expand their bitumen refining capacity. Billions more are being invested by industry and governments on port development, infrastructure projects, and on managing and planning bitumen development (e.g., AFE 2011a). In sum, total investment on bitumen

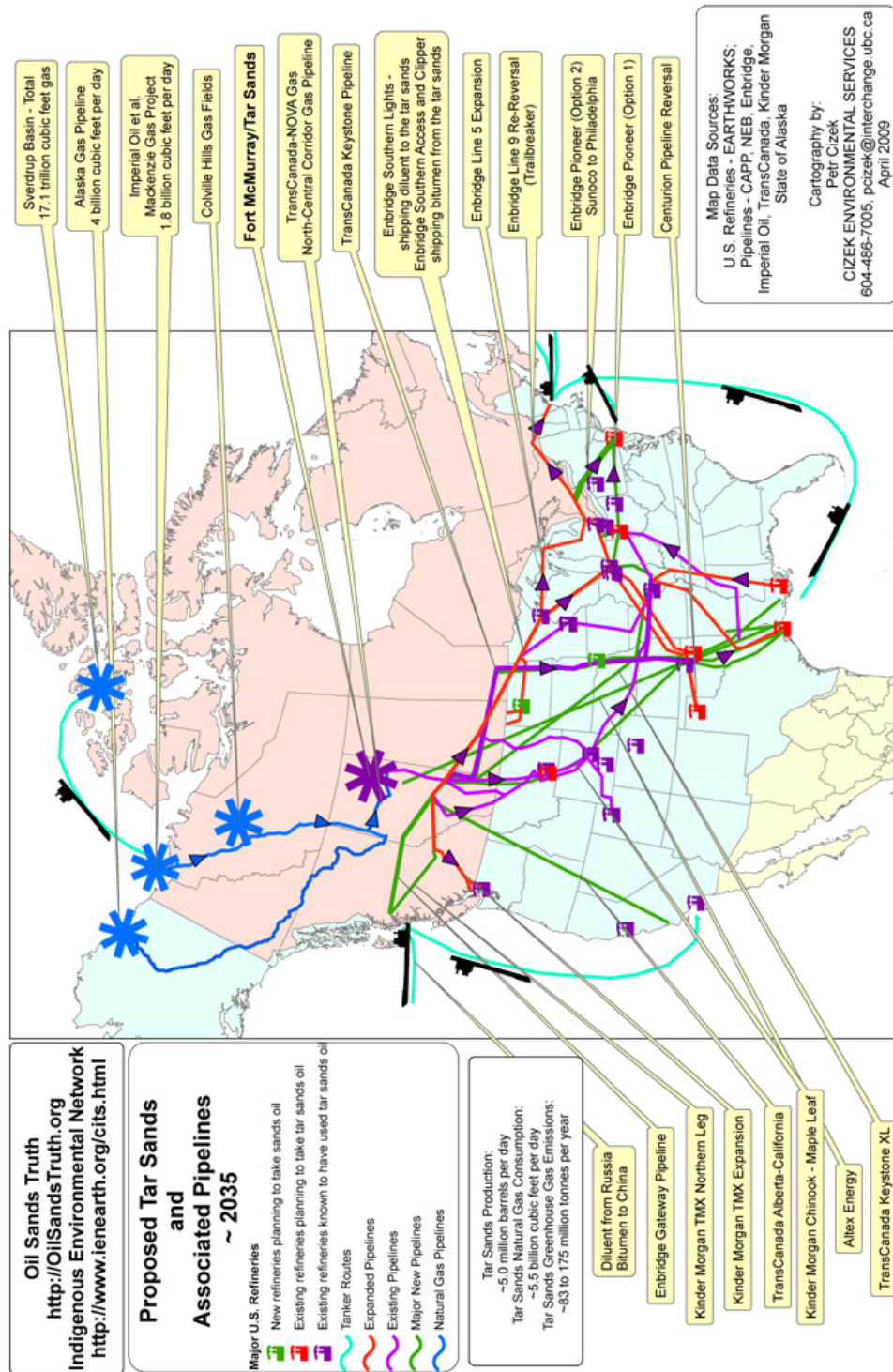


Figure 2.3. Cizek's Conception of Development Associated with Bitumen Extraction

Source: Used with permission from Oil Sands Truth (Undated). Map excludes refineries in Canada designed or planned to take bitumen.

development is more than two orders of magnitude greater than the \$1 billion megaproject threshold.

As for lifespan, bitumen development as a whole also pushes the boundaries of typical megaprojects. Bitumen was initially recognized as an energy resource in the late 1800s, but it took until 1967 for commercial production to begin and it wasn't until the 1990s that production rose to a globally-significant level. If current plans come to fruition, production will continue throughout the 21st century as only about 4% of 'initial established reserves' have so far been produced (ERCB 2011a). From recognition to full development, more than two centuries may pass.

The functional output of bitumen development is also noteworthy. Already bitumen development supplies over half of Canada's oil output and production is currently at a globally-significant rate of over a million barrels a day. More importantly, though, production is planned to grow rapidly within the next several decades (Figure 1.2). If this level of production were reached, Canada would likely become one of the top five countries in terms of oil production (CAPP 2007).

Bitumen projects on their own often embody the 'huge' characteristics of megaprojects, but as Table 2.2 shows, development as a whole is even greater.

Table 2.2. Characteristics of Bitumen Development that Make it 'Huge'

Characteristic	Description
Scale of resource	Developable reserves under an area of 142,000 km ² , about half the area of the UK. Initial volume in-place of 1.8 trillion barrels (largest known oil deposit in the world). Remaining established reserves of 170 billion barrels (third largest reserves in world).
Scale of development	Composed of hundreds of projects, many of them megaprojects with: <ul style="list-style-type: none"> • capital costs of billions of dollars (e.g., ~\$30 billion for Kearl mine); • construction employment of thousands of person-years (e.g., Enbridge (ENGP 2010) estimates 62,700 person-years of direct, indirect, and induced construction employment for its Northern Gateway pipeline project); and • hundreds of thousands of bpd in production capacity (e.g., the Syncrude mine currently has a production capacity of 407,000 bpd (Dunbar 2011)). Tailings ponds covering over 100 km ² . Earthen dam second largest in world. Tens of thousands of kilometres of roads built so far. Cross-continental network of upgrading, refining, and pipelines, and plans to link with

Characteristic	Description
	markets in Asia. Rapid community and population growth in development region.
Scale of costs	Over one hundred billion already invested: \$119 billion CDN in mines, <i>in situ</i> , and upgrading; \$32 billion USD in pipelines. Hundreds of billions in investment plans: \$253 billion CDN on mines, <i>in situ</i> , and upgrading; \$31 billion USD in pipelines; \$53 billion USD in refineries.
Timespan of development	Individual projects with half-centuries or more of expected lifespans (e.g., the Kearl lifespan is about 60 years), over a century in coming to fruition, and over a century in production expected.
Functional performance	Over a million bpd currently produced, plans to more than triple development within next few decades. Moving Canada into the top five global producers of oil.

2.4.2. Massive and Widespread Impacts

Bitumen projects tend to have very large environmental, economic, and social impacts. Mines have some of the greatest impacts because they are among the largest of bitumen projects, but also because of the nature of open-pit mining – bitumen mines entail total clearing and denudation of large areas. The Kearl mine, for example, will dramatically change 23,000 hectares of land north of Fort McMurray, including water courses and Kearl Lake (Figure 2.4). The mine will transform the lands and waters in the project area, and this will obviously have a dramatic impact on local Aboriginals and other former users of this area. The environmental impacts of bitumen development as a whole, though, are of a much greater scale.

The environmental impacts of bitumen development to date have firmly established northern Alberta as one of Canada's prime environmental impact hotspots, garnered global attention, and affected Canada's international relations. A prime source of controversy is the GHG footprint of bitumen development. While researchers haven't been able to agree on exactly how much more GHG-intensive bitumen production is

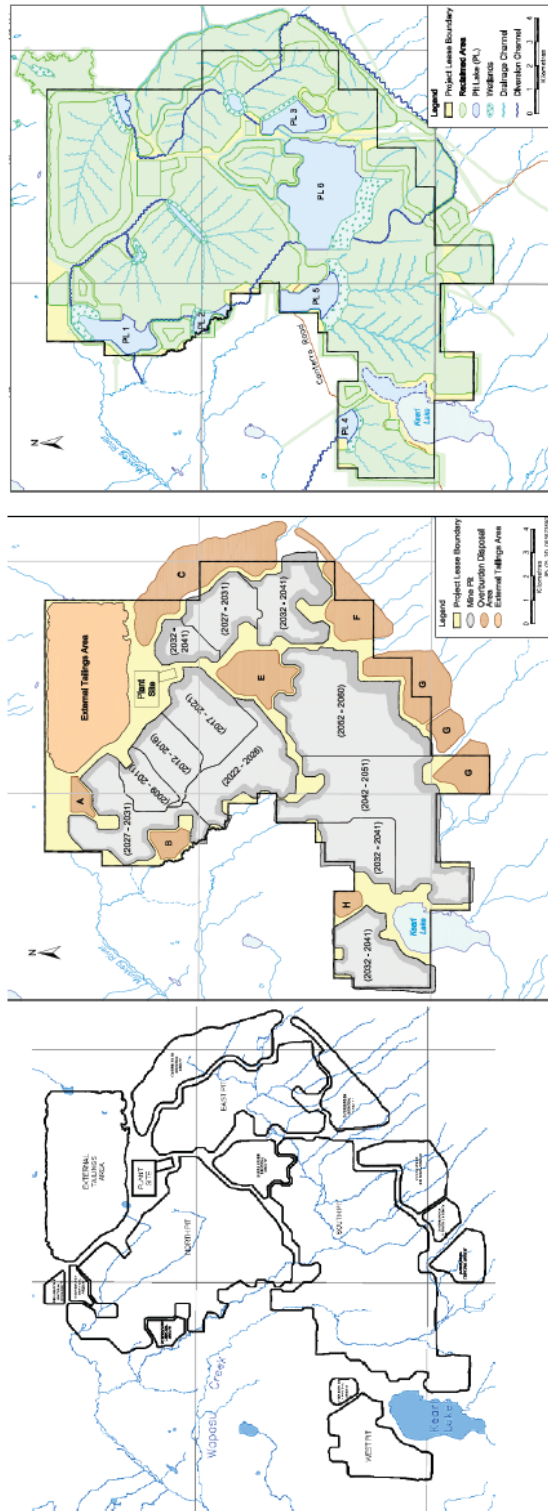


Figure 2.4. Transformation of Kearl Landscape Over Project Life (Pre-development, Development, Post-reclamation)

Figure constructed with maps used with permission from Imperial Oil (2005).

than other crude oil production pathways (e.g., Charpentier, Bergerson, and MacLean 2009, IHS CERA 2010), it is very clear that GHG emissions from the industry are nationally significant. In 2005 emissions from bitumen development were 30 Mt CO₂e, about 4% of Canada's total emissions, but by 2020 emissions are expected to rise 326% to 92 Mt (amounting to 12% of total national emissions) at a time when emissions from the rest of the oil and gas sector are expected to fall and total national emissions are expected to rise only 7% (EC 2011a). Developers, though, plan to grow production much more (Figure 1.2). CERI (Millington et al. 2012) predicts total industry emissions to be 159 Mt per year by 2045. Concerns over the GHG footprint of bitumen development have led to protests in the US against the Keystone XL pipeline (Goldenburg 2011) and international policy activism such as Europe's fuel-quality directive (EC Undated-a).

Another environmental issue of bitumen development garnering international attention is with respect to water. Bitumen mining typically consumes 2 to 4.5 barrels of fresh water, plus recycled water, for every barrel of bitumen (Lee et al. 2008, Griffiths, Taylor, and Woynillowicz 2006). Lee et al. (2008) estimate that all operating, approved, and planned bitumen production projects will eventually withdraw 529 million m³ per year of fresh water, a volume greater than that used by the City of Toronto in a year. Unless technology changes, much of this water will not be returned to the aquatic environment but instead will end up in tailings ponds.¹² Upgrading also consumes lots of water – about 0.8 barrels for every barrel of bitumen upgraded (Griffiths and Dyer 2008). Critics are concerned about the capacity of the Athabasca River ecosystem to withstand the withdrawals, especially given the anticipated effects of climate change (Schindler, Donahue, and Thompson 2007, Griffiths and Woynillowicz 2009, Griffiths, Taylor, and Woynillowicz 2006). Pollution of the region's water adds to the above concerns. Though insufficient analysis has been completed on the subject (Gosselin et al. 2010), there are numerous indications that development is a major source of water pollution and that pollution is at a level that is threatening ecosystem and human health in the region (Kelly et al. 2009, 2010, Timoney and Lee 2009, Kurek et al. 2013). Evidence is

¹² In 2010 Suncor unveiled a new tailings pond reclamation technology called TRO that may partially resolve this issue if it proves effective and is widely adopted by the bitumen mining industry.

mounting that the high levels of consumption of “country foods” by Aboriginals in the region are what is contributing to elevated levels of cancer, Type II diabetes, and lupus (Brethour 2006, Timoney 2007, Gosselin et al. 2010).¹³ Migratory birds are also affected by this pollution. The area in Alberta holding bitumen is a convergence zone for birds as they fly en route to the Peace-Athabasca Delta, “the most important waterfowl staging area in Canada” (EC Undated-b), and unfortunately many of these birds mistakenly land in tailings ponds and other contaminated water bodies. Most famously, 1,606 ducks died in the spring of 2008 after landing in a Syncrude tailings pond (CTV 2009). Concerns over water pollution from bitumen development also extend into the US. A key issue in the Keystone XL pipeline debate has been the potential effect of the project on the Ogallala aquifer (e.g., Vanderklippe 2011b).

Much of the water pollution associated with bitumen development stems from air emissions from upgraders, flare stacks, and other equipment on production sites. Many of Canada’s top polluters of criteria air contaminants are bitumen projects; the bitumen industry was the 4th largest Canadian industrial producer of sulphur oxide (SO_x) and nitrogen oxide (NO_x) pollution in 2007, the 5th for volatile organic compounds (VOCs) and mercury, 6th for cadmium, 9th for particulate matter (2.5 microns; PM_{2.5}), polycyclic aromatic hydrocarbons (PAHs) and lead, and 15th for carbon monoxide (Gosselin et al. 2010).

A fourth major environmental impact is loss and alteration of wildlife habitat. Timoney and Lee (2009) estimate that habitat loss from mining translates to a permanent loss of 58,000 to 402,000 birds in the regional population.¹⁴ *In situ* production doesn’t involve open-pit mining, but it is also very ecologically disruptive by way of habitat fragmentation both directly related to *in situ* production processes and the footprint of natural gas production, a major input to *in situ* extraction processes (Jordaan, Keith, and Stelfox 2009 Figure 2.6). Road development in the bitumen region, for example, is implicated in declines in fisher (*Martes pennanti*), lynx (*Lynx canadensis*), marten (*Martes americana*), and weasel (*Mustela sp.*) (Nielsen et al. 2007). Declines in

¹³ Gosselin et al. (2010) warn that more analysis is required to determine the strength of the alleged link between pollution from bitumen development and disease.

¹⁴ Permanent meaning as long as industrial development supplants natural habitat.

Woodland caribou populations are also blamed on bitumen development (Schneider et al. 2010, Sorensen et al. 2008, CEMA 2008), and Wells et al. (2008) estimate that habitat loss from bitumen development as a whole over the next 30 to 50 fifty years will mean the loss of between 6 and 166 million birds.



Figure 2.5. Seismic Lines South of Fort McMurray, Alberta

Photo: Graham Long (used with permission).

With the above environmental impacts in mind, one can see why the United Nations Environment Programme identifies the bitumen region as one of the world's 100 hotspots of environmental degradation (UNEP Undated) and why the area has been labelled an "environmental sacrifice zone" (Thompson, Laxer, and Gibson 2005, Pratt 1976, Cizek 2006).

The prime justification for bitumen development is its economic benefits. The economic impacts of the Kearl project, according to proponents, are purported to be very large:

- direct employment during construction of 9,980 person-years and during operations of 1,200 jobs when the project is fully operational;

- \$5.5 billion in capital investment, a provincial GDP effect of about \$1 billion per year, and a household income effect (across Canada) of about \$500 million per year associated with operational costs;
- royalty and corporate tax earnings to the Alberta and federal governments of about
- \$24 billion over the life of the project; and
- property tax earnings to the Regional Municipality of Wood Buffalo of \$14.5 million per year once the project is operating (Imperial Oil 2005).

When Kearn's economic impacts are combined with those of the many other bitumen projects under development, though, the sum of impacts is huge. Honarvar et al. (2011) estimate that production and upgrading development alone will contribute \$2.1 trillion to national GDP over the years 2010 to 2035, 11.7 million person-years of employment, and \$766 billion in government revenue. Alberta is forecast to experience 94% of the GDP impacts and 86% of the employment impacts (Honarvar et al. 2011). For comparison, consider that national GDP in 2011 was \$1.7 trillion (STC Undated-c), Alberta GDP in 2010 was \$264 billion (STC Undated-d), general revenue flowing to the Canadian government in 2010 was \$601 billion (CIA 2011), and revenue flowing to the Alberta government for the 2011-12 fiscal year is estimated at \$36 billion (Alberta 2011b).

Critics have been quick to point out, though, that there are many serious negative economic effects of bitumen development including overheating of the Alberta economy, economic decline in communities across Canada from which commuting labourers are drawn, and perhaps most importantly, Dutch disease in the Canadian economy – the decline in the national manufacturing sector attributed by some critics to appreciation in the Canadian dollar linked to increased oil exports (Pitts 2008, Nikiforuk 2008, Stewart 2008, Gibson 2007, Bergevin 2006, Scott 2008b, Allan 2012, Bimenyimana and Vallee 2011, Beine, Bos, and Coulombe 2011).

Another huge impact of bitumen development is its use of natural gas. Extracting one barrel of bitumen using SAGD *in situ* techniques requires about 1,250 ft³ of gas (Gosselin et al. 2010), roughly equivalent to the amount required to heat an average Canadian home for 7 days (Woyndlowicz, Severson-Baker, and Reynolds 2005). The bitumen industry consumes about 1.3 billion cubic feet a day of North American gas

supplies at present (about 19% of total gas demand in Alberta) but by 2020 this is expected to double to around 3 billion cubic feet per day (ERCB 2011a). With such high rates of consumption a federal government committee concluded that “the use of natural gas ... represents one of the greatest challenges facing the industry” (SCNR 2007).

It is clear that the impacts of bitumen development as a whole are massive and widespread. It is difficult to compare the scope of impacts of bitumen development with those of ‘typical’ megaprojects, but it seems reasonable to conclude that the magnitude of impacts from bitumen development are probably beyond the level of typical megaprojects due to the intensity of development and its geographic, temporal, and financial scale.

2.4.3. Novelty

Like megaprojects in general, bitumen development is intimately associated with novel technology. Bitumen development has always been a technically complex business and owes its existence to the development of new technology. The invention of the hot water separation technique in 1929 by Karl Clark started the industry. By the 1960s the technique was commercialized and today this technology remains the technological foundation for all operating mines. SAGD is the same for *in situ* production. According to historian Paul Chastko,

the introduction of SAGD was the single most important development in oil sands technology since ... hot water separation. [It] enabled smaller companies to join with the majors in developing the sands (2004 218).

Technological development continues to be a major focus as the industry grapples with high production costs and environmental impacts (Alberta Chamber of Resources 2004, Vanderklippe 2009). Current technological development foci include tailings management and carbon capture and sequestration.

The degree of technological development associated with bitumen development can be compared to that of other developments described as megaprojects in the literature. Comparisons can be made with respect to how long it takes to develop technologies, their costs, and also their significance to, or influence on, society.

Comparing hot water separation and SAGD to the Concorde airplane project, for example, it would seem that the former are of a greater level of significance than the latter in terms of influence. The former (has so far) led to a whole new industry – oil production from a previously inaccessible petroleum source – and appears to be a contributing factor in spurring on a new wave of oil development worldwide, whereas the latter has had limited effect on air transportation. The NASA space program is also raised in the literature as an example of a megaproject. On the surface it would appear that the hot water separation and SAGD technologies might compare well to space technologies. Both bitumen extraction and space technologies took decades to develop, and in a few decades' time, given the close link between the global economy and oil, the significance of bitumen extraction technology on society might be very similar to the significance of space technology on society today. This latter comparison is an important association that I use later in this chapter in distinguishing between megaprojects and grander development phenomena.

2.4.4. *Symbolism and Societal Significance*

Bitumen development is very symbolic and its development is driven by a variety of societal objectives. While symbolism and societal significance are two distinct characteristics of megaprojects, it makes sense to examine them together here given their strong association in bitumen development. It's easiest to see symbolism and societal significance in bitumen development by starting with its history.

Between the late 1800s and the mid-20th century, bitumen transformed from “black goo” on a riverside to the fixation of dreamers in industry, science, and government (Chastko 2004, Foster 1979). In 1889 a chronicler on the Laird Expedition noticed

that [the Fort McMurray] region is stored with a substance of great economic value is beyond all doubt, and, when the hour of development comes, it will, I believe, prove to be one of the wonders of northern Canada (Syncrude 2006).

Over the next several decades, entrepreneurs and government scientists tried to determine a means to produce oil from the “fabulous but so far uneconomic” tar sands

(Finch 2007 103) but failed repeatedly. In the 1950s the Alberta and Canadian governments even seriously considered nuclear detonation as a means to develop the resource (Chastko 2004).

The tide turned in 1967 with the opening of the GCOS (now Suncor) mine. On opening day a banner hung across the bridge in Fort McMurray heading north to the plant read “Bridge to Tomorrow’s Energy” and the premier of Alberta declared that

this is a red letter day, not only for Canada but for all North America. No other event in Canada’s centennial year is more important or significant (Finch 2007 106)

and that

it is fitting that we gather here today to dedicate this plant not merely to the production of oil but to the continual progress and enrichment of mankind (Suncor Energy Undated-b).

J. Howard Pew, chairman of US-based Sun Oil which financed GCOS, remarked that the opening “marks a great forward step in the development of the oil industry” (Suncor Energy Undated-b) and that “no nation can long be secure in this atomic age unless it be amply supplied with petroleum” (Finch 2007 105). At the time, the automobile was entrenching its position in the American lifestyle, conflict in the Middle East was obstructing oil shipments and spiking oil prices, and Arab leaders were considering an oil embargo (Finch 2007, Chastko 2004). The *Oil and Gas Journal* observed at the time that

the start of commercial production of synthetic crude from the Athabasca tar sands has been hailed as the dawn of a new era, the forerunner of vast new supplies of hydrocarbon energy, assurance of hemispheric self-sufficiency in petroleum... (Chastko 2004 103).

Throughout these early years, bitumen symbolized challenge, a symbol consistent across many megaprojects in history. At first the challenge was how to extract the bitumen, then it was how to do this commercially.

In the 1990s, many of the basic production challenges had been overcome and development accelerated rapidly, climbing from 0.3 million bpd in 1990 to one million bpd in 2004 (CAPP 2011c). A key driver was international recognition in the early 2000s of the volume of oil in Alberta's bitumen reserves (see s.1.2) – almost overnight Canada catapulted from 21st to 2nd place behind Saudi Arabia in terms of global reserves.¹⁵ Huge amounts of international capital were invested, and today bitumen production is 1.5 million bpd, almost matching total conventional production in Canada (CAPP 2011c). Workers today commute by plane to the Fort McMurray region from all parts of Canada, and industry routinely promotes the importance of bitumen development to the economy. To advocates bitumen is “black gold,” “resources beyond belief,” “the eighth wonder of the world”, and an “economic miracle” (Woynillowicz, Severson-Baker, and Reynolds 2005, Anderssen, McCarthy, and Reguly 2008), and to governments in Canada bitumen makes Canada and Alberta an “energy superpower” and “global energy leader” (CBC News 2006, Office of the Prime Minister 2008, AE Undated).

From early on bitumen was associated with energy security, especially in the US whose government and oil companies have been involved right from the start (Chastko 2004, Crane 1982, Laxer 1974, Shaffer 1983). This interest remains, and is exemplified in statements from the US Energy Policy Development Group which calls bitumen “a pillar of North American energy and economic security” (Woynillowicz, Severson-Baker, and Reynolds 2005) and the US *Energy Policy Act* [Pub. L. 109-58] which requires the securing of “North American energy freedom” and developing bitumen for the purpose of fuelling the US Department of Defense. To McCullum (2006) bitumen development is indeed about ‘fueling fortress America’. Of course, with the Enbridge Northern Gateway pipeline and other proposals to ship Alberta oil to Asia, there is more than one foreign entity linking bitumen development with their energy security. At time of writing, China and other Asian countries (e.g., Korea, Japan, Thailand, and Malaysia) and a range of European nations (UK, Norway, Netherlands, France) are involved in development either through private or state-owned oil companies.

¹⁵ In 2011 Canada dropped to third behind Venezuela (Alberta 2011a).

Foreign involvement in bitumen development has long been the subject of debate in Canada. Advocates feel that foreign capital is necessary to reap the full benefits of the resource and that it is in Canada's best interest to export oil abroad. Consequently, advocates have pursued trade and energy policy that facilitates exports to the US, Asia, and elsewhere. The Enbridge Northern Gateway pipeline and tanker project and China's purchase of Calgary-based Nexen in late 2012 exemplify such interests. The opposing view is that Canadian energy security and sovereignty is threatened by an export focus. In 1972, for example, Alberta's Conservation and Utilization Committee questioned the wisdom of pursuing rapid development of bitumen in exchange for the long-term costs associated with exported energy, technology and job opportunities, environmental impacts, and depletion of the non-renewable resources (Crane 1982). The committee wondered if the province would be better served by development "for the ultimate benefit of Alberta and Canada" (Crane 1982 214). More recent debates focus on the *North American Free Trade Agreement's* (NAFTA) proportionality clause which requires Canada to maintain exports of energy to the US (e.g., Thompson, Laxer, and Gibson 2005), and the role of China in Canadian oil development (e.g., Romero 2004, McCarthy and Pitts 2010, Burney and Hampson 2012).

In the minds of some, the large role that the US has played in bitumen development to date is a sign of Canadian subservience to the US. From this perspective, the willingness of Canadian leaders to sacrifice the environment through nuclear detonation and as a 'sacrifice area', the proportionality clause under the *North American Free Trade Agreement*, and Alberta's low royalty rates on oil production are all perceived as examples of how Canada has 'sold out' to the US.¹⁶ Thus, while Prime Minister Harper labels Canada an energy superpower, his critics suggest that more accurate labels are energy superstore, energy satellite, and energy colony (Clarke 2008).

¹⁶ Alberta has among the lowest royalty rates on oil production in the world (ARRP 2007, Taylor et al. 2004, US GAO 2007), and depending upon whether the audience is the Canadian public or American investors, there is a track record of government and industry speaking of either challenging fiscal conditions (lending to arguments for low royalty and tax burdens and subsidies) (e.g., Kvisle 2007) or wholesale giveaways that will make investors a 'killing' (Nikiforuk 2007).

Regardless of these critiques, the rising importance of bitumen in global energy markets has reconfigured political power in Canada. Business in Canada is increasingly centred in Calgary and less in the traditional centres of Toronto and Montreal, and with this shift political power is increasingly centred in Alberta. Federally, the Conservative party – with a strong voter base in Alberta – has been in either minority or majority power in the Canadian parliament since the 2006 election. Throughout these electoral wins the Conservatives have been led by Stephen Harper, only the second Albertan prime minister since 1935 after Joe Clark's brief stint in 1979 through 1980. With this shift to a bitumen-friendly federal government, federal policy has transformed to become very supportive of development (e.g., McCarthy 2012). More than ever, Canadian energy and environmental policy is made with attention to the opportunities and constraints of bitumen development. Alberta's growing power is also signalled in its approach to foreign relations. For several years now Alberta has been doing business directly with Washington and other global parties to the annoyance of the Canadian federal government (e.g., see Chastko 2004 226).

Alongside this corporate-political shift a new symbol for bitumen has emerged – that of 'ethical oil'. Levant (2010) argues that bitumen should not be spurned given Canada's democratic society and the autocratic, 'unethical' societies from which alternative oil supplies around the world are drawn. This label has gained widespread traction among proponents and drawn fire from critics. Time will tell if the ethical label comes to symbolize bitumen, or if this effort to re-brand bitumen will only cement negative symbols.

Indeed, among the most dominant symbols of bitumen are the associations of development with greed and wrongness. These symbols are evident in the sustained barrage of publications, media reports, and non-government organization activity around the world over the environmental and other impacts associated with development (e.g., Kunzig 2009, Bethge 2011). To critics, rapid development of bitumen is the 'most environmentally destructive project on the planet' and a grave threat to the planet's atmosphere (Hatch and Price 2008, Cizek 2008, McGowan 2011). Polls have consistently shown that Canadians have a deep concern over the negative impacts of bitumen development (e.g., Henton 2008, CBC News 2009, Pembina Institute 2007), and the level of policy development in Canada and around the world demonstrates the

concerns that people and decision-makers around the world have for bitumen development. In Canada policy development has largely focused on trying to reduce the environmental impacts of development (e.g., Alberta 2008c, 2009c), and outside of Canada much policy has been developed around penalizing bitumen production such as a US mayor resolution to ban the purchase of “dirty oil” (US Conference of Mayors 2008 also see , California Energy Commission 2009, NRDC 2008, EC Undated-a, Ebner 2010). Investors have also become cautious of the environmental liabilities of development (e.g., Ethical Funds 2008).

The preceding discussion alludes to the variety of symbols that have come to represent bitumen development and the variety of societal objectives that have driven bitumen development. In many respects, the symbolism associated with development and objectives driving it is common to megaprojects – a mix of strong ideas, both good and bad – but an important distinction with bitumen development is that the symbolism and objectives extend across Canada as well as around the world. Thus, as with its physical footprint, the geography of bitumen symbolism and societal significance is much more widespread than typical megaprojects.

2.4.5. *Public and Private Involvement*

Fitting with typical megaproject patterns, a range of government actors are involved in the development of individual bitumen projects, and more so in the development of bitumen as a whole. Governments across Canada and the world are involved in bitumen development both in roles as promoters but also as managers shaping how development takes place. In Canada, all levels of government are involved, and therefore scores of agencies and organizations play roles. The federal and Alberta provincial governments are the major governmental actors, but other sub-national as well as municipal governments are involved due to the physical, environmental, and economic geography of development, including the governments of British Columbia, Saskatchewan, Manitoba, and Northwest Territories and the municipal governments of the Regional Municipality of Wood Buffalo and Edmonton. Significantly, unlike most megaprojects discussed in the literature, the governments of foreign nations are also substantially involved including those of the US, China, and Norway.

Governments act as promoters of development in four ways. First, governments market development. Examples include the Alberta government's touting of the Blair Report (Blair 1950) in the 1950s which found that a profit could be made, the Alberta government's sending of envoys to investment capitals like New York City in recent years to solicit interest from investors and to market Alberta's low royalty rates, Alberta's routine advertising in Alberta and around the world (e.g., see Kiladze 2010, Wingrove 2010), and Prime Minister Harper's past energy superpower commentary and promotion of bitumen-related pipeline projects in the US and China (e.g., Junggren 2012). Second, governments regularly sponsor research. Since the 1800s Canadian governments have sponsored research on bitumen development through such bodies as the Alberta Oil Sands Environmental Research Program, the Canada Centre for Mineral and Energy Technology, and the Canada-Alberta ecoEnergy Carbon Capture and Storage Task Force. These research programs were essential to developing the technology that initiated the industry (Pratt 1976, Campanella 2012) and continue to propel development. Third, governments promote development through favourable policy making. Perhaps the most significant example of this was when the Alberta government accepted many of the recommendations of the industry-led National Task Force on Oil Sands Strategies (NTFOSS 1996, 1995) and introduced the 'generic royalty regime'. Fourth, governments promote development through direct involvement in projects. In the past the Alberta and federal governments invested in the Syncrude and OSLO mines. Syncrude, the second commercially-successful bitumen project, was, during its early years, a consortium of Imperial Oil, Cities Service, Gulf Oil, and the Canadian, Alberta, and Ontario governments. Today no Canadian governments are directly involved in any production projects, but government does invest in mitigation projects (e.g., the Alberta government is investing almost \$2 billion in carbon capture and storage over the next 15 years (Alberta 2010a)) and in infrastructure projects necessary for development such as the improvement of Highway 63 between Edmonton and Fort McMurray (see s.6.5.5). Foreign governments are directly involved in production projects, though, through state-owned companies (e.g., China and Norway).

Governments act as managers, typically through policy and regulation, such as:

- planning initiatives such as the Mineable Oil Sands Strategy and the Lower Athabasca Regional Plan;

- the prosecuting by both Alberta and federal governments of Syncrude in 2009 for 1,606 duck deaths;
- municipal policy in the Regional Municipality of Wood Buffalo where production takes place, and in Edmonton with respect to upgrader development; and
- policy activism outside of Canada such as the US Environmental Protection Agency's 2010 recommendation that environmental impact review of the Keystone XL pipeline project be expanded to include GHG emissions in Canada emitted by bitumen developers.

Particularly notable is the degree to which Alberta's quasi-judicial energy regulator, the ERCB, is involved in managing bitumen development. The ERCB plays an active role in shaping how operators design and conduct their operations, from how mines are laid out to how tailings are managed, through its many directives and other regulatory instruments.

It is particularly striking how the Alberta government in particular has been transformed by development. Numerous branches of the Alberta government are now dedicated to managing bitumen development, such as the Oil Sands Sustainable Development Secretariat at the Alberta Treasury Board, the Oil Sands Branches at Alberta Energy and Alberta Environment and Sustainable Resource Development.¹⁷ Governments are actively shaping development, but significantly, the reverse has also occurred as governments themselves are shaped by development.

Non-government actors involved in development are large in number and highly diverse. Upwards of 50 different companies are currently involved in production and upgrading alone (Dunbar 2011), and perhaps thousands in total are involved supplying the industry with equipment and services. As is common in megaproject development, in numerous cases firms have joined together into consortia to address the financing challenges and economic risks of project development (Vanderklippe 2012b), such as with the Athabasca Oil Sands Project (composed of Shell Canada, Chevron Canada, and Marathon Oil) and the Syncrude mine. Some of these consortia – such as Syncrude

¹⁷ In May of 2012 the Alberta government merged the Environment and Sustainable Resource Development ministries.

– are or were private-public partnerships.¹⁸ With such high costs and complexity more partnerships can be expected. Private actors also act as lobbyists and public relations teams, most notably the Canadian Association of Petroleum Producers (CAPP). Finally, it is also notable that a new form of consortia has developed: in 2011 six companies formed the Oil Sands Leadership Initiative to work collaboratively to address sustainability issues.

Non-industry groups are increasingly involved and increasingly influencing bitumen development. Perhaps the two most influential types are environmental and Aboriginal groups. Environmental groups are heavily involved and are Canadian (e.g., Environmental Defence), American (e.g., the Natural Resources Defense Council), but also from outside of North America (e.g., Friends of the Earth (UK))(see McCarthy 2012). Aboriginal groups are involved by way of their rights written into treaties and affirmed in the Canadian constitution. As development has proceeded Aboriginal groups have increasingly gotten involved to try to protect their rights and interests. Box 2.2 lists the many groups other than the proponents and federal and Alberta governments that participated in the hearings for the Kearl mine.

Several things are particularly noteworthy about actor involvement in bitumen development. First, the actor population, and the interrelations among actors, are complex and dynamic. Second, governments of all levels are heavily involved, demonstrating that development has captured the full range of political interests. It's likely that this is a common phenomenon with

Box 2.2. Parties involved in Kearl hearings other than industry and government.

Athabasca Chipewyan First Nation
Clearwater River Paul Cree Band No.175
Deninu Kue First Nation
Fort McKay First Nation Industrial Relations Corporation
Mikisew Cree First Nation
Northern Lights Health Region
Oil Sands Environmental Coalition¹
Regional Municipality of Wood Buffalo
Wood Buffalo First Nation and Wood Buffalo Elders Society
Wood Buffalo Métis Association

Source: Imperial Oil (2005). Note: 1. The coalition included the Pembina Institute, the Toxics Watch Society of Alberta, the Fort McMurray Environmental Association, and the Prairie Acid Rain Coalition.

¹⁸ Syncrude formerly included the Ontario, Alberta and Canadian governments. None of these governments continue to be involved, but a state-owned Chinese oil company is now involved.

megaproject development, but it hasn't been explicitly raised in the literature. An interesting facet to government involvement in bitumen development is also that governments outside of Canada, most notably in the US, have taken up active roles, as have NGOs outside of Canada. Fourth, development has shaped the Alberta government profoundly. Instead of just government shaping projects the reverse is occurring. In the case of bitumen development the structure of the Alberta government has been rearranged dramatically, and policy at both provincial and federal levels has been influenced greatly. This is a topic that has received minimal treatment in the megaproject literature, but is not a unique feature of bitumen development. The degree to which bitumen development has shaped government is comparable with the degree to which other programs of development have shaped government, such as logging and fishing in Canada. This latter observation is relevant to understanding the nature of bitumen development (s.2.5 below).

2.4.6. Complexity

From the perspectives of engineering and project management, bitumen projects are exceptionally complex. These projects are engineering marvels as attested to in the huge amounts of ore that they process and the huge regulatory applications submitted by proponents. Projects require years of planning, large teams of highly experienced staff, exceptional coordination, and massive capital investments. The sheer number of projects involved in bitumen development as a whole magnifies this complexity even more.

The complexity of bitumen development is compounded further by the interdependence of each component. Bitumen development requires harmony between production facilities and all of the downstream components of petroleum processing including distribution infrastructure, but also with input suppliers (e.g., labour, natural gas) and community and public infrastructure. All of these components respond to a wide variety of factors such as market dynamics (e.g., the light oil-bitumen price differential), evolving business plans (e.g., pipeline companies' expansion plans with respect to bitumen and synthetic crude oil supply and demand), transportation constraints (e.g., pipeline shutdowns due to accidents; see Vanderklippe (2010b, a)), and regulatory trends and expectations (e.g., US climate policy).

As s.2.4.2 suggests, bitumen development also poses complex impact patterns. Impacts are complex due to their wide range of types, their geographical distribution, their timelines, and the uncertainties associated with them. Some environmental impacts are fairly well understood, such as regional NO_x pollution, but others such as the effects of development on the Fort McMurray region's groundwater, are not. Community impacts are restricted to communities, but the structural changes to the Canadian economy that may be caused by Dutch disease are longer-term and wider-reaching. Understanding the nature of the impacts is made more complex when one considers their potential for cumulative effects. Impact complexity is also a function of the differential distribution of impacts – not just across space and time but across social groups that are differentiated economically, in terms of their political power, past injuries from prior impact exposure, sensitivity to impacts, and the degree to which they benefit from development.

In response in part to the above, bitumen development is subject to a very complex regulatory environment. The majority of the regulation exists to guide how individual projects are developed, but some of it relates to the broader program of development underway and the cumulative environmental, community and other effects that bitumen development as a whole is causing. Many government bodies are involved, numerous pieces of legislation and accompanying regulations exist, and there is a wide range of policy guiding planning and development. Carter (2007) claims that the Alberta oil and gas industry is guided by over 750 government documents. Many bitumen projects trigger legislation in Alberta but also at the federal level, and some, such as the Keystone XL pipeline, trigger regulatory frameworks of other countries. The complexity of the regulatory environment is compounded by its continual change, particularly in Alberta given how regularly Alberta's chief energy regulatory body, the ERCB, reworks its list of directives and other requirements.

The level of complexity of bitumen development is arguably greater than that of a typical megaproject. It is hard to imagine a single megaproject such as Alaska's Red Dog Zinc Mine or even the Channel Tunnel exhibiting such complexity. It is possible, though, to see the NASA Space Program, labelled a megaproject in the literature, possessing a similar scale of complexity, a point that I take up below in this chapter.

2.5. Bitumen Development as Megaprogram

2.5.1. *Gigaprojects and Programs of Development*

The above review demonstrates that bitumen development is composed of many megaprojects and many more projects of a lesser scale that together exhibit the features of megaprojects to a greater degree than that of typical, singular megaprojects. Given such, a new term other than megaproject may be more appropriate for describing bitumen development.

The most intriguing label for bitumen development is Cizek's (2006) term gigaproject. Most literally the term signifies a scale three orders of magnitude greater than a megaproject. Bitumen development has not reached the trillion dollar capital cost threshold, and it is debateable if any of bitumen development's other characteristics are three orders of magnitude larger than a megaproject, but regardless, the term suggests that the only difference is quantitative.

Another possible term for bitumen development is megaprogram, and this term introduces the notion that there are also qualitative differences at hand. A program is a series of related projects carried out over time, often in the same place, and is ongoing and/or repetitive in nature (Morris and Hough 1987, Samset 2003, Wood and Djeddour 1992), whereas a project is a series of activities and/or tasks that fit together and are bound by a common objective and defined start and end dates (e.g., Kerzner 1998, Morris and Hough 1987, Sang 1995). Bitumen development is a series of similar and often interlinked and interdependent projects, and these projects – on their own but also in combination – exhibit 'mega' characteristics to a significant degree.

This distinction between projects and programs is not made in the megaproject literature. The megaproject literature calls everything from the Red Dog Zinc Mine in Alaska and the South African Gautrain to the NASA Space Program and the internet a megaproject, but it makes much more sense to call the former two megaprojects, and the latter two are clearly ongoing, evolving programs of development like bitumen development. Megaprojects are individual projects of great significance, but megaprograms are series of projects that combined are of even greater significance to

the geographies they affect. It is easy to see many programs of industrial and resource development as megaprograms, such as forestry in BC, the fishing industry in the east coast of Canada, and even the automobile industry in Michigan and Ontario. Theorists so far have confused matters by not distinguishing between megaprojects and megaprograms, and this may have forestalled the theory and practice of project review and other fields. There may even be a wide range of scale in megaprograms just as there is a wide range of scale in megaprojects – the internet is undoubtedly of a scale of impact and significance beyond that of bitumen development – and there may be other qualitative differences that set programs apart from projects.

Regardless, two distinctions are now evident in development: one is between the mega scale of development and the lesser, conventional scale, and the other is between projects and programs. These distinctions are not binary but continuous. Figure 2.6 shows these continua with examples from oil and gas development. As the ‘mega’ label can be thought most fundamentally as significance of development to, and on, society, but as megaprograms can do this to a greater extent than megaprojects, Figure 2.6 is warped accordingly. A single oil well can be considered a conventional project. Bitumen projects such as the 345,000 bpd Kearl mine fit well with the definition of megaproject, though this type of project is shifting towards conventionality in north-eastern Alberta given how many massive bitumen projects have been constructed in recent years. The Mackenzie Gas Project is a \$7 billion pipeline proposal planned for the Northwest Territories and is perhaps a ‘textbook’ megaproject in that part of Canada. The Beaufort Sea Hydrocarbon Production and Transportation Proposal (Beaufort Sea HPTP) put forward in the early 1980s but never developed (see Bell et al. 2002) exemplifies something in the middle of a project and a program – a somewhat defined but also somewhat open-ended multi-component development of mega-scale:

the multi-component Beaufort Sea Hydrocarbon Production and Transportation Proposal was of an order of magnitude greater than other northern energy and transportation development that had undergone EA panel reviews. Indeed, it may be envisaged as a regional development scenario that linked together all of the types of projects previously examined under the process...more than a concept, less than a specific project, the regional development scenario for hydrocarbon production and transportation occupied an uncertain and fluctuating middle ground substantially different from that occupied by previous panels (Sadler 1990 26-29).

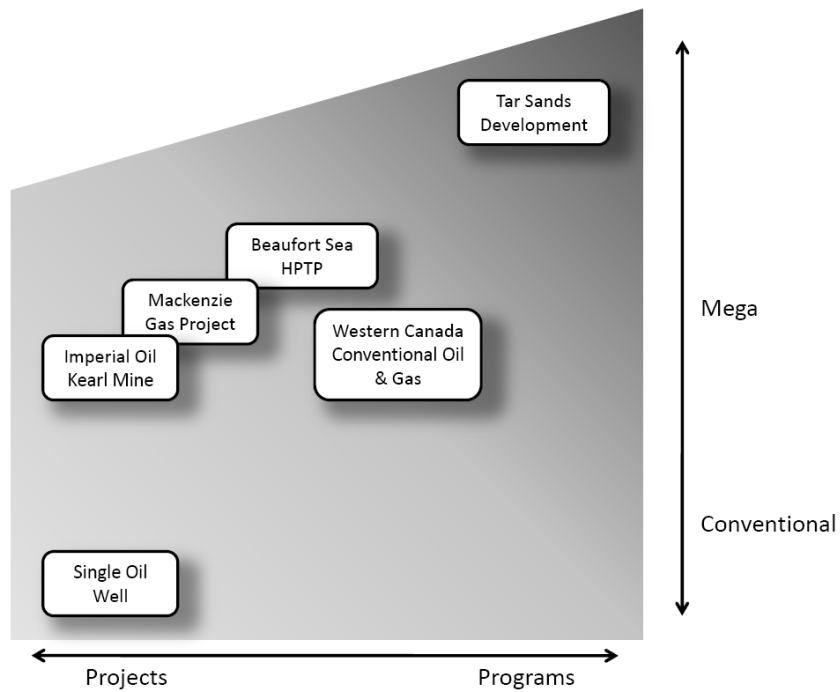


Figure 2.6. Spectra of Development

2.6. Challenges to Project Review

The characteristics of megaprojects translate into several challenges for project review (Box 2.4), and as discussed further below in s.2.6.9, these challenges are accentuated when megaprojects exist within a megaprogram. These special challenges need to be addressed beyond simply necessitating that project review be matched with the scale and scope of megaprojects and megaprograms, and as discussed in s.2.7 below, these challenges are not necessarily unique to megaproject and/or megaprogram development, but they are particularly relevant in these development contexts.

Box 2.4. Key Challenges of Megaprojects

1. Highly controversial
2. Political interference
3. Highly dynamic
4. Breadth of issues
5. Understanding the big picture
6. Cognitive Bias
7. Strategic manipulation
8. High risk

2.6.1. *Highly Controversial*

Megaprojects tend to be polarizing and generate intense political activity, and this means that megaproject review must have means to cope with high levels of controversy (Warrack 1993, Flyvbjerg 2007, Flyvbjerg, Bruzelius, and Rothengatter 2003, Stough and Haynes 1997, Blair and Carr 1981, Capka 2004, Szyliowicz and Goetz 1995, Hall 1980, Morris and Hough 1987). Megaprojects tend to engage and enrage existing NGOs such as environmental and social justice groups, but they also often spur the creation of new groups formed specifically to fight, promote or shape development. Public funding of megaprojects, for example, often raises issues of appropriate uses of taxpayer monies. Controversy can be traced to most if not all of the defining characteristics of megaprojects and often extends across a wide range of public policy topics (Doern and Toner', 1985 in Knight 1990).

The level of conflict surrounding megaprojects is compounded when governments leave stakeholders out of megaproject planning and decision-making (Gellert and Lynch 2003, Bruzelius, Flyvbjerg, and Rothengatter 2002). When stakeholders are left out they can become powerful obstacles to government decision-making processes and any implementation of decisions that stem from them. Environmental groups have been very successful at influencing public policy in the past in Canada, and this pattern is being borne out in bitumen development with, for example, the current battle on the fate of the TransCanada Keystone XL pipeline proposal.

Any sound project review process must therefore have means to manage controversy and overcome polarization of ideas and people. Politics are a fact of life, but a sound review process can take advantage of the wide range of ideas that exist across groups and can address inequities, promote democracy, and involve stakeholders in the process such that conflict is reduced and the broader public interest is served.

2.6.2. *Political Interference*

A second challenge is political interference. Politicians and bureaucrats may be tempted to meddle in reviews to pursue their own agendas or the agendas of interest groups. As numerous studies have shown, politicians and bureaucrats are often preoccupied with power, prestige, and maintaining and growing their influence. Elected

officials stand to gain in terms of campaign and legislative support if they make policy that benefits interest groups (Haveman 1976). Policy can be crafted in ways that helps particular groups and spreads costs across the wider population such that little opposition is generated, a phenomenon known as ‘concentrating benefits and diffusing costs’ (Boardman et al. 2006, Hall 1980, Weimer and Vining 1999). Bureaucrats can also be tempted to promote projects if they think it will lead to an expanded role for their agency. For example, government planners conducting impact forecasts can take advantage of uncertainty to steer analyses one way or the other to promote certain interests (Ascher 1993).

Megaprojects are particularly attractive in this regard as the political payoffs can be large if projects are successful (Knight 1990), and in Canada, resource megaprojects are particularly valuable from this perspective. Natural resources have always been at the centre of the Canadian economy and as employment and other economic benefits are among the most important policy objectives of politicians, resource megaprojects promising to employ large numbers are particularly attractive to politicians and bureaucrats (Hessing, Howlett, and Summerville 2005, Hayter and Barnes 2001, Boyd 2003).

This close relationship among government, resource development, and the incentives of politicians and bureaucrats translate into the potential for ‘capture’ by development interests. In Alberta, it is the fossil fuel industry that is more likely than any to have captured government. The economy in Alberta revolves around fossil fuels (Table 2.3), and this dominant role of fossil fuel development in the Albertan economy is likely to translate into strong influence on provincial politics (Hessing, Howlett, and Summerville 2005) and thus is likely to strongly influence how project review is carried out. Accordingly, Albertan politicians and bureaucrats may have a positive bias towards bitumen development – not a cognitive bias but an ‘interest bias’ towards bitumen development in decision-making.

Table 2.3. Top Ten Sources of Revenue for Alberta Government, 2010

Revenue Source	Amount (million \$ CDN)
Personal income tax	7,877
Corporate income tax	4,754
Bitumen royalties	3,160
Health transfers from Government of Canada	2,329
Crude oil royalties	1,848
Education property tax	1,717
Natural gas and by-products royalties	1,525
Lottery operations	1,405
Other transfers from Government of Canada	1,210
Bonuses and sales of Crown leases	1,165

Source: Alberta (2011d).

Due to the receptivity of government to oil development, development interests – both domestic and international – are likely to have large sway in government. Project review policy, such as environmental assessment legislation, may be disproportionately shaped by these interests and may not reflect other valid interests and concerns like ecological sustainability or community resilience. Project review policy may in turn place greater weight on economic factors in decision-making relative to non-economic factors, especially if decision criteria are ambiguous. As well, precedents set in project review decision-making, such as the conditions for project approval, may more often reflect industry interests than other interests.

The project review process should therefore contain mechanisms to prevent political interference that promotes types of development that don't serve the broader public interest and thwarts proposals that might be in the broader public interest, but also to prevent interest groups from taking advantage of the predispositions of politicians and bureaucrats. To be clear, resource development is not the problem; the problem is development in ways that does not fit with the broader public interest.

2.6.3. *Highly Dynamic*

A third challenge is the highly dynamic nature of megaproject development. Project review is designed around the rational model of decision-making, from problem identification through to implementation. However, because of the tendency for megaprojects to be associated with novel technology, controversy, high levels of uncertainty, and complexity, the process of developing and reviewing megaproject proposals is often messy and constantly changing (Lawrence 2003, Gibson et al. 2005). Szyliowicz's (1995) recounting of the development of the Denver International Airport exemplifies the dynamicism of megaproject reviews. While the US Federal Aviation Administration specified an airport planning process based upon the rational model, changes in political leadership, new information, the rise of opposition groups, changes in the structure of the airline industry, and the demands of airline companies all made for a much less orderly process. To address such dynamics, the decision-making process for megaprojects should be flexible and adaptable (Szyliowicz and Goetz 1995).

2.6.4. *Breadth of Issues*

A fourth challenge in megaproject review is dealing with the breadth of impacts, risks, and parties involved. The project review for the Shell Scotford Upgrader expansion, for example, identified issues with the project's air pollution, noise and light impacts, visibility, impacts on water and aquatic resources, terrain and soil impacts, impacts on vegetation and wildlife, human health issues, odours, land use, historical resources, and socio-economics (Shell Canada 2005). This review, like most bitumen megaproject reviews, involved a wide range of provincial, federal, and municipal government actors, numerous community groups and concerned citizens, as well as other bitumen proponents. The scope of impact assessment in megaproject reviews is thus often very wide, and the many actors involved are forced to grapple with all of these issues. Further, as many megaprojects have the potential to affect wide geographies over long timeframes, stakeholders across many jurisdictions may be interested in participating. The challenge in project review is thus ensuring that review is effective and efficient despite the breadth of issues that inevitably arise.

2.6.5. Understanding the Big Picture

Related to the wide breadth of issues with megaprojects is the challenge of being able to understand the big picture. If the goal of project review is to gather information, process it, and provide final decision-makers with a tractable summary of advantages and disadvantages of a project, then megaprojects pose a big challenge. Megaproject impact information must be distilled into something meaningful and tractable, but in doing so the key components, inter-relationships, uncertainties, and assumptions associated with all of this information must be treated with care such that a project's potential impacts are not lost upon decision-makers and stakeholders (Ascher 1993). Those involved in project review must therefore find means to develop an overall understanding of the proposed project and not contribute to bogging review down in less important details.

2.6.6. Cognitive Bias

A sixth challenge to megaproject review is that humans tend to be subject to a variety of cognitive biases that affect their thinking (Kahneman, Slovic, and Tversky 1982, Tversky and Kahneman 1974, Kahneman 2011). In megaproject decision-making, a key concern is optimism bias and its variants.

Optimism bias entails overestimating benefits and underestimating costs. This bias is common in impact assessment and forecasting, especially with megaprojects (Lovallo and Kahneman 2003, Knight 1990, Ascher 1993, Gunton 2003a), and it affects not just laypeople, but experts as well. Gunton (2003a), in his review of the economic failure of BC's Northeast Coal Project, identifies a "group-think growth" mentality among planners, leaders, and decision-makers, both in government and in proponents. Gunton attributes this bias to these parties getting overly-wrapped up in the economic possibilities associated with resource booms, the commitment associated with large capital investments, and the paucity of economic development opportunities in hinterland regions. In his extensive review of international megaproject development, Flyvbjerg (2007) finds that optimism bias leads to a 'planning fallacy' pattern in which

planners and project promoters make decisions based on delusional optimism rather than on a rational weighting of gains, losses, and

probabilities. They overestimate benefits and underestimate costs. They involuntarily spin scenarios of success and overlook the potential for mistakes and miscalculations (18-19).

A variation of this optimism bias might be called 'presumption of net benefit' bias. Perhaps extending from the rosy outlook that people tend to have of megaprojects is often a presumption that the project is on the whole beneficial with the consequence being the feeling that it is not necessary to carefully review project proposals. Cocklin and Kelly (1992), for example, observe that the New Zealand government pursued large-scale energy projects in the 1980s without fully examining their advantages and disadvantages because they were assumed to be in the 'national interest' given the oil price shocks at the time, the perception of energy vulnerability, and concern over economic conditions. The assumption was, according to Cocklin and Kelly, that comprehensive impact assessment was unnecessary because any problems and costs that might occur would be outweighed by the benefits. In the end, the negative impacts of the projects were found to be relatively minor, but the point remains that the sense of knowing the correct course of action can lead to the skipping of rational process, and sometimes this skipping of process will be to the detriment of society. A related idea is that decision-makers exhibit a 'selectivity bias' and pay little attention to particular types of impacts, such as environmental impacts, as they view them to be unimportant (Ascher 1993).

Explanations for these cognitive biases may be linked to the scale, symbolism, societal significance, and novelty of megaprojects. Hall (1980) recounts how the Sydney Opera House was driven by desires to be "adventurous" and to do something exciting, and Steinberg (1987) suggests that Israeli nuclear power, irrigation, and military aircraft megaprojects were driven by pride, nationalism, and a desire to reinforce Israelis' self-image. Steinberg (1987) writes that proponents have "faith in the ability of the individual and the society to overcome seemingly insurmountable obstacles and to 'change the cosmic order'" (344). Flyvbjerg et al. (2003) suggest that megaprojects "excite the world's imagination" and thus problems identified during the course of their development are commonly dismissed (4). Emotion is often a significant driver of megaprojects, but it can lead to a sidestepping of rational checks and balances.

The human tendency to use decision heuristics, or rules of thumb, can also interfere with project review (Kahneman, Slovic, and Tversky 1982, Tversky and Kahneman 1974, Kahneman 2011). Heuristics that might interfere with rational decision-making in project review include 'conventional wisdom' bias, status quo bias, anchor bias (overly weighting certain types of information), and domain bias (making choices that fit with what is fashionable or conventional in a particular field or discipline). Several authors have explored this latter bias in the context of government decision-making.

Domain bias can come from being part of an organizational culture. Allison (1971) notes how organizations tend to respond to challenging situations in ways consistent with the organizations' past experiences, capabilities, perspective, and repertoire of responses. Governments tend to make decisions by breaking problems down into parts along pre-established organizational lines, and each organization and its employees then tackle their parts of the problem in their own particular way. Government environment agencies will see things differently than those agencies responsible for resource development. Borins and Good (1987 in Boardman et al. 2006) similarly argue that government agencies and individuals within them behave according to their roles: "guardians" are focused on costs and budgets and as such they tend to be skeptical of big and risky endeavours, whereas "spenders" tend to be more positive towards projects as they are focused on promoting their policy foci and sectoral interests.

To ensure sound project review there should thus be mechanisms in place to prevent cognitive bias from being injected into reviews by organizations and the individuals within them. Mechanisms should be in place to require the rationales for projects are examined, that any assumptions that proponents may have are critically inspected, and that the advantages and disadvantages of projects are fully and carefully assessed. A sound review process should have mechanisms in place to ground decision-makers in complete information and reduce the emotional spell that symbolism, societal goals, technology, and scale can have on decision-making. If bias is not countered, then problems and issues arising in project reviews may be defined in lopsided ways, the types of responses that are considered may be less than complete, criteria for decision-making may be inappropriate, options may be evaluated in skewed

fashions, and information generated in support of project review decision-making may be incomplete.

2.6.7. Strategic Manipulation of Data

A seventh challenge is strategic misrepresentation of project benefits and costs – or lying, in the words of Flyvbjerg and colleagues (Flyvbjerg 2007, 2008, Flyvbjerg, Bruzelius, and Rothengatter 2003, Bruzelius, Flyvbjerg, and Rothengatter 2002, van der Westhuizen 2007, Knight 1990). Proponents and their contractors may overstate revenue and income earnings of projects in order to get megaprojects approved because the penalties for doing so tend to be small relative to the profits that may be earned. Consultants may overstate net benefits because they stand to gain repeat business if they are able to help get projects approved. Local politicians may overstate net benefits of projects because they must compete for scarce funds allocated for special development, such as infrastructure funding from senior governments, and because negative impacts of projects tend to emerge well after they are out of office. Interest groups may promote false information as they have little costs and risks for doing so. The overall result, the international data suggest, is that suboptimal projects are approved – “survival of the unfittest” – resulting in economic inefficiency through a misallocation of resources, and reinforcement of a lack of trust in analysts, government, and developers (Flyvbjerg, Bruzelius, and Rothengatter 2003). While it is often argued that decisions are made less on the findings of impact assessment and more on politics (e.g., Osland and Strand 2010), political decisions are fundamentally based upon perceptions and so it remains important to ensure that megaproject review is grounded in sound information, not misinformation. As such, the project review process needs to be designed in such a way to counter manipulation.

2.6.8. High Risk

A final, and perhaps the most important, challenge in megaproject review is high risk stemming from many of the fundamental characteristics of megaprojects as well as many of the other challenges identified above. Megaprojects pose the risk of unanticipated impacts, and even complete failure: despite growing experience around the world with megaproject development, many perform poorly economically,

environmentally, and in terms of public support (Flyvbjerg, Bruzelius, and Rothengatter 2003, Morris and Hough 1987, Samset 2003, Lovallo and Kahneman 2003).

The risk of megaproject failure is a function of numerous factors but can be broken down into two elements: poor information on key development parameters, and the scale of megaprojects' costs, impacts, geographic breadths, timelines, and numbers of involved parties. In other words, it is hard to predict megaproject success, and if they fail there may be extremely serious ramifications. To illustrate, consider when the performance of megaprojects is uncertain: a megaproject's huge fixed costs (on the order of tens of billions in the case of bitumen projects) combined with uncertain operational performance translates into high risk for investors, be they private or public, and because ultimately a project's financial performance affects not just investors but governments, employees, customers, and nearby citizens, risk exposure is wide. As another example, consider if the science underlying projects is uncertain, such as understanding how SAGD might affect groundwater. In such a case a megaproject's physical scale can translate into wide environmental risk. The novelty of megaprojects, including their tendency to employ new technologies, is a key source of uncertainty (Flyvbjerg 2009, Morris and Hough 1987, Collingridge 1992, Merrow, Phillips, and Myers 1981). New technologies are often poorly understood in terms of their final costs and operational performance, and by extension environmental impacts of new technologies are often poorly known. The long timeframes of megaprojects is another risk factor: long lengths of time pass between when a project is designed and when it is built, and megaprojects are typically designed to operate for many decades. Over such timeframes many factors can change dramatically such as the prices of inputs and outputs, and trade and environmental policy (Flyvbjerg 2007, Bruzelius, Flyvbjerg, and Rothengatter 2002, Steinberg 1987, de Bruijn and Leijten 2008a, Capka 2004, Knight 1990, Flyvbjerg 2009). The policy environment is also highly uncertain. In the past, bitumen development was strongly influenced by the regulatory environment, fiscal terms, trade policy, and the influence of key stakeholders (Chastko 2004, Wirick 1982). Historically, these factors were generally favourable to development, but today the situation is different: domestic and international climate policy, royalty and tax policy, and the policy of Canada's trading partners are not guaranteed to be supportive.

All of the above risk factors are further complicated by the challenges of understanding the big picture of megaproject impacts, cognitive biases, incentives for political interference and strategic manipulation of data as described above. These challenges heighten the risk of megaprojects because they weaken the information base upon which megaproject decision-making is made. These other challenges increase the likelihood that the information that decision-making rests upon is faulty.

Clearly, megaproject review processes must have mechanisms in place to enhance the quality of information that review gathers. If the scale of megaprojects is to remain as they are, then the review process must have high quality of information to rest decision-making upon.

2.6.9. *The Effect of Megaprograms*

When new projects are proposed as part of a megaprogram – as is the case in bitumen development – the challenges to project review associated with megaprojects are heightened. For example, megaprojects tend to be highly controversial, but when they are part of a program of development, controversy can be expected to be elevated given the megaprogram's greater scale, greater symbolism, and greater relationship to societal objectives. Similarly, in a megaprogram the breadth of impacts is broader than megaprojects, and as such there are more stakeholders.

The breadth of impacts will also likely be greater in the megaprogram context because of the greater number of projects, and the increased likelihood for cumulative effects. Cumulative effects are effects that stem from the additive, synergistic, or other types of interactions between the effects of projects and other actions and stresses (Hegmann et al. 1999). Cumulative effects are often thought of in terms of biophysical effects, but they are also associated with economic, social, and other types of effects. Cumulative effects are more likely in the megaprogram context because of the similarity of effects across a megaprogram's constituent projects, and thus the increased likelihood for interactions between the effects. As such, the challenge of addressing impacts is greater in the megaprogram context.

However, while most megaproject challenges are likely enhanced when there is a megaprogram under development, it's not clear that the risk of project failure in particular would be heightened. Megaprojects' risks of failure may be higher in megaprograms because risk factors may be heightened by the megaprogram. For example the tendency for cognitive bias, such as the 'group-think growth' irrationality identified by Gunton (2003a), might be greater in bitumen development given all of the momentum in the megaprogram, the larger population of actors, the already large role that bitumen development plays in the Albertan and Canadian economies, the greater financial and political costs, and the greater symbolism and societal significance of development. Risk of project failure in bitumen development may also be heightened by the megaprograms' greater breadth of impacts, greater complexity and the wider range of uncertainty. However, some risk factors like technological and scientific uncertainty might be reduced given the wider and larger population of actors concerned about the same information gaps and the learning that can occur amongst them, the 'learning by doing' that happens over time due to iteration and the long lifespan of the megaprogram, and the greater economies of scale that exist to help address these gaps. Risk may also be lower because the effects of the failure of a single project may be unimportant in the scheme of the whole megaprogram. By virtue of the many different projects that compose the megaprogram government, risk is pooled among a large number of stakeholders such that failure of any individual project has less and less of an impact on each individual stakeholder as the megaprogram grows (Pearce and Nash 1981).

To address the enhanced pressures that come with megaprograms, even if there are lowered risks, those conducting project reviews should prepare for the possibility of heightened megaproject challenges. Thus while megaprojects demand the 'best of project review', if megaprojects are part of a megaprogram then there is no room for any shortcomings in review.

There may also be a benefit to project review by explicitly recognizing that a megaprogram is underway. In acknowledging the existence of a megaprogram and contemplating its future evolution, those assessing the cumulative effects of individual projects may have an easier job. Megaprograms may be evolving, and the direction of this evolution may not be clear, but recognition of the megaprogram may possibly help to reduce uncertainty by providing some bounds on, or articulation of, the likely future.

Similarly, decision-makers concerned about the ramifications of their decisions in terms of shaping future development or setting precedents should be aided by the better conception of the future provided by recognizing the general direction of development underway.

2.7. Do Megaprojects and Megaprograms Demand Unique Forms of Project Review?

In this chapter I identify challenges to project review associated with megaprojects and with megaprograms, and I argue that megaprojects require project review processes that contain mechanisms to address a range of serious challenges, and that megaprograms heighten these demands even more. Do conventional projects, i.e., those of smaller scales and of lesser societal significance than megaprojects, and projects that are being developed in the absence of an overarching megaprogram pose these same challenges to project review? Conventional projects may pose some of the challenges of megaprojects to those conducting project review, and thus reviews of some conventional projects may demand some of the mechanisms necessary in megaproject review to protect the public interest, but overall they by definition would not demand such mechanisms or at least not to the same extent as megaprojects.

2.8. Staple Theory and Megaproject Review

Staple theory, a body of ideas developed in Canada that integrates resource development with economy to explain patterns of development in hinterland regions and the institutional structures that tend to emerge (Gunton 2003b), is an important foundation to the preceding discussion of the nature of megaprojects and the challenges they pose to megaproject review. The following description of staple theory is based upon Gunton (2003b), Knight (1990), and Markey et al. (2005).

Staple theory concerns the political economy that develops in regions focused on the exploitation and export of staples – natural resources that require little or no processing prior to export. Development is fostered by the influx of capital to a region and the 'spread effects' of that capital through forward, backward, final demand, and

fiscal linkages amongst the regional economy. The 'comparative advantage' school of thinking, most closely associated with Mackintosh (1964), emphasizes the benefits of development stemming from the resource endowment. According to the comparative advantage school, natural resource endowments can be used to attract large sums of foreign capital which are then used to develop the resource. Rapid economic growth ensues in the region. Without this development and the foreign investment that it involves, regions only have domestic savings and inventions to propel growth.

The 'dependency' school of thought, most closely associated with Innis (1956 (1930)), is more focused the potential for negative effects of staple development. According to this school, growth based upon staple production distorts the economy as the exporting region demands the hinterland to overspecialize, leading the region to become highly vulnerable to the dynamics of the global commodity market, and ultimately, limited sustained growth. The dependency school identifies a 'staples trap' with the following pattern: staples require large amounts of investment, which typically is provided by large foreign-owned firms that have a bias for creating linkages outside the staple region, which results in a truncated local economy and thus leakage of many of the economic benefits. Alongside, the region's class structure is distorted in that the local entrepreneurial class fails to grow and instead what emerges is a class that services the foreign-owned industries, and an associated lack of capacity to diversify the region's economy. These problems in turn are compounded by the dynamics of the global market for the staple: volatile prices, and associated instability in the region's economy. Booms leads to overspecialization, and busts put governments in weak bargaining positions and result in political pressure to provide unsustainable financial support. Finally, in the long run, the staple is gradually exhausted, leading to collapse and associated economic, social, and potentially environmental consequences.

Mackintosh (1964) wasn't blind to the challenges of staples, but wasn't so pessimistic either, a theme in the staple theory literature that remains today. Watkins (1963), most prominently, synthesized the two schools of thought, arguing that staple endowments can be important drivers of economic development, provided that the vulnerabilities of the growth model are guarded against. Richards and Pratt (1979) and Gunton (2003b) continued this line of thinking. Parallel and alternative conceptions of the advantages and disadvantages of natural resource-led development are found in the

resource curse, Dutch disease, and related literatures (e.g., Auty 1993, Anonymous 1977, Corden 1981, Stevens and Dietsche 2008, Ross 1999, Clapp 1998).

All of this is relevant to megaproject review because it provides further understanding of the nature of megaprojects and the challenges that they can pose in megaproject review. The staple theory and related literature helps underscore the potential for massive and widespread impacts of megaprojects, the high levels of significance to society that megaprojects can have, and the patterns of public and private involvement that can occur. Further, and most importantly, the staples theory and related literature helps explain the highly controversial nature of megaprojects, the potential for political interference in review decision-making, the potential for cognitive bias and strategic manipulation of data, and the potential for high levels of risk. Mackintosh (1964), for example, observed a propensity among governments and proponents to develop unrealistically ambitious expectations for the staple industry, and to thus over-invest. Gunton (2003a) similarly identified the potential for optimism bias in project decision-making. The staple theory and related literature are used next in Chapter 3 alongside a variety of other literature and survey results to help characterize good practices in megaproject review.

2.9. Summary

This chapter outlines key challenges to project review that likely exist in bitumen development. As others have, I have concluded that bitumen development represents a scale of development that is larger than that of megaproject. I label this bigger scale of development a megaprogram. More important to project review, megaprojects and megaprograms pose challenges to those conducting reviews of individual projects: megaprojects pose challenges, and megaprograms heighten them. These challenges must be addressed by any project review process that is intended to promote sound development and protect the public interest. In Chapter 3 I use this characterization of challenges to help develop a characterization of an ideal bitumen project review process.

3. Good Practice in Bitumen Megaproject Review

3.1. Introduction

Chapter 2 outlined the challenges posed by megaprojects and megaprograms to project review generally, and in this chapter I build from this by characterizing an ideal project review process for the bitumen development context, which is a particular 'megaproject within a megaprogram' context. Note that the focus of this chapter is on articulating 'good practices' for the review of individual bitumen megaprojects. The intent is to guide the conduct of project review such that it is most capable of promoting sound development and protecting the public interest in bitumen development. I define good practice as an action that is likely to help the process achieve a successful outcome.

In s.2.7 in Chapter 2 I concluded that the review process for megaprojects, and especially those occurring within megaprograms, must be very good. This need for very high quality review is the context, and rationale, for this chapter. While good practices in project review have been explored at length by many authors, there are several ways in which the existing literature can be built upon to improve our understanding of good practices of project review in the megaproject within a megaprogram context.

The EA literature is a critical foundation for guiding megaproject review; in many jurisdictions the project review process is the EA process. Many authors have contributed to characterizing good practices in EA, based upon what is done around the world in current and past EA systems, and have used these characterizations to evaluate EA in different jurisdictions (e.g., Smith 1993, Wood 1995, Barker and Wood 1999, Wood and Coppell 1999, Ahmad and Wood 2002, Zeremariam and Quinn 2007, Badr 2009, Doyle and Sadler 1996, Leu, Williams, and Bark 1996a, Ahammed and Harvey 2004, Leu, Williams, and Bark 1996b, Senecal et al. 1999, Gibson and Walker 2001, ICPGSIA 2003, Vanclay 2003, Lawrence 2003, Gibson et al. 2005, Jones et al.

2005, Land-Murphy 2004). As well, the emerging strategic environmental assessment (SEA) literature is useful in terms of guiding how project review relates to broader megaprogram issues. The key limitation of this EA literature with respect to this thesis is that this literature is not focused on the particular characteristics and challenges of megaprojects or megaprograms.

The 'megaproject' literature is obviously focused on the megaproject context, and as such this literature provides much valuable guidance (e.g., Collingridge 1992, Hall 1980, Altshuler and Luberoff 2003, Steinberg 1987, Storey and Hamilton 2003, Szyliowicz and Goetz 1995, Morris and Hough 1987, Flyvbjerg, Bruzelius, and Rothengatter 2003). However, by and large this literature has been in the form of case studies of particular projects or types of projects (e.g., transportation) and particular issues (e.g., new technology) and as such the many lessons learned have not yet been synthesized into coherent guidance (with the exception of some work on the topic by Warrack (1993), Gunton et al. (2004), Van Hinte et al. (2007) and Wozniak (2007)). There has also been little synthesis of the megaproject and EA literatures.

The guidance presented here in this chapter builds upon the guidance presented in the above two bodies of literature by synthesizing them, but also by focusing discussion on the megaproject within a megaprogram context. To be effective, a project review process should be adapted to the unique circumstances and characteristics of the review context (Gibson 1993, Senecal et al. 1999, Lawrence 2003, Andre et al. 2006, Wood 1995, Morrison-Saunders, Baker, and Arts 2003, Gibson et al. 2005, Land-Murphy 2004). Good practices tend to be constructed from a range of experiences and a range of contexts and so to be effective in a given context they need to be adapted to that context (Bardach 2004, Vesely 2011). The context here in this thesis is most chiefly the need for a very, very high quality review process, though there are other contextual factors of the bitumen megaprogram that demand attention, such as the Aboriginal context in Canada. It is through a survey of experts with experience in bitumen development and review of literature written with this context in mind that I develop project review good practices here.

The rest of this chapter proceeds as follows. In the next section I review the methods that I used to develop the list of good practices. Next I present 22 sets of good

practices, grouped by theme. For each set I describe practices with reference to both the literature and the expert survey, and I explain the rationales for each, including how each is expected to address the special challenges of megaprojects. In doing so, I help address a key shortcoming in much of the 'best practice' research: the lack of linkage between practices and what they are intended to achieve (Vesely 2011). Also, note that I use the term 'good practices' instead of 'best practices' because there has, by and large, been little rigorous study to show that practices actually contribute to achieving desired outcomes – a second shortcoming of the 'best practice' research (Bardach 2004, Vesely 2011). In ss. 3.4 and 3.5 I discuss this limitation further and how the research in this thesis overcomes this limitation in part, and there as well I discuss other limitations with the research in this thesis, how future researchers could improve the theory of best practices in project review, and the contributions of this research.

3.2. Methods

I developed good practices in four steps. First, I reviewed the EA and megaproject literatures and assembled a preliminary list of good practices by linking together common themes. Next I assessed this preliminary list in relation to the challenges identified in Chapter 2. In cases where I determined that there were gaps in the literature and/or existing good practices did not address the challenges I attempted to refine the practices. For example, inspired by the case of the Oldman River dam in Alberta in which the courts concluded, after construction had already begun, that federal EA was required, and that the ensuing federal EA concluded that the dam should not have been built, I have proposed time buffers after decision-making to allow appeals to be considered before development may begin (s.3.3.2.4).

The third step in my research entailed surveying people with expert knowledge of bitumen project review to test ideas that lacked strong consensus in the literature (and with respect to the material presented in Chapter 5, to gather data with respect to the quality of the bitumen review process). I developed a questionnaire with four different sections of questions about the respondents (such as the source of their experience), good practices in project review, the quality of the current federal and Alberta review processes, and outcomes of the current process. The questionnaire was long and had a

total of 162 questions. The survey was conducted on-line. Several protections were put in place to make the survey confidential. One hundred and seventeen experts participated in the survey, and 75 fully completed the questionnaire. Participants ranged from across the federal, Alberta, and Regional Municipality of Wood Buffalo governments as well as from industry, Aboriginal groups, environmental groups, consultancies, and also included citizens that participated independently. However, only one staff member from the ERCB and none from the Canadian Environmental Assessment Agency (CEA Agency) participated due to concerns of senior members of both the board and agency with the survey and the ramifications of their organization's participation. Participants had an average of 10.3 years of experience with the bitumen and similar project review processes. I provide detailed information on survey methods and participation rates in Appendix A, and the survey is presented in Appendix B. In the fourth step I integrated the survey results with my preliminary list of good practices to further refine the practices and to arrive at a final list of good practices.

3.3. Good Practice in Bitumen Megaproject Review

Decades of experience with EA processes provides consistent guidance on the ideal steps in project review (e.g., Doyle and Sadler 1996, Sadar 1996, Wood 2003). A sound process is thought to proceed through six steps:

1. initial review of proposal,
2. scoping and development of terms of reference for application,
3. preparation of application¹⁹,
4. review of application,
5. decision-making regarding whether or not to approve the application, and setting of terms and conditions of approval if granted, and
6. monitoring, enforcement, and adjustment, also known as 'follow-up' and regulation.

¹⁹ I use the term application to refer to all documentation that proponents are required to submit to government – in EA the application is commonly called a report or environmental impact statement.

The standard model is for government to lead all steps except step 3 which is often led by proponents. This standard model, with the partial exception of step 3, is accepted here in this thesis as sound; it is how these steps are carried out, and what is happening in each of these steps, that is critical. In s.3.3.2.3 I discuss an alternative conception of step 3.

In the following subsections I discuss three types of good practices. The first type is concerned with the broader system of land and resource management and how project review fits within this system. The second type fits with each of the ‘standard steps’ and details practices specifically associated with each of these steps. The third type of practice applies to more than one step and in some cases to all of the standard steps. Figure 3.1 illustrates the three types of good practices (GPs).

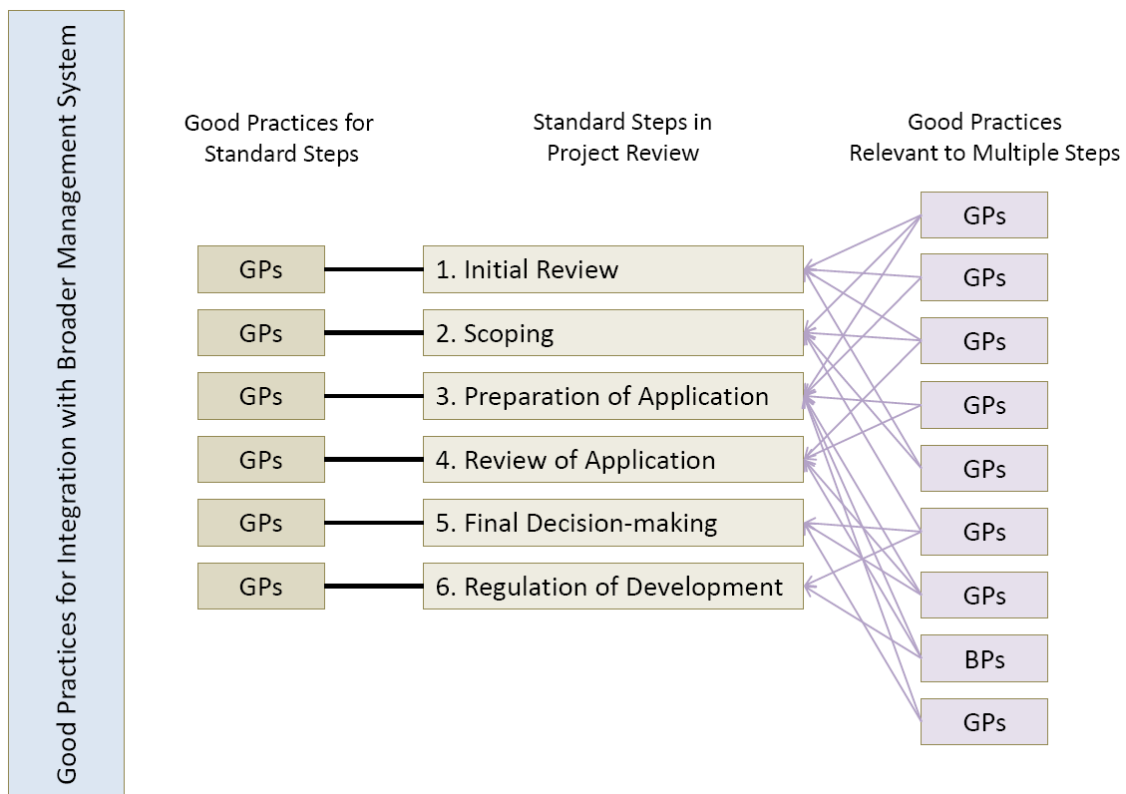


Figure 3.1. Illustration of the Three Types of Good Practices

Another important characteristic of the good practices is that they are *groups* of *actionable* items in that they are *sets* of things that government can *do* to enhance the likelihood of an effective review process. All good practices can thus be considered

process criteria – actions that are assumed to contribute to successful outcomes. Note that this chapter does not articulate what proponents or other non-government parties should be doing; this chapter is focused on good *government* practice in project review.

The descriptions of good practices below generally follow a common pattern. I first present the main elements of the practices and highlight key issues raised in the literature. Next I present data gathered in the expert survey pertinent to each topic. Next, if there are conflicts in ideas, I present potential resolutions. In cases where a set of good practices has multiple major topics I cycle through the above order. I conclude each good practice description with a discussion of the benefits of each including how the practices address the challenges of megaprojects.

3.3.1. Integration with Broader Management System

The project review process should be integrated within a broader system of land and resource management (Gibson 1993, Gibson et al. 2005). The broader management system is what government uses to achieve its objectives (which might be, for example, a healthy economy, environment, and healthy communities). This management system has numerous components, and project review is but one of them (Table 3.1). Kennett’s (2006, 1999) conception of integrated landscape management is a useful model of such a management system from the perspective of understanding where and when project review should fit in (Figure 3.2).

Table 3.1. Components of a Land and Resource Management System

Component	Focus	Examples
rules and suggestions	everyday actions	hunting regulations, encouragement not to litter
oversight of regulated activities	smaller-scale actions	road building authorization
project review	larger-scale or special actions	environmental assessment process
monitoring, enforcement, feedback	compliance impacts, mitigation effectiveness, policy effectiveness, policy improvement	pipeline leak monitoring, enforcement of ATV restrictions
planning	future possibilities	regional planning



Figure 3.2. Kennett's Five-stage Model of Integrated Landscape Management

The first stage in Kennett's model is setting broad strategic policy to provide "meaningful direction to decision-makers" on both procedural and substantive matters (Kennett 2006 6). For example, the *Provincial Land Use Strategy* proposed in the early 1990s by the Commission on Resources and Environment in BC included a Land Use Charter that set out principles of sustainability, decision-making, and Aboriginal peoples. This policy set the stage for more detailed planning of land and resource use in BC. Government should thus articulate society's goals and its vision for future development, including how large-scale projects can contribute to these goals (Blair and Carr 1981, Warrack 1996, Bruzelius, Flyvbjerg, and Rothengatter 2002). This policy or policies should specify the purposes and roles of later stages of decision-making, including those of project review, and should be developed through genuine stakeholder engagement so as to be broadly supported and consistent with stakeholder values, not just those of politicians and bureaucrats. Grounding high-level policy in values is key: this first stage of decision-making should be the initial construction of a value-focused land and resource management system (Greig 2008). Strategic land and resource policy should also be internally consistent as well as consistent with other strategic policy (such as economic and foreign affairs) so as to provide a harmonized policy environment. The bureaucracy should be structured in a manner complementary to strategic policy, i.e., in terms of budgets and orientation.

The second stage is land-use planning, which translates and builds upon the strategic direction developed in stage one into specific direction for parcels of lands and resources in the planning area. In this step values for the lands and resources in question should be more tightly defined (e.g., wildlife health), and valued components (e.g., woodland caribou population viability) should be identified across the planning area to focus government management efforts. As well, government should identify objectives over space and time for each valued component, acceptable levels of change in valued components indexed by space and time (i.e., thresholds), and priorities to

guide inevitable trade-off decisions (Noble 2010). Plans may also include direction on management practices for achieving objectives, such as transportation planning requirements for developers. All of this work is essential to support the management of cumulative effects on valued components, i.e., the combined effects of human activities on the environment, which is in large part the focus of the land and resource management system (Kennett 2006, Duinker and Greig 2006, OAGC 2009b). All of this planning work should be developed through genuine stakeholder engagement. The Commission on Resources and Environment and subsequent Land and Resource Management Planning processes in BC are useful examples – these processes identified the values for regions and sub-regions of BC and developed strategic plans covering most of the province through a collaborative process with stakeholders. The plans identified what lands should be protected in parks, what lands should have their resources developed intensely, and which other lands should be managed in special ways for multiple values.

The third stage is disposition of private rights to public lands and resources, also called tenuring. Rights must only be offered for lands and resources that were approved for such development in land use plans developed in stage two. With rights in hand, and certainty that development is possible, developers can invest further into the possibility of developing the lands and/or resources in question. This third stage can be administrative in nature and need not involve stakeholders because if stakeholder engagement was genuine and effective in stages one and two then issues over where development should occur and what generic kind of development is acceptable have already been resolved.

The fourth stage is project review, the focus of this thesis. Project review entails reviewing proposals for development to see how they fit with strategic policy and land-use plans developed in the first two stages of decision-making.²⁰ (Projects would only be proposed where tenure is held, and tenure would only be offered for places that fit with land use plans developed in stage two.) If proposals don't mesh with high-level policy,

²⁰ In the same fashion, high level policy should direct how actions not requiring project review occur.

then they should be rejected.²¹ More concretely, the first two stages play a critical role in guiding project review by:

- indicating the purposes of project review, specifying decision-making criteria, and guiding how criteria should be interpreted,
- indicating what types of projects are acceptable and where and when they may be developed,
- guiding which methods of impact assessment are acceptable by way of how well methods inform of the issues of interest, and
- providing decision-makers with the capacity to judge the significance of the cumulative effects of projects (by for example identifying valued component thresholds) (Sadler 1990, Stratos 2008, Kennett 1999).

If high-level policy is oriented toward preservation of particular cultural traditions, for example, then high-level policy should indicate objectives with respect to cultural health which in turn guide the choice of methods of impact assessment such that cultural impacts can be accurately identified. Altogether, the nature of project review is shaped by the previous stages, and – importantly – with such support from the earlier stages, project review is able to stay focused on issues specific to particular proposals instead of getting swung into debates on broader issues (such as whether or not a particular form of development is appropriate) that are settled in the earlier stages.

The fifth and final stage is permitting for projects approved in stage four. At this stage many of the finer details of projects have not yet been resolved; through the permitting phase government can shape the finer details of projects.

A key characteristic of Kennett's model is that decisions over broad issues are made before those over narrow issues, and latter stages are guided by former stages. The implication for project review is that the first three stages should be completed properly prior to any consideration of proposals for specific projects.

SEA, regional EA, and class EA are three complementary planning tools which can be used to support the first and second stages. SEA is the review of the impacts of policies, plans, and programs, regional EA is the review of the impacts of current

²¹ Projects may also be rejected for other reasons, such as if a project causes significant adverse effects.

development and alternative future development scenarios in regions, and class EA is the review of the impacts of generic types of development. All three activities can be used to lay the groundwork for project review by helping government identify and clarify objectives for lands and resources, examining issues beyond the level of individual projects, gathering baseline data, identifying impact thresholds, assessing cumulative effects, and guiding project review decision-makers with respect to how to interpret project review decision-making criteria (CCME 2009, Benevides et al. 2008, Duinker and Greig 2006, Kennett 2007).

To get a better idea of the role of SEA, regional EA, and class EA in supporting project review, I asked experts participating in the survey which tools should be used to plan bitumen development (Table 3.2). While these survey results may not be applicable to describing good practices outside of bitumen development, they do nonetheless help inform of the appropriate tools for megaprogram planning.

Table 3.2. Importance of Different Planning Tools in the Bitumen Megaprogram Context

Planning Tool	Very Important	Important	Somewhat Important	Not Important	Don't Know
Reviewing applications for individual projects on a case-by-case basis	42%	32%	12%	11%	2%
Reviewing classes or types of projects that compare in some way such as location or technology, i.e., class EA	27%	36%	22%	13%	3%
Reviews of regional effects of development, i.e., REA	78%	16%	4%	1%	1%
Reviews of nation-wide effects	38%	24%	22%	6%	10%
Reviews of government policy that relates to larger program of development, i.e., SEA	43%	32%	13%	9%	4%

Respondents support the use of a range of tools to address issues with bitumen development but highlight the review of regional effects in particular as an important complementary tool to project review. A lawyer respondent wrote that

while individual projects need to be reviewed, it is most important that the overall impact of multiple projects and land use decisions are assessed and monitored and compared against regional thresholds and objectives.

Another lawyer respondent made it clear that such regional assessment needs to be done *prior* to any consideration of project proposals:

before applications are considered... a regional assessment ought to be done to determine whether that region can handle the development and what type of things will be necessary to allow the development (i.e., roads, monitoring stations, etc.). Until a regional assessment is completed, no individual [projects] should be approved.

Respondents also commented on the other types of reviews. In regards to the idea of a national review of bitumen development, a provincial government respondent referred to the *Mackenzie Valley Resource Management Act* [S.C. 1998, c.25] as a potential model. A consultant respondent felt that

we should be... engaging the public in a debate in determining what we want to do collectively, as a province, and as a country. Instead, we are reviewing none [of the above] and the decisions on all of [these topics] are being abdicated to industrial proponents.

Altogether these survey results strongly suggest that land and resource management should involve multiple tools both to address megaprogram issues but also to properly support the reviews of individual projects.

In the expert survey I also asked respondents whether or not tenure and project review decision-making should be consolidated. I asked whether “all of the government decision-making required for large-scale projects – for example with regard to tenure, environmental assessment, permitting, etc.” should be made together in a single process, or if there should be “multiple decision-making processes to deal with different aspects separately.” A critique of separation of tenure decision-making from project review is that fragmentation of decision-making occurs as decision-makers are separated from the environmental consequences of development (e.g., Kennett 2006, Droitsch, Kennett, and Woynillowicz 2008). Fifty-six percent of respondents felt that all decisions should be made together in a single process, 29% thought that multiple decision-making processes should be used, and 14% were unsure. Some respondents commented that tenure decision-making had to come before project review decision-making because developers will not invest in preparing detailed proposals of projects without some certainty of development, while others argued that this separation of

decision-making introduces a bias into project review decision-making favouring approval.

The best resolution to these issues appears to be integrated landscape management in which strategic issues are addressed prior to project review. It is in these early steps – stages 1 and 2 – that government and stakeholders (including industry) determine what and where development is acceptable. Once complete, tenure can be offered in areas approved for development. Project review is then used to examine *particular designs* of development. Proposals for inappropriate means to develop resources that have been approved for development can still be rejected, but there is certainty established in that the area and resources in question are appropriate for development.

Integrating project review within a broader decision-making process for lands and resources serves many purposes. First, integration helps address the limited resources of stakeholders by focusing each stage of decision-making on different issues and allowing stakeholders to focus on each step at a time. Second, by addressing broader issues in earlier steps, project review becomes more efficient and predictable. Proponents are more likely to propose appropriate projects because they have a better understanding of what is and is not acceptable (Kennett 1999). There is also an efficiency gain by addressing issues in their proper forum. Issues of a broader nature (such as the economic interdependencies of bitumen projects which translate into, for example, labour market inflation) should be dealt with in fora intended for addressing these issues (Stratos 2008). In such fora, stakeholders can be provided with opportunities to participate as opposed to just the limited opportunities for standing typically provided in project review processes – processes not meant to address these broader issues (Kennett 1999). In this way project reviews are left solely for the judging of the merits of applications instead of ballooning into debates over broader issues (Kennett 1999), such as megaprogram issues. This system addresses the high level of controversy of megaprojects as well as the political fighting common to project review by addressing broader issues raised by megaprojects in the proper forum.

Another benefit of this set of good practices is that biased thinking and political interference are countered to some degree because high-level policy provides the

foundation for transparency. With this policy in place, decision-making in project review can be scrutinized in terms of consistency with high-level policy. This set of good practices also supports effective impact assessment as developing high-level policy prior to considering applications for new projects entails identifying problems and objectives, gathering baseline information, identifying thresholds and other necessary inputs. In doing so, opportunities and constraints can be identified, plans can be laid out to maximize net benefits, and strategies can be developed to guide development.

3.3.2. *Good Practices Associated with Standard Steps of Project Review*

3.3.2.1. Initial Review

Project review begins when proponents disclose a proposal to government or government first learns of a proposal. Whichever the case, government should ensure they receive a proposal with enough detail on the fundamental aspects of the proposed project, and then government should conduct an initial review the proposal, leading to a discussion between government and the proponent on the appropriateness of the proposal and next steps (Warrack 1993, Warrack 1996, Cocklin and Kelly 1992, EMMRPIWG 2008, Chicken 1994, Doyle and Sadler 1996, Wood 2003). This step is also called screening, preliminary disclosure, and initial consultation. The primary objective of initial review is to identify potentially sound proposals and to weed out bad proposals not worthy of further consideration.

Initial review entails three decisions: (1) the acceptability of the proposal, (2) whether or not detailed review is necessary if the proposal is acceptable (3) what type of review is necessary if detailed review is necessary. Each decision should be structured using sound criteria (s.3.3.3.8). The first decision should be guided by high-level policy (s.3.3.1). As resources are limited (Gibson et al. 2005), government should review only those proposals that have the potential for serious impacts, and so decision two should be based upon the project's potential to cause significant impacts (Sadler 1996, Gibson 1993, Doyle and Sadler 1996, Ahmad and Wood 2002, Wood 2003). The third decision should be based upon a project's distinguishing characteristics such as scale, types of impacts, level of controversy, and risk.

There are several benefits to good practices in initial review. Initial review helps avoid wasting resources by filtering out bad proposals before they get to detailed review (Warrack 1993, Chicken 1994) and also allows government to confront highly controversial proposals proactively, all making the process more efficient. Initial review also prepares government, proponents, and stakeholders by allowing them to identify opportunities and problems and exchange ideas at an early stage. At this stage, proposals can be shaped to maximize their public interest value. Government is also given the opportunity to identify gaps in the current policy framework that need to be filled. Proponents are helped by receiving guidance on regulatory requirements that may need to be addressed in their detailed application (EMMRPIWG 2008) as well as gaining early feedback that they can use to better align their proposals to fit government policy, stakeholder concerns, or other factors before committing financially or politically (Kennett 2006, Bruzelius, Flyvbjerg, and Rothengatter 2002, Warrack 1996). The benefit of structuring initial review with decision-making criteria is that bias and political interference is countered, making the whole review process more rational, transparent, and democratic.

3.3.2.2. Scoping

If government concludes from initial review that a proposal is potentially acceptable and decides that the proposal should be reviewed in detail, and the proponent wishes to proceed, then an independent review body (IRB) should initiate scoping with the proponent, government, and stakeholders. As discussed in s.3.3.3.4, the IRB is a body with expertise in project review independent of the government of the jurisdiction. In scoping all parties should identify the key issues associated with a proposal, and once identified, acceptable methods for examining these issues should be identified (Sadler 1996, Doyle and Sadler 1996, Sadar 1996, Senecal et al. 1999, Stratos 2008, Gibson 1993, Gibson and Walker 2001, Wood 2003, Gibson et al. 2005). Scoping should not limit reviews to portions of projects – all major components of projects should be examined – and scoping should ensure that impacts are assessed across their spatial and temporal extents. Throughout, government should always ensure that four essential topics are examined: (a) justification for the project, (b) impacts and mitigation plans, (c) performance compared to alternatives, and (d) likelihood of project success. Scoping may narrow the specific items examined within

these four topics, but reviews should at least cover these topics so that decision-makers and stakeholders have an understanding of project fundamentals.²²

Justification must be assessed because megaprojects are high risk endeavours (s.2.6.8). Scoping should ensure that there is a critical assessment of project objectives and whether the project, given its huge costs and potential impacts, is justifiable (Gibson 1993, Lawrence 2003, Van Hinte, Gunton, and Day 2007, Priemus 2008, Warrack 1993, Bruzelius, Flyvbjerg, and Rothengatter 2002, Gibson and Walker 2001, Samset 2003, Gibson et al. 2005). Justifications should match opportunities and problems identified in high-level policy (s.3.3.1), and the onus should be on proponents to make a convincing case, i.e., that the risks posed by the project are outweighed by its benefits.

A primary purpose of project review is to assess potential impacts, and thus scoping should ensure that all potentially serious impacts of all types (e.g., biophysical, economic, social, cultural, etc.) are examined (Cocklin and Kelly 1992, Warrack 1993, Van Wee and Tavasszy 2008, Senecal et al. 1999, Morris and Hough 1987, Gibson 1993, Chicken 1994, Doyle and Sadler 1996, Wood 1995, Gibson and Walker 2001, Vanclay 2003, Gibson et al. 2005, Storey and Hamilton 2003). It is critical that scoping ensure that cumulative effects are examined – while it is important to understand a project's direct effects, the focus of project review (and the broader land and resource management system of which project review is a part) should remain on values and thus how valued components are affected by the project in combination with other stresses (Senecal et al. 1999, Lawrence 2003, Van Hinte, Gunton, and Day 2007, Wozniak 2007, Kennett 1999, Ross 2002, Gibson 1993, Sadar 1996, Greig 2008). In the megaproject within a megaprogram context especially, the breadth of a given project's impacts enhance the likelihood of cumulative effects, and cumulative effects are even more likely to occur given overlap in time and space of similar forms of development (s.2.6.9).

A third essential topic is alternatives: the proposed project should be compared with alternatives, including the alternative of no development (Gibson and Walker 2001, Senecal et al. 1999, Lawrence 2003, Van Hinte, Gunton, and Day 2007, Haveman 1976,

²² In s.3.3.3.12 I discuss how impact uncertainties and risks should be addressed alongside other risk management topics.

Priemus 2008, Warrack 1993, Bruzelius, Flyvbjerg, and Rothengatter 2002, de Bruijn and Leijten 2008a, Hall 1980, Collingridge 1992, Vanclay 2003, Sadar 1996, Ahmad and Wood 2002, Wood 2003, Warner and Preston 1974, WCD 2000, Gibson et al. 2005). Projects are designed with certain objectives in mind, and there are often multiple ways to achieve objectives, i.e., 'alternative means of carrying out the project' such as different technologies, scales, means of construction and operation, siting, and scheduling. Scoping should direct project designers to identify realistic alternatives and to require that impact assessors compare the performance of alternatives in terms of not just their business appeal but their other positive and negative impacts (ICPGSIA 2003).²³ Importantly, reviews should not just examine which alternatives are acceptable but which are best as project review should not be about second-best development but propelling society forward as much as possible towards sustainability (Gibson 1993, Gibson et al. 2005)(see s.3.3.3.5).

Fourth, review should examine whether a project is likely to succeed, both in terms of a proposal's likely financial success and if the proponent has the capacity to succeed with the proposal. Confidentiality concerns of proponents may be an obstacle, but with even minimum information on a project one can perform reference class forecasting to examine a project's potential success (s.3.3.3.3). The proponent's internal relations should also be checked in terms of how many parties are involved, whereby consortia composed of large numbers of parties may have poor inter-relations, information flow, morale, and leadership, all of which complicate development (Morris and Hough 1987, Warrack 1996, Chicken 1994). Proponents should be checked in terms of their resources, experience, and past development performance (Morris and Hough 1987, Warrack 1996, Chicken 1994, Siemiatycki 2010). The review should also examine the skills, accreditation, and ethics of a proponent's contractors and consultants (Vanclay 2003, ICPGSIA 2003, Zeremariam and Quinn 2007, Wood 2003, Leu, Williams, and Bark 1996b). Finally, proponents should be examined in terms of their capacity to adapt and be flexible to changing regulatory, market, and other conditions (Morris and Hough 1987).

²³ At this stage, especially since high-level policy has determined that the form of development under consideration in project review is acceptable for this location, it is not necessary to examine totally different 'alternatives to the project'.

It is critical that scoping doesn't just indicate what topics must be covered in applications but also how proponents are expected to cover them. One provincial government respondent remarked that "sometimes methods [of impact assessment] are proposed that make us cringe" and one federal government respondent wrote that current methodological requirements for proponents established in scoping are "completely inadequate" as they lack scientific rigour, resulting in assessment results that are "vague, largely narrative descriptions". To address these problems, scoping should guide impact assessors with respect to methods. An industry consultant argued that

methodology should be set as a consistent base by government to make impact scenarios easily comparable and calibrated. [Environmental assessment] conducted using established assessment methodology can become more efficient, eliminating [the] need to justify, explain or "prove" legitimacy of methodology...

As part of its methodological guidance, government should also specify acceptable methods for determining significance, and how it expects impact assessors to structure their arguments pertaining to the significance of any impacts that are identified. The test for significance should be clearly described (s.3.3.3.6) and codified in law (s.3.3.3.7). Section 3.3.3.3 discusses in detail the components of sound methods of impact assessment.

All of the above scoping direction should be captured in a draft document that specifies how the application will be prepared, often called a draft terms of reference (TOR) for the application (Wood 2003). The draft TOR should then be published, and stakeholders should be provided with an opportunity to shape the final TOR to ensure it covers all key issues. Once the IRB finalizes the TOR government should publish it; the final TOR becomes the contract between those preparing the application and those reviewing it.

The benefits of good scoping practices are many. Scoping addresses limitations in resources by focusing all involved on the key issues, making the process more efficient, and likewise helps address the challenge posed by the breadth of issues of megaprojects. At the same time, by balancing the narrowing of the review with the need

to uphold minimum standards of review, bias and strategic manipulation are countered. Assessing alternatives, for example, counters domain bias that might lead proponents and politicians to rely upon a particular but inferior type of development to address particular objectives. Good scoping practices also promote transparency and public scrutiny, which further helps counter bias and interference. These practices provide stakeholders with the opportunity to provide input, and proponents are further given the opportunity to respond through their project design (Slotterback 2008). This all makes the process more democratic, and it can make the process more efficient because the next steps in review will be less controversial if issues are addressed (or at least identified) early. Assessment of the distribution of impacts also makes the process more democratic, which in turn helps address the controversial nature of megaprojects. All of the above, in combination with examining a project's likelihood of success, directly address the high risks of megaprojects.

3.3.2.3. Application Preparation

Preparing an application involves describing a project, gathering baseline information on valued components, assessing impacts, identifying mitigation measures to address residual effects, determining the significance of residual impacts, documenting all of the above, and passing the application on to the IRB and government. The dominant concerns here are preventing bias and strategic manipulation in impact assessment, and ensuring that project designers are sufficiently integrated with impact assessors so that mitigation can be made most effective. There are several models for who does impact assessment, which is the most important part of the application.

Perhaps the most common model – often referred to as ‘self-assessment’ – is for a proponent's consultants to perform impact assessment. This method is used widely across Canada and the world. The advantages of this model are that the proponent pays for the work on its own application, and there is integration, i.e., feedback, between project designers and those conducting impact assessment with respect to identifying means of mitigating impacts (Hollick 1984, Wathern 1988). The disadvantage is that assessment may be biased towards the interests of the proponent (Hollick 1984, Herring 2009, Wathern 1988, Nikiforuk 1997) through either conscious manipulation of impact

assessment results or unconscious cognitive bias in data interpretation. To counter bias and strategic manipulation of data, Hollick (1984) recommends that government keep a list of consultants that proponents are allowed to use based upon past performance and qualifications. Flyvbjerg (2007) recommends legal penalties for malpractice.

A second model is to have government or its consultants perform impact assessment, with the proponent paying for the work through a fee-for-service arrangement. In the US, for example, the Bureau of Ocean Energy Management conducts EA of offshore oil and gas development proposals prior to their approval (BOEM Undated). This model separates impact assessors from the proponent as government is the client, and in doing so may counter bias in impact assessment. As an academic respondent pointed out, though, government may have a conflict of interest for or against development and thus there is still possibility for bias. Another survey respondent pointed out that this model separates project designers from impact information and thus can forestall the development of mitigation measures (also see Wathern 1988). Government also lacks an incentive in this model to keep the costs of impact assessment under control.

A third model is to have an independent party perform impact assessment and proponents would again pay. This 'independent impact assessor' would not be the IRB described in s.3.3.3.4 as it would not be appropriate to have the same body preparing the application as that reviewing the application. Cognitive bias and strategic manipulation may be reduced or prevented using this model, but as project designers are separated from the impact assessors, identification of mitigation measures may be impeded.

There are at least two other models: government conducts impact assessment and pays for it itself, or government pays for an independent impact assessor to do the impact assessment. The potential problems with these models include the separation of the proponent from impact assessment work to the possible detriment of mitigation, the potential for government underfunding of impact assessment, concerns over government inefficiency, and the appropriateness of having government pay for impact assessment of private projects (Hollick 1984).

Respondents favoured using an independent impact assessor with the proponent paying for this work (Table 3.3). A common sentiment among respondents was that the party that benefits should pay, and most considered this party to be the proponent, though some respondents argued for a hybrid system in which both government and proponents pay. Respondents on the whole – as evidenced from their rankings and comments – did not appear to be concerned about separating impact assessors from project designer and the supposed detrimental effect this would have on impact mitigation.

Table 3.3. Rankings of Different Models for Who Conducts and Pays for Impact Assessment

Impact Assessment Body and Payee	Average Ranking (out of 5) Across Survey Respondents
impact assessment done by independent body with proponent paying	2
impact assessment done by independent body with government paying	2.8
impact assessment done by proponent's consultants with proponent paying	3.1
impact assessment done by government with proponent paying	3.3
impact assessment done by government with government paying	3.7

The data in Table 3.3 run counter to the fact that the self-assessment model is widely used across Canada and elsewhere, a fact that suggests that self-assessment is workable. More research is necessary to examine the independent impact assessment and self-assessment models. For the purposes of articulating good practice there all that can be concluded is that both are good practice, but that mechanisms must in place to counter bias and data manipulation in the self-assessment model.

3.3.2.4. Scrutiny of Application

Applications should be scrutinized for quality prior to decision-making (Sadler 1996, Flyvbjerg 2007). Quality should be assessed in terms of completeness with the requirements set out in the TOR, adherence to approved methodology, but also accuracy, lack of bias, and logic in conclusions. The application should be scrutinized

by the IRB, but also by the proponent (if an independent impact assessor was used) and stakeholders.

Of the many topics covered in applications that deserve close scrutiny, it is crucial that cumulative effects of projects are assessed well. Megaprojects are likely to be associated with cumulative effects due to the wide breadth and magnitude of their impacts, and in the megaprogram context, cumulative effects are even more likely given the overlap and similarity between the impacts of a megaprogram's many component projects and the consequent greater likelihood of additive and other types of interactions among these impacts. To date, in general, cumulative effects assessment in project review has been ineffective, but methods are improving (Baxter, Ross, and Spaling 2001, Creasey and Ross 2009, Duinker and Greig 2006, Kennett 2007). Those scrutinizing megaproject applications must ensure that cumulative effects are assessed well because cumulative effects are the essence of megaprograms.

Mitigation plans should be closely scrutinized. Mitigation plans are often relied upon to convert a project with significant adverse effects to one without such effects, but without close scrutiny to ensure that the plans are going to be effective, significant adverse effects may still occur. Many respondents were critical of how mitigation plans are often scrutinized. A federal government respondent noted that

proponents are frequently allowed to proceed on the assumption that technology or research will be developed to deal with mitigative issues or uncertainty.

A lawyer respondent felt that a key obstacle in reviews of mitigation plans is confidentiality:

proponents say they cannot afford to implement more pollution control and related measures... They also claim details of technology reviews and assessments cannot be shared due to the proprietary nature of the information. As a result, the proponents' claims that pollution controls or other protective measures are not affordable or viable cannot be tested.

Proponents' mitigation plans should be scrutinized in terms of whether they are realistic, genuine, justified, and whether any stated barriers to mitigation truly exist.

As well, it is important that arguments relating to the significance of residual impacts are scrutinized well. Determining the significance of project impacts is one of the most challenging parts of project review, but also one of the most fundamental (Noble 2010). Significance determinations – constructed of an understanding of impact context, impact predictions, and the interpretation of the meaning of the impacts – should be scrutinized in terms of logic, reason, solid grounding in premises, clarity of terminology, and consideration of uncertainty (Hicks 2011). Impact assessors should characterize a project's impacts with respect to whatever criteria government specifies and show how in combination impacts are or are not significant.

If the IRB or others identify significant deficiencies in an application, or if it is determined that the final TOR for review were too narrow, the review process should provide a mechanism to allow these deficiencies to be addressed (Sadler 1996). The IRB should have the authority to require proponents and the independent impact assessor to fill information gaps and revise analyses as necessary, and the proponent and independent impact assessor should be legally required to respond (Wood 2003).

Once the IRB is satisfied that the proponent and impact assessor has addressed all deficiencies in the application, the final version of the application should be published, including an explanation of how deficiencies were addressed (Wood 2003). Next the IRB should publicly announce that the final application has been submitted and that the project has been adequately examined. Stakeholders (and proponents when an independent impact assessor is used) should have the opportunity to appeal the IRB's 'completeness decision' and the sufficiency of review of the application (Wood 2003 s.3.3.3.13).

This set of good practices addresses the potential that impact assessment is done poorly, i.e., that project impacts are adequately examined and that bias, strategic manipulation, and political interference have been sufficiently countered (Hollick 1984, Flyvbjerg, Bruzelius, and Rothengatter 2003). Proper scrutiny means that final decision-makers are given sound information from which to make approval decisions, and altogether the risks of megaproject development are countered.

3.3.2.5. Final Decision-making

Once an application is scrutinized and any content deficiencies are addressed a decision must be made on whether or not to approve the project. The key issues here are bias and public accountability in final decision-makers, ensuring that final decisions reflect what was learned in project review, ensuring that development does not begin prematurely, and setting approved projects in motion in such a way that expected outcomes are likely to be achieved.

Final Decision Maker

According to Gunton et al. (2004) and Van Hinte et al. (2007) final decision-making should be undertaken by those who are accountable through the democratic process. As elected officials are unlikely to have expertise in the substantial matters raised by megaproject applications, a common model of final decision-making is for elected officials to appoint an independent panel of experts to advise elected officials with decision recommendations. A second model is to give final decision-making power to an independent body lacking ties to the project or other interests at stake in the decision. At least two other models for final decision-making exist: elected officials take advice from a stakeholder table, and a stakeholder table coming to agreement on final decisions.

Survey respondents ranked the independent body with final decision making authority the highest (Table 3.4). Several respondents pointed out, though, that the independent body model has limitations. One federal government respondent, for example, noted that independence means “independent from proponents as much as from government.” Many respondents also raised concerns over public accountability, and this may explain why they ranked the ‘elected official decision-maker supported by an independent body’ model second highest. An academic respondent noted how independent bodies are not accountable to the general public whereas government is, and a regulator respondent felt that ultimately elected officials must make final decisions:

for major projects the governing party must make the final decision and be accountable for it. If the process has been effective stakeholders will have had sound input and have affected the proponent’s plans and the review board’s recommendations.

Considering the data I cannot unequivocally recommend good practice for who conducts final decision-making.

Table 3.4. Survey Results Ranking of Different Models of Who Conducts Final Decision-making

Final Decision-maker	Average Ranking
independent body appointed by government	1.8
elected officials from governing party based on recommendations of independent body	2.5
stakeholder table coming to consensus or near-consensus	2.6
elected officials from governing party based on recommendations of a stakeholder table	3

Final Decision-making Contingent on Review Findings

Traditionally viewed, project review is a tool to aid decision-making – a single input to decision-making – not a complete decision-making procedure in its own right (Wood 2003). Nonetheless, if project review is to contribute to final decision-making and be taken seriously, it is crucial that decision-making hinges in some substantive way upon review findings. Therefore, final decision-making should not already be made or biased by prior decision-making but should be contingent upon the findings of the project review (Wood 2003). This is not to say that final decisions should be bound by the findings of the review, but that final decisions should be clearly linked to review findings and any large discrepancies between review findings and final decisions should be justified.

Therefore, once a decision is made, a decision statement should be published that clearly explains the review findings, the decision, and how and why the decision was made (Wood 2003, Gibson et al. 2005). The decision should be traced to decision criteria (s.3.3.3.8). Wood suggests that decision-makers should be legally required to demonstrate how review findings factored into their decision, that decisions should be legally prohibited until the review is complete, and that decision-makers must have the legal freedom to refuse an application. This latter idea is strongly supported by an NGO respondent who said that

the process has to allow for a “no project” option... sometimes it is not appropriate for these large-scale projects to proceed and any process for review has to afford this option.

Buffer Period

Before the decision is finalized, a short buffer period should be provided in order to allow space for appeals over the ‘draft’ decision. It is critical that proponents do not begin to develop projects and that irrevocable decisions are not made prior to the resolution of such appeals. Approval decisions should be placed on hold for a limited period of time – perhaps a month – for appeals on draft final decisions to be registered. If registered, appeals should be given a short time to be screened – again perhaps a month. If appeals are not groundless, final decisions must be held back while the appeals are tried. See s.3.3.3.13 for further discussion of appeals.

Terms and Conditions

To address residual impacts and other issues remaining with proposals that are judged on the whole to be in the public interest, decision-makers should attach effective terms and conditions to approvals. Terms and conditions may be identified by government, the IRB overseeing the review process, or others involved in the process.

Effective terms and conditions prescribe both allowable procedures and desired outcomes. For example, terms and conditions might specify how particular contaminants are to be handled, that the proponent implement an ISO 14001 environmental management system, that the proponent develop and adhere to environmental protection plans, or what government expects the proponent to contribute in terms of effectiveness monitoring. According to two industry respondents, developers should be required to follow codes of practice established or approved by government. Second, terms and conditions should be clear, specific, and unambiguous. Proponents should have a clear understanding of what activities they can do and what outcomes are permissible. Third, terms and conditions should have the support of experts and stakeholders and be proven effective. Fourth, terms and conditions should follow from and be consistent with high-level policy (s.3.3.1)(BC Auditor General 2011). Fifth, terms and conditions should be backed by law making them mandatory and enforceable.

Benefits of Final Decision-making Good Practices

If elected officials are in charge of final decision-making, the essential nature of the democratic system is preserved as voters can hold decision-makers accountable for their decisions. Such an arrangement can also help reduce controversy. Good practices such as stakeholder participation (s.3.3.3.10) can at least partly counter the partisan bias that may be injected into decision-making under this arrangement. If an independent body is in charge of final decision-making then some biases and political interference in megaproject review may be reduced, helping to counter the high risks of megaprojects.

By requiring a demonstrable link between final decisions and the findings of reviews it is more difficult for politicians and interest groups to manipulate the process, and in doing so risk factors associated with bias, manipulation of data, and political interference are countered. In turn, decision statements that link findings and final decisions make it easier to hold final decision-makers accountable for their decisions, and as a result the process is more likely to advance the public interest as well as make the process more democratic, transparent, and legitimate. Further, these practices help boost public confidence in the review process and help address the controversial nature of megaprojects.

Deferring final decisions until after a short period for appeals to be registered and tried makes the process even more legitimate but also flexible as this practice helps to prevent premature momentum and helps ensure that decisions are sound.

The prime benefit of effective terms and conditions is that projects are more likely to be successfully implemented and the high risk of project failure is reduced. Effective terms and conditions structure how proponents must develop their projects, establish acceptable outcomes, and provide a strong basis for monitoring and enforcement.

3.3.2.6. Monitoring and Enforcement

If terms and conditions are to be effective, a strong system of monitoring and enforcement must be in place (Gibson 1993, Senecal et al. 1999, Gunton et al. 2004, Van Hinte, Gunton, and Day 2007, Wozniak 2007, Leu, Williams, and Bark 1996b, Zeremariam and Quinn 2007, Doyle and Sadler 1996, EMMRPIWG 2008, Sadar 1996,

Ahmad and Wood 2002, Wood 2003, WCD 2000, BC Auditor General 2011, Noble 2010). Compliance monitoring is required to ensure proponents comply with procedural requirements and regulations while they build and operate their projects, and effectiveness monitoring (also called progress monitoring) is required to ensure that outcome objectives are met and that mitigation measures are working. Compliance monitoring should be backed up by enforcement, and effectiveness monitoring should be backed up with requirements to remediate shortcomings.

Effectiveness monitoring should be performed by an independent body that has no conflict of interest that might interfere with its duties. The Independent Environmental Monitoring Agency established to monitor the impacts of the Ekati Diamond Mine in the Northwest Territories of Canada is one example of an independent monitoring body.²⁴ The monitoring body should have adequate authority and resources, including legal and scientific expertise. Monitoring results should be regularly and publicly reported (Gunton et al. 2004, Van Hinte, Gunton, and Day 2007, Wood 2003, BC Auditor General 2011) and results should be put in a database and used to inform future project review decision-making, such as the effectiveness of mitigation measures (BC Auditor General 2011, Wood 2003). Enforcement should be performed by government.

Noble (2010) identifies six principles of an effective monitoring program: (1) objectives and priorities should be identified, (2) a targetted approach to data collection, (3) hypotheses and acceptable limit thresholds should be set for each issue that is the focus of monitoring, (4) a companion focus on project effects on the broader system, (5) use of controls, (6) continuity, (7) adaptability, and (8) comprehensiveness of coverage of impact issues.

The prime benefit of effective monitoring and enforcement is that it helps ensure that projects are developed as approved (Wozniak 2007, Gunton et al. 2004, Van Hinte, Gunton, and Day 2007, Wood 2003). Monitoring and enforcement enables government to address proponents' shortcomings but also facilitates learning on the impacts of development and mitigation effectiveness. Each of these benefits in turn help to address the high risks of megaprojects. Further, if monitoring and enforcement is conducted

²⁴ <http://www.monitoringagency.net/>

transparently and through good communication, it helps reduce controversy over megaproject development and makes the process more legitimate. The challenge of understanding the big picture is addressed as monitoring helps identify important issues amidst all of the details that arise in project review. Finally, strategic manipulation and political interference are discouraged through enforcement.

3.3.3. *Good Practices Pertinent to Whole Project Review Process*

3.3.3.1. Process Management

Individual project reviews should be guided by internal planning and their progress should be subject to monitoring and review. At the onset of the detailed review portion of a project review, government and the IRB should establish clear objectives, work plans, resource budgets, timelines and scheduling, and milestones, and government should clarify roles and responsibilities (EMMRPIWG 2008). Objectives for individual reviews might include items like meeting commitments to stakeholders, and completing steps within time and other resource constraints. Project reviews should be monitored and evaluated in terms of meeting performance objectives such as time and resource use, and progress should be regularly and publicly reported (EMMRPIWG 2008, Gunton and Joseph 2007, Wood 2003).

As well, there should be periodic monitoring, review, and public reporting of the performance of the review process across individual project reviews, i.e., process auditing (Wood 2003, Ahmad and Wood 2002, Leu, Williams, and Bark 1996b, Soumelis 1977, EMMRPIWG 2008). Such audits should be legally mandated (Wood 2003), and should examine the average time requirements of reviews, the average costs to parties, effectiveness towards meeting the goals of project review as set out in enabling legislation, and proponent compliance trends. Audits should also compare the process with international trends in project review (Doyle and Sadler 1996, Leu, Williams, and Bark 1996b).

The progress of individual reviews can be monitored internally by government or by an IRB, but process audits should be conducted independently (Samset 2003, Wood 2003). The lessons learned through monitoring and auditing should be recorded,

disseminated, and used to improve the process and support legal reform (Gibson and Walker 2001, Wood 2003).

Finally, there should also be a program in place for training and capacity building for government and IRB staff but also others involved in project review such as consultants, proponents, and other stakeholders (Ahmad and Wood 2002, Leu, Williams, and Bark 1996b).

Review planning and process auditing serve to improve current and future reviews. By examining the effectiveness of the process, trends in proponent compliance, and how forecasted impacts match realized impacts, future reviews can be improved so that society's objectives are better met. Independent audits also help uncover trends of bias, strategic manipulation, and political interference in project review, and help build public confidence and thus attack the controversial nature of the process.

3.3.3.2. Resources

Government must ensure the process is adequately resourced in terms of funding, experienced and skilled personnel, leadership, and time to complete necessary tasks (Gunton et al. 2004, Van Hinte, Gunton, and Day 2007, Warrack 1996, Knight 1990, Ahmad and Wood 2002, Morrison-Saunders, Baker, and Arts 2003, Land-Murphy 2004). Funding should be sufficient to enable government and the IRB to fully carry out good practices. Some funding might be generated from proponents as a condition of development. Government and IRB staff should have expertise in how the review process works, the nature of megaprojects, the impacts and issues raised by applications, means of mitigation, and the methods proponents use to assess impacts (Morrison-Saunders, Baker, and Arts 2003).

Adequate resourcing also means ensuring that the process has sufficient time to do a good job while at the same time ensuring that the process is efficient. One suggestion is that reasonable time constraints should be set to ensure there is some pressure on involved parties to complete the review process efficiently (EMMRPIWG 2008). Seventy six percent of respondents thought that a legal constraint on time was either "very important", "important", or "somewhat important"; only 20% thought that

constraints on time was “not important”. However, many respondents’ comments highlighted how the need for efficiency must be balanced with ensuring sufficient time for sound review. An academic respondent said that time limits should allow for sufficient input by all interested parties, and a citizen respondent complained that

right now the proponent has years to prepare its application and the interveners have weeks to review and prepare their case. The whole system is weighted against interveners.

Similarly, an industry respondent wrote that since projects vary in magnitude of impacts, applications vary in quality, and reviewers’ comprehension of the issues associated with different projects varies, review times should not be fixed. Another industry respondent indicated that applications differ and there is “no one size fits all” though “there should be reasonable ranges of times for reviews.” A federal government respondent said that

it is more important that the review be done correctly rather than steward to some legal time commitment. If there is to be a binding commitment for the review process then there should be an equally binding commitment for the project to proceed. Too often the companies want speed and then the project does not move ahead.

Similarly, a provincial government respondent felt that “clarity must be provided as to whether or not the time limits apply only to government review time or also apply to industry response time.” A regulator respondent indicated that

the time required for review of an application is greatly influenced by the quality of the application and the promptness with which the applicant responds to deficiencies. Putting a time limit on the review typically does not consider the delays caused by the applicant and for which the decision making body has little control. Poor quality applications simply take much more time to review.

A suggestion made by one consultant respondent is to set timelines for government response for defined hurdles in the process, where the proponent starts the timeline once they submit a key document or otherwise signal their readiness for the next step in the process. Considering the many different arguments made, it appears

that good practice is to set time guidelines for project review and to allow for changes to accommodate the circumstances of individual reviews.

Adequate provision of resources, including time, is an essential foundation for a good review process because they are behind nearly every good practice. As such, adequate resourcing directly influences the degree to which project reviews can address all challenges to project review posed by megaprojects. Setting semi-flexible constraints on time for reviews makes the process more efficient and legitimate, which can reduce the controversy surrounding megaproject development.

3.3.3.3. Methods of Impact Assessment

The preparation and review of applications entails the use of a variety of methods of impact assessment to identify and measure the incremental effects of project development. Many methods of impact assessment exist (Box 3.1), but project review should only rely on *sound* methods of impact assessment so that applications are trustworthy. Nine characteristics contribute to a method's soundness.

First, a sound method is suited to context (Gunton and Vertinsky 1990, Park et al. 2006, McAllister 1982, Wood 2003). No one method is perfect for every situation; the appropriate method to use fits the context (Warner and Preston 1974). Sound methods match the roles they are intended to fill, the types of information sought, the types of impacts being examined, and the types and quality of data available (Rosenhead 2005, Soumelis 1977, Park et al. 2006, Gunton and Vertinsky 1990, Hochschorner and Finnveden 2003, Chicken 1994, ICPGSA 2003, McAllister 1982, Nash, Pearce, and Stanley 1975). The many challenges that

Box 3.1. Examples of Impact Assessment Methods

- Adaptive environmental assessment and management
- Analogs / literature review
- Checklists and matrices
- Cost-benefit analysis
- Expert opinion
- Mass-balance calculations
- Modeling
- Multi-criteria evaluation methods
- Networks
- Overlays / geographic information systems
- Post-development audit / evaluation
- Public involvement strategies
- Remote sensing
- Risk analysis
- Scenario building
- Trend extrapolation
- Traditional ecological knowledge

Sources: Noble (2010), Canter (1998), Sadar (1996).

megaprojects pose to project review signify that sound methods of impact assessment used in megaproject review must also be capable in situations of high uncertainty, in which a wide breadth of issues must be examined, in the presence of widespread bias, where the decision environment is controversial and dynamic, and where there will be widespread attempts at strategic manipulation and political interference (s.2.6). As Park et al. (2006) point out, typically no one method is perfect and so multiple methods may be required.

A second characteristic of a sound method is that it is flexible in that it can be used in a variety of manners and can be adapted to be useful under changing conditions (Hochschorner and Finnveden 2003, Warner and Preston 1974). Review contexts change as data are gathered, as political dynamics unfold, and as market conditions vary, and sound methods are capable of performing well despite variations in demands, inputs, and expectations (Gunton and Vertinsky 1990, Chicken 1994, Warner and Preston 1974).

Third, a sound method is also scientifically robust. The steps that a sound method follows to generate its results follow sensibly from one step to the next, and so a sound method constructs its results logically (Gunton and Vertinsky 1990). A sound method is reliable and replicable as results are consistent across research teams (McAllister 1982, Wood 2003, Hanley and Spash 1993). Results of sound methods are constant when inputs are constant, but if inputs do change, then results are sensitive to these changes (Park et al. 2006, Gunton and Vertinsky 1990, Tiruta-Barna, Benetto, and Perrodin 2007, Chicken 1994, Soumelis 1977). A sound method also is not internally biased in that it responds equally to different types of data inputs such that results are not skewed one way or another depending upon the nature of the inputs (Gunton and Vertinsky 1990, Hochschorner and Finnveden 2003). Some methods, for example, might treat qualitative data differently than quantitative data. As well, a sound method provides results that compare closely with other methods designed to answer similar kinds of questions, what Hanley and Spash (1993) call convergent validity, and a sound method produces results that fit with theory (Hanley and Spash 1993, Chicken 1994, Green 1997). Finally, a scientifically robust method is capable of coping with uncertainty in inputs and helping analysts understand the ramifications of uncertainty on results.

A fourth characteristic of a sound method is that it relies upon minimal subjective judgement (Gunton and Vertinsky 1990, Park et al. 2006, Hochschorner and Finnveden 2003, Sadar 1996). Ideally, methods are based completely on objective inputs, i.e., factual items, and require no value-based judgements. This is the ideal, especially given the controversial and political nature of megaprojects (ss. 2.6.2, 2.6.3, and 2.6.4), but many methods of impact assessment necessarily entail subjective inputs. Data gaps require analysts to make subjective judgements, and facts themselves must be interpreted – a subjective process. The ideal, then, is a method that relies as little as possible on subjectivity, and where subjective judgements must be made they are done explicitly (Warner and Preston 1974).

Fifth, a sound method should be understandable (Hochschorner and Finnveden 2003, Rosenhead 2005, Chicken 1994, McAllister 1982, Gunton and Vertinsky 1990, Nash, Pearce, and Stanley 1975, Warner and Preston 1974, Green 1997, Hollick 1981). Methods of impact assessment are typically not simple for the layperson to understand, but ideally they are understandable in that their theoretical basis and key assumptions are visible and it is reasonably easy to evaluate the method's applicability to a particular case. Understandable methods are not black boxes but instead have visible mechanics in that it is reasonably easy to see how results are constructed. Likewise, outputs from sound methods are understandable and can be communicated without too much difficulty.

A sixth characteristic of a sound method of impact assessment is that it creates useful outputs that facilitate understanding among stakeholders and are helpful to those making decisions (Gunton and Vertinsky 1990, Park et al. 2006, Chicken 1994, Diez 2001, Green 1997). Sound methods should help us understand the important issues, such as 'is the project in the public interest and how can the project be designed and managed to maximize the public interest?' (Green 1997). In doing so a sound method fosters an understanding of the meaning of impacts (Warner and Preston 1974). Impact significance can be expressed in relation to policy objectives, society's values, comparisons with similar projects, or minimum standards (Noble 2010). Outputs are most useful if they are expressed in terms and metrics familiar to users and stakeholders, but also in specific, verifiable terms that can be checked later on in effectiveness monitoring (Noble 2010).

Many authors argue that an ideal method aggregates or “sums up” impact information to indicate the overall, or total, significance of the project’s impacts (Gunton et al. 2004, Warner and Preston 1974, Hochschorner and Finnveden 2003, McAllister 1982). This argument is particularly relevant to megaproject review given the challenge of understanding the big picture (s.2.6.8). Debate remains though around whether an ideal method produces a composite or ‘grand index’ result, or whether it is better to provide information in a more disaggregated form so that users can form judgements themselves (Warner and Preston 1974, Hochschorner and Finnveden 2003, McAllister 1982). Gunton and Vertinsky (1990) further argue that an ideal method interprets project impacts and recommends a decision. Such a method promotes decisiveness instead of simply providing information.

A seventh characteristic of a sound method is that all involved in the review process – decision-makers, analysts, experts, and interested individuals – have confidence in the method and its outputs (Hanley and Spash 1993). As Hanley and Spash (1993) note, the quantity of academic journal articles based upon a particular method may be a poor indicator of the method’s level of acceptance in society as a whole. In contrast, a sound method is compatible with existing institutions, norms, rules, cultural perspectives, and any other factors that might affect users’ and stakeholders’ opinions of the validity of the results coming from the method (Gunton and Vertinsky 1990, McAllister 1982, Green 1997, Nash, Pearce, and Stanley 1975).

An eighth characteristic of a sound method is that it is cost-effective. Accordingly, a sound method’s requirements for time, data, staffing, equipment, and funding are balanced by what it contributes to review (Kok, Benders, and Moll 2006, Gunton and Vertinsky 1990, McAllister 1982, Warner and Preston 1974, Wood 2003, Green 1997).

Finally, a ninth characteristic of a sound method is that it involves stakeholders in the analysis process. A sound method is not technocratic, but democratic and participative (Green 1997). In the fields of planning, risk analysis, and environmental valuation, methods are increasingly participative, and this trend should be reflected in project review (Warner and Preston 1974, Samset 2003, ICPGSIA 2003, Wood 2003,

Laird 1993). A sound method is thus designed for use as a means of participatory analysis, or it can relatively easily be adapted for such.

As shown in Figure 3.3, the nine characteristics of a sound method of impact assessment are inter-related: many characteristics are supportive of one another, though some are in tension with others. Rarely if ever will there be a perfect method, but the ideal still remains the ideal.

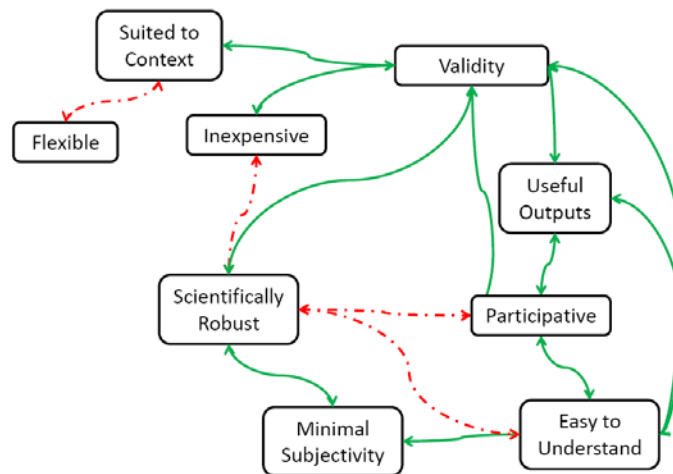


Figure 3.3. Inter-relationships Between Characteristics of Sound Methods of Impact Assessment

Green arrows signify supportive relationships among characteristics, and red dashed arrows signify tension.

The many characteristics identified above of sound impact assessment methods provide many benefits to megaproject review. Such methods can gather and interpret the wide range of impact data and convert this into useful summary information that helps all involved 'understand the big picture'. Such methods help make project review more able to cope with changing circumstances, and they help make the review process transparent and legitimate (Chicken 1994). Sound methods help address bias, strategic manipulation, and political interference (Warner and Preston 1974), help address stakeholder conflict, and help address limits to resources. As well, and in part due to these other benefits, sound methods help make review more democratic and legitimate, help make project review less controversial, and help inform the process and reduce the high risks of megaprojects.

Reference Class Forecasting and Cost-benefit Analysis

While government and stakeholders should decide exactly which methods of impact assessment are used, there are two methods that have received special attention in the megaproject review literature: reference class forecasting, and cost-benefit analysis (CBA). Both of these methods ought to be used in megaproject reviews given the contributions that they can make to understanding the impacts of projects.

Reference class forecasting improves forecasts of project impacts by providing an “outside view” (Flyvbjerg 2007, Van Wee and Tavasszy 2008, Flyvbjerg 2008, Hall 1980, Lovallo and Kahneman 2003). Reference class forecasting works by comparing forecasts of the impacts of the project in question to the realized impacts of a class of similar projects. Flyvbjerg (2007) explains that reference class forecasting “does not try to forecast the specific uncertain events that will affect the particular project, but instead places the project in a statistical distribution of outcomes from this class of reference projects” (28). There are three basic steps to reference class forecasting: (1) identify a relevant class of past projects, (2) establish a probability distribution for the selected reference class, and (3) compare the specific project with the reference class distribution. A total of 84% of respondents felt that it was either very important, important, or somewhat important that reference class forecasting is used.

Reference class forecasting promotes rationality by improving the accuracy of judgements on project impacts, particularly in terms of countering cognitive biases and strategic manipulation. As well, reference class forecasting is likely to aid analysts understand the big picture of megaproject’s wide breadth of impact issues – analysts and decision-makers may focus on particular issues at the expense of others; reference class forecasting helps illuminate the key issues of projects by showing which issues were important in similar projects. Altogether, reference class forecasting is a key means to address the high risks of megaprojects.

CBA is based upon the theory of welfare economics and stems from simple comparisons of pros and cons of alternative courses of action (Boardman et al. 2011). The basic steps in CBA are: (1) catalogue impacts, (2) monetize impacts, (3) discount future impacts and compute net present value, and (4) make a recommendation. CBA is widely considered the principal method for examining the net impacts and value of

megaprojects to society (Davis 1990, Barget and Gouguet 2010, Gunton 1992, 2003a, Vickerman 2007, Knight 1990, Stough and Haynes 1997, Priemus, Flyvbjerg, and Van Wee 2008, Chicken 1994, Shiftan and Shefer 2009, Kinnaman 2011). CBA is sometimes used alongside economic impact analysis (EconIA), another set of methods for estimating the economic effects of projects, and CBA is often a part of 'multiple account' methods of evaluation in which economic impacts are examined using CBA and non-economic impacts are assessed using other methods, such as in BC's evaluation guidelines from the 1990s (Crown Corporations Secretariat 1993). Monetary valuation methods, i.e., methods of shadow pricing such as hedonic pricing and contingent valuation, are key techniques used in CBA, and some people equate monetary valuation to CBA. While both EconIA and multiple account methods may be very useful in project review, neither get the level of attention that CBA does in the good practices literature.

A total of 91% of respondents felt that it is either very important, important, or somewhat important that CBA is used. However, respondents' support for CBA was highly qualified. A federal government respondent expressed a concern common to many: the monetary value of economic gains is easily measured, but social and environmental impacts are much harder to monetize and assess through CBA. Several respondents also noted that Aboriginal rights issues could not be addressed through CBA, and one provincial government respondent wrote that the method was heavily reliant on controversial assumptions and weak science.

The greatest argument for CBA in the project review context appears to be that it provides the rare capability to 'sum up' a wide range of the impacts of a megaproject, and provide an overall indication of a project's worth to society. In other words, CBA provides a means to address the challenges of assessing the wide breadth of issues of megaprojects and understanding the big picture. CBA is also a means of assessing one of the 'essential topics' – a project's economic viability. In Chapters 6 and 7 I discuss CBA and EconIA with respect to their capacities to inform project review.

3.3.3.4. Consolidated Review Process Managed by Independent Review Body

To provide for the most efficient review that has the least bias and political interference, the project review should be a single process that covers all items of

concern identified in scoping at once and the review process should be managed by a single independent review body (IRB) (EMMRPIWG 2008, Stratos 2008, Kennett 2006, Warrack 1993, Land-Murphy 2004). This consolidation of review should address all issues of concern and should raise review to the higher standard of any component processes (Forbes et al. 2012). The IRB should play many of the central roles in project review (Table 3.5), from managing and leading scoping, participating in scrutinizing the application, and if granted the authority, final decision-making. Throughout, the IRB should be the “single window” or communication hub for all parties (Warrack 1993). In doing all of this, the IRB is responsible for implementing many of the good practices listed in this thesis.

Table 3.5. Roles of the Independent Review Body (IRB) and Other Parties in Project Review

Step in Project Review	Proponent	Government	Independent Review Body (IRB)	Independent Impact Assessor	Other Stakeholders	Effectiveness Monitoring Body
Initial Review	prepare and submit proposal	receive proposal and pass to IRB; make final decision with respect to detailed review / next steps	review proposal; make recommendation to government with respect to proposal acceptability and need for detailed review; communication hub	-	-	-
Scoping	develop draft TOR	set minimum standards for TOR; provide information needed for scoping; publish final TOR	help develop draft TOR; gather feedback on draft TOR; develop final TOR; communication hub	-	ensure TOR covers all key issues	-
Application Preparation	prepare application (except impact assessment) and submit	provide information needed for impact assessment	communication hub	assess impacts and submit results to IRB	-	-

Step in Project Review	Proponent	Government	Independent Review Body (IRB)	Independent Impact Assessor	Other Stakeholders	Effectiveness Monitoring Body
	to IRB					
Scrutiny of Application	respond to questions on proponent's portion of application; scrutinize impact assessment portion of application and submit comments to impact assessor	scrutinize application and submit comments to impact assessor	scrutinize application and submit comments to impact assessor; coordinate information requests; ensure application complete and make completeness decision; communication hub	respond to questions on impact assessment portion of application	scrutinize application and submit comments to impact assessor	-
Final Decision-making	-	if final decision-maker, make final decision and publish decision statement	if final decision-maker, make final decision and publish decision statement; communication hub	-	scrutinize final decision-making	-
Monitoring and Enforcement	(developing project)	monitor compliance and conduct enforcement; direct remediation in the event of poor effectiveness monitoring results; learn from monitoring results and revise legal/policy framework as necessary	learn from monitoring results	learn from monitoring results	scrutinize monitoring	perform effectiveness monitoring; compile and report on monitoring trends

The IRB should be led by experts who oversee IRB activities and act as chief decision-makers, and they should be supported by staff with a wide range of skills pertinent to megaproject review. The IRB and all of its members and staff should be completely impartial with no contractual or other obligations, impediments, or incentives that would influence their actions: the IRB and its employees should be focused on making rational decisions consistent with the public interest (Kennett 2006, Warrack 1993, Gunton et al. 2004, Van Hinte, Gunton, and Day 2007, Sadar 1996, Wood 2003, Gibson 1993, Vanclay 2003). The IRB's lead experts should be appointed by government and in combination these people should possess expertise across all topics that are raised in megaproject review. The IRB should have adequate funding and should be empowered by legislation that provides sufficient authority over proponents and other parties to enable it to fulfill its mandate (s.3.3.3.7).

It is critical that there are mechanisms in place to hold the IRB accountable to the public interest. As IRB members are not elected, a key means of providing public accountability with IRBs, according to Wood (2003), is to provide stakeholders with the ability to appeal major decisions made by the IRB (s.3.3.3.13). Other means of accountability may need to be developed.

It's important to acknowledge that the IRB is disconnected to the information held by government and the activities and other decisions of government. This is the issue of 'siloeing', or fragmentation, within typical government structures, and the tendency for these structures to lack consideration of the big picture and produce uncoordinated decision-making (Kennett 2006). An alternative is to have a temporary body, staffed by a team of government employees with relevant skills, manage and conduct the review process, and a second alternative is to have an existing government body with some association with the nature of the project manage and conduct the review, such as an energy or economic development department.

Despite the integration with government decision-making in these latter two models, respondents ranked the IRB model the highest, citing its independence as a crucial benefit (Table 3.6). The main problem with the temporary review body model, according to respondents, is the lack of continuity in staff which can compromise the

quality of project review. The key problem with the government department model is perceived to be bias. An environmental department, for example, might have a strong anti-development bias while an energy department may have a pro-development bias.

Table 3.6. Survey Results Ranking Different Review Body Models

Final Decision-maker	Average Ranking (out of 3)
independent review body	1.3
temporary review body drawn from government	2.3
government department with association to project	2.5

The resolution to the above issues appears to be integrated landscape management in which project review decision-making is guided by previous stages of decision-making. As detailed in s.3.3.1, project review should be guided high-level policy, land use plans, and tenure decision-making, so that the major problems with un-integrated decision-making are addressed prior to project review. The IRB model – a permanent body independent of government and other stakeholders managing and running much of the review process with government, proponents, and other stakeholders as ‘clients’ in the review process – is ideal (Figure 3.5).

The benefits of a consolidated review process run by an IRB are many. The consolidated process allows involved parties to focus their resources onto a single process as there is no duplication of demands (EMMRPIWG 2008). Similarly, the IRB (and the independent impact assessor, if used) addresses limitations in resources by concentrating expertise and experience into one body dedicated to project review. In doing so, reviews of applications are better as those reviewing applications are not split between project review and other duties (Warrack 1996). A second benefit is that by being the single window for communication the IRB minimizes duplication and mixed messaging that may come from multiple bodies in charge of a process, translating to a more efficient review. Third, the independence of the IRB helps counter some forms of bias as well as strategic manipulation and political interference in project review. When government departments are not leading project review the domain biases and interests of those departments are more easily kept out. A fourth benefit is that an independent body can help build public confidence in the process, helping to address the highly

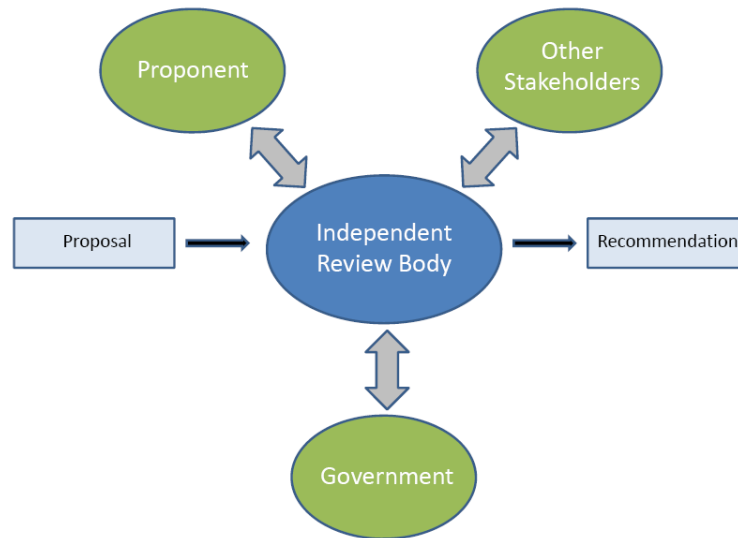


Figure 3.4. Relationships Between Parties in the Project Review Process

controversial nature of megaprojects.

3.3.3.5. Mitigation and Maximizing Net Benefits

All steps in the project review process should be oriented towards maximizing the net benefits of development and enhancing sustainability within the jurisdiction. Project review should not just be about minimizing harms through mitigation such that a project's negative impacts are reduced to an acceptable level; the review process should propel developers to develop projects that make tangible gains across all three economic, environmental, and social pillars of sustainability, or at least gains in one pillar with no losses in the others (Noble 2010, Gibson 2006, Gibson et al. 2005).

Mitigation is a longstanding and useful tool to promote sustainability in project development; each step in the review process should maintain a focus on reducing harm and enhancing benefits (Wood 2003, Rajvanshi 2008). Mitigation should direct initial project designs and thus government should conduct initial review with this in mind, and scoping should communicate to proponents the degree of mitigation that government expects and ways that harms might be reduced and gains might be enhanced. Those scrutinizing applications should critically examine mitigation plans, and final decision-making should impose terms and conditions that formalize mitigation expectations.

There are a range of ways to mitigate harm, and the following order of generic measures range from best to worse: avoidance at source, minimize at source, abatement on site, abatement at receptor, repair, compensation in kind, other compensation or enhancement (Wood 2003, Noble 2010). Mitigation efforts should start with the first measure and proceed through the remaining types of measures as required. To enhance project benefits, the process should propel proponents to identify ways to enhance project benefits or create new ones. Impact-benefit agreements between proponents and communities and stakeholder groups can be used to formalize such programs (Sosa and Keenan 2001, Noble 2010). The most effective mitigation programs are initiated early (for cost-effectiveness), utilize measures that are proven from experience and are supported by stakeholders and experts, are employed by proponents that have the experience and resources necessary to successfully implement them, are adaptive to changing circumstances (including new information), are used according to an implementation plan, and are enforceable (Rajvanshi 2008). Once mitigation measures have been implemented their effectiveness should be monitored, and if necessary, new measures should be designed and attempted (Wood 2003 see s.3.3.2.6).

According to several authors, mitigation of all harms should be mandatory, and if no other measures will work, developers should be required to compensate all groups left worse off by a project (Van Hinte, Gunton, and Day 2007, Wozniak 2007, Gunton et al. 2004). Compensation should be a last resort to address project harms because of the risk that the substitute may not be as good as the original asset (Rajvanshi 2008). Compensation should be negotiated between proponents, government, and those negatively affected, not imposed upon affected parties, and there should be equal access to compensation among affected parties (CEARC 1998, Wood 1995).

Respondents support the requirement to mitigate and compensate for harms (Table 3.7), but contrary to the literature, many felt that there should be limits to what harms must be mitigated and when compensation should occur. Respondents thus honed in on a key question in mitigation: what minimum threshold must be passed for a negative impact to be harmful enough to require mitigation (or compensation)? An industry consultant respondent argued that compensation is important but hinged upon the timeline of losses:

Table 3.7. Level of Importance of Mitigation and Compensation

Planning Tool	Very Important	Important	Somewhat Important	Not Important
legal requirement for proponents to mitigate negative effects of projects	81%	14%	3%	2%
stakeholder groups are compensated for negative impacts that they incur	52%	25%	18%	3%

where real rights in the lands are established and economic loss can be quantified, then compensation is important. Where changes to use of the lands is interrupted for a period of time, but ultimately returned through reclamation, then compensation should not be awarded as the mitigation completely addresses such impacts through reclamation.

This point of view is questionable given that it is a common principle of damage assessment to compensate for loss of use; the respondent's suggestion also hinges on certainty of reclamation. Another consultant respondent felt that mitigation (including compensation) should not be required if the ecosystem is abundant regionally. A provincial government respondent and a regulator both suggested that a geographical boundary might be established beyond which mitigation is unnecessary. Similarly, a federal government respondent argued that mitigation is probably not appropriate for stakeholders overseas or out of province (even though this goes against principles of international law which require jurisdictions causing harm to compensate others that are harmed).

Many respondents felt that some impacts should be accepted as part of development. An industry respondent felt that

society must expect that there are some unmitigated impacts that are outweighed by the long term benefits that the project brings in terms of employment, taxes and royalties. Impacts should be weighed in balance with benefits - and all impacts should not need to be individually mitigated or compensated.

This line of thinking raises the notion of net benefits; the respondent seems to suggest that some developments are inherently more valuable than whatever negative impacts they may cause. A more appropriate practice would be to carefully examine all project

benefits and costs and from this perspective of net impacts one can guide decision-making with respect to what mitigation measures proponents should be required to undertake, and more fundamentally whether a project on the whole should be approved or not. If the costs of compensation (or other forms of mitigation) are greater than the benefits of the project, then the project should be rejected.

The benefits of a project, and how they are considered in project review, is a critical aspect of a good practices project review process. Mitigation of negative impacts of projects – or ‘acceptability-oriented’ project review – is the typical, and now out-dated, model of project review. Project review should go beyond this. Raising the test employed in the Voisey’s Bay, Newfoundland mine project review as an example, Gibson et al. (2005) in their text *Sustainability Assessment* argue that project review should not just seek to minimize negative harms through mitigation but to contribute to an overall net gain, and that net gains should not just be assessed in terms of economic benefits compensating for other losses but also in terms of ecological, community, and/or other indicators. Gibson et al. write:

in most assessment practice the focus is on avoidance or mitigation of significant negative environmental effects... typically, the working objective is just to recognize and reduce any potentially severe adverse effects, to ensure the project damages are acceptably minimal. Demanding ‘a positive overall contribution’ is very different... The panel made it clear that it expected Inco to show that it would create or enhance beneficial effects as well as mitigate the negative ones (6-7).

To implement such a focus, the purpose of project review should be aligned accordingly (s.3.3.3.5), enshrined in law (s.3.3.3.7), embodied in legally-backed decision criteria (s.3.3.3.8), and embedded in the IRB’s mission statement (s.3.3.3.4). As well, government may direct that proponents sign impact-benefit agreements with stakeholders.

Several respondents offered their suggestions for how mitigation programs should be implemented to address project harms. A provincial government respondent advocated the collection of security bonds from developers to ensure project reclamation, and legal remedies to collect from the developer any additional costs to protect taxpayers. Another provincial government respondent advocated for

compensation larger than the original cost, the idea being that anyone affected negatively is not just compensated back to their original position but provided some extra compensation. An industry respondent noted that if a project is in the public interest but there are high mitigation costs, then government should assist the proponent in addressing those negatively affected so as not to deter the proponent from developing the project. A consultant suggested that legal benchmarks for environmental effects should be set such that if a benchmark is exceeded the project in question is stopped until the developer can mitigate the particular harm incurred.

The literature and survey data indicate the importance of legally-mandated mitigation and compensation for negative impacts, but they do not resolve the key questions of when exactly mitigation is required, when exactly compensation is appropriate, and how exactly compensation should be made. Further research along these lines is necessary.

Maximizing net gains by minimizing harms and enhancing sustainability throughout project review is a means to resolve conflict (Wozniak 2007, Gibson 1993, Lawrence 2003) and stakeholders are much more likely to participate in a process instead of fight it from the outside if they have confidence that their interests will be addressed (Laird 1993). As such, mitigation can address the highly controversial nature of megaprojects. A related benefit is that democracy is served as these practices help ensure that no group in society is overly subjected to the interests of other groups (Vanclay 2003). Of course, to do all of this requires that stakeholders are convinced that their concerns will actually be addressed. Focusing on some measures, such as changing the project design and avoiding problems at their sources, are more likely to reduce conflict and gain stakeholder support than other strategies further down the mitigation list such as compensation in-kind. A focus on minimizing harms early in the review process also makes for a more efficient process as problems often grow as projects gain inertia; as project designs become solidified it often becomes harder to change direction. Methods like cost-effectiveness analysis, a variant of CBA, can play a valuable role in highlighting the most efficient ways to address the negative impacts of projects and the most efficient ways to enhance gains. Lastly, the challenge posed by megaprojects' highly dynamic nature is addressed as these practices provide the

flexibility to get around obstacles that might otherwise prevent good projects from being developed.

3.3.3.6. Process Description

The review process should be fully described so that it is clear to all involved how the review process works (Wood 1995, Gibson and Walker 2001, Ahammed and Harvey 2004, Doyle and Sadler 1996, Bruzelius, Flyvbjerg, and Rothengatter 2002, EMMRPIWG 2008, Stratos 2008, Gibson 1993, Zeremariam and Quinn 2007, Land-Murphy 2004, Forbes et al. 2012). Of the many aspects of the process that should be clearly described, the purpose, goals and objectives of project review are key components of a good description (Doyle and Sadler 1996, Soumelis 1977, Sadler 1996, Gibson et al. 2005). The primary purpose of project review should be to support rational decision-making, and the goals and objectives of project review should be clearly stated and relate to promoting sound development and protecting the public interest. Further, the role of the process vis-à-vis the broader decision-making process (s.3.3.1) should be clearly articulated (Sadler 1990). Second, it is also critical that the roles, responsibilities, and authority of involved parties are clearly described (Gunton et al. 2004, Van Hinte, Gunton, and Day 2007, Lawrence 2003, Wozniak 2007, EMMRPIWG 2008, Gibson and Walker 2001, Ahmad and Wood 2002, Wood 2003). It should be clear who has final decision-making authority and how conflicts over jurisdiction are addressed. The description should explain how stakeholders can participate in the process, the roles and responsibilities of proponents, and it should guide proponents in terms of how they should engage with stakeholders. Third, it is critical that the description of the process clearly explains how the process works. Each step in the process should be clearly articulated, and key decisions should be identified, including the criteria with which are used for these decisions.

Donnelly et al. (1998) report that two critical factors that make review guidance useful are ensuring that it is specific and focused on practitioner needs. Too often, they find, review processes are described too generically. Thus, descriptions need to provide details and be written in a way that is useful to practitioners, but it is also key that the wide range of other participants in the process is given a good understanding of the process.

There are many benefits to a fully and well-described process. Most fundamentally, detailed and complete information on the process makes for a more efficient process by guiding proponents through the application process and providing stakeholders with a strong basis for participation (Gibson and Walker 2001, Wood 2003). With such clarity, involved parties understand their part in the process and that of others, which helps reduce conflict and controversy in project review (Van Hinte, Gunton, and Day 2007). Furthermore, clarity in roles, responsibilities, and authority helps address political interference because it helps provide for accountability and makes the process more transparent. When actors know their roles and that of others they are more able to ensure that the process is proceeding properly and not being taken advantage of by others (Van Hinte, Gunton, and Day 2007). Finally, the articulation of the purposes, goals, and objectives of project review further helps address political interference by establishing standards against which the actions of involved parties can be compared.

3.3.3.7. Legal Foundation

The review process should be established in law to help ensure that the process is as effective as it is intended to be (Gibson 1993, Flyvbjerg, Bruzelius, and Rothengatter 2003, Wozniak 2007, Leu, Williams, and Bark 1996b, Gibson et al. 2005). To provide for a strong process the legal text should be clear, specific, unambiguous, consistent, and as well it should be distinct in law from other legal requirements and processes so that it commands greater authority (Gunton et al. 2004, Gibson 1993, Wood 2003, Gibson et al. 2005). The law is most powerful when its language is mandatory and not discretionary, and consequently the legal text describing the review process should use the words “must” and “shall”, not “may”.

While all of the good practices described in this chapter might be written into law, numerous items in particular should be legislated and legally mandated:

- the purpose of the process, including specifically that the purpose is to inform decisions with respect to whether or not projects should be approved, and to promote sustainability (Doyle and Sadler 1996, Gibson et al. 2005, Boyd 2003, Forbes et al. 2012);
- steps and procedures to be followed and the components of the process (Wozniak 2007, Gibson 1993, Doyle and Sadler 1996, Wood 2003);

- the roles, authority, responsibilities, and obligations of those involved (Gunton et al. 2004, Gunton, Day, and Van Hinte 2005, Van Hinte, Gunton, and Day 2007, Gibson et al. 2005, Gibson and Walker 2001);
- how project review is linked to other government decision-making (Droitsch, Kennett, and Woynillowicz 2008, Kennett 2006, Gibson et al. 2005);
- that strategic and regional EA is required to support reviews of individual projects (Forbes et al. 2012);
- that all projects, except those known to be benign, must be reviewed in some shape or form, but that the nature of review should be differentiated according to type (and scale) of projects (Zeremariam and Quinn 2007, Gibson 1993, Wood 1995, Doyle and Sadler 1996, Gibson et al. 2005);
- report content and that all essential topics discussed in s.3.3.2.2 must be covered (Ahmad and Wood 2002);
- that proponents must respond to questions on application content, such as requests for more information (Wood 1995);
- that stakeholders must be involved in the process and that stakeholder interests must be incorporated into final outcomes (Ahammed and Harvey 2004, Gibson and Walker 2001, Wozniak 2007);
- decision procedures and criteria, including the legal test of significance (Wood 1995, Gibson 1993, Morrison-Saunders and Bailey 2003, Gibson et al. 2005);
- that decision-makers are free to refuse an application (Wood 2003);
- that applications must be reviewed before irrevocable decisions can be made on whether or not to approve a proposal (Wood 2003), and that final decisions must be justified in relation to project benefits and costs;
- that proponents must mitigate impacts, prepare environmental management plans, and monitor impacts (Wood 2003, Ahmad and Wood 2002, Van Hinte, Gunton, and Day 2007, Wozniak 2007, Gunton et al. 2004);
- how follow-up is to occur and how enforcement will be conducted (Morrison-Saunders, Baker, and Arts 2003, Gibson et al. 2005);
- resource allocations and constraints, such as timelines and budgets (EMMRPIWG 2008, Gunton et al. 2004, Wood 2003, Ahmad and Wood 2002);
- penalties for malpractice (Flyvbjerg 2007); and
- that project reviews, evaluations of individual reviews, and audits of the whole review process must occur (Wood 2003).

One benefit of a strong legal foundation is that it counters strategic manipulation and political interference in the review process by narrowing the avenues for influence and penalizing such behaviour (Van Hinte, Gunton, and Day 2007, Gunton et al. 2004). Another benefit is that it helps clarify the process – clearly describing a process is one thing, but enshrining it in law makes it more predictable (Doyle and Sadler 1996). A third

benefit is that the high level of controversy of megaprojects is addressed as stakeholders are given some assurance that megaprojects are being reviewed through a relatively firm framework and not ad hoc.

3.3.3.8. Structured Decision Procedures

Decision-making should be structured so that it is not a conduit for bias or interference in rational process but instead helps promote sound development and protect the public interest. Decision-making should follow logical and sequential steps, and clearly articulated criteria should exist to guide major decisions (Senecal et al. 1999, Gunton et al. 2004, Lawrence 2003, Van Hinte, Gunton, and Day 2007, Wozniak 2007, Wood 2003, Gibson et al. 2005, Leu, Williams, and Bark 1996b, Forbes et al. 2012, Hierlmeier 2008a). Alaska and Australia, for example, have articulated the factors which compose the 'public interest' decision criteria used in each jurisdiction to guide oil and gas development decision-making (Hierlmeier 2008a). Criteria guiding final decision-making should follow from high-level policy (s.3.3.1) and should focus the process on ends, not means (Kennett 2006, 1999, Bruzelius, Flyvbjerg, and Rothengatter 2002, Flyvbjerg, Bruzelius, and Rothengatter 2003). For example, criteria should focus the process on whether or not a project achieves goals set out as high-level policy, not how a particular technology is employed. Criteria should also reflect the principles of sound decision-making, such as efficiency, democracy, and sustainability (Vanclay 2003, Gibson et al. 2005) and should clearly indicate that project review decision-making must not be unduly influenced by prior decision-making, such as the fact that a particular proponent may hold mineral tenure.

The above notwithstanding, a matter of debate is the degree to which criteria should guide decision-making – should criteria unambiguously guide decision-making and thus heavily constrain decision-makers with tightly defined pre-set factors, or should criteria be loose guideposts that provide decision-makers with ample flexibility? The issue is one of discretion. Wood (1995) suggests that the appropriate level of discretion is a matter of debate and should be set appropriate to involved parties, but Gibson (1993) stresses that discretion in project review decision-making should be limited.

Seventy-two percent of respondents felt that “elected decision-makers’ discretion should be heavily constrained by explicit and legally-binding decision making rules,

procedures, and criteria”, and 61% felt that non-elected decision-makers’ discretion should also be heavily constrained. Many respondents felt that if detailed and explicit guidelines and rules were in place that fair and effective review would be assured independent of decision-making. Some respondents commented on the need to limit the discretion of decision-makers so that they didn’t overly inject their biases into project review. For example, a consultant argued that the law should not permit senior elected officials in charge of final decision-making discretion to avoid relevant laws, such as environmental protection laws, that would make projects unapprovable.

The survey results affirm the recommendations in the literature for minimal discretion in review processes, though as some respondents made clear, some discretion remains necessary. A provincial government respondent wrote that

highly constrained decision making is not decision making – it makes the decisions ahead of time in setting the constraints. That can be appropriate for routine (small) projects that are low risk... [but]major projects require specific considerations and decisions, although the scope of these decisions could be narrowed through policy. The ability to use discretion and judgement is vital to meaningful decision making.

It is likely impossible to establish a system of rules to guide project review decision-making that ensures that good projects are always approved and bad projects are always denied without some discretion given the variety and range of situations that can arise. Consequently, good practice is to provide minimum discretion through relatively tightly-defined decision criteria. Further work is necessary to further identify how best to constrain discretion, though the answer may lie in mechanisms of transparency to help prevent abuse.

A structured decision procedure based upon tightly defined criteria provides several benefits. First, without the guidance provided by decision criteria, decision-makers are forced to improvise and guess, and may inject their personal biases as a result, leading to decisions that may be inconsistent with high-level policy goals and the public interest (Kennett 1999, Van Hinte, Gunton, and Day 2007, Hierlmeier 2008a). Second, these criteria can also counter political interference by structuring the factors on which decisions must be made. Assuming that decision criteria are consistent with the public interest, criteria make decision-making more democratic because they make

decision-making more transparent and traceable and better enable stakeholders to hold decision-makers to account (Lawrence 2003, Gunton et al. 2004, Van Hinte, Gunton, and Day 2007, Hierlmeier 2008a, Wozniak 2007). Third, sound criteria also help prevent bias stemming from other parts of the decision-making process. A problem discussed by Kennett (2006) and Vlavianos (2007b) in Alberta is bias injected into project review decision-making stemming from government's prior decision to issue proponents private rights to the public lands and resources in question. Criteria that clearly separate project review decision-making from prior decision-making should help reduce any such bias. Fourth, decision criteria guide the whole review process and involved parties (particularly proponents and final decision-makers) towards 'understanding the big picture' in megaproject proposals. When criteria are set, particularly with respect to final decision-making, it becomes clearer what is important and what is not, and this influences scoping and methods of impact assessment. Decision criteria likewise influence what types of development are proposed. The process becomes more predictable as prospective developers are guided as to what kind of development is desired by government and how their proposals will be examined, and this may encourage investment by providing more certainty (Bruzelius, Flyvbjerg, and Rothengatter 2002). Fifth, decision criteria also help reduce the high levels of controversy of megaproject review. Clear criteria are the foundation of transparent decisions; ambiguous criteria foster conflict over decisions by those who disagree with the decisions.

3.3.3.9. Communication

Good communication is crucial to effective review because it is the foundation for understanding the process. Good communication is required between government and proponents, but also with other stakeholders. Communication should be clear, precise, consistent, timely, regular, and ongoing, but also limited to what is necessary (Bruzelius, Flyvbjerg, and Rothengatter 2002, Senecal et al. 1999, Gunton et al. 2004, Wozniak 2007, Flyvbjerg 2008, Haveman 1976, Wood 1995, EMMRPIWG 2008). Section 3.3.3.6 explains that the fundamentals of the process should be communicated up front through documentation. Throughout a review, though, additional ongoing communication is needed on:

- next steps and what is required and/or expected of parties;

- the status of applications in the process;
- problems and issues with applications (e.g., data gaps);
- results of analyses, stakeholder involvement exercises, subjective judgements, justifications, assumptions, and their ramifications and consequences;
- decisions, terms and conditions;
- uncertainties and risks of proposals; and
- options available to involved parties following decision points, such as avenues for appeal for stakeholders (Wood 2003, Tennøy, Kværnner, and Gjerstad 2006).

To be the most useful, communication should follow several good practices. First, information should be easily accessible by the public (Wood 2003, Forbes et al. 2012). Confidentiality and secrecy concerns must be balanced with the need for involved parties, such as stakeholders, to have a sufficient basis for informed participation (Wood 1995). Second, information should be communicated in a timely manner to support the participation and involvement of all parties (Forbes et al. 2012). Third, communication should suit the audience, and so both technical and non-technical materials should be provided, and materials should be provided in the first languages of all stakeholders (Samset 2003, Wood 2003). Information should be published in media that is easily accessed by the intended audience and, in the case of communications to the public, a variety of media should be used to reach all constituencies (Sorel 2004, Wood 2003). Fourth, communication should be coordinated and handled by the IRB (s.3.3.3.4).

Clear communication provides clarity on the roles and expectations of parties involved in the process. Clear communication enables parties to act appropriately and follow through and achieve what is expected of them, making for a more efficient process. Similarly, good decisions can only be made when review information is communicated well to decision-makers (Tennøy, Kværnner, and Gjerstad 2006). This is critical to addressing the high risks of megaprojects. Finally, good communication helps address the controversy of megaprojects by providing the basis for understanding what is happening (Sorel 2004).

3.3.3.10. Stakeholder Participation

All stakeholders should have the capacity to substantially influence the outcome of the process such that the process serves all those who are affected by megaproject development (Senecal et al. 1999, Lawrence 2003, Flyvbjerg, Bruzelius, and Rothengatter 2003, Collingridge 1992, Andre et al. 2006, Wood 1995, Gibson and Walker 2001, Doyle and Sadler 1996, ICPGSIA 2003, Donnelly, Dalal-Clayton, and Hughes 1998, Gibson et al. 2005, Noble 2010).²⁵ Substantial influence is a basic principle of democracy and implies that stakeholders have real, genuine capacity to affect the outcome of the decision-making process (Laird 1993, Storey and Hamilton 2003, Arnstein 1969, Andre et al. 2006, Land-Murphy 2004, Forbes et al. 2012). Substantial influence stems from legal, procedural, or other mechanisms that empower stakeholders within the project review process. To try to express this substantial level of influence, I follow from Rowe and Frewer (2005) and use the term *stakeholder participation* instead of the more common term stakeholder involvement.

A necessary component of stakeholder participation is that opportunities for involvement are extended across all interest groups to enable full representation (Andre et al. 2006, Warrack 1993, Gibson 1993, Gunton et al. 2004, Frame, Gunton, and Day 2004, Wozniak 2007, Laird 1993, Cocklin and Kelly 1992, Storey and Hamilton 2003, De Bruijn and Leijten 2008b, Flyvbjerg, Bruzelius, and Rothengatter 2003, Collingridge 1992, Wood 1995, Zeremariam and Quinn 2007, Gibson et al. 2005, Land-Murphy 2004). As well, participation demands that stakeholders are involved throughout the review process (Andre et al. 2006, Frame, Gunton, and Day 2004, Gibson 1993, Gibson and Walker 2001, Wozniak 2007, Bruzelius, Flyvbjerg, and Rothengatter 2002, Flyvbjerg, Bruzelius, and Rothengatter 2003, Gunton et al. 2004, Linkov et al. 2006, Priemus 2008, Otway and von Winterfeldt 1992, EMMRPIWG 2008, Gray 1989,

²⁵ The term stakeholder means, most generally, a person or group that has a stake in the outcome of a decision. In the project review context, the stakeholder population includes proponents, other industry interests, the governments involved, Aboriginal groups, environmental groups, citizens living near projects, communities that will be affected, and anyone else that has a stake in the outcome. This definition of stakeholder contrasts with many people's understanding that stakeholders are those affected by decisions *aside* from proponents, government, and Aboriginal groups, the latter who in Canada prefer to distinguish themselves from all others. In this thesis I use the term stakeholder generally to signify *all* that have a stake in the outcome of a decision.

Ahammed and Harvey 2004, Morrison-Saunders, Baker, and Arts 2003, Samset 2003, ICPGSIA 2003, Slotterback 2008, Wood 2003, Warner and Preston 1974, McDaniels, Gregory, and Fields 1999, Fiorino 1989, 1990, Land-Murphy 2004, Forbes et al. 2012). Stakeholders should be involved from initial review through to the monitoring impacts, with the exception of one key component of project review: final approval decisions should be left with either democratically accountable government officials or an independent body (s.3.3.2.4).

Another key aspect of stakeholder participation is that there are ample opportunities for stakeholders to learn. If stakeholders are to contribute constructively they must understand the issues (Senecal et al. 1999, Andre et al. 2006). Stakeholders have preferences, but preferences are based on knowledge and values, both of which can evolve. According to Laird (1993), learning is not simply about acquiring new facts but about being involved in analyzing the problem and challenging current understandings. Stakeholders should be exposed to written materials, to experts, members of government, and proponents, and be given opportunities to debate and learn from one another (WCD 2000).

Participation also demands that power imbalances among stakeholders are reduced such that all can participate on a more equal footing (Frame, Gunton, and Day 2004, Gunton and Day 2003, Gibson and Walker 2001, Land-Murphy 2004). Many stakeholders – such as aboriginal and environmental groups – operate on small budgets or are volunteer-driven and have very few resources compared to government and industry. Such stakeholders require funding, training (e.g., in negotiation, data analysis, and evaluation), and favourable logistics (e.g., scheduling of meetings) in order to participate effectively (Andre et al. 2006, Laird 1993, Gunton et al. 2004, Irvin and Stansbury 2004, Wozniak 2007, Gibson 1993, Wood 2003, Hessing, Howlett, and Summerville 2005, Forbes et al. 2012).

Stakeholder participation also entails engaging stakeholders in ways that facilitate conflict resolution and build relationships (Andre et al. 2006). Certain forms of stakeholder involvement facilitate this, such as interactive meetings, but others forms of involvement, such as internet polls, do not. Methods should be chosen based upon their

ability to integrate all the parties involved, to facilitate each party’s learning about each other’s perspectives, and to make problem resolution a collective responsibility.

According to Gunton and colleagues (Gunton et al. 2004, Van Hinte, Gunton, and Day 2007), the proper form of stakeholder involvement in megaproject review is “shared decision-making” where participants are provided with authority to make decision recommendations and “work together in face-to-face negotiations to reach... consensus agreement[s]” (Frame, Gunton, and Day 2004 60) subject to final decision-making by democratically-accountable elected officials. In such a form of involvement, facilitators are used, and the process is based on interest-based negotiation (see Fisher, Ury, and Patton 1991). Shared decision-making is consistent with Collingridge’s (1992) recommendation for power-sharing and negotiation in large-scale project decision-making, and it is also consistent with the conditions of stakeholder participation outlined above.

Despite the strong call in the literature for stakeholder participation (through shared decision-making or otherwise), respondents were not highly supportive of it. This may be due to lack of experience or familiarity with this model in EA processes. The quasi-judicial model – the model currently in use in Alberta – was ranked the highest of the models referred to in the survey (Table 3.8).

Table 3.8. Survey Results Ranking Different Models of Stakeholder Involvement

Involvement Model	Average Ranking (out of 4)
quasi-judicial process in which stakeholders can formally assess, submit evidence, and cross-examine witnesses	1.7
gather stakeholder input prior to decision-making	2.3
shared decision-making in which government, proponents, and other stakeholders negotiate a decision on applications	2.4
notification and provision of information to stakeholders	3.3

The level of resources available to stakeholders – a key factor affecting power balances between parties involved in the review process – figured prominently in

respondents' comments. A regulator wrote that

the quasi-judicial process is best, however the current system is grossly imbalanced as it requires members of the public who intervene to do so in their 'spare time' using their own funds and often taking time off their regular jobs to do so. Meanwhile the proponent has full-time staff and high-paid consultants who can work full-time representing the proponent's view.

A citizen respondent wrote that shared decision-making can only be successful if the financial costs, time commitments, and ability of interveners to understand the project are addressed.

A group of respondents were concerned about the definition of stakeholder. A federal government respondent wrote that

the ability of some dilettantes from Toronto or overseas (or Calgary for that matter) to come and cause problems needs to be stopped. At the same time, a larger voice needs to be given to the people who live in the area.

An industry respondent felt that only those stakeholders that are directly affected by a project should be given access to the review process. In contrast, a regulator argued that people who represent the "broader public interest" should be involved alongside those with direct financial and/or property interests, and an industry respondent wrote that the process should provide opportunities to not just those who have financial and/or property interests but all those affected by the cumulative effects or socioeconomic impacts of projects, such as when development affects municipal infrastructure.

Respondents made many comments about shared decision-making, often with reference to their experience in the bitumen development context. A lawyer wrote that

I rated shared decision making as the lowest because so far such processes are dominated by industry and government so "shared decision making" is illusory.

An industry respondent stated that

the collaborative approach is generally unworkable. Although stakeholders may suggest it, often they have a no oil agenda which makes collaboration mutually exclusive to any outcome. The preferred method is an equal and willing engagement by all parties.

If respondents had not ranked the different models based upon their experience in the bitumen development context but instead based on a generic review context, shared decision-making may have been rated higher. An academic felt shared decision-making

comes closest to true citizen engagement and that is why it should be preferred. The others are simply window dressing - i.e., ask for input but no requirement to listen really... Shared decision making means shared decision making.

A regulator respondent suggested that shared decision-making could be integrated with the other models:

many of the features of shared decision-making can be worked into [the quasi-judicial model] if stakeholders are involved early in the process and if a proponent does not set its plans until stakeholders have had meaningful input.

A provincial government respondent felt that shared decision-making should be employed “at the regional scale” before individual project reviews are undertaken and “this is where one is most likely to obtain the best decision-making for everyone involved.” Two respondents advocated shared decision-making specifically to resolve Aboriginal issues. A lawyer felt that

a shared decision-making process is not necessary in general and is not desirable if proponents are part of the decision-making process, but shared decision-making is desirable in cases where First Nations' rights are at stake in areas which are subject to aboriginal title and rights.

The survey results are generally consistent with the advice in the literature on good practices for stakeholder involvement. However, the combination of the moderate ranking of shared decision-making and the mix of opinions expressed in comments does raise into question the appropriateness of shared decision-making in project review. Notably, the value of shared decision-making in project review was considered with

reference to conditions in Alberta at present or in the past. It is obviously impossible at this point to know how respondents would have rated shared decision-making if they weren't focused on bitumen development experience, but the survey data do suggest that shared decision-making could be a workable model of stakeholder involvement. Indeed, methods of stakeholder involvement should be chosen to fit the decision environment (e.g., Samset 2003, Bradshaw 2003, Noble 2010, Wood 2003). Shared decision-making might be ideal for some decision points, such as scoping or final decision-making, but other methods of involvement may be more suited to other steps in project review.

The benefits of stakeholder participation to project review are many. Stakeholder participation helps improve the information base upon which project review occurs because it gathers more accurate information on how stakeholders are affected as well as more diverse and creative inputs to the process than would otherwise be gathered (Frame, Gunton, and Day 2004, Laird 1993, Rowe and Frewer 2005, Collingridge 1992, Noble 2010). By asking stakeholders for information and perspective, participative processes are more informed than expert-driven processes because no one can judge the importance of impacts on stakeholders better than stakeholders themselves, and stakeholders possess unique knowledge about how impacts occur and where solutions may lie (Gibson 1993, Vanclay 2003, UN 2007). Stakeholder participation also provides greater scrutiny over subjective decisions (Wozniak 2007) which has the effect of not just improving decisions and making them fairer as they are more in line with stakeholder interests (Frame, Gunton, and Day 2004) but also uncovering mistaken beliefs and assumptions (Collingridge 1992) and placing a check on bias and interest group behaviour (Bruzelius, Flyvbjerg, and Rothengatter 2002, Sabatier and Mazmanian 1979 in Rickson, Western, and Burdge 1990, Flyvbjerg, Bruzelius, and Rothengatter 2003). The improved information base from stakeholder participation helps the process address the breadth of issues that megaprojects cause and develop an understanding of the big picture, and ultimately serves to address the high risks of megaprojects. This opening up of the process to the wide range of interests also brings interest groups who are traditionally outside of the process inside the process, helping to address the controversial nature of megaprojects and reduce conflict (Wozniak 2007, Cocklin and Kelly 1992, EMMRPIWG 2008, CAPP 2006, De Bruijn and Leijten 2008b, Noble 2010).

In doing so, decisions reached in review are more likely to be implemented successfully because stakeholders are more likely to support them (De Bruijn and Leijten 2008b, Wozniak 2007, Frame, Gunton, and Day 2004, Andre et al. 2006, Bruzelius, Flyvbjerg, and Rothengatter 2002, Noble 2010).

3.3.3.11. Expert Involvement

In project review there are often many information gaps that can only be addressed by gathering expert opinion. Experts are people with specialized knowledge and skills. Experts can apply their knowledge to address objective matters, such as conducting impact assessment using a special technique, but also subjective matters, such as when knowledge gaps exist that require 'educated guesses' (Cooke 1991, Otway and von Winterfeldt 1992, Linkov et al. 2006). However, despite being labelled such, experts are neither infallible nor perfect in their thinking, and this needs to be addressed in project review. Experts may make errors in judgement (e.g., probability biases such as anchoring) and be overconfident, and their thinking may be affected by their own ideological persuasion, self-interest, or other motivations (Morgan and Henrion 1990, Cooke 1991, Kahneman, Slovic, and Tversky 1982, Collingridge 1992).

Consequently, to ensure high-quality expert input, it's important that experts involved in project review are 'checked' for these shortcomings in their thinking. When science documentation is used, peer-reviewed studies should be used instead of 'grey literature' (Flyvbjerg 2007, 2008, Flyvbjerg, Bruzelius, and Rothengatter 2003, Sinnette 2004, Bruzelius, Flyvbjerg, and Rothengatter 2002, ICPGSA 2003, Morrison-Saunders and Bailey 2003, Hall 1980). In the case of expert studies done expressly for a project review, Flyvbjerg (2007) recommends that studies are released for public scrutiny. If expert advice is needed in person, such as during a quasi-judicial hearing, then it should be drawn through a formal, structured, and transparent process. The process should involve gathering a range of opinions from experts that are independent of interests in the decision, probing experts' values, assumptions and reasoning, examining areas of agreement and disagreement, highlighting strengths and weaknesses of understanding, and documenting and communicating judgements (Keeney 1992 in Arvai, Gregory, and McDaniels 2001, Otway and von Winterfeldt 1992, Failing, Gregory, and Harstone 2007, Laird 1993, Morgan and Henrion 1990, Cooke 1991, Flyvbjerg, Bruzelius, and

Rothengatter 2003). A municipal government respondent suggested that "there should be some pre-set qualifications for experts before government or proponent funds are used to pay for them" and a lawyer respondent argued that experts should be qualified by a panel before they give evidence as would be done in a legal proceeding. Leu et al. (1996a) recommend that a database of experts is developed indexing experts by subject.

There are numerous benefits to using good expert involvement practices. Experts can fill in information gaps, and place a check on others' information and conclusions, and thereby help address bias, interest group behaviour, and the high risks of megaprojects. Finally, these practices also help reduce conflict among stakeholders, and thus address the controversy associated with megaprojects, by helping to address the "duelling analyst" phenomenon. As such good expert practices can help build stakeholder support by helping to settle conflicts over different interpretations of impacts.

3.3.3.12. Precautionary Process

To reduce the high risks inherent in megaproject development, the review process should exhibit precaution throughout its procedures and practices. Most basically, the review process should identify sources of uncertainty, describe and analyse risk information (through probability and sensitivity analysis, for example), develop and implement strategies to reduce risk, monitor the effectiveness of mitigation strategies, and require proponents (through terms and conditions) to adjust procedures and activities if monitoring results are poor (Allen 2004, Flyvbjerg, Bruzelius, and Rothengatter 2003, Warrack 1993, Warrack 1996, Stough and Haynes 1997, Collingridge 1992, ICPGSIA 2003, Tennøy, Kværner, and Gjerstad 2006, Gibson et al. 2005, Noble 2010). However, as these practices are limited by methods, knowledge, and other resources, additional steps should be taken to address megaproject risks.

Building upon the above ideas, one strategy is to more comprehensively integrate the precautionary approach into the decision-making process, sometimes called the precautionary principle (Gibson and Walker 2001, Vanclay 2003, Forbes et al. 2012). The precautionary approach revolves around the notion that scientific uncertainty does not justify a lack of action to prevent harm (e.g., UNEP 1992). In project review, the precautionary approach therefore entails conservative decision-making and strong

efforts at risk reduction when projects pose serious risks. The precautionary approach advanced here does not require that severe restrictions be put on human activities in order to avoid all risks – what some call the precautionary principle (e.g., Peterman 2004) – but that caution be exercised throughout the review process. As examples, caution can be exercised in scoping (e.g., adjusting information requirements and what methods must be used), terms and conditions (e.g., restricting allowable impacts further than what would be acceptable under certainty, and requiring proponents to take strong action to mitigate risks), and monitoring (Sadler 1987 in Sadler 1990).

A second strategy that should be useful to address uncertainty is to incorporate adaptive management into the decision-making process (Van Hinte, Gunton, and Day 2007, Wozniak 2007, Gibson et al. 2005). As originally conceived, adaptive management involves confronting uncertainty through a targeted process of learning through experimentation and incorporating new knowledge into future decision-making (Walters 1986). Often in practice, however, adaptive management entails simply adjusting practices when information arises that suggests that current practices are insufficient. The original and more common forms are referred to as ‘active’ and ‘passive’ adaptive management, respectively. While active adaptive management may help the most in terms of resolving uncertainties, it is not necessarily appropriate in all circumstances; careful consideration should be made of spatial and temporal scales of issues and management institutions, the nature of the uncertainties in question, the costs, benefits, and risks of the issues in question, and the degree of stakeholder and institutional support that exists for adaptive management (Gregory, Ohlson, and Arvai 2006). Adaptive management could be implemented in project review through approval terms and conditions.

A complementary precautionary trial-and-error approach is recommended by Collingridge (1992) to address the risks of new technology in megaproject development. Grounded in Lindblom’s (1959) model of incrementalism, Collingridge’s approach involves:

- ensuring that only new technologies with low consequences are experimented with;
- ensuring that experiments entail changing only a few conditions at any one time;

- designing experiments for quick results and fast learning; and
- making learning a public affair by involving stakeholders.

Collingridge’s approach fits well with both adaptive management and stakeholder participation (s.3.3.3.10) and can be integrated into the review process by way of decision-making criteria (s.3.3.3.8), methods used to review projects (s.3.3.3.4), and through good communication (s.3.3.3.9).

Indeed, it is critical that key uncertainties and the risks that stem from them are communicated well. Tennøy et al. (2006) stress that impact uncertainties, including how different inputs led to different conclusions, must be communicated transparently to decision makers and stakeholders in project review.

Respondents rated a variety of precautionary practices highly important to project review (Table 3.9). A citizen respondent argued that

the reality of risk assessment is that all levels of risk are based on estimates. Moreover, not all risks may even be identified or identifiable at the project evaluation stage. Risk can be reduced if the proponents of projects know and fear that they will be held fully accountable to mitigate any and all harmful outcomes if those should occur at any time in the future.

Table 3.9. Level of Importance of Various Precautionary Practices

Precautionary Practice	Very Important	Important	Somewhat Important	Not Important
specification, at time of approval, of who is liable for unforeseen consequences, required mitigation measures, and timelines for mitigation	77%	14%	5%	3%
assessment of uncertainty and risk in impact assessment by identifying uncertainties, quantifying the probabilities of undesirable events and the magnitude of harm, and conducting sensitivity analyses in impact forecast models	62%	26%	10%	1%
active adaptive management involving active experimentation and incorporating what is learned into future management decisions is used to deal with uncertainty	54%	32%	10%	3%

Precautionary Practice	Very Important	Important	Somewhat Important	Not Important
proponent is required to demonstrate beyond a reasonable doubt that uncertainties are benign, meaning that despite imperfect knowledge there will be no serious consequences from the project.	44%	24%	12%	17%
extra caution when new technology is proposed by allowing only smaller projects at first until technology is proven and requiring redundancy in systems so that proven technology exists to back up new technologies	39%	28%	23%	8%

A consultant suggested that proponents should pay into trust funds to cover the costs of any unforeseen costs that may be incurred by the public due to unplanned events. However, a provincial government respondent felt that "the liability for unforeseen consequences will depend on their nature, and since they are unforeseen, cannot be specified ahead of time." Numerous industry and government respondents felt that it would be impossible to demonstrate that uncertainties are benign, though a regulator wrote that

care is needed not to set impossible standards of proof while at the same time guarding against potential unacceptable impacts. Where such an impact could result, the hurdle must be higher.

An academic offered that demonstrating "beyond a reasonable doubt" is "likely unrealistic in this context" and that "on a balance of probabilities... would make more sense." While a provincial government respondent felt that the precautionary practices suggested to deal with the risks of new technology were "unrealistic and unreasonable", an industry respondent noted that

regulators normally have the ability to be involved in piloting new technology and approving pilot plant programs to remove the uncertainty associated with newer technologies.

A citizen respondent similarly argued that "unproven technologies need to be proven prior to allowing them to be included in the project application and possibly influencing approval."

Respondents advanced several other ways to address risk. A provincial government respondent felt that the problem was one of clarity in policy:

providing clear and consistent definitions of the terms, and perhaps specifying methodology, will make it easier for regulators and stakeholders to understand uncertainty and risks and compare projects.

A consultant respondent suggested that reviews

need to formally include “upset scenarios”. These are often done by the proponent for their internal planning processes but are not often shared through the public review process.

An industry respondent noted that, at least in the Alberta project review process, the degree to which projects are defined at the time of project review is not high, so decisions made in project review must be on the bigger picture and that further concerns should be dealt with at a later date through permitting. This comment raises the point that the degree to which risk is addressed in project review is a function of the state of the project – review should be conducted on the most recent design and perhaps there should be a revisiting of key issues once a project’s design is firmed up. Finally, a citizen respondent suggested that large buffer areas should be used to separate development from residents to address risks.

The survey results add ideas new to the literature on how megaproject risk can be addressed, and the results suggest that proponents should be required to demonstrate that the uncertainties associated with their project are likely harmless, and also that liability should be assigned at time of approval.

There are several benefits to precautionary practices. Precautionary practices confront imperfect information, or uncertainty, and the risks that stem from it, and thus these practices directly confront the high risks of megaprojects. These practices – adaptive management and the trial-and-error approach in particular – provide a means to take what is learned and feed it back into decision-making and thereby provide a means to proactively address uncertainty.

3.3.3.13. Appeal Mechanisms

Many in the literature argue that stakeholders should be given the capacity to appeal all major decisions in the review process (e.g., Wozniak 2007, Altshuler and Luberoff 2003, Gibson 1993, Leu, Williams, and Bark 1996a, b, Wood 2003, Forbes et al. 2012), but there is debate on exactly what should be appealable, who should be able to appeal decisions, who should hear appeals, and the authority that should be given to the appeal body.

Grounds for appeal in Canada are well established in common law and include jurisdiction (i.e., was the decision-maker acting *ultra vires*?), real or apprehended (i.e., perceived) bias, and failure on the part of a decision-maker to consider relevant factors (Tollefson 2003). These items may be matters of procedure (i.e., were all procedural requirements of the process carefully followed?) but also can be matters of substance (i.e., was the logic, reasoning, and interpretation of evidence done correctly?). According to 61% of respondents, stakeholders should be able to appeal decisions on matters of both procedure and substance (Figure 3.5). However, a provincial government respondent felt that appeals should only be allowed if they meet “explicit and high (demanding)” criteria but not those that are “unachievable or impractical”, and similarly, a municipal government respondent argued that

there should be a quick review of the reason for the appeal and if it is found to be groundless (i.e. ‘I don't agree with the decision’), then an appeal should not be allowed.

Indeed, Forbes et al. (2012) argue that tests or other obstacles are necessary to ensure that only worthy challenges to project review decisions are allowed.

A second debate concerns who should be able to appeal decisions. Many project review processes utilize quasi-judicial hearings, or tribunals, for many major decisions, and typically in tribunals, standing is offered to those who have a direct material interest in the decision, i.e., proponents and those whose property or business interests are ‘directly affected’ (Muldoon et al. 2009). However, recent trends in Canada are loosening these conventions and opening participation up to a larger range of actors (Archer et al. 1999, Tollefson 2003). Indeed, while most respondents felt that standing

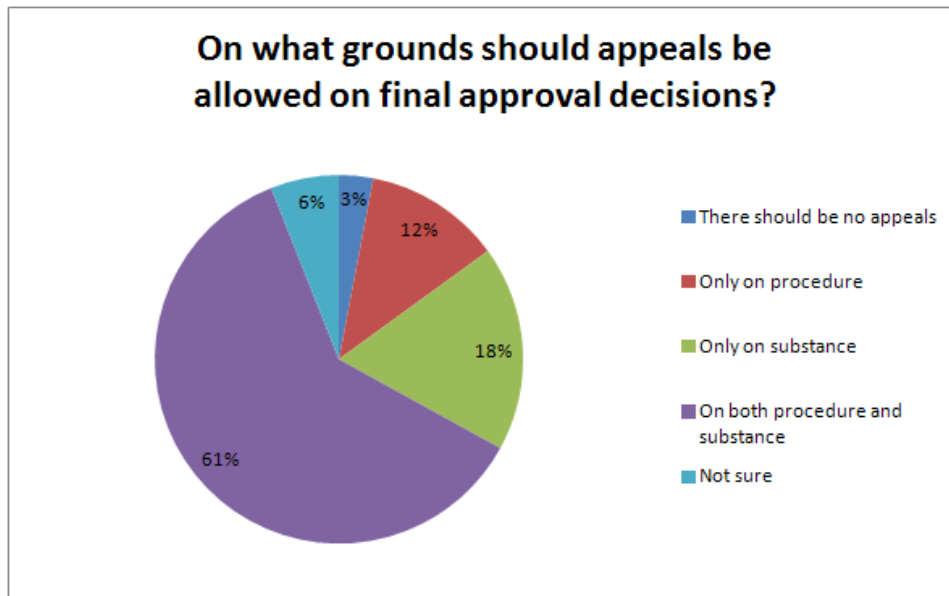


Figure 3.5. Respondent Preferences Regarding Grounds for Appeal of Final Decisions

in appeals on final decisions should be limited to those with direct interests in the decision, a sizeable proportion of respondents felt that standing should be extended to any interested party (Table 3.10). This latter group felt that standing should be offered to taxpayers, to the government if the decision was made by an independent body, to parties “directly affected in terms of their health and well-being” or those able to demonstrate that broader public interests are not being addressed, and to Aboriginal groups who object to projects on grounds of interference with their constitutional rights. Forbes et al. (2012) agree and argue that anyone representing the public interest should have the ability to appeal major project review decisions.

A third point of debate is who should hear appeals. Should appeals be heard by the original decision-maker, the courts, or some other body? According to the literature, appeals should be handled by a qualified, impartial, and independent appellate body (Gibson 1993, Lawrence 2003, Gunton et al. 2004, Van Hinte, Gunton, and Day 2007). Typically, appeals are heard by a more senior decision-maker in government, a specialized appeal body, or the courts (Muldoon et al. 2009). In Canada the courts are generally accepted as the appropriate appeal body for matters of procedure as the

Table 3.10. Respondent Opinions on Appropriate Standing Regarding Appeals on Final Decisions

Of respondents who thought that appeals of final decisions should...	thought that those with direct financial or property interests should be allowed to appeal	thought that proponents should also be able to appeal	thought that 'any interested party' should have the right to appeal
only be allowed on procedural matters	75%	58%	25%
only be allowed on substantial matters	76%	53%	12%
be allowed on both procedural and substantive matters	63%	46%	32%

courts are experts in law. It is less clear who should hear appeals on substance. Canadian courts tend to defer to political decision-makers on substantive matters, known as curial (or judicial) deference, under the argument that decisions on matters of substance should be made by bodies with expertise in the matters (Tollefson 2003). As the courts are generally not considered experts in the substance of environmental science and other project review matters, advocates of this view hold that the courts are inappropriate to hear appeals on substance. The majority of respondents felt that appeals should not be heard by the original decision-maker (Table 3.11). Respondents on the whole favoured the courts or an independent appellate body to hear appeals. A citizen respondent argued that

the appeal body must have complete distance from government, proponents and interveners so no decisions are influenced from within or without, but are judged on the transcript of the hearing.

Table 3.11. Respondent Opinions on Appropriate Appellate Body

Of respondents who thought that appeals of final decisions should...	thought that the original decision-maker should <u>not</u> hear the appeal
only be allowed on procedural matters	75%
only be allowed on substantial matters	60%
be allowed on both procedural and substantive matters	67%

A lawyer respondent thought that substantial matters should be heard by a scientific panel.

A fourth debate concerns the authority of the appellate body. Should the appellate body assess the evidence and make a new decision? Or, should this body, after considering the evidence, refer the decision back to the original decision-maker for reconsideration? Or should the appeal body have other powers? The majority of respondents favoured giving the appellate body the authority of choice on whether to replace the decision or send the issue back for reconsideration (Table 3.12).

Table 3.12. Respondent Opinions on Appropriate Authority of the Appellate Body

Of respondents who thought that appeals of final decisions should...	thought that the appellate body should have the right to overturn the decision and replace it with its own decision	thought that the appellate body should have the right to overturn the decision and refer the issue back to the original decision-maker	thought that the appellate body should have the choice of whether to replace the decision or send the issue back to the original decision-maker
only be allowed on procedural matters	0%	75%	13%
only be allowed on substantial matters	0%	78%	22%
be allowed on both procedural and substantive matters	9%	37%	54%

Respondents made a variety of additional comments regarding an ideal appeals system. A regulator respondent advocated an appellate body superior in position to the original decision-maker so that the decision-maker is kept “on its toes” and acting consistently with the principles of natural justice. A provincial government respondent advocated financial support for those who appeal, but also “awarding of costs for frivolous or vexatious appeals”, adding that “it may be wise to require an appeal fee, refundable if the appellant is victorious.” An industry respondent felt that “the approval

process needs to be robust to minimize the risk of appeals.” This respondent highlighted their conception of appealability of decision-making as risk:

there needs to be some recognition of the risk to the investment if the appeal process could result in the approval being denied after it had been granted. There needs to be some protection of the investment climate in order to continue to attract investment. If the appeal process can put the entire project at risk, we would very quickly have no one willing to provide venture capital into these projects in the first place.

One solution to the above problem is to have a short delay in the decision-making process prior to final approvals being issued, as advanced in s.3.3.2.5.

Designing a sound appeal system is challenging, and this research helps illuminate what such an appeal system should look like in the megaproject review context. First, there is support for allowing appeals on major decisions on both matters of procedure and substance, though there must be a test in place to ensure that the appeals are not frivolous. Various such tests exist today in various legal environments; further research is needed to examine their usefulness in the project review context. Second, proponents and those with direct material interests should be allowed to make appeals. There is moderate support for extending standing more broadly, but further investigation is required on the advantages and disadvantages of doing so. Third, appeals should not be heard by the original decision-maker: appeals on procedure should go to the courts, and appeals on substance should go to an independent appellate body with expertise in the matters. Fourth, appellate bodies should have the power to consider the evidence and to overturn a final decision and return it back to the original decision-maker with clear direction on how to remedy the identified problem(s). The outstanding questions are whether the appellate body should review new evidence, and whether the appellate body should be given the power to replace a decision with its own.

The project review appeal system should be prescribed in the laws providing for the review process in order to provide for a ‘statutory right’ to appeal. Without specification of the above details on what is appealable, standing, appellate bodies and their powers, stakeholders are given only the limited powers provided by Canadian administrative law.

One benefit of this set of good appeal practices is that it addresses limitations in resources. Mistakes may be made in impact assessment and elsewhere in the project review process, and a system for appeals provides a means to correct them. For this reason, this set of practices also helps address the high risks of megaprojects by providing a means to improving the information base upon which decision-making rests, whether due to honest mistake, bias, strategic manipulation, or political interference. These practices also help address the highly controversial nature of megaprojects by providing a sound means to address disputes. Finally, these practices make the process more predictable and thus make the process more certain for investors and other stakeholders.

3.3.3.14. Obligations to Indigenous Peoples Met

In many areas around the world, indigenous peoples continue to occupy their traditional lands and practice their cultural activities including hunting, gathering, religious practices, and speaking traditional languages. It is a matter of human rights that these people are allowed to continue practicing their culture.

The United Nations' *Declaration on the Rights of Indigenous Peoples* (UN 2007) establishes numerous rights and conventions that are highly relevant to resource development including:

- the right to practice customs and traditional activities on and with traditional lands and resources;
- the right to not be subjected to forced assimilation or destruction of culture;
- the right to participate in decision-making over matters that may affect them;
- the need for nation states to make amends for a history of injustice against indigenous peoples;
- the right to compensation for lost lands and resources;
- the right to the conservation and protection of the environment and the productive capacity of their lands and resources; and
- the rights to financial and technical assistance from nation states to enable indigenous peoples to ensure their rights are protected.

The UN declaration also establishes that nation states shall take measures to protect indigenous rights and address threats to indigenous peoples. Governments are therefore obliged to not just react to indigenous issues but to be proactive in their

dealings on these issues. Each country that has signed the UN declaration – Canada has – is obliged to apply these principles in their policy making alongside adherence to the country's own laws pertaining to indigenous rights. An ideal project review process will thus ensure that the rights established in the UN declaration as well the country's own laws are protected (Gunton et al. 2004, Van Hinte, Gunton, and Day 2007, Wozniak 2007, Passelac-Ross and Potes 2007). According to Forbes et al. (2012), the UN declaration should be embedded in a jurisdiction's project review laws.

Impact-benefit agreements between indigenous groups and proponents can play an important role in protecting these rights (WCD 2000). These agreements formalize how proponents will mitigate and compensate for harms of projects, but also how indigenous interests will be respected in the course of development (Sosa and Keenan 2001). Many of these agreements are also used to formalize benefits arrangements between proponents and Aboriginal groups, such as employment and training programs (Noble 2010, Galbraith, Bradshaw, and Rutherford 2007).

Project review should also be adapted to the cultural characteristics of indigenous people affected by proposals (Land-Murphy 2004). For example, project reviews should communicate with indigenous people in their native language, and stakeholder engagement activities should respect affected indigenous groups' cultural norms.

Respondents offered numerous suggestions for good indigenous practices in megaproject review. The majority who commented were concerned with *how* indigenous peoples are involved. A dominant concern was that First Nations and Métis should have special status with regards to stakeholder involvement and decision-making. A consultant respondent wrote that

there is a need for development and implementation of a separate process for consultations with potentially affected First Nations, and for use of this separate process to jointly decide on avoidance, mitigation and compensation for infringement of constitutionally-protected Treaty rights.

An NGO respondent argued that "First Nations need to be decision-makers, not "interest groups"". Another concern was that indigenous groups had sufficient resources to participate. A consultant respondent stated that

the relative sizes of the parties involved may skew the review process (i.e., large multi-nationals versus small First Nation groups or other locals with varying levels of organization and experience). Any mechanism of stakeholder involvement must acknowledge this size disparity and ensure that it does not affect the provision and receipt of input.

These data all reinforce the notion that government should meaningfully engage indigenous people in project review and mitigate negative impacts. The practices outlined in ss. 3.3.3.10 and 3.3.3.5 provide guidance on these topics but may miss important means for addressing government obligations to indigenous people in particular.

The benefits of good indigenous practices are threefold. First, these practices help ensure that universally-recognized rights of indigenous peoples are upheld. Second, in recent decades Aboriginals in Canada have increasingly succeeded – through litigation – in forcing governments to change the way that they interact with Aboriginal people and deal with Aboriginal territory. A risk to megaprojects is that future legal decisions may seriously affect projects either through forced changes to project operations, financial liabilities, or otherwise. By proactively addressing obligations to indigenous peoples, government can reduce the risk of a legal ruling in the future affecting project development. Third, ensuring obligations to indigenous peoples are met can help reduce controversies that may exist around resource development and its impacts on indigenous peoples.

3.3.3.15. Minimal Public Investment in Projects

Government is often expected to play two conflicting roles in megaproject development: (1) safeguarding the public interest, and (2) promoting projects when policy objectives are thought to require development or when private markets undersupply public goods (Bruzelius, Flyvbjerg, and Rothengatter 2002, Flyvbjerg, Bruzelius, and Rothengatter 2003). From the point of view of the megaproject review literature, government should minimize getting financially involved in development and instead focus on playing the role of public safeguard (Flyvbjerg 2008, Bruzelius, Flyvbjerg, and Rothengatter 2002, Flyvbjerg, Bruzelius, and Rothengatter 2003, Gunton 2003a). Accordingly, government should minimize directly investing in projects, and likewise should not indirectly invest in projects through sizeable financial guarantees,

back-stops, or subsidies. Government should instead require that private actors cover the costs of projects themselves. If government concludes that it absolutely must get financially involved, then involvement should be limited (Bruzelius, Flyvbjerg, and Rothengatter 2002, Flyvbjerg, Bruzelius, and Rothengatter 2003). Much of the rationale for this good practice stems from Flyvbjerg and colleagues' research on the failure of transportation megaprojects in Europe and elsewhere in the world.

To test these ideas, I asked respondents if they supported government financial involvement in large-scale project development. Most said that "it depends" (Table 3.13). The dominant rationale among supporters of government financial involvement was the perception that such involvement is necessary at times for the greater public good. An industry respondent felt that governments need to invest in the infrastructure that is required to support large-scale projects like roads, housing, and support services as "projects cannot carry all of this investment on their own." A municipal government respondent wrote:

we are seeing that around the world, governments are getting involved in supporting major developments that have major benefits to society. Canada needs to stay competitive with the global market and should use incentives wisely for projects that are considered important to the overall development of the country.

Numerous respondents thought that technological development, such as carbon capture and storage, was an appropriate reason for government involvement. Several respondents stressed, though, that involvement should only occur when private developers lacked the funding. A regulator wrote that involvement was appropriate when "an extremely important project (that is in the public interest) cannot otherwise proceed."

Many respondents pointed out the need for impartial project review decision-making if government becomes financially involved. A consultant respondent argued that involvement would be acceptable if a project was in the public interest and

Table 3.13. Respondent Opinions on the Appropriateness of Government Financial Support of Large-scale Project Development

Support for government financial involvement in large-scale project development	Reasons why
61% said it depends	(see text)
22% said no	<ul style="list-style-type: none"> • 85% agreed that project review decision-making becomes biased if government is financially involved • 55% agreed that government subsidizing of development results in uneconomic projects • 55% agreed that government tends to make poor economic decisions and perform poorly in the marketplace • 50% agreed that private actors tend to act imprudently when they are not completely financing projects
14% said yes	<ul style="list-style-type: none"> • 46% agreed that private developers have too little incentive to provide for society's needs (i.e., public goods) and so government involvement is necessary • 31% agreed that government involvement is necessary because private developers are unwilling or unable to shoulder the full costs of development • 15% agreed that the benefits of large-scale project development are so great that government should help as much as possible

as long as there are clear guidelines and a process in place to avoid a conflict of interest... [you] can't have the government body that is investing in a project reviewing... it.

Another consultant respondent suggested that government financial involvement should only be contemplated once project review has determined that the project is in the public interest.

Respondents offered numerous other reasons for and against government financial involvement. Two respondents argued that as the public owns the resources and already receive benefits from their development (through royalties and taxes), government should not be constrained from directly participating in development. One provincial government respondent wrote:

I believe all citizens should benefit from our natural resources and government can achieve that by getting into the game again and increasing revenue and decreasing taxes. I am not suggesting a socialist state by any means, but low risk, high revenue opportunities are a no brainer.

A few respondents argued not for direct involvement, but for direct returns for public investors as payback for financial support. A municipal government respondent argued that any government financial involvement must return a consequent share of the revenues, and an aboriginal respondent argued that the profits earned from the investment should be returned to the government. A few respondents also thought that government subsidization of projects alters the attractiveness of energy supply options that compete with hydrocarbon projects, and that government's role should not be to address the externalities of development.

The most dominant themes in the data are that government should only get financially involved in project development if the project has public interest appeal and if public funding is absolutely necessary to get the project going, but that financial involvement is likely to introduce bias into project review and may promote uneconomic development. These ideas are consistent with the literature. A conundrum remains, though: evaluating the public interest value of a project requires consideration of public investment – one cannot examine a project's net economic benefits, for example, without considering the public investments that go into the project – but evaluating the public interest value of a project, including its risks of failure, in which the public is investing is biased by virtue of the investment. If review and decision-making rested in the hands of a non-government body then this problem could be overcome, but if final decision-making at least remained with elected officials (as recommended in this chapter) then there appears to be no easy solution except to minimize public investment.

An interesting problem identified by respondents that may also have few solutions is that even the collection of royalties from resource development projects may create a bias in decision-making. It may be that such bias is only countered by following other good practices of project review.

A key benefit of minimal public investment in megaprojects under review is in terms of reducing bias in project review. Government involvement as a developer creates a bias towards the project which can interfere with rational decision-making (Gunton 2003a, Bruzelius, Flyvbjerg, and Rothengatter 2002, Ascher 1993). This bias may be interest bias (linked to the potential of a project to earn royalties for government, for example) and manifested in political interference, or a cognitive bias such as over-optimism linked to megaproject characteristics. A second benefit is that the risk of megaproject failure is reduced. Risk is reduced by addressing biases in government decision-making, but also because of the accountability structured into private investment. When private capital finances the project, the developer is more likely to accurately evaluate the economic merit and risks of projects than when government funding is involved (because of the more direct accountability between decision-makers and investors than between decision-makers and taxpayers), translating into project development that makes more economic sense, and also project implementation may be more successful because developers may have a stronger incentive to monitor and address delays and control costs (Bruzelius, Flyvbjerg, and Rothengatter 2002, Flyvbjerg, Bruzelius, and Rothengatter 2003, Flyvbjerg 2007). A final benefit is that the process becomes more legitimate by separating decision-maker from financier.

3.4. Discussion

The above description of good practices provides a list of ingredients for an ideal process for the review of megaproject proposals in the megaprogram context. The good practices are summarized in Table 3.14.

A notable feature of the good practices presented in this chapter is how information quality is dealt with. Adequate information – defined as complete, accurate, reliable, applicable, and easy to put to use, and sourced from scientists, government, traditional peoples and other stakeholders – is highlighted across the literature as critical to sound review (e.g., Van Hinte, Gunton, and Day 2007, Morrison-Saunders and Bailey 2003, Senecal, 1999 #1871, ICPGSIA 2003, Warrack 1993, Wozniak 2007, Morrison-Saunders, Baker, and Arts 2003, Vanclay 2003). This is indisputable. Its critical to realize, though, that adequate information is a function of other good practices (Figure

Table 3.14. Good Practices for Megaproject Review Within the Megaprogram Context

Good Practice	Description
Integration with Broader Management System	<ul style="list-style-type: none"> • Government manages lands and resources using a system of interdependent but hierarchical decision-making including strategic policymaking, land use planning, tenuring, project review, and permitting. • High-level policy lays the foundation for decision-making and is developed through stakeholder-inclusive strategic policymaking and land use planning, which itself may be developed through strategic EA, regional EA, and/or class EA. High-level policy communicates government's objectives, indicates where, when, and how development may occur, sets priorities, identifies the values that will drive land and resource management, and delineates acceptable levels of change in valued components. • Tenure decision-making reflects high-level policy in terms of where development may occur. • Project review examines whether particular conceptions of development are acceptable or not, based upon the direction provided in high-level policy. • Permitting follows from project review to address the details in acceptable project proposals.
Initial review	<ul style="list-style-type: none"> • Proposal is subject to initial review to make an initial determination of acceptability, and if acceptable, the type of detailed review required, if any. • Decision-making in initial review follows a structured process. • If the project is deemed acceptable the proponent is clearly informed of (a) initial concerns of government and stakeholders and (b) next steps in the review process.
Scoping	<ul style="list-style-type: none"> • If the proposal is accepted and requires detailed review, then government conducts scoping to determine the nature of detailed review and to narrow it to key issues. • Through scoping the proponent receives feedback from government and stakeholders regarding issues raised by the proposal. • The scope of detailed review is formally established in a contract such as terms of reference (TOR), and the contract specifies the content of the proponent's application and how it should be prepared. • Regardless of any narrowing of the scope of reviews during scoping, review covers four essential topics: (1) project justification, (2) potential impacts and planned mitigation measures, including cumulative effects (3) alternatives and which is the best performer, and (4) likelihood of project success.
Application Preparation	<ul style="list-style-type: none"> • Impact assessment work is done by an independent body with proponents and/or government paying, or by the proponent with proponent paying and safeguards in place to safeguard the quality of impact assessment. • There is good communication between impact assessors and project designers so that impacts are mitigated in manners that provide for the greatest net benefits. • Legal and procedural incentives, including the use of accredited impact

Good Practice	Description
	assessors, exist to propel accurate, high-quality assessments without bias.
Scrutiny of Application	<ul style="list-style-type: none"> • Applications are checked for consistency with the TOR in terms of content and methods, and content (including significance conclusions) is scrutinized for quality and freedom from bias. Cumulative effects assessments are scrutinized especially carefully. • Reviewers have the legal capacity to request that deficiencies in applications are addressed, and proponents are legally required to respond. Requests to proponents to address deficiencies are coordinated. • Once the application is deemed acceptable quality and review of the proposal is deemed sufficient to enable a decision, the review body announces that the final application is complete and publishes the final version of the application. • The review body writes a decision recommendation based upon the content of the final application and publishes the recommendation.
Final Decision-making	<ul style="list-style-type: none"> • Approval decisions are linked to the findings of the review process, and are justified by reference to society's objectives, values, and interests. • Approval decisions and their rationale(s) are expressed clearly in a decision statement. • Approval decisions are put on hold for a limited period of time to allow for appeals to be heard. If found to have merit, then approvals are suspended until the appeal is resolved. • If elected officials conduct final decision-making then protections are in place to address their potential bias. If an independent body makes final decisions, then mechanisms are in place to provide accountability. • Approvals specify terms and conditions which: describe allowable procedures and maximum permitted impact outcomes; are clear and specific; are supported by stakeholders, experts and empirical evidence; are consistent with high level policy; and are mandatory and backed by law.
Monitoring and Enforcement	<ul style="list-style-type: none"> • Project review is backed by compliance monitoring and enforcement, as well as effectiveness monitoring and requirements for remedial action if mitigation is found not to work. • Monitoring is performed by an independent and impartial body. • Compliance and effectiveness is publicly reported. • Knowledge gained from monitoring and enforcement activities is recorded and used for future project reviews.
Process Management	<ul style="list-style-type: none"> • Government employs strategies during reviews of applications to enhance the effectiveness of reviews such as work planning, budgeting, delineating roles and responsibilities, establishing timelines and milestones, and monitoring and reporting of progress. • Process is regularly audited for effectiveness and with respect to international standards. • What is learned in terms of review performance is used to improve future reviews.

Good Practice	Description
	<ul style="list-style-type: none"> Review staff are regularly involved in training and capacity-building exercises.
Resources	<ul style="list-style-type: none"> Process is provided with sufficient funding, staff, leadership and time. Funding is sufficient enough to allow government to conduct a review process that follows all good practices. Staff have expertise in all aspects of the process and the issues raised by the application. Staff are continuous across individual reviews. Sufficient leadership exists to propel the process. Sufficient time is provided to enable a fair and thorough examination of a proposal's merits.
Methods of Impact Assessment	<ul style="list-style-type: none"> Only sound methods of impact assessment are used in project review. Sound methods: (1) are suited to the review context, (2) are flexible and adaptable, (3) are scientifically robust, (4) are minimally reliant upon subjective inputs, (5) are easy to understand, evaluate, and put to use, (6) create useful outputs, (7) are highly accepted by users and stakeholders, (8) are cost-effective, and (9) are participative in that stakeholders are involved in their use. Reference class forecasting and cost-benefit analysis are highly recommended methods of impact assessment.
Consolidated Review Process Managed by Independent Review Body	<ul style="list-style-type: none"> Review process consolidates all government reviews and decision-making into one single review instead of multiple reviews. Review is led and managed by an independent review body (IRB) at arm's length from government. The IRB is focused on ensuring rational review. The IRB has adequate resources, authority, and is unbiased, and publicly accountable.
Mitigation and Maximizing Net Benefits	<ul style="list-style-type: none"> Project review is focused on maximizing net benefits in economic but also ecological, social, and other indicators of sustainability. Mitigation strategies avoid impacts at the source, where possible, and otherwise, in order of preference, minimize, abate, repair, or compensate. Mitigation programs are designed to address harms early rather than later. Proponents are legally required to mitigate negative impacts and compensate stakeholder groups for any losses that can't otherwise be mitigated. Project review propels development to make an overall positive contribution, instead of just ensuring that negative impacts of projects are reduced to an acceptable level.
Process Description	<ul style="list-style-type: none"> The review process is fully and explicitly described in publicly-available documentation. The description clearly outlines the purposes and objectives of the process, the roles, responsibilities, and authority of all involved, and how all parties may participate. The purposes and objectives of the review process are oriented around rational decision-making that seeks to promote development in the public interest.

Good Practice	Description
Legal Foundation	<ul style="list-style-type: none"> • All key elements of the process are established in law. • Legal text is clear, specific, unambiguous, consistent, and distinguishes the project review process from other legal requirements and processes. • Legal text uses mandatory language (e.g., “must” and “shall”) and minimizes discretion. Flexibility is retained only where necessary to enable the process to be appropriately adapted to context. • The purpose of project review is written into law and is to inform decision-making and promote sustainability.
Structured Decision Procedures	<ul style="list-style-type: none"> • All major decision-making is structured and guided by clearly defined decision-making criteria. • Decision criteria are clear and follow from high-level policy. • There is minimal discretion given to decision-makers.
Communication	<ul style="list-style-type: none"> • Communication is clear, consistent, timely, precise, regular, ongoing, but limited to what is necessary. • Communication supports the participation of all parties in the process; confidentiality provisions do not inhibit participation. • Communication is made publicly available, free and easy to access, and is tailored to the audience. • Communication is run through a ‘single window portal’.
Stakeholder Participation	<ul style="list-style-type: none"> • Mechanisms are in place providing stakeholders with the genuine capacity to influence outcomes. • All stakeholder groups are given the opportunity to be involved. • Involvement is extended to all steps in the process. • There are ample opportunities for learning. • Power imbalances among stakeholders are levelled. • The means in which stakeholders are involved facilitates conflict resolution.
Expert Involvement	<ul style="list-style-type: none"> • Experts are involved in a manner that is wary of their limits and fallability. • Peer-reviewed inputs are favoured, and any research done for project review is opened to public scrutiny. • When experts are convened for input, the process is formal, structured, and transparent. Experts are hired by the review body for independence, and are vetted for true expertise. A range of opinions are gathered from multiple experts. The process probes assumptions and reasoning, examines areas of agreement and disagreement, and highlights strengths and weaknesses in understanding. Results of expert input sessions are documented and publicly reported. • Expert input is treated as one input alongside other valid sources of information.
Precautionary Process	<ul style="list-style-type: none"> • The process exhibits precaution in its procedures and practice to address the uncertainties and risks associated with megaproject development. • Precautionary practices include: (a) risk assessment, (b) adaptive

Good Practice	Description
	management, (c) caution with new technology, and (d) transparent risk communication.
Appeal Mechanisms	<ul style="list-style-type: none"> • Appeals are allowed on major decisions of matters of both procedure and substance. • The appeal system is enshrined in the laws that provide for the project review process. • Requests for appeals must pass a test to ensure that appeals are not groundless. • Standing for appeals is extended at least to proponents and others with direct material interests. • Appeals are not heard by original decision-makers but on matters of procedure are heard by the courts, and on matters of substance are heard by an independent appellate body with expertise in the matters. • Courts addressing appeals on procedure have the authority to rule on the matters at hand, while appeal bodies addressing appeals on substance have the only authorities to consider the evidence and overturn decisions and return them to the original decision-maker for reconsideration.
Obligations to Indigenous Peoples Met	<ul style="list-style-type: none"> • Government ensures that the project review process adheres to and promotes the principles in the <i>UN Declaration on the Rights of Indigenous Peoples</i> as well as any obligations established in the nation's constitution.
Minimal Public Investment in Projects	<ul style="list-style-type: none"> • Government focuses on playing the role of public safeguard. • Projects are privately funded; government abstains from funding, subsidizing, or otherwise directly or indirectly investing in megaproject development. • If investment is deemed absolutely necessary for public interest reasons it is limited so that private partners provide the majority of the capital.

3.6). Adequate information is best conceived of as an intermediary outcome of a good process and a sound decision. To have adequate information – a crucial ingredient of sound review – government must adhere to a great many of the good practices identified in this chapter.

A key contribution of this thesis is its synthesis of good practice ideas from the EA and megaproject literatures. The EA literature forms the backbone of the good practices; the EA literature is the most developed of the three literatures in terms of good practices and contributes to nearly all good practices listed in this thesis. The megaproject literature echoed many of the ideas from the EA literature but in some cases added measurably, such as with respect to how experts should be involved (s.3.3.3.11) and the precautions that should be taken when new technologies are proposed (s.3.3.3.12). Additionally, some wholly new ideas came from the megaproject

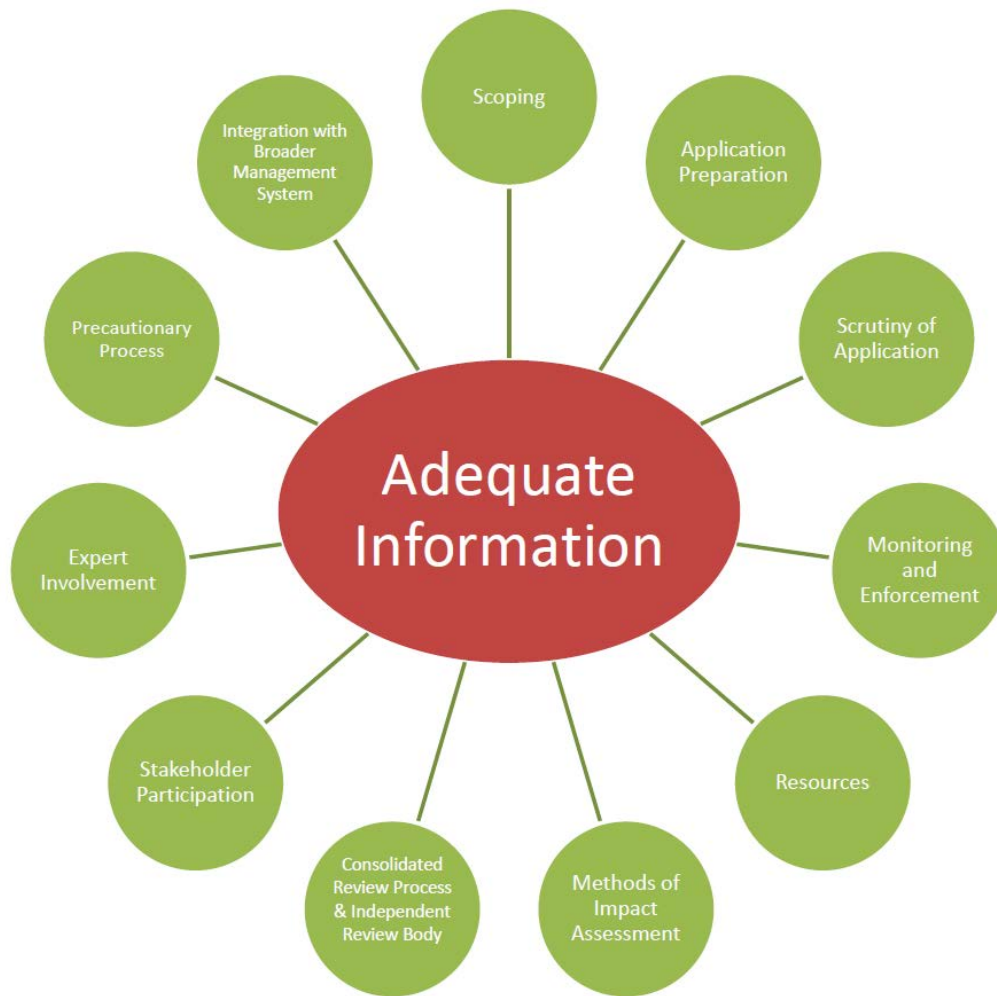


Figure 3.6. Adequate Information as the Product of Other Good Practices

literature that were not identified at all in the EA literature: examining the likelihood of project viability (s.3.3.2.2), reference class forecasting (s.3.3.3.3), and minimizing public investment (s.3.3.3.15). It is also important to acknowledge the huge role that the megaproject literature played in establishing the context for this study – this literature describes the nature of megaprojects and the challenges they pose to project review. With such an understanding, the good practices are put in context and their roles and importance become more apparent.

Practitioners should note that there may be cases in which attending to one set of practices runs into conflict with others (Lawrence 2003). Perhaps the best example of this is the conflicting characteristics of a sound method of impact assessment (s.3.3.3.3).

In such cases, government has to compromise and choose which good practices to pursue, ideally based upon which is perceived to promote the public interest to the greatest extent (CEARC 1998, Lawrence 2003).

An overarching lesson from this synthesis is that megaproject review is complex with many interacting and interdependent components. This study's description of good practices is more comprehensive than previous descriptions, and consequently meeting all these good practices criteria is very demanding. As well, there is some overlap among good practices, reflecting the fact that some good practices pertain to specific steps in review, and some pertain to multiple steps, but also reflecting overlapping concerns among good practices. Great effort has been taken to minimize overlap and to place practices alongside one another in the most sensible manner, but the very complex nature of project review means that some topics arise in numerous places and in multiple ways.

3.5. Limitations

There are several limitations to the good practice characterization presented in this chapter. First, the complexity of the good practices poses a formidable challenge to those designing and revising project review law, policy, and practice, and a formidable challenge to those participating in project reviews.

Second, the context examined in Chapter 2 may be incomplete. The present list of good practices is grounded in an understanding of the challenges of megaprojects and megaprograms, but bitumen megaproject review is undoubtedly affected by other contextual factors that bring with them their own challenges. The decision-making model underlying project review is the rational model, and there is a wide array of challenges to implementing this model in project review, such as limited information and implementation gaps, none of which have been specific foci of this chapter. Another contextual factor is proponent behaviour, i.e., how proponents of bitumen projects respond to particular project review characteristics. Challenges associated with investor behaviour may be identified that could lead one to alter the good practices framework presented here. Further work could examine these and perhaps other contextual factors

leading to further refinement of good practices for megaproject review, though such efforts must keep in mind the trade-off in applicability of good practices that comes with such specificity – the more tailored are good practices to a specific context, the less applicable the practices are to other contexts.

A third limitation is that not all of the challenges identified in Chapter 2 are adequately addressed by the good practices (Table 3.15). Most challenges are directly addressed in many ways by multiple good practices, but relatively few good practices address the challenges of understanding the big picture, breadth of issues, and highly dynamic nature of megaproject development. This result suggests that it is crucial that the good practices that do address these latter challenges are implemented well, and that more effort might be put toward identifying how to address these challenges.

Table 3.15. Degree to Which Megaproject Challenges are Directly Addressed by Identified Good Practices

Challenge	# of Practices that Directly Address Challenge
Highly controversial	17
Biased thinking	15
Strategic manipulation of data	11
Political interference	16
Breadth of issues	5
Highly dynamic	6
Understanding the big picture	5
High risk	13

A strength of this study is that the good practices were tested by experts involved in project reviews of bitumen projects specifically. However, this is also a limitation of the results. Good practices identified in this chapter must be regarded with caution when used to guide megaproject review outside of the bitumen development context. The characterization of good review practice is arguably adapted especially for bitumen project review, and may not apply in other megaproject or ‘megaproject within a megaprogram’ contexts. However, in most cases conflicts between survey data and the literature were minimal; the survey helped refine the ideas in the literature by adding

nuance and perspective, but it did not suggest significant changes. This pattern suggests that the good practice characterization in this chapter is not overly biased towards the bitumen development experience, and thus that the practices may remain highly applicable outside of the bitumen development context.

Another limitation of the study is that staff of two of the government organizations at the centre of bitumen project review – the ERCB and the CEA Agency – did not participate in the survey. This sampling gap means that insight from many of the people ‘most inside’ the particular process that is the focus of this thesis was not gathered in this study. However, it should be noted that some former staff of one of these agencies did participate in the survey, and I have had numerous personal conversations with many ERCB staff which have helped me to understand the issues.

Beyond addressing the limitations just identified, future research on good practices in megaproject review could take several paths. Future researchers could conduct more sophisticated analysis of the importance of practices to those involved in project review. In many questions in the questionnaire I asked respondents to rate the importance of practices using Likert-type scales or to rank importance. These approaches gather ordinal data, not interval or ratio data, and so the information gathered on importance is not particularly discerning. To improve, future analysts might use pairwise comparisons, choice experiments, or other tools.

Future researchers could also begin to gather more data on the relationship between process and performance. There has been relatively little empirical verification of the degree to which practices lead to desired outcomes in best practice research generally (Vesely 2011), but also in the project review context specifically. This thesis does little to directly address this gap in the literature. However, this thesis confronts this gap indirectly: through a synthesis of three bodies of literature and the gathering of opinion from sizeable and diverse range of people involved in project review the 'good practices' identified in this thesis rest upon a large and consistent foundation of what is perceived to lead to positive outcomes. While more rigorous testing of the outcomes that are associated with the practices advocated in this thesis is warranted, the fact that such a wide range of literature (based upon the observations of authors that have examined multiple review processes and questioned multiple practitioners) is in most cases

consistent, and the fact that this literature is generally consistent with the results of my primary research on the subject, provides a measure of confidence that the practices advocated in this thesis are associated with good outcomes. In respect of the lack of direct data on the matter I refer to the practices identified here in this thesis as ‘good practices’ instead of ‘best practices’ (Bardach 2004). Overall, I would then argue that the good practices identified in this thesis are valid because of their wide foundation and consistency, despite the need for further validation through research that directly links them with outcomes.

Future researchers can also contribute to the theory of best practices in project review by filling in outstanding gaps. The following topics require further resolution:

- who should be making final decisions on approvals (s.3.3.2.5);
- when exactly mitigation is required, when exactly compensation is appropriate, how exactly compensation should be made, what exactly should be done when the costs of mitigation exceed the benefits of doing so (s.3.3.3.5);
- the proper amount of discretion (s.3.3.3.8);
- the proper role and form of shared decision-making in project review (s.3.3.3.10);
- appropriate tests to filter out frivolous appeals to project review decisions, and whether standing in appeals should extend beyond those with ‘direct material interests’ (s.3.3.3.13); and
- the appropriate conditions and manners for government financial involvement in megaproject development (s.3.3.3.15).

Future researchers could also expand the literature reviewed and conduct additional surveying to build the theory of project review good practices, or could employ other methods such as interactive focus-group discussions with experts on controversial topics to enable discussions on the merits of alternative practices. We can expect good practice theory will continue to evolve and so the list presented in this thesis should be viewed as a next step in theory building for megaproject review.

3.6. Putting the Practices in Perspective

A good review process employs a large number of good practices. This chapter groups good practices into three types: practices pertaining to how project review fits

within the larger management system, practices relevant to specific steps in project review, and practices relevant to multiple steps. Inevitably there is some cross-over in topic matter. The outcome of the synthesis of good practice ideas is a complex, inter-related system that tries to cover all necessary bases, balance those issues that lack unambiguous resolution, and ultimately facilitate sound development. A sound project review process is not about stopping development but about moving society forward through sound development.

The list of good practices compiled in this chapter improves upon the existing characterizations in the literature as it is grounded in a broader literature base, the needs and problems of the review context in question, and the perspective of experts involved in bitumen project reviews. In Chapter 5 I use these good practices as process criteria in an evaluation of the current bitumen project review process.

4. Description of the Current Process for the Review of Bitumen Megaproject Proposals

4.1. Introduction

In this chapter I describe the current process for the review of bitumen megaproject proposals.^{26,27} This chapter begins with an explanation of how the Canadian constitution establishes a role for both the federal and Alberta governments as managers of bitumen development. Following I describe the three different types of review that a typical bitumen megaproject is subjected to: federal environmental assessment as per the *Canadian Environmental Assessment Act, 2012 (CEAA 2012)*[S.C. 2012, c.19, s.52], Alberta environmental assessment as per the *Environmental Protection and Enhancement Act (EPEA)*[R.S.A. 2000, c.E-12], and the ERCB's public interest review process as per the *Energy Resources Conservation Act (ERCA)*[R.S.A. 2000, c.E-10] and the *Oil Sands Conservation Act (OSCA)*[R.S.A. 2000, c.O-7]. These three processes establish two fundamental foci of project review: whether or not a project is likely to cause significant adverse effects that aren't justifiable in the circumstances, and whether or not the project is in the public interest.

In the case of most bitumen megaprojects, the three types of review are harmonized into a 'joint review panel' project review that addresses the requirements of all legislation through one single process. For clarity I first describe each type of review

²⁶ This chapter only describes how extraction and upgrading bitumen megaprojects are reviewed; it does not describe how other projects associated with bitumen development, such as pipeline megaprojects, are reviewed. In Canada, pipeline projects are subject to a different regulatory framework than bitumen projects, and due to limits in space this thesis is focused on the regulatory framework of production and upgrading projects. This chapter also does not describe in detail the permitting process following project review; this chapter is focused on the project review process which is the focus of the thesis.

²⁷ Other descriptions of the bitumen review process and related regulatory frameworks are provided in Blakes (2010) and Vlavianos (2007b).

separately and then I explain how the three become harmonized into a single process. In the course of this description I explain how permitting and strategic environmental assessment (SEA) relate to project review.

In the second to last section of this chapter I discuss some performance statistics of the federal and Alberta processes. I close this chapter by illustrating the above process by drawing upon and describing the events of a recent bitumen megaproject review. The case study is the Imperial Oil / Exxon-Mobil Kearl mine which underwent project review over the years 2003 to 2008. The Kearl mine is a 345,000 barrel per day (bpd) greenfield project currently under construction north of Fort McMurray. The project triggered both federal and Alberta project review.

4.2. Canadian Constitution

The *Constitution Act, 1867* [30 & 31 Victoria, c.3. (U.K.)] establishes the powers of the federal and provincial governments. In terms of powers related to bitumen development, the constitution grants authority to the federal government for matters of:

- regulation of inter-provincial and international trade, including the export of crude oil from Alberta over pipelines or other means (s.91.2);
- raising of money through taxation (s.91.3);
- navigation and inland fisheries, waterways, water consumption, and other effects on water by bitumen projects to the extent that these involve navigation and fisheries (s.91.10 and 91.12);
- Aboriginal matters, including “lands reserved for the Indians” (s.91.24);
- migratory birds (s.132 and the *Canada-US Migratory Birds Convention*); and
- matters of national concern under the “peace, order, and good government” clause (s.91).

Alberta, having gained ownership of its crown lands and natural resources through the *Alberta Natural Resources Act* [S.C. 1930, c.3], is given authority over the following bitumen matters:

- taxation within the province for the purposes of raising revenue for provincial purposes (s.92.2);
- disposition of provincial lands (s.92.5);

- exploration, development, conservation, and management of non-renewable natural resources, export of natural resources, and taxation of resource development (s.92A);
- “local works and undertakings” in the province (s.92.10); and
- “property and civil rights” (s.92.13).

In sum, the two levels of government have jurisdiction over different aspects of bitumen development, and both have jurisdiction over environmental matters. As a result, bitumen megaprojects are subject to review processes of both levels of government.

4.3. Federal Project Review

Federal project review under the *CEAA 2012* is called environmental assessment (EA) and is administered by the Canadian Environmental Assessment Agency (CEA Agency). The Major Projects Management Office (MPMO) plays an initial role in federal project review, and for pipeline projects that cross provincial or national borders the National Energy Board conducts its own ‘public interest’ review alongside EA. To limit the complexity and size of this thesis, and to keep this thesis focused on the megaprojects at the heart of bitumen development, I do not describe the National Energy Board’s pipeline project review process under the *National Energy Board Act* [R.S.C. 1985, c. N-7] which is used to review proposals such as the Enbridge Northern Gateway pipeline and tanker project and instead focus on the review process applicable to bitumen extraction and upgrading projects. See Van Hinte et al. (2007) and Van Hinte (2005) for a description of the National Energy Board review process. In s.5.2.1 I discuss federal policy that shapes federal EA decision-making.

4.3.1. Major Projects Management Office

Since 2007 the MPMO has been the initial federal contact for proponents of bitumen megaproject proposals. The federal government established the MPMO as an agency within Natural Resources Canada to improve the effectiveness, efficiency, transparency, predictability, timeliness, and accountability of the review process for “major resource projects” (MPMO Undated-b, Canada 2007, Undated-c). The main roles and responsibilities of the MPMO are to provide a point of entry into the federal

review process, engage in early discussions with proponents, manage the federal government's internal planning of project reviews, track and monitor the Crown's Aboriginal consultation, track the progress of proposals in the review process, and lead initiatives to improve the performance of federal project review (MPMO Undated-b, Canada 2007).

At present the MPMO is the *recommended* entry point for proponents of major resource projects to the federal EA process. Proponents are not legally required to initiate EA through the MPMO, but are recommended to do so, and the MPMO gets involved whether or not proponents engage with it (MPMO Undated-b).

If the proponent chooses to engage the MPMO, the first step is to submit a Project Description to the MPMO (MPMO Undated-a). A Project Description is a document containing basic information about the project and proponent, such as proponent contact information, key components of the project, stakeholder consultation activities, and how the project may trigger federal EA. This first step is used by the MPMO to determine if a federal EA is required or not and whether an EA will be coordinated by the MPMO or not. Guidance for proponents on preparing a Project Description is provided in Canada (2008a).

Following review of a proponent's Project Description, the MPMO facilitates the development of a Project Agreement. Project Agreements contain:

- an agreement on the contents of a revised Project Description that is acceptable to relevant federal entities;
- an EA work plan;
- a description of the roles, statutory obligations, and commitments of federal entities;
- an Aboriginal consultation and engagement work plan;
- a Permitting, Authorizations and Approvals work plan;
- timelines and other service standards fit to the proposal; and
- a description of project management responsibilities (Canada 2007).

Project Agreements are authorized by the Major Projects Deputy Ministers' Committee which is a group of deputy ministers and senior officials from relevant federal ministries and agencies such as Natural Resources Canada, Fisheries and Oceans (DFO), and the

CEA Agency, but these agreements are not legally binding. Upon their completion, Project Agreements are published.

4.3.2. Federal Environmental Assessment

Project review at the federal level is EA and is governed by the *CEAA 2012*. (The 2012 federal budget the Canadian government repealed the previous version of the *CEAA* [S.C. 1992, c.37] and promulgated the 2012 version of the *CEAA*.) The *CEAA 2012* came into effect July 6, 2012. Regulations articulating further detail of the new law were published on July 18th, 2012.

As stated in s.4 of the *CEAA 2012*, the purposes of EA are:

- (a) to protect the components of the environment that are within the legislative authority of Parliament from significant adverse environmental effects caused by a designated project;
- (b) to ensure that designated projects that require the exercise of a power or performance of a duty or function by a federal authority under any Act of Parliament other than this Act to be carried out, are considered in a careful and precautionary manner to avoid significant adverse environmental effects;
- (c) to promote cooperation and coordinated action between federal and provincial governments with respect to environmental assessments;
- (d) to promote communication and cooperation with aboriginal peoples with respect to environmental assessments;
- (e) to ensure that opportunities are provided for meaningful public participation during an environmental assessment;
- (f) to ensure that an environmental assessment is completed in a timely manner;
- (g) to ensure that projects, as defined in section 66, that are to be carried out on federal lands, or those that are outside Canada and that are to be carried out or financially supported by a federal authority, are considered in a careful and precautionary manner to avoid significant adverse environmental effects;
- (h) to encourage federal authorities to take actions that promote sustainable development in order to achieve or maintain a healthy environment and a healthy economy; and
- (i) to encourage the study of the cumulative effects of physical activities in a region and the consideration of those study results in environmental assessments.

Figure 4.1 shows the typical steps in federal EA.

so it must also consider public comments (who are given a 20 day period to do so).

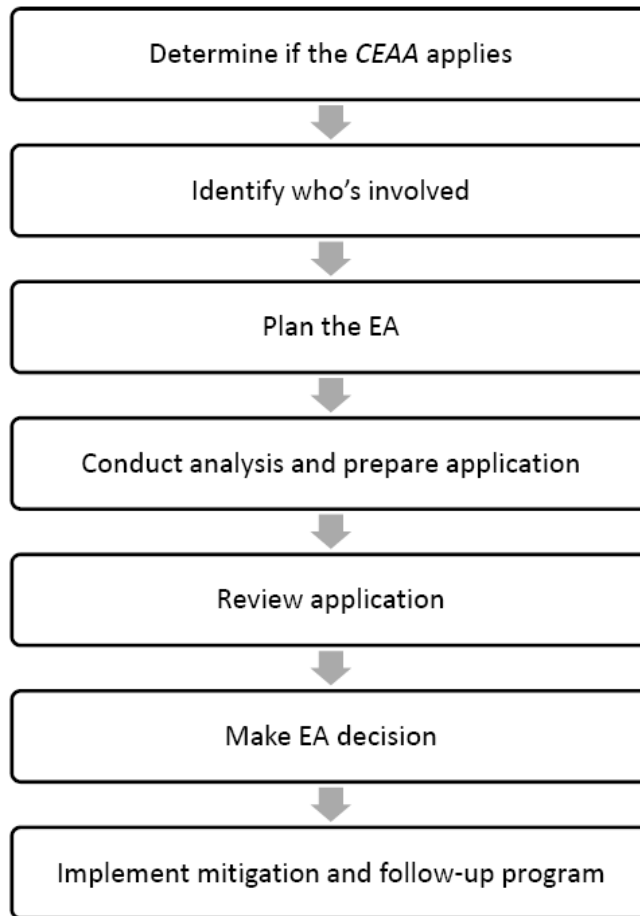


Figure 4.1. Typical Steps in Federal Environmental Assessment

The first step of federal EA involves either proponents submitting a project description to the CEA Agency (through the MPMO, or directly to the CEA Agency), or government learning of a proposal and contacting proponents about the possible need for EA. The federal government must then determine whether or not the *CEAA 2012* applies. The starting point for bitumen projects under the *CEAA 2012* is a screening process in which proponents submit a project description to the CEA Agency (s.8, *CEAA 2012*). EA is mandatory if a project is listed in the *Regulations Designating Physical Activities* [SOR/2012-147]. Sections 6 to 9, 12 and 13 of the regulations specify that EA is mandatory for a variety of bitumen development projects:

- large dams and dykes;
- large water diversions;
- large groundwater extraction facilities;
- oil sands processing facilities and mines with capacities of greater than 10,000 m³/d (equivalent to 62,893 barrels per day);
- large oil sands processing facility expansions; and
- large expansions of oil refineries and upgraders.

However, s.10 of the *CEAA 2012* indicates that projects may also be reviewable if in the opinion of the CEA Agency the project has the potential to cause “significant adverse effects”. It’s unclear at this time how the CEA Agency will make such determinations, but it may use guidance from the CEA Agency’s predecessor, the Federal Environmental Assessment Review Office (FEARO 1994) on the factors of significance, i.e., effect magnitude, geographic extent, duration and frequency, reversibility, and ecological context. The CEA Agency has 45 days (from the time of receipt of a project description) to make this decision, and in doing

If EA is required, then a designated Responsible Authority (RA) is identified to conduct the EA. In the case of the bitumen project types listed above that must undergo EA, the CEA Agency is the RA. Next a decision must be made whether a regular EA will be conducted or if a review panel-type of EA will be conducted. Under s.38, the Minister of Environment is empowered to initiate a review panel if in the Minister’s opinion it is in the public interest to do so. The Minister must consider the following factors: whether the project has the potential to cause significant adverse effects, public concerns about such effects, and opportunities for cooperation with other jurisdictions for the purposes of project review (s.38(2), *CEAA*). Section 38(3) of the *CEAA 2012* requires the Minister to set time limits for establishing the panel, receiving the panel’s decision report, and for the Minister to make a final decision. Section 54 of the *CEAA 2012* indicates that final decisions are required within two years of a review panel being struck, however, and critically, this two year time limit does not apply to proponents. The two year limit applies only to the government and panel and not proponents who have one of the most sizeable tasks – preparing the application. Under the 1992 version of the *CEAA* review panels were common for bitumen megaprojects; it will remain to be seen whether this pattern continues.

Review panels are led by individuals appointed by the Minister who are

unbiased and free from any conflict of interest relative to the designated project and who have knowledge or experience relevant to its anticipated environmental effects (s.42, *CEAA 2012*).

Review panel EAs begin with a determination of scope. Section 19 of the *CEAA 2012* sets out the minimum factors that must be considered in federal EA:

- environmental effects, including those of malfunctions or accidents, cumulative environmental effects;
- the significance of these effects;
- public comments;
- mitigation measures that are technically and economically feasible;
- the requirements of the follow-up program in respect of the project;
- the purpose of the project;
- alternative means of carrying out the project that are technically and economically feasible and the environmental effects of any such alternative;
- any change to the designated project that may be caused by the environment;
- the results of any relevant study conducted by a committee established under ss. 73 or 74 of the *CEAA 2012*; and
- any other matter that the Minister requires to be taken into account.

Section 39 of the *CEAA 2012* empowers the CEA Agency to refine the scope of review by directing more specifically what information the proponent must gather. The *CEAA 2012* does not specify that proponents or other stakeholders should be involved in this scoping process, nor anything else about what scoping entails or how it proceeds. Environmental effects are defined as changes within federal jurisdiction including changes to:

- fish and fish habitat;
- other aquatic species;
- migratory birds;
- federal lands;
- effects that cross provincial or international boundaries;
- effects that impact on Aboriginal peoples, such as their use of lands and resources for traditional purposes; and

- changes to the environment that are directly linked to or necessarily incidental to any federal decisions about a project (CEA Agency Undated-c also see s.5, CEAA 2012).

The environment is defined in s.2 of the *CEAA 2012* as:

components of the Earth, and includes land, water and air, including all layers of the atmosphere; all organic and inorganic matter and living organisms; and the interacting natural systems that include [these] components.

Once scope is finalized, the proponent (or their consultants) prepares an application and submits it to the review panel. Upon receipt of the application it is published for public access at the CEA Agency's internet site and the panel reviews it. The focus of the panel's review is to determine whether the project is, after mitigation measures are considered, likely to cause significant adverse effects. Significance determinations are guided by criteria set out by the FEARO (1994).

To gather information and evidence to help it to come to a conclusion on the significance of effects, the panel holds hearings (ss.43, 44, 45, *CEAA 2012*). Proponents explain their proposal and the effects that they predict, and government and other interveners are given the opportunity to cross-examine the proponent and other parties and to present evidence. The hearings and all material are accessible to the public, however standing in hearings is offered only to "interested parties" (s.43, *CEAA 2012*) which are defined in s.2 of the *CEAA 2012* as persons directly affected by the project or that have relevant information or expertise. The decision of who meets this definition is decided by the review panel (s.2, *CEAA 2012*); no other criteria are provided in the act indicating how the panel is to make this decision.

It is unclear how the federal government addresses its legal duty to consult Aboriginal people as established in s.35 of the *Constitution Act, 1982 [being Schedule B to the Canada Act 1982 (UK), 1982, c.11]* and associated case law. Under the *CEAA 1992* this duty would not necessarily be sufficiently addressed through the act's public participation requirements (CEA Agency 2008b), and so federal parties could undertake further Aboriginal consultation. A federal memorandum of understanding (Canada Undated-b) described the federal government's former approach which entailed a 'case-

by-case' decision made over whether or not additional consultation should take place. The *CEAA 2012* only indicates that traditional knowledge may be taken into account in EA (s.19(3), *CEAA 2012*), and that Aboriginals are to be consulted on policy developed related to the *CEAA 2012* (s.105), though a CEA Agency website indicates that EA early in project planning will help the government discharge its duties to consult and accommodate (CEA Agency Undated-c). In s.5.2.21 I describe treaties in the bitumen region and respective duties of the Crown regarding Aboriginal interests.

Once hearings are finished, and within its two year time limitation from the date the review panel EA is initiated, the review panel considers all of the evidence and then submits a report to the Minister of Environment presenting its conclusions, rationale, recommendations with respect to mitigation and follow-up, and a summary of public comments (s.43, *CEAA 2012*). If the review panel misses its time deadline, or if the Minister feels that the panel will miss its deadline, the Minister may terminate the review panel EA and call upon the CEA Agency to complete the process (ss. 49 and 50, *CEAA 2012*). Next, the Minister must report in a decision statement its decision on whether, after taking the review panel's report into consideration, the project is likely to cause significant adverse effects (ss. 51, 52, 54, *CEAA 2012*). If the conclusion is yes, then federal cabinet must decide if the effects are justifiable (s.37, *CEAA 2012*). If the Minister and/or cabinet approve the project, conditions are attached, such as how monitoring or other follow-up activities are to occur. Section 6 of the *CEAA 2012* indicates that proponents must fulfil conditions of approval or face fines.

There are several other notable elements of the federal EA process. Section 32 of the *CEAA 2012* empowers the Minister to substitute another jurisdiction's review process for federal EA under certain circumstances, but this power does not apply if a review panel is established, the type of EA that typically occurs with bitumen megaprojects. When review panels are established the Minister may not substitute another jurisdiction's process but may establish a joint review panel with that jurisdiction as long as the terms of reference reflect minimum *CEAA 2012* requirements (ss. 40 and 42, *CEAA 2012*). Section 57 of the *CEAA 2012* continues the participant funding program that existed under the *CEAA 1992*; no details exist with regards to who is eligible for funding under the *CEAA 2012*, but under the former program a participant was eligible if they had

a direct, local interest in the project, such as living or owning property in the project area; have community knowledge or Aboriginal traditional knowledge relevant to the environmental assessment; or plan to provide expert information relevant to the anticipated environmental effects of the project [and were not] a for-profit organization; have a direct commercial interest in the project; or represent another level of government, other than an Aboriginal government (CEA Agency 2008a 9).

Section 59 of the *CEAA 2012* requires proponents to help pay for a review panel's costs. Section 74 of the *CEAA 2012* empowers the Minister with the ability to initiate studies of the environmental effects of multiple activities in a region. Sections 98 and 100 of the *CEAA 2012* prohibit and penalize parties for the submission of false or misleading information. Finally, ss. 105 and 106 of the *CEAA 2012* mandate the CEA Agency to conduct EA research and provide training.

The *CEAA 2012* does not provide any statutory rights to appeal, though decisions made under the *CEAA 2012* may still be appealed under standard provisions of administrative law. An example of a recent appeal under the *CEAA 1992* is presented in s.4.7 below.

4.3.3. Federal Permits

Bitumen projects typically require federal permits to proceed. Past projects have required permits under the *Fisheries Act*, *Navigable Waters Protection Act* [R.S.C., 1985, c.N-22] and *Migratory Birds Convention Act* [S.C. 1994, c.22]. Proponents typically apply for permits at the same time that they apply for EA approval.

4.3.4. Federal Strategic Environmental Assessment

Since 1990 federal policy has required that the federal government conduct SEA of policies, plans, and programs. According to the policy (PCO and CEA Agency 2010), SEA is intended to "incorporate environmental considerations into the development of public policies and strategic decisions...[and to] strengthen accountability and provide greater public confidence that federal government decisions are being made in full awareness of the potential environmental impact" (2). As described in s.5.2.1 there has yet to be a SEA of the federal government's policy of promotion of bitumen development.

4.4. Alberta Project Review

The *Constitution Act, 1982* provides Alberta with jurisdiction over many matters of bitumen development, and due to concerns for the conservation and maximum productivity of hydrocarbon resources (Breen 1993) and the potential environmental and other types of impacts of resource development, the Alberta government has established its own project review system with two components: EA administered by Alberta Environment and Sustainable Resource Development (AESRD) called ‘environmental impact assessment’, or EIA, and ‘public interest’ review by the Energy Resources Conservation Board (ERCB). In s.5.2.1 I describe the variety of policy that the Alberta government has developed to shape bitumen development and related decision-making, include project review decision-making, such as the *Lower Athabasca Regional Plan* and the *Athabasca River Water Management Framework*.

4.4.1. Preliminary Disclosure

The first step of project review in Alberta begins when a proponent first discloses a proposal and government conducts an initial review of the proposal “in principle, in terms of the form, timing, location, or any other essential feature of the proposal” (ERCB 1991 3).²⁸ If government accepts the proposal in principle then it – presumably AESRD or the ERCB – provides advice to the proponent on the level and nature of public and Aboriginal consultation required, the types of approvals that will be necessary, and what approval processes can be conducted in tandem. Once government has determined the degree of consultation required, the proponent is free to publicly disclose their proposal and government informs the public and First Nations of the project and upcoming regulatory milestones (Alberta 2007a). Proponents then disclose the project to the public and initiate consultation. Typically, EIA, public interest review, and permitting under the *EPEA* and *Water Act* [R.S.A. 2000, c.W-3] are conducted in tandem, but for clarity I describe each of these processes separately below before discussing how they are harmonized.

²⁸ *Directive 023* is not specific about what party in government conducts initial review.

4.4.2. Public and Aboriginal Consultation

The ERCB's *Directive 056* (ERCB 2008b) establishes minimum public consultation and notification requirements for proponents contemplating new development projects.²⁹ The following description is based upon this document unless otherwise specified.

Directive 056 indicates that the 'public' is "all potentially directly and adversely affected persons, including First Nations and Métis" (2-2). Proponents are required to personally consult with public parties whose "rights may be directly and adversely affected by the nature and extent" of proposed projects (such as landowners and nearby residents) and attempt to confirm that they have no objection to proposals (2-1). As well, proponents must notify additional parties of the proposal such as local authorities and crown disposition holders such as land owners. For bitumen projects proposed for public lands – as are the vast majority of such projects – AESRD is the 'landowner' and AESRD considers the surface rights disposition process³⁰ sufficient notification (Vlavianos 2007b 35).

In the course of consultation proponents are expected to provide parties with: an official letter from the ERCB Chair, easily understood information on the project, technical details on the project, and ERCB literature on the approvals process. Proponents are required to respond to questions and concerns in a timely fashion and document their consultation process. If proponents cannot attain "nonobjection" from parties who may be affected by the project, then the ERCB's Appropriate Dispute Resolution process is initiated, involving an independent mediator and voluntary meetings between the proponent and affected parties (ERCB 2003 6). If after Appropriate Dispute Resolution parties still object to the proposal, then a "nonroutine" application is submitted to the ERCB. Due to the controversy surrounding bitumen

²⁹ *Directive 056* spells out minimum requirements for *in situ* bitumen projects but the ERCB indicated in a 2006 decision that the same requirements hold for bitumen mines (AEUB 2006b 19).

³⁰ Surface rights disposition, or tenuring, is a process proponents and government go through in advance of project review in which proponents gain surface and mineral rights.

development, applications for bitumen megaprojects are typically nonroutine. The ERCB's participant involvement process is shown in Figure 4.2.

Section 35 of the *Constitution Act, 1982* and associated case law imposes a duty on the Crown to consult and possibly accommodate Aboriginals potentially affected by proposed projects. Treaties 6 and 8 cover the bitumen region, and these require the Alberta government to consult with Aboriginals (see s.5.2.21 for details). This duty is shaped by the nature of the decision being made, who is making the decision, and what effects the decision might have on Aboriginal rights. To direct its consultations with Aboriginals, Alberta has developed a First Nations consultation policy (Alberta 2007a). Accordingly, both Alberta Energy, which oversees the ERCB, and AESRD require that proponents consult with First Nations on their behalf:

in most cases Alberta will require Project Proponents to conduct procedural aspects of project-specific consultation, but Alberta will retain responsibility to determine whether consultation has been adequate in the circumstances (Alberta 2005 5).

Notably, Alberta Energy does not consult or require consultation with First Nations prior to tenuring lands and minerals. Alberta Energy's position is that the disposition of mineral rights "does not, in and of itself, adversely impact First Nations *Rights and Traditional Uses*" (Alberta 2007a part 2 page 1, italics in original). It's important to note that the Alberta government does not require that proponents and First Nations agree over issues raised in proposals; all that is required is that consultation is adequate, and in practice the Alberta government decides if consultation has been adequate (Alberta 2007a). The Supreme Court of Canada has determined, however, that provincial governments cannot infringe on aboriginal treaty rights. Finally, note that no policy has yet been developed regarding consultation with the Métis – only a First Nations consultation policy currently exists.³¹

³¹ Aboriginals under s.35 of the *Constitution Act, 1982* include Indian (First Nations), Inuit, and Métis. No traditional lands of the Inuit exist in Alberta.

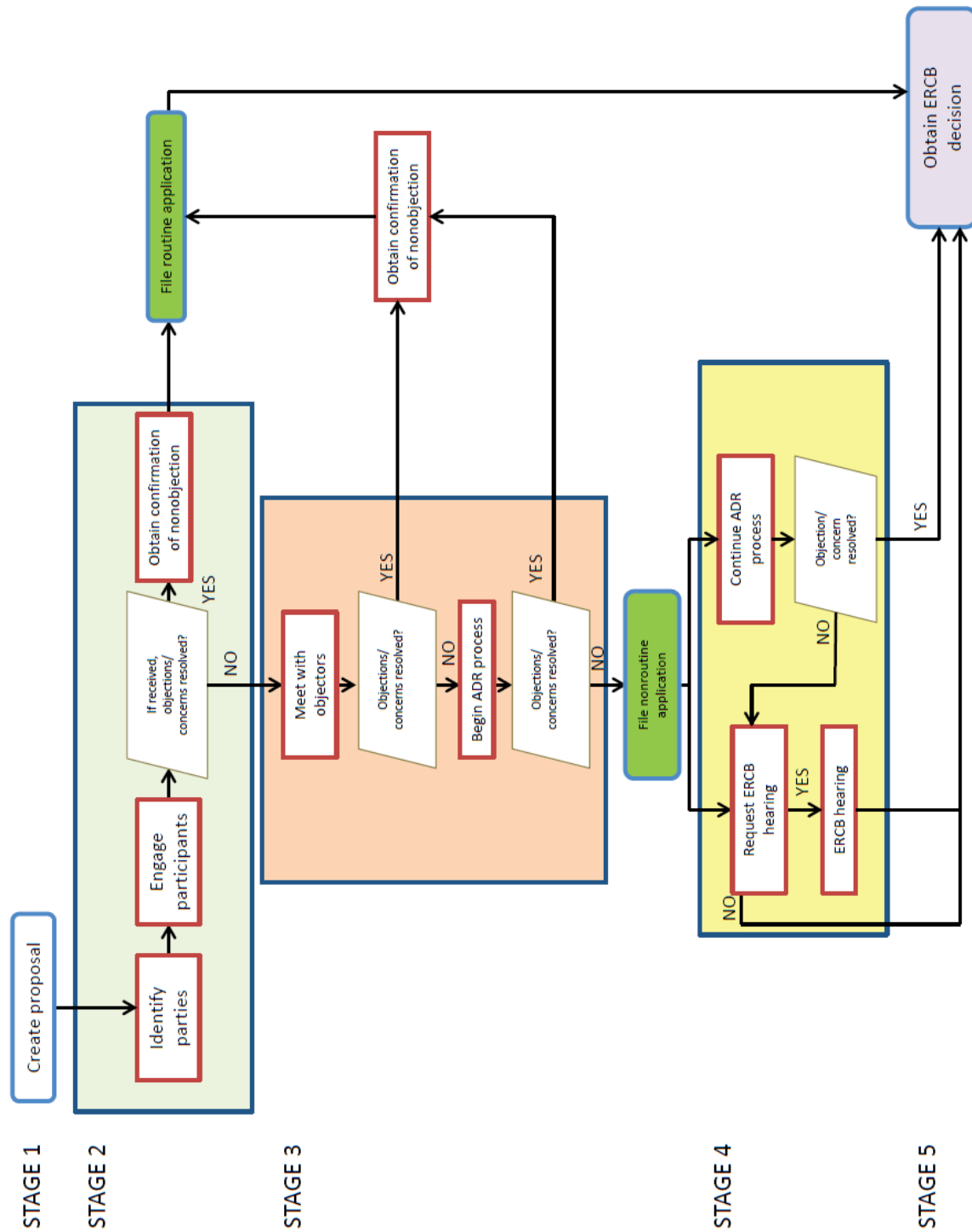


Figure 4.2. Consultation in the ERCB's public interest review process.

Source: Adapted from AEUB (2005). Note: ADR stands for Appropriate Dispute Resolution.

4.4.3. Environmental Impact Assessment

The *EPEA* provides for environmental assessment (called environmental impact assessment, or EIA) in Alberta. As described in s.40 of the *EPEA*, the purposes of EIA are:

- (a) to support the goals of environmental protection and sustainable development,
- (b) to integrate environmental protection and economic decisions at the earliest stages of planning an activity,
- (c) to predict the environmental, social, economic and cultural consequences of a proposed activity and to assess plans to mitigate any adverse impacts resulting from the proposed activity, and
- (d) to provide for the involvement of the public, proponents, the Government and Government agencies in the review of proposed activities.

The EIA process is shown in Figure 4.3. EIA is not a decision-making process but an information gathering exercise to inform the ERCB's public interest review process. The following description is based upon AENV (2008a) except where otherwise noted.

EIA is initiated when either AESRD becomes aware of a proposed project and refers the proponent to the Environmental Assessment Director to conduct initial review of the project, or the proponent contacts the Director of their own volition. In initial review the Director determines if an EIA is required by consulting the *Environmental Assessment (Mandatory and Exempted Activities) Regulation* [A.R./1993-111]. "Mandatory activities" such as bitumen extraction, processing, and upgrading plants processing more than 2,000 cubic metres of crude bitumen per day (about 320 bpd) require EIA. Activities not specifically mentioned in the regulation are called "discretionary activities" and EIA may still be triggered if the Director decides that EIA is appropriate based on public concerns and other decision-making criteria in ss. 44 and 46 of the *EPEA*.

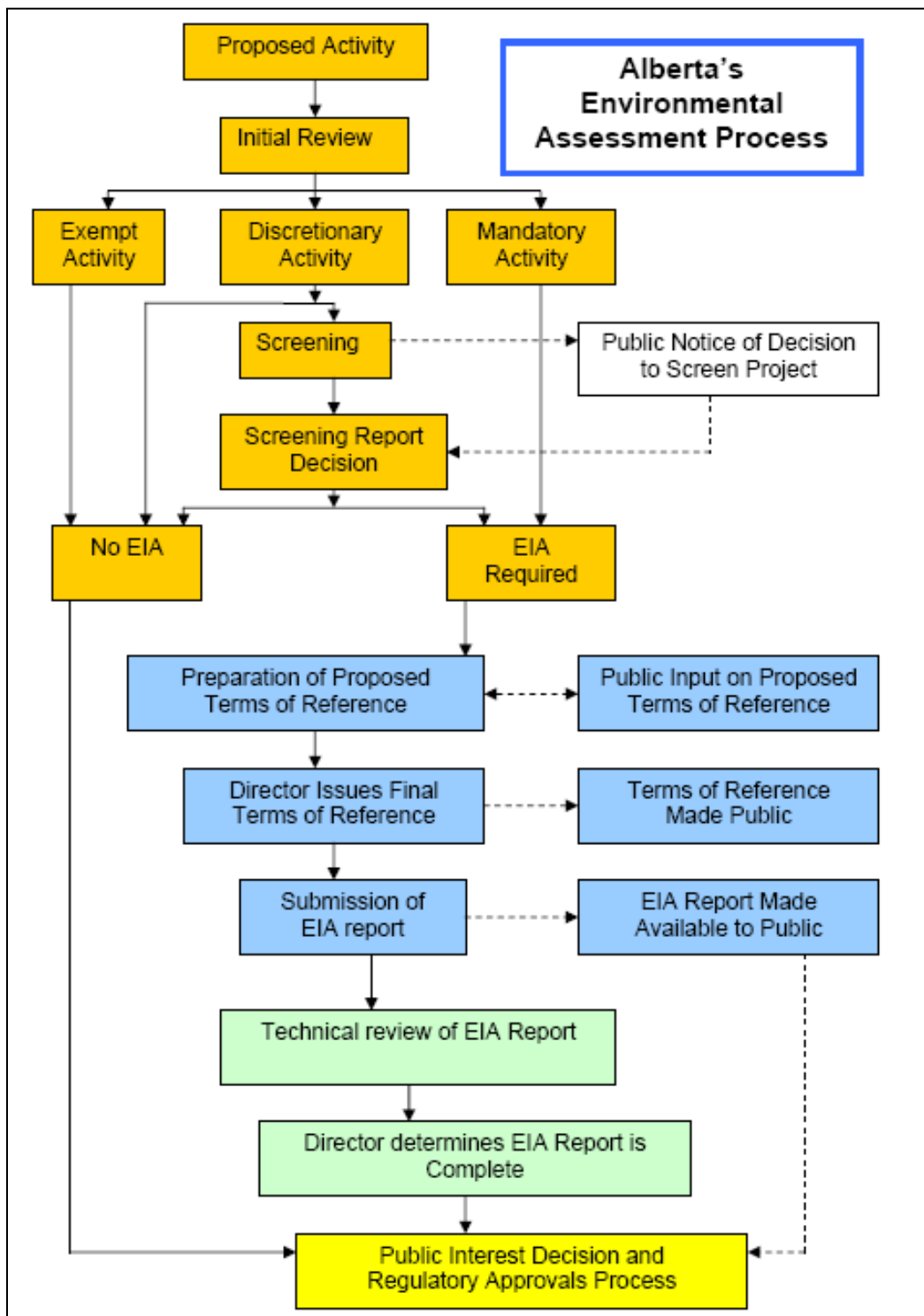


Figure 4.3. The Alberta EIA Process

Source: Used with permission from AENV (2008a).

If an EIA report is necessary then the proponent outlines their Proposed Terms of Reference (PTOR) for the EIA report. As dictated in s.49 of the *EPEA*, PTORs must include:

- a detailed description of the project and a justification for it;
- an analysis of the site selected, justification for this site, and a consideration of alternative sites;
- a description of baseline environmental conditions and topics of major concern;
- a description of potential environmental, health, social, economic, and cultural effects of the project, including cumulative, regional, temporal, and spatial considerations;
- an analysis of the significance of potential impacts;
- a description of mitigation and monitoring plans, as well as contingency plans to address unpredicted negative impacts;
- consideration of alternatives to the proposal, including the alternative of doing nothing;
- plans for waste minimization and recycling, and plans for minimizing production and release of pollution;
- public and First Nations consultation plans and results of consultation; and
- “any other information that the Director considers necessary to assess the proposed activity”

unless the Director deems otherwise. To help proponents, Alberta has published standard TORs for different types of project (e.g., AENV 2009b).

Once the PTOR is developed, proponents submit it to AESRD and the public for review (s.48, *EPEA*). Once received, the Director compares the PTOR with requirements set in the *EPEA* and input from the public and other government agencies, and then publishes a Final Terms of Reference (FTOR).

Next the proponent prepares its EIA report according to the requirements in the FTOR. The process of putting together the EIA report is the same as the process of putting together the federal application described in s.4.3.2. The *EPEA* and standard TOR guidelines don't specify what methods of IA proponents should use, but guidance is provided in AENV's (2010b) guide to preparing EIA reports and a publication regarding

cumulative EA (AEUB, AENV, and NRCB Undated). Once completed, the proponent submits its EIA report to AESRD, which then publishes the report.

The next step in the EIA process is technical review by a “multi-disciplinary, integrated team of experts” from across government (AENV 2008a 3). The purpose of the review is to determine if the EIA is consistent with the FTOR and if there are any risks that demand attention (4). To address insufficiencies in EIA reports, more information may be requested from proponents through Supplemental Information Requests. It is common that many supplemental information requests are made: by 2011, the average numbers of supplemental information requests for bitumen mines, *in situ*, and upgrader proposals were 371, 268, and 270, respectively (Alberta 2011f).³² For the Suncor North Steepbank Mine Extension and Voyageur Upgrader proposal, 500 supplemental information requests were made to the proponent by Alberta Environment (AENV) and the ERCB (ERCB 2011b). When the review team is satisfied that they understand the project, its potential effects, and the proponent’s proposed mitigation measures, they inform the Director who then decides if the report is complete. If determined complete, the Director then refers the report to the ERCB which then examines the project in terms of its contribution to “the public interest” (s.53, *EPEA*; see s.4.4.4 below).

The *EPEA* does not provide any statutory rights of appeal, though as with federal EA under the *CEAA 2012*, stakeholders have some capacity to appeal *EPEA* decisions under the provisions of administrative law.

The Alberta government sometimes hires third party contractors to assist in the EIA process. “Independent, third party consultants” may be hired to “conduct EIA reviews, attend hearings, and review approvals for some applications” (Alberta 2006a 24). In such cases, AESRD continues to oversee “all applications and make the necessary decisions related to applications” (Alberta 2006a 24). The proponent pays the contractor, but contractors are selected by AESRD and the contractor is supposed to take direction solely from AESRD (AENV 2010c).

³² Alberta (2011f) doesn’t indicate how many years these averages are calculated over.

4.4.4. ERCB Public Interest Determination

The ERCB is the chief decision-maker in Alberta with respect to energy development, and bitumen developers must get ‘public interest’ approval from the ERCB to proceed with their proposals.³³ The ERCB is an “independent, quasi-judicial agency” responsible for regulating “the safe, responsible, and efficient development of Alberta’s energy resources” (ERCB Undated-a). The powers of the ERCB with respect to bitumen development are provided for by the *ERCA*, the *OSCA*, and the *Oil and Gas Conservation Act* [R.S.A. 2000, c.O-6].

The ERCB is led by a board of nine members and a supporting team of engineers, geologists, economists, other experts, and administrative staff. Board members are appointed by the Lieutenant Governor in Council, i.e., the Alberta cabinet (s.5, *ERCA*). Historically, board members have been drawn from industry and government with skills in petroleum engineering, energy law, and geology (Breen 1993, ERCB Undated-c). Members’ terms are five years if they demonstrate “good behaviour”, but may last longer at the “pleasure” of the Lieutenant Governor in Council (s.5, *ERCA*).

The *OSCA* requires that proponents attain approval from the ERCB for the development of facilities for bitumen recovery or processing. *Directive 056* requires that applications include:

- a description of the approval, permit, or licence applied for;
- a reference to the act(s) and section(s) under which the application is made;
- a description of the facts relevant to the application;
- a description of public consultation already conducted;
- any other information necessary to provide the ERCB with a full and complete understanding of the application; and
- whether there are any outstanding landowner/resident concerns.

Directive 023, while officially only a draft, indicates that application requirements for bitumen recovery and upgrading projects also require:

³³ The ERCB and the Alberta Utilities Commission (AUC) were created in 2008 to replace the Alberta Energy Utilities Board (EUB).

- a statement of the need and timing for the project;
- a description of the proposal including location, size, scope, schedule of construction, duration of operations, and “a discussion of the reasons for selecting the proposed schedule” (8);
- a description of the status of land access negotiations;
- a description of technical details of the proposed project, including
 - geology;
 - engineering details of the mine, pits, and tailings areas;
 - hazards and safety programs;
 - in the case of *in situ* proposals, comparisons of recovery processes in terms of technical, economic, environmental, and cost factors;
 - how land disturbance will be minimized;
 - in the case of upgrading proposals, how resources will be processed, comparisons of the proposed process versus alternatives in terms of recovery, energy efficiency, cost, commercial availability and environmental factors;
 - on-site electrical facilities;
 - appraisal of options and consideration of recovery, energy balance, costs, technical details, and environmental factors in the case of proposals in which external energy sources are planned;
 - environmental control measures;
 - economic information with respect to commercial viability as well as the results of a CBA and an economic impact analysis of the project at the local, provincial and national levels, including employment effects;
 - environmental impact assessment and biophysical impact assessment;
 - social impact assessment regarding population, services and infrastructure, land use, housing, quality of life, impacts on special groups, and historical resources;
 - an environmental protection plan;
 - a conceptual development and reclamation plan; and
 - a solid waste management plan.³⁴

³⁴ *Directive 023* has been in revision for some time; according to Ken Schuldhuis (Manager, ERCB, email message to author, February 24, 2012) an updated version is currently expected in late 2012.

Additional information may be required; the ERCB may alter the requirements depending upon the particular project proposed (ERCB 1991). *Directive 023* does "not explicitly specify the 'detail' that should be provided, the intent is that sufficient information must be available to permit the overall evaluation of whether the project will result in the economic and efficient use of resources and protection of the environment" (ERCB 1991 2). *Directive 023* outlines the information that the ERCB may require in order to make its decision.³⁵

Upon receipt of an application, the ERCB reviews it for completeness. If incomplete the ERCB either requests further information or denies the application. The status of applications is posted on the ERCB's website.³⁶

As discussed in s.4.4.2, applications for bitumen megaprojects are typically classified as 'nonroutine' applications, and consequently usually trigger hearings. ERCB hearings are conducted like legal proceedings, as the ERCB plays a quasi-judicial, or tribunal, role. Hearings are governed by the ERCB's *Rules of Practice* [A.R./2011-98] and Canadian administrative law and follow a series of prescribed steps (Figure 4.4). Prior to hearings, Prehearing Meetings may be held to inform involved parties of procedure (ERCB 2003), and parties may make information requests of other parties to clarify evidence or simplify issues (s.29, *Rules of Practice*). If a party served with an information request is unwilling or unable to provide a complete response, it must explain itself (s.31, *Rules of Practice*). Requesting parties may ask the ERCB to intervene in such circumstances. The ERCB may also call a Technical Meeting to review and clarify an application, submission, or response, or to recommend procedures for the hearing.

Hearings themselves are open to the public, but official standing is limited to the proponent, the intervener that triggered the hearing (i.e., those whose "rights may be directly and adversely affected") and to other interveners if granted standing by the ERCB based upon the same 'direct and adverse effect' test (ERCB 2003 7). The ERCB

³⁵ Ken Schuldhuis, Manager, ERCB, email message to author, January 26, 2009.

³⁶ www.ercb.ca.

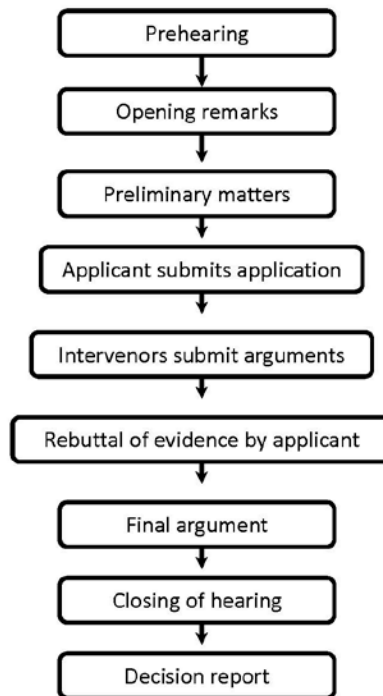


Figure 4.4. The ERCB Hearing Process

Source: Adapted from ERCB (2003).

retains discretionary power over who fits this description, and the only definition of this term is in *Directive 056*:

parties whose rights may be directly and adversely affected by the nature and extent of a proposed application” including First Nations and Métis... parties with a direct interest in land, such as landowners, residents, occupants, other affected industry players, local authorities, municipalities, and other parties who have a right to conduct an activity on the land, such as Crown disposition holders (ERCB 2008b 2-1, 2-2).

Lesser opportunities for participation, such as the opportunity to make a presentation in a hearing, are also often offered to other parties that would otherwise not be given standing (e.g., see ERCB 2008a). Determination of the level of participation is made on a case-by-case basis. Parties that wish to present evidence in support of their arguments must submit it ahead of time. All submissions become public information unless confidentiality is granted by the ERCB (ERCB 2003 10). During a hearing parties examine, cross-examine, and rebut arguments, and lawyers and expert witnesses are

commonly used. The Crown may participate in a hearing to present evidence, cross-examine witnesses, or submit argument. A court reporting service records the hearing, and transcripts can either be purchased or viewed at the ERCB library in Calgary (ERCB 2003). Hearings can take up to several weeks. Hearing times and locations are scheduled with involved parties in mind. Locations are typically chosen close to the proposed project (ERCB 2003). Costs of participation for local interveners may be covered as provided by s.28 of the *ERCA*.

The decision-making entity in hearings is called a hearing panel and is composed of three ERCB board members, led by an appointed chair (ERCB 2003). Hearing panels consider all of the evidence in front of them – statements and other evidence gathered in the hearings, the proponent's application, and the EIA report – and come to a decision recommendation. If the panel recommends approval, the decision is reviewed by the Lieutenant Governor in Council who may then authorize the panel's decision recommendation (s.10.5, *OSCA*). The panel's final decision and reasons are compiled into a decision report and published by the ERCB within 90 days of the hearing (ERCB 2003).

The prime criterion for ERCB decision-making is the “public interest.” This criterion is written into various laws empowering the ERCB as well as policy and other documentation. Section 2 of the *ERCA* establishes that the purposes of the act are to, among other things,

effect the conservation of, and to prevent the waste of, the energy resources of Alberta... control pollution and ensure environmental conservation... [and] secure the observance of safe and efficient practices

and s.3 of the *ERCA* instructs the ERCB to

in addition to any other matters it may or must consider in conducting the hearing, inquiry or investigation, give consideration to whether the project is in the public interest, having regard to the social and economic effects of the project and the effects of the project on the environment.

Section 3 of the *OSCA* establishes the purpose of the act is to

effect conservation and prevent waste... to ensure orderly, efficient and economical development in the public interest... to ensure... safe and efficient practices

and to control pollution, and s.12.5 of the *OSCA* defines the “public interest” in terms of efficiency of use, present and future availability of hydrocarbons in the province, and “any other matter that the [ERCB] considers to be relevant.” *Directive 056* (AEUB 2005) defines the public interest in terms of what is 'economical, orderly, and efficient'. As Vlavianos (2007b) points out, the ERCB’s empowering legislation and policy and ERCB decision reports highlight the breadth of the ERCB’s mandate over resource conservation and the social, economic, and environmental aspects of development.

If projects are approved, either one or both of the ERCB and the Lieutenant Governor in Council set conditions of approval (s.10, *OSCA*). Some of these conditions are impact mitigation measures, while others relate to such things as ensuring that the ERCB receives adequate resource information from developers. The ERCB may also address potential negative impacts of projects by noting the *commitments* that proponents make. The ERCB expects that proponents will adhere to *commitments* made during public and First Nations consultation, in their applications, and in hearings (ERCB 2010a 48). The ERCB may also make *recommendations* to involved parties, such as the Alberta government, in order to mitigate project impacts.

There are three types of appeal provided in the law overseeing ERCB review. The ERCB has the authority provided in s.40 of the *ERCA* to review its decisions on its own initiative or at the request of affected parties in what is called a “review and variance request” (ERCB 2003). In cases where a decision has been made after a hearing and where a party directly-affected by the decision was not notified of the hearing, such parties have 30 days following the decision to request a review of the decision. The party affected may request that the ERCB suspend the offending decision until their arguments are heard, and the ERCB may choose to do so or to refuse the request. The ERCB can offer a public hearing to the party that was affected by the decision if the ERCB concludes that the party is ‘directly and adversely affected’, and the ERCB is free to confirm, vary, or rescind the decision following a hearing based upon what it sees as “just” (s.40(5) of the *ERCA*). A second type of review provided for in the *Rules of*

Practice has no time limit and may involve any decision of the ERCB. This second type of review is granted by the ERCB based on whether the ERCB agrees that the party is directly and adversely affected, and if granted, the ERCB will hear new facts or evidence, or information indicating that the ERCB has made a legal or factual error (s.48(6), *Rules of Practice*). A third type of appeal is provided for under s.41 of the *ERCA*: appeals of ERCB decisions may be made to the Alberta Court of Appeal on questions of jurisdiction and law, and appeals of decisions of the Court of Appeal may be granted to the Supreme Court of Canada. There are no specific avenues for stakeholders to appeal Lieutenant Governor in Council decisions (such as Lieutenant Governor in Council approval of ERCB decision recommendations with respect to a project review); in such cases, stakeholders only have the very limited opportunities provided in Canadian administrative law.

4.4.5. Alberta Permits

Aside from requirements to undergo EIA and public interest review developers often also require permits under the *EPEA*, *Water Act*, *Oil Sands Conservation Regulation*, *Hydro and Electric Energy Act* [R.S.A. 2000, c.H-16], or *Historical Resources Act* [R.S.A. 2000, c.H-9] (see AENV Undated). For example, ss. 60, 61, and 66 of the *EPEA* requires that proponents apply for “approvals” and “registrations” (i.e., types of permits) when projects include activities such as: constructing, operating, or reclaiming of bitumen processing plants, mines, or *in situ* production sites. An example of permits required from the ERCB are the requirements under ss. 24 and 48 of the *Oil Sands Conservation Regulation* for developers to be approved to store mine tailings. As with federal permitting, proponents often apply for Alberta permits in the same applications that they use for the purposes of addressing EIA and ERCB project review requirements. It is through these permits that government and the ERCB can impose additional terms and conditions on proponents, such as limits to water use, or reclamation requirements. Often conditions of permits are drawn from previous permits to similar projects (e.g., compare the Kearl (AENV 2011a) and Joslyn (AENV 2007a) *EPEA* permits). Permitting is an important complement to the project review process.

4.4.6. Harmonization of Alberta Review Processes

The above Alberta review processes are typically harmonized under a memorandum of understanding between AESRD and ERCB (MOU)(AEUB 1996). To improve efficiency and consistency, but “without fettering the discretion of any statutory decision maker”, the AESRD and ERCB review processes are brought together and conducted as one (1; Figure 4.5).

Under the MOU, the proponent files their applications respecting the *EPEA*, *Water Act*, and *OSCA* in one document, and both the ERCB and AESRD appoint lead coordinators to consult with proponents and other stakeholders and jointly establish a review schedule. Next AESRD checks the application for completeness in terms of the requirements of the *EPEA* and *Water Act*. When the application is deemed complete, notices of application are given by both AESRD and the ERCB. The next step involves separate technical reviews of the application by AESRD and the ERCB. If AESRD have concerns from the perspective of its responsibilities under either the *EPEA* or *Water Act*, it informs the ERCB and the proponent. In the event that further information is needed by the regulators, a Deficiency Letter is sent to the proponent.

Once all deficiencies are addressed and technical review is complete, the ERCB reviews the application regarding whether or not the application is in the public interest. If the public is materially affected, if there is likely to be public objection, and/or if the concerns of all potential interveners have not been resolved, the ERCB typically initiates a hearing process as described in s.4.4.4. In hearings AESRD can take an active role in the hearing cross-examining witnesses or presenting evidence, and AESRD can pass on any of its concerns regarding EIA report content or other matters of environmental protection.

At the conclusion of hearings the ERCB decides whether it thinks the project is in the public interest, and if so, recommends approval of the project to the Lieutenant Governor in Council. According to the MOU, if the ERCB recommends approval of the application, AESRD next conducts decision-making regarding permitting and must consider the ERCB's recommendation in its decision-making. Note that the MOU implies, but does not explicitly specify, that the ERCB will use all of the information gathered up to this point in making its public interest determination including EIA

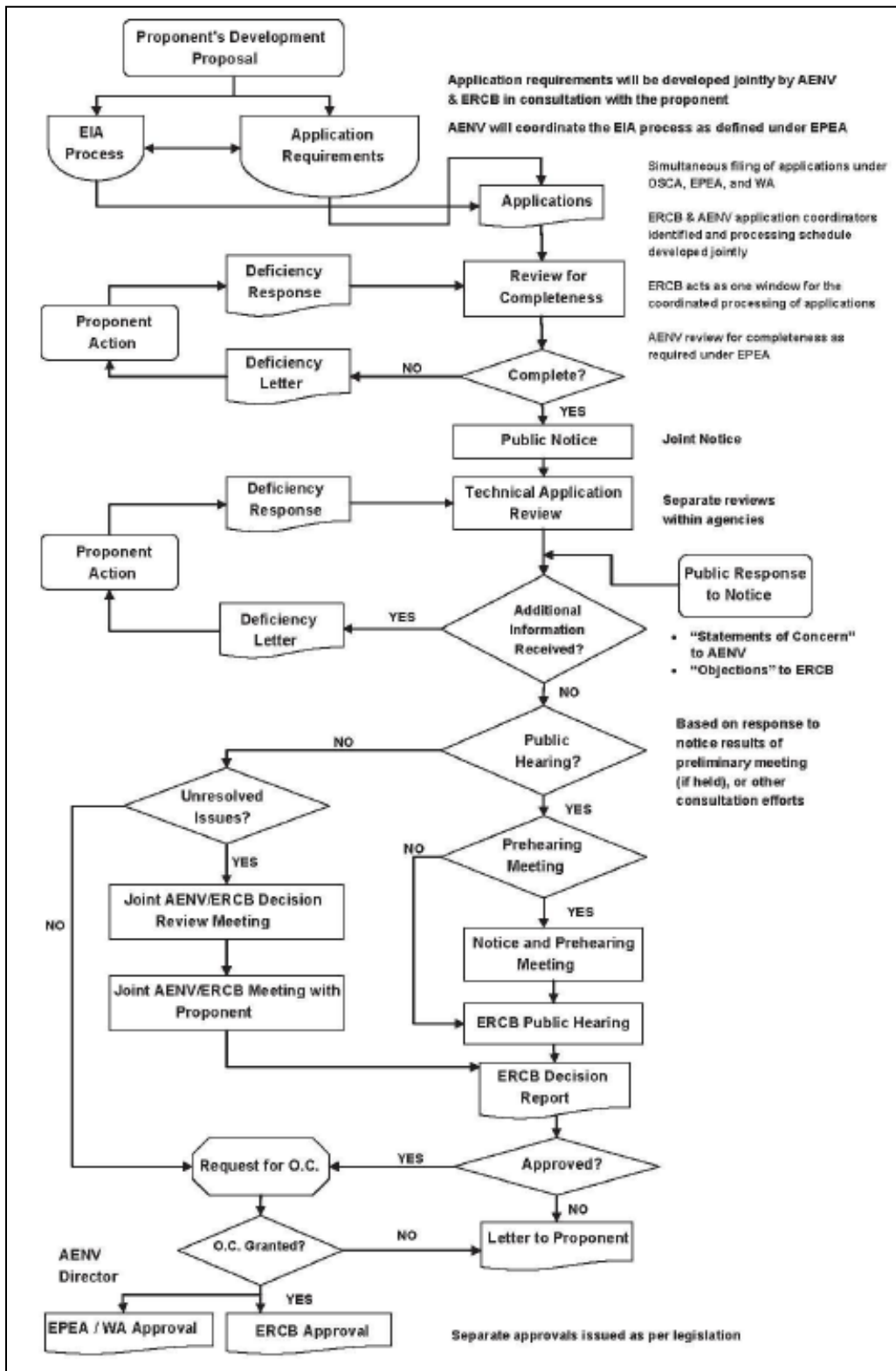


Figure 4.5. Integrated Approval Process for Bitumen Projects¹

Source: Used with permission from Alberta (2011g). Note: 1. WA refers to the *Water Act*.

information and materials included in the application with respect to permits that the project may require under the EPEA and *Water Act*.

The MOU is intended to ensure that despite integration of EIA and public interest review AESRD and ERCB retain their chief roles as set out in their empowering legislation. According to the MOU, AESRD retains “decision making authority” over the approval of applications with respect to:

- the designation of projects subject to the EIA process and the management of that process;
- the conservation and reclamation requirements for all surface disturbances;
- the pollution prevention, pollution control, and waste management systems;
- the allocation of water resources; and
- the use and protection of potable water systems (AEUB 1996 2).

According to the MOU the ERCB retains “primary decision-making authority” over the approval of applications with respect to:

- the conservation of energy resources including the resource recovery technology;
- the location of the development and layout of facilities;
- the design of produced water recycle systems for *in situ* developments;
- the storage and disposal of oilfield wastes resulting from *in situ* developments;
- the sub-surface disposal of produced fluids and solids; and
- determination of whether a project is in the public interest (having regard for the social, economic, and environmental effects of the project) (1).

As development issues often relate to items within the jurisdiction of both AESRD and the ERCB, decision-making is to be made by whichever authority has primary jurisdiction with the advice of the other.

4.4.7. Alberta Strategic Environmental Assessment

Unlike the federal government, the Alberta government has no official SEA process. As described in s.5.2.1, though, the Alberta government has undertaken a variety of planning processes that can be considered elements of SEA.

4.5. Joint Review Panels

In the case of bitumen megaprojects that trigger both federal EA and Alberta review, all of the above processes are typically harmonized into a joint review panel (JRP) review process. The mechanics of JRP reviews are set out in the *Canada – Alberta Agreement for Environmental Assessment Cooperation* (Canada and Alberta 2005), the MOU between AESRD and the ERCB (AEUB 1996) described in s.4.4.6 above, and additional agreements signed by the federal and Alberta governments unique to each JRP review. Figure 4.6 shows how JRP reviews harmonize and integrate the federal EA, federal permitting, Alberta EIA, ERCB, and Alberta permitting processes into one single process. The following description is based on the *Canada – Alberta Agreement*.

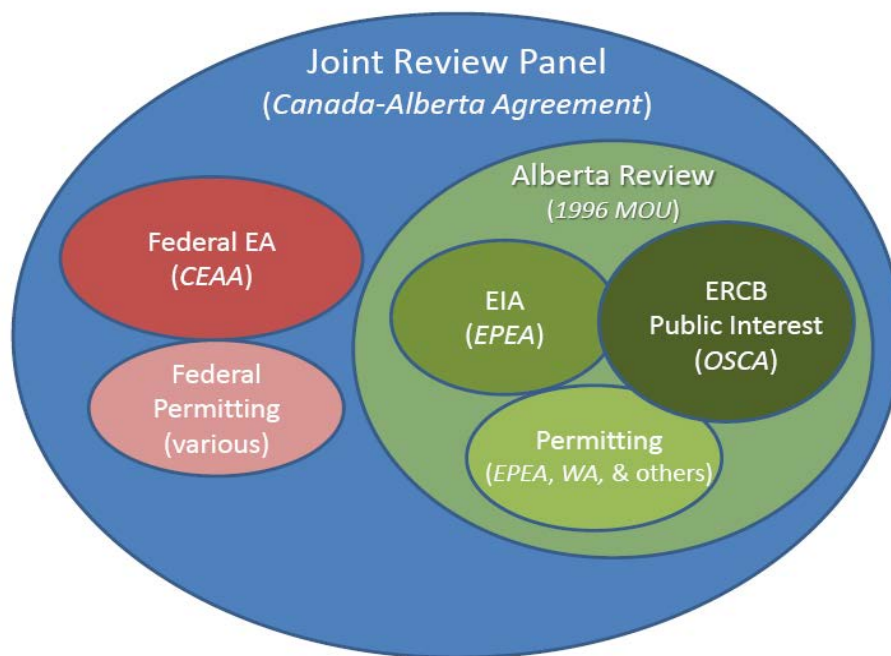


Figure 4.6. Review Consolidation Under a ‘Joint Review Panel’ Type of Review, and Respective Legislation and Agreements in Brackets

A JRP review begins when both federal and provincial triggers are present and the federal and provincial governments identify the opportunity to coordinate reviews. Next, a “Lead Party” is established to administer the process. The Lead Party – either the federal or provincial government – is chosen based upon whether or not the project is planned for federal or provincial lands but also determined by factors such as: the

scale, scope and nature of the review; the capacity of each organization to take on the review; and the physical proximity of government infrastructure. In the case of bitumen megaproject reviews, Alberta is typically the Lead Party.

Next each party establishes a “senior one window contact” that is responsible for communications, coordination, consistency with legal requirements, and working with their counterpart. Then a Joint Advisory Review Team is established. The team is chaired by the Lead Party and brings together experts from both parties. The parties then establish and publish timelines, schedules, and milestones in consultation with the proponent. In cases where hearings are required, which is the case for bitumen megaprojects, the parties next formally establish the joint review panel.

Panels are formed of three members chosen by both the federal and Alberta government. The Lead Party – typically Alberta – selects a chair and second member, with the approval of the secondary party – typically the federal Minister of Environment in bitumen reviews. The secondary party selects the third member, with the approval of the Lead Party. All three members are expected to be unbiased, free of conflicts of interest relative to projects, and to have relevant knowledge and experience.³⁷

The mechanics of a JRP review is supposed to be consistent with legal requirements for each of the constituent processes; all processes and steps required by the federal and Alberta legislation are to be followed. While overlapping components are harmonized for efficiency, such as hearings, many components occur as they would otherwise, such as separate publishing of review documentation in both the federal and provincial registries. The many actors involved in the constituent processes are involved in JRP reviews as they would otherwise be, such as RAs with respect to federal EA, though in some cases actors’ roles are adjusted.

³⁷ This requirement is affirmed in s.42 of the *CEAA* 2012.

4.6. Project Review Statistics

Given the ramp up in development of bitumen, the number of projects that have undergone project review has grown significantly since the mid-1990s. Bitumen project proposals are but one of many kinds processed through federal EA, but they are the main type of proposal processed through Alberta EIA (Figure 4.7)(AENV 2010a, 2011c) and are a sizeable proportion of ERCB public interest reviews.

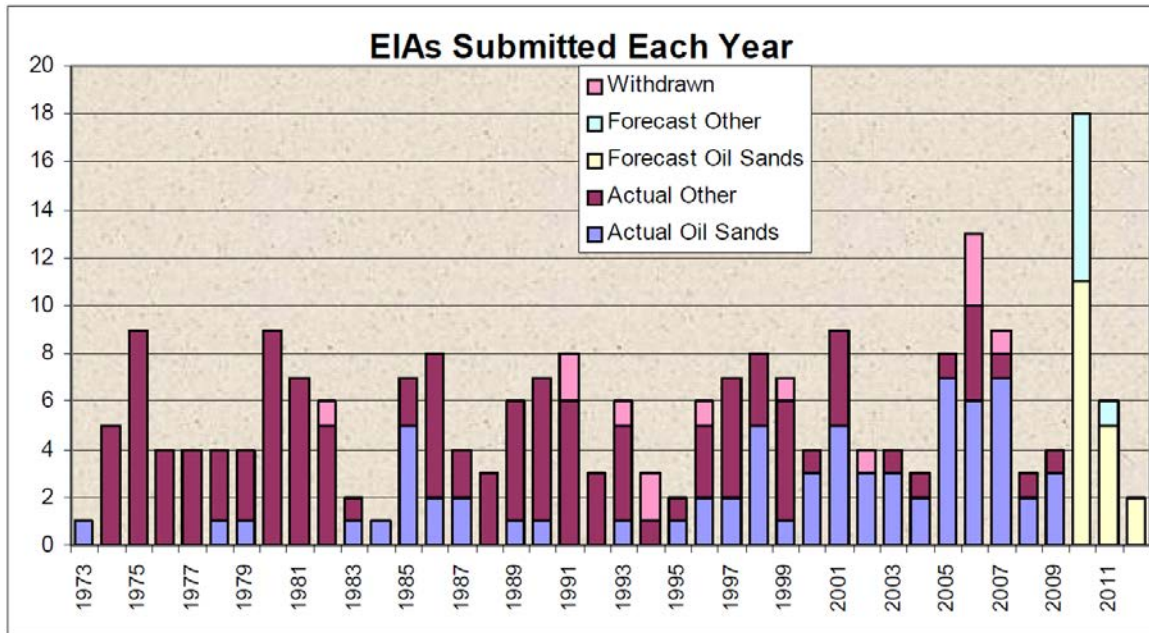


Figure 4.7. Bitumen Projects Subject to Alberta EIA Over Time (1973-2011)

Source: Used with permission from AENV (2010a).

The first EIA report ever submitted for a bitumen project was in 1973 – the EIA for the Syncrude Mildred Lake mine and upgrader – and the first EIA of an *in situ* bitumen project (Esso's Cold Lake project) was submitted in 1979 (AENV 2011c). Today, the majority of EIAs for bitumen projects are for *in situ* projects (Table 4.1). The ERCB does not publish a database of number of applications processed or approved, but some statistics are available. As of early 2011, the ERCB had approved eight mining projects and 61 *in situ* projects (ERCB 2011b). In 2011 alone, the ERCB approved 352 applications for mining or *in situ* bitumen activities (whole projects, but

also components and activities within projects), and 22 were ‘closed’ and 16 were withdrawn.³⁸ The ERCB closes applications when they are very low in quality, and proponents withdraw applications for various reasons such as to avoid denials which may affect a company’s reputation.³⁹ Denials are rare – four applications were denied in 2009.⁴⁰ No comparable statistical compilations are available from the CEA Agency.⁴¹

Table 4.1. Number of EIAs Completed in Alberta's History

Project Type	Number of EIAs Completed
mines	19
<i>in-situ</i>	37
upgraders	9

Source: AENV (2011b). Note: The number of EIAs completed is not reflective of number of separate projects; EIAs are sometimes required for expansions.

Review times for bitumen megaprojects are typically greater than a year. AESRD schedules EIAs to take 43 weeks (about 11 months) to complete, but to date EIAs have taken 65 weeks on average (16 months) (Alberta 2011f).⁴² AESRD notes that review times vary due to differences in project complexity, whether significant changes are made to projects while they are undergoing EIA, the speed with which government reviewers manage to review applications, and how fast the proponent responds to supplemental information requests (Alberta 2011f). In terms of ERCB review, applications for bitumen megaprojects often take more than a year to pass through the process, including the time for ERCB staff to review the application, make supplemental information requests to applicants, and the time for proponents to respond to supplemental information requests. The vast majority of applications are eventually approved. The ERCB doesn’t publish statistics on approval rates, but on rare occasions

³⁸ Brenda Poole-Bellows, Regulatory Development Branch, ERCB, email message to author, April 3, 2012.

³⁹ Ibid.

⁴⁰ Ibid.

⁴¹ No EA statistics are available on the CEA Agency website, and an email request sent to the CEA Agency on June 17th, 2011 was not answered.

⁴² Alberta (2011f) does not indicate the time period over which this average is calculated.

proponents withdraw their applications.⁴³ The Suncor North Steepbank Mine Extension and Voyageur Upgrader took six years to pass through the process until approval in 2006 (ERCB 2011b). Again, no comparable statistics on federal EA in terms of time for reviews and approval rates are available. The Kearl project entered project review in 2003 but didn't get final federal approval until 2008 – a five year process.

4.7. Kearl Project Review

The Kearl mine has a long history stretching back many decades (Table 4.2) and is a useful case study for understanding how bitumen megaproject reviews happen in practice. Kearl first entered the project review process in 1997 but its proponents withdrew the project in 1999. Kearl re-entered the review process in 2003 when its proponents disclosed an updated project plan, Proposed Terms of Reference for EIA, and began public and aboriginal consultation.

Table 4.2. Significant Events in the Project Review Process for the Kearl Mine

Date	Event
1950s	Mobil Canada (subsidiary of US-based Mobil) acquires leases 36 and 31A and begins to evaluate resource
1989	Lease 87 acquired jointly by Mobil Canada and Husky Energy
1997	Initial public disclosure filed by Mobil Canada
1997	Mobil Canada enters into Alberta EIA process
1998	Final EIA terms of reference issued for initial project conception
April, 1999	Mobil Canada suspends Kearl project
1999	Exxon and Mobil merge
2000	Lease 6 acquired jointly by Imperial Oil (Canadian subsidiary of Exxon-Mobil) and Husky Energy
2002	Imperial Oil and Husky Energy agree to give Imperial Oil all mining rights to leases 6 and 87
November, 2003	Imperial Oil releases updated project disclosure, publishes proposed revised EIA terms of reference, and initiates public consultation

⁴³ Tom Keelan, ERCB, email message to author, April 2, 2012.

Date	Event
2003	Imperial Oil begins public consultation and enters the project review process
April 22 nd , 2004	Final EIA terms of reference are issued
March, 2005	Imperial Oil updates the Kearl project description
July 12 th , 2005	Imperial Oil files regulatory application
July 25 th , 2005	AEUB and AENV issue notice of application
January 18 th , 2006	Federal Minister of Fisheries and Oceans Geoff Regan formally requests that federal Minister of Environment Rona Ambrose refer the project to a review panel
June 14 th , 2006	Federal Minister of Environment Rona Ambrose refers the project to a review panel
July 13 th , 2006	Federal government and AEUB sign joint review panel agreement
October 6 th , 2006	Federal and Alberta governments respond to application through submissions to the Joint Review Panel
November 6 th - 29 th , 2006	Joint Review Panel holds hearings in Fort McMurray, Nisku, and Edmonton
February 27 th , 2007	ERCB and Canada publish Joint Review Panel Report ('decision report') which concludes that the project will have no significant adverse effects and is in the public interest
March 29 th , 2007	Coalition of environmental groups launches legal challenge to Joint Review Panel conclusion in federal court
May, 2007	Alberta government approves project through order-in-council
August 14 th , 2007	Federal government approves project through order-in-council
January, 2008	Environmental groups argue their case in federal court in Edmonton. Judge reserves decision.
February 12 th , 2008	Federal Minister of Fisheries and Oceans grants Imperial Oil necessary <i>Fisheries Act</i> permit
March 5 th , 2008	Federal court judge finds that Joint Review Panel committed an error in law by not providing a rationale that the project's GHG emissions will not have a significant effect and orders Joint Review Panel to provide rationale for its conclusion
March 13 th , 2008	Environmental groups start new court challenge seeking to have <i>Fisheries Act</i> permit invalidated on basis of above decision
March 20 th , 2008	Federal Department of Fisheries and Oceans informs Kearl proponents that permit is invalid
May 6 th , 2008	Joint Review Panel provides rationale and affirms findings of no significant adverse effects

Date	Event
May 7 th and 8 th , 2008	Proponents, DFO, and environmental groups argue issue of permit in federal court in Calgary
May 14 th , 2008	Federal court judge argues <i>Fisheries Act</i> permit is invalid
May 15 th , 2008	Federal cabinet approves Joint Review Panel's assessment for a second time
May 30 th , 2008	Environmental groups write federal government arguing that project should either be denied or required to use carbon capture and storage
June 6 th , 2008	Federal Ministry of Fisheries and Oceans re-issues <i>Fisheries Act</i> permit with no requirements to address project's GHG emissions
June 17 th , 2008	Environmental groups state they will not challenge re-approval but criticize federal EA process
May, 2009	Imperial Oil board of directors approve construction of first phase of Kearl project

Sources: AEUB (2007), Anonymous (2009a), Canada (2006), Ecojustice (Undated), AEUB and AENV (2005), and Imperial Oil (Undated-a, c, 2003, 2005).

The project was subject to project review under the *CEAA 1992*, the *EPEA*, and the *OSCA*, and required permits under the *EPEA*, *Water Act*, and *Hydro and Electric Energy Act* (AEUB and Canada 2007). Federal EA was required because a permit under s.35(2) of the *Fisheries Act* was required, and Alberta EIA and ERCB review were triggered by the fact that the project is a bitumen mine. The scale of Kearl – a planned production capacity at the time of 300,000 bpd (48,000 m³ per day)(Imperial Oil 2005) – meant that a review panel was undertaken for federal EA, and objection from relevant Alberta parties meant that hearings were required under the *OSCA*. Considering all of this, the federal and Alberta governments determined that a JRP review should be conducted. The formal agreement for the JRP was reached in July of 2006.

The proponents' consultation entailed meetings with stakeholders, adjacent leaseholders, Aboriginal groups, and municipal service organizations between 2003 and 2007. The Final Terms of Reference for EIA were released in 2004, and a little more than a year later in 2005 the proponents submitted their application. The proponents addressed their requirements under the *Hydro and Electric Energy Act* in a separate application to the Alberta government.

Table 4.3 presents the many issues that the proponents covered in their application. A wide variety of studies and methods of impact assessment were employed to examine these issues, including air quality dispersion modelling, EconIA,

Table 4.3. Issues Examined by Proponents in Kearsy Application

Issue	Sub-issue
air quality	ambient air quality potential acid input ozone odours compliance with emission guidelines GHG emissions
noise	local noise levels and noise at dwellings air traffic noise levels
groundwater	groundwater levels and flows groundwater quality
surface water quantity	flows, water levels, and open water areas sediment yields, concentrations and channel regimes closure drainage sustainability
surface water quality	water quality substance concentrations thermal regime dissolved oxygen PAH and metals in sediments acidification pit lakes
fish and fish habitat	fish habitat fish abundance fish and fish habitat diversity
soils and terrain	topographic diversity soil series diversity edaphic diversity land capability air emissions and soil series
vegetation	landscape diversity community diversity species diversity air emissions and landscape diversity
wildlife	species diversity community diversity landscape function
human health	long-term effects

Issue	Sub-issue
	short-term effects particulate matter reclamation water bodies and watercourses
wildlife health	long-term effects reclamation water bodies
aquatic health	aquatic health pit lakes
resource use	aggregate resources agriculture forestry hunting and trapping fishing designated ecological areas recreation and tourism access visual aesthetics
historical resources	-
socio-economics	socio-economic plans, policies and initiatives economic and fiscal impacts population impacts community impacts
traditional land use	-

Source: Volume 4 in Imperial Oil (2005).

geographic information systems, literature reviews, scenario building (to examine future cumulative effects), species diversity tests, and wildlife population modelling.

The proponents argued that the chief benefits of the project were that the project would contribute to Alberta's stated vision of bitumen development and would generate sizeable economic benefits including over 20,000 person-years of construction employment, \$5.5 billion in new economic activity associated with capital investment, \$1 billion per year in provincial GDP, and \$24 billion in royalty and corporate tax earnings to the provincial and federal governments over the life of the project (Imperial Oil 2005 Volumes 1 and 9). With respect to the project's many negative environmental effects, the proponent concluded that none would be significant after mitigation.

Hearings were held in Fort McMurray, Nisku, and Edmonton on November 6th, 10th, 14th, and 16th, 20th to 24th, and 27th to 29th of 2006, respectively. A wide variety of groups participated in hearings (Box 4.1). Leading up to the hearings, staff at DFO, Environment Canada, and Health Canada reviewed the application for the federal government (Canada 2006), and staff at AENV, ASRD, Alberta Energy, Alberta Health and Wellness, Alberta Municipal Affairs, Alberta Infrastructure and Transportation, and Alberta Seniors and Community Supports reviewed the application for the Alberta government (AEUB and Canada 2007).

The JRP was composed of John R. Nichol, Tom McGee, and Les Cooke. Mr. Nichol, P.Eng., was a member of the ERCB board at the time and was given the role of panel chair.⁴⁴ Mr. McGee is still an employee of the ERCB working in 'stakeholder engagement'. Mr. Nichol and Mr. McGee were chosen by Alberta, the Lead Party.

Box 4.1. Parties Involved in Kearl Hearings

Imperial Oil
 Athabasca Chipewyan First Nation
 Canadian Natural Resources Ltd.
 Clearwater River Paul Cree Band No.175
 Deer Creek Energy
 Deninu Kue First Nation
 Fort McKay First Nation Industrial Relations Corporation
 Government of Alberta
 Alberta Environment
 Alberta Department of Energy
 Alberta Health and Wellness
 Alberta Infrastructure and Transportation
 Alberta Municipal Affairs
 Alberta Seniors and Community Support
 Alberta Sustainable Resource Development
 Government of Canada
 Department of Fisheries and Oceans
 Environment Canada
 Health Canada
 Indian and Northern Affairs Canada
 Mikisew Cree First Nation
 Northern Lights Health Region
 Oil Sands Environmental Coalition
 Petro-Canada Oil Sands
 Regional Municipality of Wood Buffalo
 Shell Canada Ltd.
 Suncor Energy
 Syncrude Canada Ltd.
 Synenco Energy Inc.
 Wood Buffalo First Nation and Wood Buffalo Elders Society
 Wood Buffalo Métis Association
 Alberta Energy and Utilities Board
 Canadian Environmental Assessment Agency
 Source: AEUB and Canada (2007 100-103).

⁴⁴ At the time (2006) the ERCB was called the Alberta Energy Utilities Board.

Mr. Cooke was chosen as the federal government appointee due to his experience in government, strategic policy, economic development, environmental management, and oil development (CEA Agency Undated-b).

By the time hearings were concluded, 'nonobjection' was reached between the proponents and the Athabasca Chipewyan First Nation, Clearwater Band, Wood Buffalo First Nation, and Wood Buffalo Métis Locals Association, partial agreements were reached with the Fort McKay First Nation Industrial Relations Corporation, Mikisew Cree First Nation, Northern Lights Health Region, and Regional Municipality of Wood Buffalo, but no agreement was reached with the Oil Sands Environmental Coalition (AEUB and Canada 2007).

The JRP released its decision report on February 27th, 2007 and concluded that the project is in the public interest, providing that specified mitigation measures and recommendations of the panel are implemented (AEUB and Canada 2007). The conditions of approval are listed in Box 4.2. Many of these conditions of approval are mitigation measures, as are many of the commitments made by the proponents during consultation, in the application, and at the hearings. Regarding the many commitments made by Kearl's proponents during the project review process, the Joint Review Panel stated that

when a company makes commitments of this nature, it has satisfied itself that these activities will benefit the project, the stakeholders, and the public, and the Joint Panel takes these commitments into account when arriving at its decision. The Joint Panel expects that Imperial Oil will adhere to all commitments it made during the consultation process, in the application, and at the hearing to the extent that those commitments do not conflict with the terms of any approval or licence affecting the project or any law, regulation, or similar requirement that Imperial Oil is bound to observe. The Joint Panel expects Imperial Oil to advise the EUB if, for whatever reasons, it cannot fulfill a commitment. The EUB would then assess whether the circumstances regarding the failed commitment warrant a review of the original approval. The Joint Panel also notes that the affected parties also have the right to request a review of the original

approval if commitments made by the applicant remain unfulfilled (AEUB and Canada 2007 104).⁴⁵

Box 4.2. Conditions of Kearl Approval

1. Imperial Oil will consult with the impacted oil sands lease holders and the EUB to develop an acceptable resource appraisal drilling program to be completed by the end of the 2008/2009 drilling season.
2. Imperial Oil will work with the EUB to determine the economic resource potential and recovery plans for these areas prior to finalizing agreements.
3. Imperial Oil will finalize the agreements with adjacent oil sands lease holders regarding all resource and land-use related concerns arising from the impact of the Kearl oil sands Project facilities upon adjacent oil sands lease holders no later than 2010. Imperial Oil is required to consult with both the EUB and SRD prior to the finalization of these agreements.
4. Imperial Oil will work with Husky and the EUB and submit a mining and SAGD impact report to the EUB no later than the end of 2009. This report will include the effects of steam pressure upon geotechnical factors of safety for external mine waste disposal facilities. It will also include the effects of mining and SAGD operations upon resource recovery at common lease boundaries.
5. Imperial Oil will work with the government agencies to define the content and work required to support an amendment to the EUB approved project area as shown in Figure 1. An application must be submitted to the EUB for approval of an increased project area that includes external disposal site expansion and a raw water storage area.
6. Imperial Oil will work with the government agencies to define the content and work required to support an amendment to the mine plan. An application(s) must be submitted to the EUB for approval no later than 2009.
7. Imperial Oil will work with the EUB to define the required drilling and analysis needed to evaluate any routes under consideration for the raw water pipeline and to file the appropriate pipeline application once this work is completed (Section 10.1.3).
8. Imperial Oil will submit to the EUB for its review and approval, five years prior to mining at any lease boundary or final pit wall, a report containing a comprehensive evaluation of the lease boundary geology and reserves, geotechnical conditions, alternative mining scenarios and impacts, associated costs in accordance with Section 3.1 of EUB ID 2001-7, the final results on agreements reached between Imperial Oil and adjacent leaseholders, any impacts on landform design and drainage, and efforts made by Imperial Oil to enhance cross-boundary coordination of mining and closure.
9. Imperial Oil will provide as part of its annual mine plan reporting an update of its efforts to coordinate mine and closure plans with other operators in terms of landform design, drainage, reclamation, and material balances.
10. Imperial Oil will submit the detailed geotechnical designs for all external overburden disposal areas to the EUB at least six months prior conducting any field preparation in these areas.
11. Imperial Oil will limit annual average solvent losses from TSRU to not more than 4 volumes per 1000 volumes of bitumen production.
12. Imperial Oil will not discharge untreated froth treatment tailings to the tailings disposal area.
13. One year prior to plant start-up, Imperial Oil will provide measurement plans to the EUB for review and approval, including process and instrumentation diagrams, metering, sampling methods, and material balance procedures that will satisfy the requirement of ID 2001-7.
14. On an annual average basis, the amount of asphaltene rejection will be limited to 10 mass per cent based on bitumen production.
15. Imperial Oil will work with EUB staff to update the data in Tables 2-1 through 4-10 of the Supplemental Information such that EUB staff can use the data to reliably track Imperial Oil's tailings performance over time. Imperial Oil will submit the updated tailings material balances in Tables 2-1 through 4-10 of the application for EUB approval no later than September 30, 2008.
16. Imperial Oil will submit reporting of actual tailings performance against the plan represented by Tables 2-1 through 4-10 within one month of the end of each quarter.
17. Imperial Oil will submit to the EUB on an annual basis a report that describes its EPL research and development efforts for the previous year. This report should include all of Imperial Oil's efforts and its contributions to any industry collaboration on a full-scale EPL demonstration.

Source: AEUB and Canada (2007), pgs. 104-106.

⁴⁵ The acronym EUB refers to Alberta Energy Utilities Board, the name of the ERCB at the time of the Kearl review.

The recommendations that the panel made to the federal and Alberta governments are listed in Box 4.3. As with conditions of approval, many recommendations were identified during the hearings. For example, one topic raised in the hearings was the challenges faced by the multi-stakeholder group Cumulative Environmental Management Association (CEMA) in advising the federal and Alberta governments on cumulative effects management, and how government resourcing and support of CEMA is lacking. This point of debate led the JRP to recommend that the federal and Alberta governments demonstrate better leadership with CEMA.

Box 4.3. Recommendations in the Kearl Review to the Federal and Alberta Governments

Federal Government:

1. Environment Canada and AENV work together to assess the need for a mine fleet emissions technology review and regulation development process
2. Fisheries and Oceans Canada (DFO), AENV, the oil sands industry, and all other affected stakeholders dedicate the resources, staff, and funding to ensure that Phase II of the Water Management Framework for the Athabasca River is completed in a comprehensive manner and on time
3. Phase II of the Water Management Framework be implemented by January 1, 2011, in keeping with the stated commitments of the Governments of Alberta and Canada
4. DFO and AENV incorporate an ecological base flow into the final Water Management Framework for the Athabasca River
5. Canada raise the issue of integrating all regional monitoring systems with the appropriate multistakeholder forums, having regard for existing priorities and resources; AENV should determine how integration could best be accomplished
6. DFO continue discussions with Imperial Oil towards establishing a no net loss plan that meets the objectives of the Fisheries Act in terms of fish habitat losses and disturbances
7. Environmental Canada and DFO, together with AENV and other regional stakeholders, develop the parameters required for regional monitoring for cumulative effects on fish habitat in the lower Athabasca River and Muskeg River watersheds
8. Canada take a more active and direct leadership role in all aspects of the CEMA

Alberta Government:

9. Alberta continue to work with the Northern Lights Health Region to address the lack of land, infrastructure, and resources that the Region is currently faced with in Fort McMurray
10. coordinated action be taken at all levels of government to ensure that the Regional Municipality of Wood Buffalo has the ability to service the anticipated level of sustained growth in the region
11. Alberta continue to work with the Regional Municipality of Wood Buffalo to ensure that the supply of land ready for residential development and the necessary planning are in place to meet the existing and expected housing demand in the region
12. Alberta take a lead role in assessing and establishing the most appropriate route for a new access road/highway on the east side of the Athabasca River
13. AENV require a detailed hydrogeological investigation for the external tailings area site, including updated seepage modelling and mitigation design, as part of the detailed dike design required pursuant to the Dam Safety Regulations
14. AENV require Imperial Oil to provide a research schedule for the testing of end pit lake predictions and design features in any Water Act or any *EPEA* approval that may be issued
15. Within the next two years, AENV, in collaboration with Environmental Canada, coordinate a regional review of the cumulative impacts on the Yellow Rail in the oil sands region using appropriate regional nocturnal surveys in areas of potentially suitable habitat
16. AENV establish requirements within any *EPEA* approval to implement the findings of the Yellow Rail initiative for surveys, determination of effects, and mitigation strategies where appropriate
17. AENV require Imperial Oil to avoid land clearing during the period of April 1 to August 30 of each year due to potential impacts to migratory bird species
18. AENV, with the support of the EUB, establish a process or taskforce to develop a mechanism to ensure that the coordination of mine, landform, water management, and reclamation plans occurs on an industry-wide basis, both within and across lease boundaries
19. AENV and Environmental Canada work together to assess the need for a mine fleet emissions technology review and regulation development process

Box 4.3. Recommendations in the Kearl Review to the Federal and Alberta Governments

20. Alberta, together with AENV, DFO, the oil sands industry, and all other affected stakeholders, dedicate the resources, staff, and funding to ensure that Phase II of the Water Management Framework for the Athabasca River is completed in a comprehensive manner and on time
21. Alberta implement Phase II of the Water Management Framework by January 1, 2011
22. AENV and DFO incorporate an ecological base flow in the final water management framework for the Athabasca River
23. AENV take immediate steps to ensure that the Muskeg River watershed management plan is completed and approved on a priority basis and no later than March 2008
24. AENV provide direction to the Watershed Integrity Task Group of CEMA by March 2007 on what AENV has been considering internally for the implementation of comprehensive criteria that would influence development in the Muskeg River basin
25. AENV implement a full backstop by the end of 2008 if CEMA fails to deliver a watershed management plan for the Muskeg River
26. AENV adhere to the target completion date of mid-2007 for reach-specific water quality objectives for the lower Athabasca River
27. AENV work with Environmental Canada, DFO, and other regional stakeholders to develop the parameters required for regional monitoring for cumulative effects on fish habitat in the lower Athabasca River and Muskeg River watersheds
28. AENV, as the responsible regulator, take a more direct leadership role in all aspects of CEMA

Source: AEUB and Canada (2007), pgs. 1-3.

In May and August of 2007 the Alberta and federal governments approved the project. DFO, as the RA for the project, released its response to the JRP report on Kearl on August 1, 2007 (DFO 2007). However, in early 2007, the Oil Sands Environmental Coalition, who had objected to the JRP's recommendation for approval of the project, was busy taking the federal government to court.

In March of 2007 the coalition appealed the JRP's decision in federal court, arguing that the JRP did not provide sufficient justification for its finding that the project's GHG emissions would have no significant adverse effects (s.34 of the *CEAA 2012* requires review panels to set out the rationale for their conclusions). The Oil Sands Environmental Coalition succeeded in forcing the JRP to justify its conclusion that the project's GHG emissions would have no significant adverse effect, but in the end the project was re-approved. The JRP issued an addendum on May 6, 2008 concluding again that the project "is not likely to result in significant adverse environmental effects" but emphasized that "the onus is now on the Governments of Canada and Alberta to finalize and implement the regulatory framework for GHGs in a timely manner" (AEUB and Canada 2008 9). The federal government re-approved the project in 2008, and DFO released its response to the JRP's re-recommendation of the project on Kearl on May 15, 2008 (DFO 2008). Construction began in 2009 and the project is currently close to first production. See Chapter 6 for more details on this project.

Note that numerous mitigation measures were also identified in the permits provided to the project by AENV, the ERCB, and other regulatory authorities. The *EPEA* permit for Kearl, for example, contains hundreds of conditions ranging from requirements to develop reclamation plans, conduct air emission monitoring in specific ways, participate in multi-stakeholder monitoring bodies, and limit nitrogen oxide emissions to specified levels (AENV 2007a).

5. Evaluation of the Current Bitumen Megaproject Review Process

5.1. Introduction

In this chapter I evaluate the current process for the review of bitumen megaproject proposals by comparing each set of good practices identified in Chapter 3 with current practices described in Chapter 4. This method of basing evaluation on good practices is very common in the EA literature (e.g., RIAS Inc. and Gartner Lee Ltd. 2000, Sadler 1990, Smith 1993, CEARC 1998, Ahmad and Wood 2002, Wood 1995, Barker and Wood 1999, Lee and Kirkpatrick 2006, Gibson and Walker 2001, Leu, Williams, and Bark 1996a). My evaluation draws upon three sources of data: a survey of experts, my own observations, and relevant literature.

The survey of 117 experts in bitumen project review gathers 'insider perspective' on how the current process works in practice (see Appendices A and B for survey methods, participation rates, and a copy of the survey). While outsiders can evaluate objective items, such as whether or not decision-making criteria are specified in legislation governing project review, only those involved in the process can evaluate subjective items, such as whether or not these criteria are sufficiently unambiguous to guide decision-making in the review context in question (Wood 2003). This survey approach has been used many times by EA researchers (e.g., Doyle and Sadler 1996, Slotterback 2008, Badr 2009, Morrison-Saunders and Bailey 2009, Zeremariam and Quinn 2007, Ahammed and Harvey 2004, Ahmad and Wood 2002, Innanen 2004). In this chapter I present statistical summaries of survey data and relevant comments where useful for illustration. I compare the survey responses of industry respondents with those of non-industry respondents, and I compare the responses of government respondents with those of non-government respondents using the Kolmogorov-Smirnov

(K-S) test for two independent samples.⁴⁶ In cases of statistically significant differences, the D statistic is presented – a D statistic (denoted by the “D*”) greater than the D critical value (denoted by the “D_{0.05}”) indicates that it is unlikely that the two sets of survey responses come from the same populations. My own observations are based upon my examination of bitumen law and policy and documentation from several recent bitumen project reviews. I rely on the reviews of the Imperial Oil / Exxon Kearn mine (Imperial Oil 2005, AEUB and Canada 2008, 2007), Syncrude’s Southwest Sand Storage Conversion mine expansion project (Syncrude 2008), the Total Joslyn North mine (ERCB and CEA Agency 2011 application submitted in 2008), and the Shell Scotford (AEUB 2006a, Shell Canada 2005), Petro-Canada Sturgeon (ERCB 2009, PCOSI 2006), North West (AEUB 2007, North West Upgrading 2006), and Total upgraders (ERCB 2010a application submitted 2007). This selection of project reviews is not extensive but does provide insight into how bitumen project reviews are currently carried out.

I draw upon a variety of literature for this evaluation, but three sources were particularly useful. Vlavianos (2007b), a report from the Canadian Institute of Resources Law at the University of Calgary, provides the most detailed description and evaluation currently available of the legal framework underlying the review process for bitumen projects. A second report from the same organization is Passelac-Ross and Potes’ (2007) investigation of Aboriginal consultation in bitumen decision-making. This second report is the most intensive examination of Aboriginal issues. The third key source, by Gosselin et al. (2010), published by the Royal Society of Canada, is the most extensive review of the state of bitumen impact science and policy to date.

The combination of data used in this evaluation – original survey results, personal observations based upon recent project reviews, and relevant literature – provides a strong foundation for evaluation. In s.5.4.2 below I discuss how the data across sources are convergent, which gives support for the strength of the conclusions.

⁴⁶ As detailed in Appendix A and discussed in s.5.4.2, no representatives of the CEA Agency participated in the survey, and only one staff member at the ERCB participated. Numerous other government staff participated in the survey, as did several former employees of the ERCB.

In the next section I present my evaluation of the current review process relative to 22 good practices identified in Chapter 3. Each box following the heading of each good practice summarizes the elements of the good practice. Note, though, that the evaluation does not cover every aspect of every good practice; in this chapter I cover only the major issues within each of the 22 good practices. In s.5.3 I present survey results regarding process outcomes, and in s.5.4 I discuss key lessons from the evaluation, limitations of the data, and conclusions. Appendix C presents evaluation survey results in detail.

5.2. Evaluation

5.2.1. *Integration with Broader Management System*

- Government manages lands and resources using a system of interdependent but hierarchical decision-making including strategic policymaking, land use planning, tenuring, project review, and permitting.
- High-level policy lays the foundation for decision-making and is developed through stakeholder-inclusive strategic policymaking and land use planning, which itself may be developed through strategic EA, regional EA, and/or class EA. High-level policy communicates government's objectives, indicates where, when, and how development may occur, sets priorities, identifies the values that will drive land and resource management, and delineates acceptable levels of change in valued components.
- Tenure decision-making reflects high-level policy in terms of where development may occur.
- Project review examines whether particular conceptions of development are acceptable or not, based upon the direction provided in high-level policy.
- Permitting follows from project review to address the details in acceptable project proposals.

Bitumen project review is integrated within a system of land and resource decision-making. Project review is guided by high-level policy including land and resource plans, is preceded by the land and resource disposition (i.e., tenuring) process, and is followed by permitting. At this basic level, the broader land and resource decision-making process in north-eastern Alberta is consistent with integrated landscape management. Further inspection, though, uncovers some important gaps.

Existing High-Level Policy

Over the last decade the Alberta government has developed a wide variety of policy signalling its aims and values with respect to bitumen development, including the *Fort McMurray Mineable Oil Sands Integrated Resource Management Plan* (2005), the

Land-Use Framework (2008), the *Provincial Energy Strategy* (2008), *Responsible Actions: A Plan for Alberta's Oil Sands* (2009), and the *Athabasca River Water Management Framework* (2007 and 2010)). The release of the *Lower Athabasca Regional Plan* (Alberta 2012a) in late August, 2012, is a key new piece to this evolving policy framework as it provides concrete direction to decision-makers on pollution limits, among other direction, and establishes a framework for cumulative effects management consisting of objectives, thresholds, and triggers for management action. Combined these policies complements what government communicates to resource stakeholders through its regulatory framework, made up of the *EPEA*, the *Water Act*, the *Climate Change and Emissions Management Act* [R.S.A. 2003, c.C-16.7], and the many laws empowering the ERCB and the ERCB's many directives.

Much of this policy responds to repeated calls from critics for planning and policy direction with respect to municipal infrastructure, cumulative effects management, and other issues (e.g., Vlavianos 2007b, Droitsch, Kennett, and Woynillowicz 2008, Griffiths and Dyer 2008, Kennett and Schneider 2008, Hierlmeier 2008a, Stratos 2008, Hierlmeier 2008b, AEUB 2007), but there are still several important gaps. The instream flow needs framework governing water withdrawals has yet to be finalized, and no thresholds and triggers for management action yet exist with respect to land disturbance, wildlife impacts, and water quantity. As well, the *Lower Athabasca Regional Plan* is vague on details such as monitoring and reporting procedures.

A variety of federal high-level policy exists to help direct federal decision-makers in bitumen project review, but it too has gaps. Federal strategic policy includes: the new *Boreal Caribou Recovery Strategy* (2012); the *Federal Sustainable Development Strategy* (2010); the *Turning the Corner* climate change strategy (2007); and the *Canadian Biodiversity Strategy* (1995); federal air and water quality standards (e.g., CCME 2006); and federal laws such as the *Fisheries Act*. All of this signals the federal government's policy objectives, as do the communications and behaviour of the federal government in the multi-stakeholder planning initiatives that it has participated in, such as CEMA, Instream Flow Needs, and Alberta Oil Sands Environmental Research Program. Limits to federal planning and policy directly related to bitumen development issues beyond a policy of rapid development is partly explained by the fact that Alberta has jurisdiction over many aspects of development, but development does have federal

ramifications and numerous aspects of development are under federal jurisdiction (s.4.2). Thus, it is surprising that there is almost a complete lack of national planning of bitumen development, at least not of any form beyond closed government doors. Critics, industry, and even the Alberta government have been calling for a national energy plan for several years now (Thompson, Laxer, and Gibson 2005, McCarthy 2009, Liepert 2011, Tait 2011a). In July, 2011 the federal and provincial governments initiated discussions, but no plan has yet emerged.

The majority of survey respondents likewise thought that existing high-level policy is insufficient to guide project review. Only 30% of respondents thought that current policy is sufficient, and non-industry respondents were significantly more negative than industry respondents ($D^* 0.49 > D_{0.05} 0.35$). An academic respondent felt that current high-level policy is “way too general and vague to provide for meaningful guidance” and that while “the ERCB endeavours to consider cumulative effects... there are no baselines or thresholds that can be used in this analysis.” A provincial government respondent felt that government needs to provide more high-level policy direction as

otherwise the individual project reviews are attempting to address a broad range of issues, which is not efficient, nor as effective as dealing with the issues properly at a policy level.

A regulator respondent wrote that high-level policy is “not always integrated well and in some circumstances conflicts occur.” A citizen respondent noted the slow pace of policy development and asked “will there be anything left to save when this legislation is finally drafted?” However, one provincial government respondent wrote that

the Energy Strategy and Oil sands Strategy were great starts and once we get the Lower Athabasca Regional Plan completed with the associated environmental media management frameworks in place... we'll be in good shape.

Presumably, given that the Lower Athabasca Regional Plan is now in place a greater number of respondents are satisfied with the state of high-level policy.

Stakeholder Involvement and High Level Policy

Genuine stakeholder engagement in high-level policy development is crucial to developing sound high-level policy and preventing stakeholder conflict in project reviews over broader development issues, but the evidence indicates that governments have so far not engaged stakeholders and incorporated their concerns sufficiently. As relayed in ss.3.3.1 and 5.2.6, many stakeholders feel that they have been left out of decisions over what lands and resources are developed, i.e., tenure decision-making. Inadequate stakeholder involvement is also evidenced by how commonly stakeholders raise issues related to bitumen development as a whole in project reviews. In the Kearl review, for example, stakeholders were highly concerned with cumulative effects and the adequacy of the CEMA and the Instream Flow Needs framework to address these effects (AEUB and Canada 2007). These issues are of a scale beyond the level of an individual project, and the fact that they were being raised in the Kearl review suggests government had not sufficiently addressed the issues raised by stakeholders in high-level policymaking. The widespread provincial, national, and international debate on bitumen development further indicates poor stakeholder engagement. An NGO respondent's comment indicates the frustration:

[government has] consistently ignored the wishes of the public... for stricter regulation of environmental and social impacts.

Another consequence may be inaccurate capturing of values in high-level policy, which translates into misguided land-use planning, tenure decision-making, project review decision-making, and permitting.

Regional and Strategic Review

There is strong support among respondents for not just project review but also SEA, regional EA, and class EA to plan bitumen development (s.3.3.1). These planning tools can help address the broader issues of the megaprogram and are critical tools for developing the high-level policy that is lacking in bitumen development. Only 29% of respondents agreed that "there is adequate review and examination of issues beyond the scale of the individual oil sands project", and non-industry respondents tended to be significantly more negative on this issue compared to industry ($D^* 0.66 > D_{0.05} 0.36$). A consultant respondent wrote:

frighteningly, we're all now faced with the spectre of one of the largest industrial developments occurring in the absence of any real understanding of the risks or impacts to the Lower Athabasca River and northeastern Alberta.

Only 33% agreed that government policy with respect to bitumen development is subject to adequate review and examination, and again non-industry respondents tended to be significantly more negative than industry on this ($D^* 0.60 > D_{0.05} 0.36$).

These data make sense. Project review is not designed to address megaprogram issues – only forms of review and planning that address the scale, interdependencies, and complexity of bitumen development as a whole are likely to resolve the many challenging issues that development brings – and neither the federal or Alberta governments have undertaken much review of bitumen development impacts and issues beyond the level of the individual project. Despite federal jurisdiction over many bitumen issues, the federal government has yet to follow its own policy and conduct SEA of the policy of rapid bitumen development. This goes against federal policy (s.4.3.4) and may reflect federal political interests that would prefer not to explore the economic, environmental, and social effects of bitumen development. This lack of SEA is consistent, though, with findings of the Federal Auditor General who notes a general lack of SEA across departments (OAGC 2008). SEA could play a useful role in planning bitumen development, addressing national issues of development (such as economic impacts across the country), but also in terms of supporting cumulative effects management. Alberta has also not conducted any substantial review of the cumulative effects of bitumen development.

5.2.2. Initial Review

- Proposal is subject to initial review to make an initial determination of acceptability, and if acceptable, the type of detailed review required, if any.
- Decision-making in initial review follows a structured process.
- If the project is deemed acceptable the proponent is clearly informed of (a) initial concerns of government and stakeholders and (b) next steps in the review process.

Both federal and Alberta review processes entail initial review, and both federal and Alberta laws specify the level of review required of different types of projects and

provide decision-makers with some flexibility to require detailed review even when the law doesn't require it (ss. 4.3.2, 4.4.3, and 4.4.4). Regardless, 41% of experts surveyed thought that the current process is not strict enough in terms of identifying when projects require detailed review. Only 34% thought that the current process is appropriate.⁴⁷ Industry respondents tended to feel that the process was stricter than it should be, and non-industry respondents tended to think that the process was not strict enough ($D^* 0.82 > D_{0.05} 0.34$).

Less than half (48%) of respondents agreed that proponents receive adequate feedback and direction from government following initial review. Industry respondents tended to be significantly more negative about quality of feedback than non-industry ($D^* 0.44 > D_{0.05} 0.34$). One regulator respondent wrote that "feedback can be confusing and misleading. Care is needed to make it... meaningful." An industry respondent felt that while the content of feedback is okay the timeliness of feedback is not.

5.2.3. Scoping

- If the proposal is accepted and requires detailed review, then government conducts scoping to determine the nature of detailed review and to narrow it to key issues.
- Through scoping the proponent receives feedback from government and stakeholders regarding issues raised by the proposal.
- The scope of detailed review is formally established in a contract such as terms of reference (TOR), and the contract specifies the content of the proponent's application and how it should be prepared.
- Regardless of any narrowing of the scope of reviews during scoping, review covers four essential topics: (1) project justification, (2) potential impacts and planned mitigation measures, including cumulative effects (3) alternatives and which is the best performer, and (4) likelihood of project success.

Government conducts scoping with proponents and stakeholders and releases draft and final TORs. Government provides guidance to proponents on how to prepare their applications (e.g., AENV 2010b), and the required content of applications is also indicated in policy and legislation, such as s.19 of the *CEAA 2012*.

⁴⁷ Only key survey results are presented in this chapter. See Appendix 3 for detailed survey results.

Coverage of Key Topics

Existing laws require that three essential topics are covered in scoping: justification, impacts and their mitigation, and alternatives. The *CEAA 2012* does not explicitly require project justification to be reviewed, but s.19 of that law requires that the project's purpose be reviewed, which when combined with an assessment of a project's effects enables one to consider a project's justification. Section 49 of the *EPEA* explicitly requires proponents to justify the project and project site in their applications; and the ERCB's *Directive 023* directs applicants to state the need and timing of the project and explain the proposed development schedule. Importantly, though, there are no requirements for proponents to justify their projects in relation to high-level policy, proponents are not required to explain which problems their projects are intended to solve nor what opportunities their projects are meant to take advantage of, and proponents are not required to explicitly justify the risks of their envisioned megaproject in terms of whatever benefits the projects might bring.

With respect to impacts and mitigation, the *CEAA 2012* requires all residual environmental effects to be examined, i.e., after mitigation, including cumulative effects. A shortcoming of the *CEAA 2012* is that health, socio-economic, and other non-biophysical effects are only of concern if they are linked to a project's biophysical effects, meaning that many impacts, such as a mine's direct employment impacts, are not of concern in federal EA. Section 49 of the *EPEA* and *Directive 023* require review of the variety of environmental and non-environmental effects of projects, helping fill the federal gap. No federal or Alberta laws require the distribution of impacts to be reviewed. All of the *CEAA 2012*, *EPEA*, and the ERCB's governing law and policy require mitigation plans to be reviewed.

With respect to alternatives, s.19 of the *CEAA 2012* requires that "alternative means of carrying out the project that are technically and economically feasible" be examined – it is unclear at this time how the latter parts of this phrase are defined. Section 49 of the *EPEA* requires that alternatives to the proposal, including the alternative of doing nothing, are examined, and that alternative sites for the project are examined. *Directive 023* also requests that proponents of *in situ* projects consider different process technologies, different upgrading process technologies, and different

external energy sources if they are deemed necessary. (*Directive 023* does not request proponents of bitumen mines to consider any alternatives.)

A gap in both federal and Alberta law is that neither demands that the financial viability of projects be examined.

Recent audits of the review process conclude that the scope of reviews should be more narrowly defined and better adapted to what is learned over time (AENV 2008c, Stratos 2008, CESD 2011). Only 40% of survey respondents agreed that "typical terms of reference correctly focus detailed reviews on the important issues." Industry respondents tended to be significantly more negative than non-industry ($D^* 0.41 > D_{0.05} 0.34$), and non-government respondents tended to be significantly more negative than government ($D^* 0.39 > D_{0.05} 0.36$). One industry respondent wrote that "[TORs are] out of date and not appropriate... learnings tell us there are much fewer issues than are being 'studied'". Another industry respondent felt that review often fails to focus on the key issues because of a lack of understanding of the purpose of project review:

the last 15 years have been plagued with "more is better" mentality without any critical thought as to true information needs applicable to the approval stage of a project development.

However, in reference to Alberta EIA, one provincial government respondent felt strongly against narrowing scope:

I do not support more focused EIAs because it is important for proponents... to demonstrate on the public record that they have competently and sufficiently reviewed all aspects of their proposal and implemented means to sufficiently mitigate adverse effects... For large-scale projects it is imperative that the full scope of potential environmental interactions of the project are assessed... Focusing an EIA on only the "known" issues assumes that past identification and monitoring of issues is complete and sufficient when in fact the Government of Alberta has never, to my knowledge, critically reviewed past EIAs.

Many respondents indicated that cumulative effects assessment, as well as socio-economic effects, project need and alternatives are given too little attention in TORs. One consultant respondent wrote that

terms of reference generated by AENV are too narrowly focussed on a local study area. Consequently, projects are dealt individually rather than as a group... [and the] outcome of effects are always "negligible or reversible".

and a federal government respondent wrote that scoping should be broader and "include regional and synergistic effects." One NGO respondent wrote that cumulative effects assessment is weakened because of overly narrow temporal scoping:

large-scale developers only have to look at the impact of their site and any other site approved six months prior. This is a problem because it is not likely that a large-scale project had been approved six months prior, therefore the developer is only looking at the impacts of their project, not the overall impact of several (or all) projects.

These data are consistent with a recent audit of federal EA (CESD 2011) that found that bitumen TORs were generic and did not change from one project to the next, and that the federal government did not take the opportunity to modify TORs to reflect identified information gaps, such as with respect to water quality and fish. The explanation may lie with insufficient guidance for RAs on how to scope projects (Barnes 2010).

Little Guidance on Methodology

The federal government provides little guidance on methods for impact assessment and imposes few methodological requirements on proponents. The essence of federal EA is determining if projects are 'likely to cause significant adverse environmental effects that are not justifiable in the circumstances'. The problem is that there is little clear guidance for how proponents might determine what are and are not significant effects, whether they are likely, and when they are justifiable. The CEA Agency's predecessor – the Federal Environmental Assessment and Review Office (FEARO) – published guidance on determining significance (FEARO 1994), and this document continues to guide significance determinations. According to the FEARO, significance should be determined by considering the magnitude, duration, geography, reversibility, and ecological context of impacts, and likelihood can be judged in terms of probability of occurrence with consideration of scientific uncertainty. But major subjective judgements must still be made: what is too large a magnitude, and what is too wide a geography? These criteria for significant could be further articulated, such as in

reference to objectives that governments have for valued components. Further, as the federal government must consider the justification of any significance adverse effects, it is notable that there is no guidance to impact assessors or government staff with respect to how they might assess justification. To its credit, the federal government does provide guidance for cumulative effects assessment (Hegmann et al. 1999, CEA Agency 2007b), but this guidance is now dated (CESD 2011).

Alberta also provides little guidance on appropriate impact assessment methodology. The Alberta *EPEA* does not prescribe methods to be used in preparing EIA reports, and AESRD provides very limited direction to proponents in its EIA guide (AENV 2010b) other than that proponents should take a 'results-based' approach when gathering and documenting project impacts. For socio-economic assessment, for example, proponents are simply instructed to "identify training, employment and business benefits specifically accruing to aboriginal communities in the Study Area where possible" (AENV 2010b 18). Despite a whole section entitled 'environmental assessment methodology' in AESRD's EIA guide, there is only explicit guidance on impact assessment methods for four items: scenarios to be assessed; cumulative effects assessment; human health risk assessment; and air quality modelling. AESRD instructs proponents to read recent EIA reports and supplemental information requests to better understand government expectations. While leaving method choice to proponents could allow them to assess impacts in the most appropriate ways, the result may be poor EIA and poor information for the ERCB or JRPs to base their decisions upon.

An important gap in AESRD's guidance is with respect to what proponents should do with their impact data so as to make it useful to decision-makers. AENV (2010b) requests that proponents summarize project impacts and their significance with respect to magnitude, extent, duration, frequency and reversibility, but how should proponents summarize this information? According to s.40 of the *EPEA*, the purpose of EIA is

to integrate environmental protection and economic decisions at the earliest stages of planning an activity [and] to predict the environmental, social, economic and cultural consequences of a proposed activity and to assess plans to mitigate any adverse impacts resulting from the proposed activity.

Following from this it would seem reasonable to expect the *EPEA* and *AESRD* to indicate how consequences are to be predicted and assessed, and how this information is to be integrated into something meaningful. Data gathering is but one part of project review – the critically important step is making sense of all of the information gathered. One government respondent wrote that there is “a lack of scientific rigour” in TORs that “results in vague, largely narrative-description EIAs.”

The ERCB’s *Directive 023* provides the most explicit guidance to proponents on appropriate impact assessment methodology. The directive indicates what proponents are to include in their application and how proponents are to prepare this information. With respect to economic impact assessment, the ERCB is very explicit relative to federal and *AESRD* direction. *Directive 023* devotes over four pages to describing how proponents are to evaluate the commercial viability of the project and assess economic impacts.

5.2.4. Application Preparation

- Impact assessment work is done by an independent body with proponents and/or government paying, or by the proponent with proponent paying and safeguards in place to safeguard the quality of impact assessment.
- There is good communication between impact assessors and project designers so that impacts are mitigated in manners that provide for the greatest net benefits.
- Legal and procedural incentives, including the use of accredited impact assessors, exist to propel accurate, high-quality assessments without bias.

In bitumen reviews proponents prepare applications and pay for it themselves. This self-assessment approach has weaknesses in terms of high potential for bias and strategic manipulation, but some mechanisms are in place to counter this. Applications often contain the CVs of consultants, and in hearings the qualifications of impact assessors are sometimes examined. However, there are no laws or policies requiring that applications contain the qualifications of those who conduct impact assessment, and there are no systems in place to track the history of impact assessors and the accuracy of their past work. The *CEAA 2012* prohibits and penalizes those who submit false or misleading information (ss.98 and 100), and the *EPEA* contains similar provisions at ss. 227, 232, and 233(1), though such legal mechanisms may not be very effective without

means to identify such infractions. No such provisions exist in any of the law governing ERCB project review.

5.2.5. Scrutiny of Application

- Applications are checked for consistency with the TOR in terms of content and methods, and content (including significance conclusions) is scrutinized for quality and freedom from bias. Cumulative effects assessments are scrutinized especially carefully.
- Reviewers have the legal capacity to request that deficiencies in applications are addressed, and proponents are legally required to respond. Requests to proponents to address deficiencies are coordinated.
- Once the application is deemed acceptable quality and review of the proposal is deemed sufficient to enable a decision, the review body announces that the final application is complete and publishes the final version of the application.
- The review body writes a decision recommendation based upon the content of the final application and publishes the recommendation.

Existing law requires that applications are examined prior to final decision-making. Both federal and Alberta agencies undertake internal examinations of applications in terms of consistency with TORs and to understand the potential impacts of projects.

Quality of Applications

A little more than half (56%) of respondents thought that applications are adequately scrutinized for accuracy and quality, though non-industry respondents tended to be significantly more negative towards the level of scrutiny than industry ($D^* 0.58 > D_{0.05} 0.35$). One provincial government respondent made a concerning clarification:

it is important to emphasize that the review of EIAs in Alberta does not consider the accuracy of the EIA conclusions. The review of EIAs conducted by [AESRD] only assures the decision makers that sufficient work has been conducted to fulfil the terms of reference. Deeming an EIA as complete by [AESRD] does not mean that [AESRD] agrees with the conclusions of the EIA regarding the significance of the impacts identified.

This is a critical observation, backed up by the recent experience with the Shell Jackpine review. In the Jackpine review the JRP required Shell to revise its cumulative effects

assessment (due to insufficiencies in analysis) while AESRD demonstrated a lack of concern about the quality of Shell's EIA and was only concerned if the EIA was 'complete' (i.e., contained content pertaining to each topic identified in scoping) (Dyer 2012, AENV 2011d). In reviews subject to the *CEAA 2012*, federal government reviewers examine applications and so insufficiencies in analysis may be caught by federal reviewers, but when the *CEAA 2012* doesn't apply, the ERCB takes on this crucial role. The question is then: how well does the ERCB review EIA information?

The MOU between AESRD and the ERCB (see s.4.4.6) indicates that AESRD *may* take an active role in review hearings and *may* pass on its concerns regarding EIA content in applications to the ERCB, and the MOU implies that the ERCB considers AESRD concerns and the content of the EIA report as well as any application materials for *EPEA* and *Water Act* authorizations in its public interest determination. However, the MOU does not *require* any of this (and even if it did, the MOU isn't law). While the ERCB does consider EIA information in its public interest review process,⁴⁸ a regulator respondent also indicated in the survey that the ERCB doesn't critically examine EIA content and that

unfortunately proponents and all too often the ERCB board members do not appreciate that is the case. While ERCB Board members may appreciate their role in relation to evaluating the project as a whole they do not understand their role to critically review the conclusions and evaluation of risks in the EIA. Instead ERCB Board members have... deferred to applicant's suggestions that Alberta Environment has deemed the EIA complete so the Board panel should not be questioning the EIA.

The ERCB presumably does not have the same level of expertise on environmental matters as AESRD, and compounding this apparent lack of scrutiny of EIA content by the ERCB is the tendency of AESRD and federal agencies to be relatively inactive during project review hearings (Gosselin et al. 2010, Vlavianos 2007b). Environmental impact information certainly gets much attention from NGOs and Aboriginal groups in hearings, but these stakeholders tend to have very limited resources.

⁴⁸ Ken Schuldhaus, ERCB, email message to author, November 1, 2010.

The survey also asked respondents how well project justification, impacts and mitigation plans, alternatives, and projects' likelihood of success are examined in bitumen reviews.

Justification

Reviews of proposals such as the Petro-Canada Sturgeon upgrader (PCOSI 2006) demonstrate that in some cases a project's justification is given consideration:

Canadian sources of light crude are rapidly declining. To sustain the Canadian and Alberta economies, alternative heavier sources of hydrocarbons must be developed, such as from Fort Hills. Most refineries in North America are designed to process light and medium crude oil. The need exists, therefore, to develop upgraders to convert these heavy hydrocarbons into petroleum feedstock suitable for existing refineries... Linkage of upstream production of bitumen with downstream upgrading in Sturgeon County will create a fully integrated operation where the value of the Fort Hills oil sands resource can be realized in the Province of Alberta. [We consider] this integrated approach as being more economically attractive and less risky than the alternative considered of simply exporting bitumen from the Fort Hills and other leases. This approach is consistent with Alberta's expectations to maximize the value of provincial resources (1-9).

In its decision recommendation for the upgrader the ERCB wrote

the Board notes that no concerns were expressed by any participants with respect to the need for the... upgrader project. The Board acknowledges Alberta's strategy for value-added resource development in Alberta and the role that the project could play in that strategy. Therefore, the Board is satisfied that there is a need for the project (ERCB 2009 6).

The justification for the upgrader and the ERCB's response presents an argument with some substance and relates the project to Alberta high-level policy. The Petro-Canada upgrader review, though, is not representative of how all projects are scrutinized for justification. For Kearl the proponent justified the project solely on the following grounds:

the project's purpose is to safely, responsibly and efficiently process a rich oil sands resource, owned by Alberta, while providing benefits to:

- residents of the Athabasca region, Alberta and Canada
- shareholders (Imperial Oil 2005 Volume 1, p2-3).

In hearings Kearl's proponents buttressed the above statement by referring to Alberta's "stated vision of increasing oil sands production" (AEUB and Canada 2007 15). No stakeholders participating in the Kearl review took issue with the rationale provided by Kearl's proponents for the project, and the JRP simply accepted the proponents' rationale. While it is true that Kearl can help Alberta fulfil its vision of increasing oil production, it seems reasonable to expect the JRP and stakeholders to examine the project in terms of other strategic policy objectives. Alberta's energy strategy (Alberta 2008c) aims also to move the province to clean hydrocarbon development and reduced GHG emissions. Kearl, being subject to federal review as well as Alberta review, also has ramifications for federal strategic policy, such as the *Federal Sustainable Development Strategy*, and so it would seem reasonable to expect the project review to examine the project's justification from these perspectives.

Only 54% of respondents thought that justification is adequately assessed in bitumen project reviews, and non-industry respondents tended to be significantly more negative towards scrutiny of justification than industry ($D^* 0.70 > D_{0.05} 0.35$). A lawyer respondent wrote that

project "need", according to provincial law, must be established. But this is overlooked. I have had AENV representatives say on the witness stand they do not know why that legislative requirement is included in the environmental assessment criteria in the EPEA because they do not consider it!

These data reflect the quality of work conducted by proponents in preparing their applications but more accurately reflect the level of scrutiny of those reviewing applications, and possibly, the lack of guidance given to proponents by government as to how to examine project justification (s.5.2.3).

Impacts and Mitigation

The evidence also suggests that reviewers don't ensure that many types of impacts are assessed well. While a 2009 review of federal EA by the Commissioner of the Environment and Sustainable Development concluded that all of the factors set out in s.16 of the *CEAA 1992* were routinely reviewed (OAGC 2009b), Gosselin et al. (2010) observe that socio-economic impacts are typically assessed poorly, and that conclusions

of net benefits don't tend to be well-supported. Consistent with these findings, only 37% of respondents felt that social impacts, such as impacts of a project on community infrastructure, are adequately assessed, and only 56% thought that economic impacts are adequately assessed. Non-industry respondents tended to be significantly more negative about the adequacy with which these impacts are assessed than industry ($D^* 0.63 > D_{0.05} 0.35$; $D^* 0.66 > D_{0.05} 0.35$). An academic respondent raised the topic of cumulative effects and wrote that "it is clear that there is little analysis of... the huge, often negative, [economic] impacts experienced in the province in recent years from intense and rapid oil sands development over a short period of time." A lawyer respondent felt that positive economic impacts are usually overstated and negative economic impacts are not even considered. A provincial government respondent stated that "recent EIAs have... paid lip service to social factors and have ignored economic factors." One municipal government respondent noted that EIAs in the 1970s used to examine socio-economic aspects of projects in much greater depth than today's EIAs.

Only 37% of respondents agreed that cumulative effects are adequately assessed, and only 50% of respondents agreed that environmental impacts are adequately addressed. Again, non-industry respondents tended to be significantly more negative than industry about the adequacy with which cumulative effects and environmental impacts are assessed ($D^* 0.67 > D_{0.05} 0.35$; $D^* 0.69 > D_{0.05} 0.35$). These data are consistent with the literature on the quality of cumulative effects assessment in bitumen review which similarly find the process deficient (Droitsch, Kennett, and Woynilowicz 2008, Vlavianos 2007b, Kennett 2006, 2007, Ross 2002). Gosselin et al. conclude that "despite longstanding commitments to cumulative impacts assessment no tangible progress has been made" (2010 280). These findings are extremely concerning.

Cumulative effects assessment – of environmental, economic, and other types of effects – is a crucial element to bitumen project review. Bitumen projects, most of them being megaprojects, pose numerous widespread effects that have the potential for within-project cumulative effects (i.e., cumulative effects stemming from interactions amongst the direct residual effects of the project) and the potential for cumulative effects stemming from additive and other types of interactions between their residual effects and the effects of other activities and stresses on the biophysical, economic, and other

environments in northern Alberta and beyond. Further, because bitumen projects are part of a larger megaprogram the potential for interactions is even greater (s.2.6.9). Any evidence that cumulative effects assessment in bitumen project reviews is weak signals a crucial gap in the project review process and the governance system as a whole in Alberta and federally. See also s.5.2.1 for a discussion of the lack of SEA and other means of cumulative effects assessment.

Poor impact assessment is in part a reflection of the level of scrutiny that government and ERCB reviewers give applications, but may also be traced to poor impact assessment methodology and poor scrutiny of this methodology. As relayed in s.5.2.3, proponents are provided little guidance on appropriate methodology. AESRD indicates that it will pay attention to good methodological practice in its reviews of EIA reports and ensure that proponents have “used accepted scientific principles and practices in gathering and interpreting the information” (AENV 2008b 3), but neither the federal government nor ERCB make similar statements. This apparent lack of interest in ensuring sound impact assessment methods are used may also explain an odd pattern in bitumen applications: proponents do not use CBA in their applications despite the ERCB’s *Directive 023* requirement for it, and perhaps more importantly, despite claiming that they do CBAs in their concordance tables at the front of their applications (e.g., see Appendix B and Volume 9 in Imperial Oil (2005), page 1-28 and Volume 2, s.19 in Syncrude (2008), and page B-3 and Volume 1 of Petro-Canada (PCOSI 2006)). It is unclear if this pattern is a function of weak government review of applications, purposeful deception, or something else. As discussed below in s.5.2.10, neither CBA nor reference class forecasting are used despite these methods being highly praised for their usefulness in megaproject review.

Only 44% of respondents agreed that mitigation issues are adequately examined, and non-industry respondents were significantly more negative towards scrutiny of mitigation plans than industry ($D^* 0.67 > D_{0.05} 0.35$). A federal government respondent wrote that

proponents are frequently allowed to proceed on the assumption that technology or research will be developed to deal with mitigative issues or uncertainty.

An NGO respondent similarly concluded that “projects are approved without any confidence in the success of remediation plans.” One lawyer respondent noted that

currently there is a large degree of uncertainty regarding potential mitigation. Ironically, proponents demand certainty with respect to tenure and approval terms and duration etc. but then offer very uncertain mitigation.

Alternatives

Only 31% of respondents agreed that alternatives to projects are adequately assessed, and non-industry respondents tended to be significantly more negative towards scrutiny of alternatives than industry ($D^* 0.65 > D_{0.05} 0.35$). The lack of guidance given to proponents on how to examine alternatives (s.5.2.3) may explain this survey result, and may also explain why only proponents’ preferred designs were fully examined and alternatives were evaluated only very superficially in the Petro-Canada Sturgeon upgrader and Kearl mine reviews. In the case of the upgrader, the proponents only briefly discussed two alternative sites, their method for deciding, and the rationale for their chosen site (PCOSI 2006). In hearings stakeholders raised the topic of alternative locations and the ERCB only briefly discussed the topic (ERCB 2009). Similarly, the proponents of the Kearl mine only considered alternatives in terms of whether or not *in situ* recovery could be used instead of open-pit mining, and then related the chosen technology (mining) to the potential economic benefits of the project (AEUB and Canada 2007 15). No interveners took issue with the depth of the Kearl alternatives assessment, and the JRP accepted the proponents’ evaluation of alternatives and noted simply that “there is no alternative to Imperial Oil’s proposed project as a means to access the existing resources” (16). Much more attention could be given to alternative designs. For example, with Kearl, the proponent could be required to examine alternative development schedules and identify those which would minimize impacts on Fort McMurray’s infrastructure and maximize economic net benefits.

Project Success

The current framework does not require any scrutiny of proposals in terms of their likely financial viability, nor of proponent’s capacities to succeed. Regardless, 41% of survey respondents still felt that proponent’s capacities to succeed are adequately

assessed, though non-industry respondents tended to be significantly more negative towards the adequacy with which proponent's capacities are assessed than industry ($D^* 0.57 > D_{0.05} 0.35$). A lawyer respondent wrote that "the ERCB does look fairly carefully at the project proponents' viability but the threshold seems low."

Filling of Information Gaps

Current law and policy provide both governments, the ERCB, and the JRP with the ability to request more information (s.44(2), *CEAA 2012*; s.51, *EPEA*; s.6.3 of *Directive 029*, and in the *Canada-Alberta Agreement*). Despite these powers, only 44% of survey respondents agreed that all major information and analytical gaps in applications get adequately filled, and non-industry respondents were significantly more negative about this than industry ($D^* 0.71 > D_{0.05} 0.35$). A citizen respondent noted that "often information gaps, pointed out in ERCB hearings by interveners, are allowed to be promised by the proponent at a later date." One federal government respondent remarked that proponents face no penalty for not answering reviewers' questions adequately.

Publishing of Review Materials

Law and policy require that bitumen project applications and JRP decision documents are published (e.g., Canada (2005), Appendix 2 s.8; s.34(a) and s.55 of the *CEAA 2012*; s.52 and s.56 of the *EPEA*). The federal government, the Alberta government, and the ERCB host registries of application documentation.

5.2.6. Final Decision-making

- Approval decisions are linked to the findings of the review process, and are justified by reference to society's objectives, values, and interests.
- Approval decisions and their rationale(s) are expressed clearly in a decision statement.
- Approval decisions are put on hold for a limited period of time to allow for appeals to be heard.
- If elected officials conduct final decision-making then protections are in place to address their potential bias. If an independent body makes final decisions, then mechanisms are in place to provide accountability.
- Approvals specify terms and conditions which: describe allowable procedures and maximum permitted impact outcomes; are clear and specific; are supported by stakeholders, experts and empirical evidence; are consistent with high level policy; and are mandatory and backed by law.

Officially, the ERCB or JRPs make decision recommendations, before elected officials, who make the final decisions. This is not inconsistent with the preferences of respondents (s.3.3.2.5). Federal and Alberta law, and federal policy, require that the ERCB and JRPs publish decision statements containing recommended decisions shortly after hearings are concluded (ss.43 and 46 of the *CEAA 2012*, Canada (2005 Appendix 2, s.8.4), and ERCB (2003 s.10.7)). Decisions are based on the *CEAA 2012*'s 'likely significant adverse effects that aren't justifiable in the circumstances' decision criterion and the ERCB's 'public interest' criterion.

Rationales for Decisions

Section 43 of the *CEAA 2012* requires JRPs to justify their recommendations, and s.47 requires that federal government decision-makers "take into consideration" decision recommendations and explain why their final decisions are consistent with, or go against, JRP recommendations. There is no similar requirement in Alberta law: the ERCB is not required to explain its decision recommendations to Alberta cabinet, and elected officials are not required to link their final decisions to ERCB or JRP conclusions. This gap in Alberta law compromises the accountability of the process and diminishes its legitimacy.

Lacking a requirement to do so, the ERCB provides few explanations of how they come to their conclusions about whether or not a project is in the public interest. Two recent decision statements highlight this gap. Nowhere in the North West upgrader application (AEUB 2007) did the ERCB provide any explanation for its conclusion that the project is in the public interest. The ERCB stated that "having carefully considered all of the evidence, the Alberta Energy and Utilities Board (EUB/Board) finds the project to be in the public interest" (1). There was no explicit discussion about the project's benefits and how these related to the project's negative impacts, and the ERCB made no other attempt to explain how it weighed the many complex issues raised by the proposal. Similarly, in the Kearl decision (AEUB and Canada 2007), the JRP provided no explanation of how it came to its conclusion that the project was in the public interest. The JRP did not explain how the project would not likely cause significant adverse effects, thus appearing to go against requirements to do so laid out in s.34 of the *CEAA 2012*. Hierlmeier (2008a) notes this same problem across bitumen project reviews. A

provincial government respondent acknowledged that “where decisions are not justified, trust is lost and decisions lose legitimacy” and a NGO respondent wrote that “the current methodology around whether a project is in the public interest is a “black box”.”

This lack of explanation is a key communication gap in the bitumen project review process, and it would appear to be an illegal gap for those projects that underwent *CEAA* review.⁴⁹ These problems might be traced to the lack of legal tests for the *CEAA 2012* and ERCB decision criteria and the associated lack of unambiguous guidance to decision-makers on how to apply the criteria (see ss. 5.2.14 and 5.2.15).

Buffer Time for Appeals

Ideally a review process provides a buffer of time after a decision has been made to allow for an appeal to be registered before momentum builds from the decision. The current process provides no such buffer.

Bias and Accountability in Final Decision-making

Bias in final decision-making is a key issue in bitumen project reviews. If the process is to ensure that the broader public interest is protected and special interests do not unduly sway decisions, then the process must not evidence any bias towards or against special interests; and yet it does. For example, the federal government recently identified environmental and aboriginal groups as “adversaries”, and industry associations, energy companies, and the National Energy Board, as “allies” with respect to the Enbridge Northern Gateway pipeline proposal currently under review and bitumen development in general (Vanderklippe 2012a). Also, the federal government indicated its support for the Enbridge Northern Gateway project well before the review panel has completed its hearings and come to a decision recommendation (e.g., Junggren 2012). These are but two pieces of evidence but are strong indications of bias. Bias in elected officials can be expected, especially bias connected to the political priorities of the governing party, and this is why there must be in place mechanisms to help ensure that decision-making is rational and considers the broader public interest. Such mechanisms include requiring decision-makers to explain the link between their decisions and the

⁴⁹ The requirement for federal government decision-makers to rationalize their decision with review panel conclusions existed in the 1992 *CEAA* as well at s.37.

findings of project reviews, but also requiring independence of review bodies (s.3.3.3.4), unambiguous decision criteria (s.3.3.3.8), an ability to appeal major decisions (s.3.3.3.13), and minimal public investment in megaprojects (s.3.3.3.15).

Despite their tendency to inject bias into the review process, there is some sense in having elected officials make final approval decisions. Elected officials are democratically accountable, whereas ERCB and JRP board members are only very indirectly accountable to the public. Even so, only 49% of respondents agreed with having federal and Alberta cabinets making final decisions, and the few respondents who commented on the topic argued that the ERCB and JRPs are the *de facto* decision-makers and that elected officials play only a very minor role in final decision-making. One municipal government respondent wrote that they could only think of “one or two examples” where elected officials overruled decisions made by unelected review bodies. As the Radke Report concludes, the ERCB and JRPs end up playing a strong role in “social policy” decision-making (Alberta 2006a 149). I explore accountability of ERCB and JRP decision-makers in s.5.2.11 below.

Bias from Tenure Decision-making

Critics argue that tenure decision-making prior to project review also inevitably biases project review as government has chosen to allow development of the resources in question and also has fiscal, political, and legal incentives to see that development occurs (e.g., Kennett 2006). Indeed, 34% of respondents thought that decision-making processes occurring prior to project review (including tenure decision-making) biases project review. An academic respondent wrote that

by the time the project gets to the project review stage, the public interest decision to develop these minerals has already been made since a company has been granted property rights (and the board is then hard-pressed to say no you can't develop those rights)... the ERCB has said on many occasions that once a company has property rights, there is a need for the particular facility applied for. All things being equal, this need can tip the scales in favour of approval.

However, as other respondents pointed out, tenuring has to precede project review as only then will companies invest in designing a project and proceeding through project review. The important issue here is not whether there is momentum for development

once tenure has been offered, but if review bodies are biased in terms of the favouring the *particular* project proposed to develop those resources. Although by granting tenure government has already decided that resource development on a parcel of land is acceptable, bias towards a *particular* project is not acceptable. As s.3.3.1 relays, project review should not be about the acceptability of development of a resource but about the acceptability of a particular conception of that development (i.e., of a particular project proposal). I have uncovered no evidence for this latter type of bias, though such bias may exist given that the review body has only the one proposal to examine. This translates into the need for review bodies to ensure that alternatives are genuinely and critically assessed. As discussed above in s.5.2.4, though, the evidence is that there are problems with this backstop.

Terms and Conditions

Final decisions typically include terms and conditions of approval. The Petro-Canada Sturgeon upgrader approval, for example, contained 13 conditions, including the requirement to test water quality on a neighbouring property prior to construction to establish a baseline (ERCB 2009). “Conditions generally are requirements in addition to or otherwise expanding upon existing regulations and guidelines” (ERCB 2010a 48). It is also common for approvals to identify commitments and recommendations (see ss. 4.4.4 and 4.6). Furthermore, projects are also shaped by government by way of conditions imposed on developers through permits. Kearl, for example, is subject to hundreds of conditions under permits granted under the *EPEA* and *Water Act* respecting environmental monitoring, reporting, procedural requirements, and outcome requirements (AENV 2007a, b). Permits and their conditions are not the focus of this thesis – this thesis is focused on the project review process specifically – but permitting plays an important role in constraining development procedure and outcomes and thus cannot be ignored in this evaluation.⁵⁰ Project review conditions, commitments, recommendations, and permit conditions are forms of ‘terms and conditions’ and can be examined in terms of good practices characteristics.

⁵⁰ Note that the ERCB does not issue any permits or other types of approvals other than its decision statement: the ERCB’s decision statements contain all conditions related to the many different types of approvals, licenses, and authorizations that proponents must attain from the ERCB under the *OSCA* and regulations.

Terms and conditions should specify allowable procedures and required outcomes. Some of Kearl's project review conditions and many permit conditions specify mandatory procedures. For example, condition 12 in the Kearl review prohibits the discharge of untreated froth treatment tailings to the tailings disposal area (AEUB and Canada 2007 Box 4.2 in Chapter 4). However, very few required outcomes are specified: no project review condition, recommendation, or commitment establishes required outcomes for Kearl. The only required outcomes established for Kearl are identified in permits, and they are few in number. Kearl's *EPEA* permit (AENV 2007a) specifies:

- maximum nitrogen oxide pollution;
- that no air pollution should be emitted that endangered human health, the quality of natural resources, or harmed plant or animal life;
- minimum water quality in sedimentation ponds; and
- wildlife and fish viability upon mine reclamation.

Importantly, neither Kearl project review conditions nor permit conditions deal with economic or social impacts of development; for Kearl, mitigation of economic and social impacts of development are addressed through a small number of non-binding recommendations (Box 4.3). A similar pattern of very few requirements for outcomes and little attention to non-environmental impact issues is seen in the Petro-Canada Sturgeon upgrader and Total Joslyn mine reviews (ERCB 2009, ERCB and CEA Agency 2011, AENV 2011a).

It's also important that terms and conditions are enforceable. The ERCB indicates that

an applicant must comply with conditions or it is in breach of its approval and subject to enforcement action by the ERCB. Enforcement of an approval includes enforcement of the conditions attached to that licence. Sanctions imposed for the breach of such conditions may include the suspension of the approval, resulting in the shut-in of a facility (ERCB 2010a 48).

This statement suggests that the ERCB takes seriously developer compliance with approval conditions, but the problem is that the ERCB and JRPs do not use conditions of approval extensively to direct the actions of proponents during development. Instead,

the ERCB and JRPs routinely rely on recommendations that they make to proponents and other parties to mitigate major project impacts, and these instruments are by definition unenforceable. In the Kearl review, water use and the state of the water regulatory framework was a key issue among stakeholders, but the JRP addressed the issue in a recommendation, not a condition of approval (AEUB and Canada 2007 1 and 2). AENV conditioned Kearl's *Water Act* permit on the expectation that Kearl's proponents adhere to the evolving bitumen water management framework (AENV 2007b), thus helping address the Kearl project's impacts on water and adding a measure of enforceability, but many issues, such as community impacts and GHG emissions, were addressed by the JRP through recommendations without any regulatory support from permits. The situation is similar with the Total Joslyn and Petro-Canada Sturgeon Upgrader projects (ERCB 2009, ERCB and CEA Agency 2011, AENV 2011a). To be fair, the ERCB and JRPs do not have jurisdiction over many levers of mitigation, but by approving projects without ensuring strong mechanisms for the mitigation of the major impacts posed by projects, the ERCB and JRPs shirk responsibility for these matters. Instead of relying on weak recommendations to attempt to address the major impacts of bitumen projects, the ERCB and JRPs could require mitigation frameworks to be in place prior to project start-up as conditions of approval, and thereby use a mechanism (conditions) which the ERCB has the capacity to enforce. I discuss other aspects of this matter in s.5.2.11 below.

The ERCB and JRPs also rely on commitments by the proponent to address project impacts, and available evidence indicates that these too have weaknesses in terms of enforceability. In the Total upgrader decision the ERCB expressed its position on commitments:

the Board expects the applicant to comply with commitments made to all parties. However, while the Board has considered these commitments in arriving at its decision, the Board cannot enforce them. If the applicant does not comply with commitments made, affected parties may request a review of the original approval. At that time, the ERCB will assess whether the circumstances regarding any failed commitment warrant a review of the original approval (ERCB 2010a 48).

The catch is that stakeholders must convince the ERCB to review the approval, and if successful and the ERCB decides after the review that it wishes to amend or cancel an

approval, the ERCB must be authorized by cabinet to do so (Vlavianos 2007b). Recent history does not give confidence in this process. Shell made commitments to the Oil Sands Environmental Coalition regarding GHG reduction on their Jackpine and Muskeg River mines and then reneged on these commitments following approval (McClearn 2009). Subsequently, even though the ERCB acknowledged that Shell had broken its agreements with the Oil Sands Environmental Coalition, the ERCB did not grant the Oil Sands Environmental Coalition standing for an appeal of the approval (Pembina Institute 2009). If this case is representative of how the ERCB and JRPs enforce commitments, then the value of commitments in terms of enforceability and mitigation success is low.

Sixty nine percent of respondents felt that conditions of approval are clear, though a regulator respondent wrote that

terms and conditions are sometimes not clear enough... More detail is often needed, for example regarding requirements if mitigation is not or is only partially successful.

A provincial government respondent wrote that

there are concerns about going more hands-off and outcomes based, when operators actually request more details - they want to know what is expected of them. So, approval conditions almost need to be more explicit, even though it may seem to go counter to what is trendy.

A provincial respondent wrote that “approval conditions need to have more specific time lines to help ensure enforcement is adequate and timely.”

These problems with terms and conditions – lack of outcome requirements, reliance on poorly enforceable commitments and recommendations, and insufficient details – may be explained by the lack of legal bounds set in current law around terms and conditions. The *OSCA*, for example, simply states that the ERCB may prescribe “any terms and conditions that the Board considers appropriate” (s.11.3.a). The *CEAA 2012* (ss.53 and 54) is no more explicit. It is perhaps due to this lack of direction that an industry respondent wrote that conditions lists are “getting longer and longer without good rationale... each approval builds off the last without considering the new information” and a provincial government respondent noted that

currently, too many conditions are being specified in approvals. Regulators should only include key conditions, which are important, and then make sure that they are properly followed-up and fulfilled by both the approval holder and the regulator.

5.2.7. Monitoring and Enforcement

- Project review is backed by compliance monitoring and enforcement, as well as effectiveness monitoring and requirements for remedial action if mitigation is found not to work.
- Monitoring is performed by an independent and impartial body.
- Compliance and effectiveness is publicly reported.
- Knowledge gained from monitoring and enforcement activities is archived and fed into future project review.

Compliance Monitoring and Enforcement

The current review process is supported by compliance monitoring and enforcement established in laws such as the *CEAA 2012*, *Fisheries Act*, *EPEA*, and *ERCA*. Section 6 of the *CEAA 2012* establishes fines of up to \$400,000 if proponents fail to comply with conditions of federal EA approval. The ERCB is perhaps the most important regulator in bitumen development, and it lays out its expectations and regulatory procedures in multiple directives, especially *Directives 019, 054, 073* (ERCB 2008c, 2010b, c). The ERCB, as well as other regulatory authorities, expect developers to comply with applicable laws, but also conditions of approval.

Effectiveness Monitoring and Remediation

Existing laws and permitting practices also establish effectiveness monitoring to identify when mitigation measures are not effective and desirable outcomes are not being achieved. Section 53 of the *CEAA 2012* requires that 'follow-up' programs are prescribed when projects undergo panel review. The federal Auditor General found that follow-up programs are being implemented (OAGC 2009b). Section 49 of the *EPEA* requires proponents to develop plans for effectiveness monitoring, and AESRD typically prescribes multiple means of effectiveness monitoring in permit conditions (e.g., AENV 2007a, 2011a).

Effectiveness monitoring is also carried out by multi-stakeholder monitoring programs such as the Wood Buffalo Environmental Association, the Regional Aquatics

Monitoring Program (RAMP), various government and academic programs, and in newly emerging programs in the wake of duck kill and fish mutation scandals (Dowdeswell et al. 2010, CESD 2011, Canada and Alberta 2012). Proponents typically commit to participate in these programs (e.g., see pages 37 and 55 in AEUB and Canada 2007), and regulators frequently require proponents to participate as conditions of permits (e.g., AENV 2007a, 2011a).

In the project reviews examined for this evaluation, no conditions of approvals specify requirements to take remedial action if undesirable outcomes occur. The Federal Auditor General found that federal authorities do take some corrective action when effectiveness monitoring results are poor (OAGC 2009b), but this may be explained by what is required by permit conditions, not project review approval conditions. In both the Kearl and Total Joslyn mine *EPEA* permits, the conditions of the permits require proponents to take action in one situation: if nitrogen oxide emissions rise higher than limits established in the permit (AENV 2007a, ss.4.1.35 and 4.1.36, 2011a ss. 4.1.40 and 4.1.41). There are no requirements to take remedial action for the vast majority of impact types in the *EPEA* permits of these projects. A comprehensive review of the extent to which bitumen project permits establish requirements for remedial action is outside the scope of this thesis.

Independence and Impartiality of Monitoring

Compliance monitoring is carried out by the ERCB and AESRD; the federal government relies on Albertan monitoring programs. While the ERCB is intended to be independent, many respondents perceive it and AESRD to be biased (see s.5.2.11). These perceptions of bias – whether or not they are grounded in reality – hamper the ability of the ERCB and Alberta government to maintain their legitimacy among stakeholders.

A greater problem is that the majority of effectiveness monitoring is carried out by industry. The majority of effectiveness monitoring is done by multi-stakeholder bodies that are industry-led – an obvious conflict of interest (Marsden 2007 (2008), Dusseault 2002, Scott 2008a). RAMP has been criticized the most. RAMP is an industry-funded body responsible for monitoring aquatic environmental indicators (RAMP Undated). Of 28 members of this monitoring panel in January 2013, 17 are industry, eight are

government, and two are Aboriginal groups; no environmental groups are interested in participating.⁵¹ RAMP has been critiqued widely for bias, including by government-sanctioned audits (e.g., Nikiforuk 2008, Marsden 2007 (2008), Schindler 2008, Holroyd and Simieritsch 2009, Price 2008, Ayles, Dubé, and Rosenberg 2004, Timoney 2007, Dowdeswell et al. 2010, Gosselin et al. 2010, Burn et al. 2011, Dillon et al. 2011). A citizen respondent explained that

monitoring, in most cases, is carried out by the company [and] exceedances, infractions, procedure breakdowns are to be reported immediately to Alberta Environment. To say this does not happen is an understatement.

AESRD's forthcoming 'arm's-length' monitoring program (Alberta 2012b) may address the above issues.

Several survey respondents link the scale of industry self-monitoring to insufficient government resources. One academic respondent calls government budget cutbacks to AESRD and the ERCB “tremendous”, and one government respondent wrote that

while government regulators draft good conditions in approval documents they have sorely inadequate resources to confirm predictions, monitor or enforce.

Poor Performance in Audits of Monitoring Programs

Government-sanctioned audits of bitumen monitoring programs have routinely identified serious problems in monitoring. The federal government relies on Alberta government monitoring, but according to the federal auditor (OAGC 2009a), the last time that federal and Alberta counterparts met about monitoring was in 2007 and there has been no evaluation of the effectiveness of this arrangement in terms of fulfilling federal obligations. A 2010 federal audit (Dowdeswell et al. 2010) concluded that impact monitoring lacks science coordination, adaptability, integration of results, and that particular subjects (such as acid rain) are insufficiently examined. A 2011 Alberta audit

⁵¹ Includes the ERCB.

(Dillon et al. 2011) concluded that RAMP is incapable of determining if development is causing pollution, and that AESRD's monitoring program has serious problems with sampling and methodology.

In 2011 the federal government announced a framework for a new monitoring program (EC 2011b) and in early 2012 the federal and Alberta governments released an implementation plan for the program (Canada and Alberta 2012). Key principles of the new program include transparency, collection of data necessary to understand cumulative effects, and scientific rigour – all identified shortcomings of the current monitoring program – and mechanisms have been identified to address each, such as regular external peer review (Canada and Alberta 2012). One problem, though, is that the current implementation plan relies on industry funding without an indication of how industry bias will be checked. This potential problem is compounded by the Alberta government's decision to study further whether the program should be independent or not (Wingrove 2012).

Survey Respondent Opinions of Regulation

Only 40% of respondents agreed that compliance monitoring is adequate, and only 38% thought that effectiveness monitoring is adequate. Non-industry respondents were significantly more negative towards monitoring than industry ($D^* 0.79 > D_{0.05} 0.36$; $D^* 0.77 > D_{0.05} 0.36$). A provincial government respondent felt there is "some growing to do regarding monitoring of compliance... monitoring has been identified as an area of challenges." A consultant respondent observed that there is no monitoring of socio-economic variables. A consultant respondent wrote that transparency is an issue as

only the regulator and the proponent are privy to what goes on in a lease (unless an accident enters the public domain)... unfortunately, proponents are reticent to disclose their successes and failures and our experience was that findings take time to emerge. This trend is improving; however, disclosure remains slower than would be desirable...

One industry respondent wrote that transparency "is a key item that many companies are working to resolve. Unfortunately it is taking longer than anticipated." Another industry respondent wrote that "monitoring results appear to go into a black hole in regulators' filing cabinets." A NGO respondent wrote that RAMP does not make their

findings public and that "any monitoring that is done in the oil sands region must be made publicly available in order to have credibility and to be transparent in its findings."

A citizen respondent pointed out that

often the ERCB puts stipulations and conditions on the approval but there is no public scrutiny process or intervener process if the proponent fails to carry these out. In fact, who knows if they are carried out ever or in a timely manner and whether the ERCB keeps track of their conditions and whether they are met.

A provincial government respondent noted that access to monitoring data is a problem, and that this could be alleviated through electronic reporting.

Only 38% of respondents agreed that compliance enforcement is adequate, and only 39% of respondents felt that appropriate remedial measures are taken. Again, non-industry respondents were significantly more negative towards enforcement and remedial action than industry ($D^* 0.83 > D_{0.05} 0.36$; $D^* 0.80 > D_{0.05} 0.36$). One provincial government respondent commented that

approval conditions have not been adequately enforced... Approval conditions need to have more specific time lines to help ensure enforcement is adequate and timely... despite a legal obligation (that has existed for over 30 years), for oil sands companies to reclaim oil sands tailings, the existing companies – Syncrude and Suncor in particular – have failed to fulfill their obligations to reclaim tailings. Rather than prosecute for failing to comply with Approval Conditions, the liability for treating that sludge is now being directed to taxpayers in the form of over \$400 Million of taxpayers' money being used to fund oil sands tailings research. When considering future projects decision makers should review the compliance record and impacts of existing projects and, where needed, consider more definitive means of ensuring that the legal obligations of any future projects will be adequately fulfilled.

Another provincial government respondent felt that there should be "substantially greater financial penalties for failing to comply and broader announcement of non-compliance issues to the public." A third provincial government respondent noted that

collectively Government of Alberta departments continue to face pressures associated with the resource development projects approved by the ERCB and [Natural Resources Conservation Board]. The growing pressures faced by [Alberta departments] include the cumulative effects

of developments on [provincial infrastructure]... such undertakings have been considered beyond the fiscal capability of [our department]. Therefore, new large-scale oil sands projects should also address their financial commitments to mitigate the impacts. It is our experience that once the proponent obtains the permit for development, they are not obliged to their commitments.⁵²

A regulator respondent noted that “terms and conditions... sometimes are not rigidly followed up and enforced.” An NGO respondent wrote that “there has to be a more effective recourse to stakeholders when commitments made to them by proponents are broken.”

5.2.8. Process Management

- Government employs strategies during reviews of applications to enhance the effectiveness of reviews such as work planning, budgeting, delineating roles and responsibilities, establishing timelines and milestones, and monitoring and reporting of progress.
- Process is regularly audited for effectiveness and with respect to international standards.
- What is learned in terms of review performance is used to improve future reviews.
- Review staff are regularly involved in training and capacity-building exercises.

Federal Strategies

The federal government employs a variety of strategies to improve review effectiveness. The MPMO makes work plans, assigns roles, determines timelines, monitors progress, and conducts research. The CEA Agency provides training, runs its quality assurance program, and conducts EA research (CEA Agency 2011a). The CEA Agency is also involved in harmonization and coordination activities (see CEA Agency 2010a).

As with other federal departments, the CEA Agency also reports annually on internal audits, but their audits are not always rigorous. In its 2009-2010 report (CEA Agency 2010a) the CEA Agency identified the goal of ensuring that federal government staff and proponents understand EA. The indicator was the percentage of staff and proponents that agree that they understand EA. Despite writing the indicator this way

⁵² NRCB stands for Natural Resources Conservation Board, the Alberta regulating body for natural resources other than energy.

and stating a target of 85% agreement, the CEA Agency did not survey staff or proponents but instead reported that

sixteen project agreements, which outline roles and responsibilities of departments and agencies, were signed by responsible authorities in the reporting period and are publicly available. Project proponents access these documents and thus are provided with an understanding of the Agency's role. The Agency also participated on project review teams, which serve as a forum to coordinate the various roles of federal departments (22).

This 'result' has little relationship to the indicator and target and thus evidences evaluation problems. The 2010-2011 report evidences other problems. The CEA Agency (2011b) indicates a strategic outcome of ensuring that "environmental considerations are taken into account in federal government decisions respecting policies, plans, programs and projects" (3) – an objective with little relation to ensuring that government decision-making actually leads to more sustainable outcomes. Another problem is poor data transparency. For example, one measure was that "a single EA report produces the necessary information to support federal and provincial EA decisions when both jurisdictions require EAs of a project". The result found in the internal audit was that "100% of cooperative reviews included reports that produced the necessary information to support federal and provincial EA decisions". This statement is all that is provided in the report and, as is, doesn't transparently demonstrate how the measure was fulfilled.

The Commissioner of the Environment and Sustainable Development conducts semi-regular external audits of federal EA. A 2009 review concluded that the CEA Agency has a very poor quality assurance program (OAGC 2009b). The audit concluded that the agency hadn't yet fully established a quality assurance program, and that there was no clear framework for evaluation nor development of strategic direction, targets, or performance measures. The most recent audit (CESD 2011) examined cumulative effects assessment in bitumen project review and found incomplete environmental baselines and environmental data monitoring systems, insufficient efforts to ensure that TORs reflect federal concerns in harmonized reviews with Alberta, and poor adaptation of TORs over time to address identified information gaps.

Regarding process auditing, the *CEAA* has been undergoing regular federal 'review' as per requirements in s.72 of the *CEAA 1992*. The most recent review was March, 2012 and identified numerous areas for improvement such as efficiency and better harmonization with provincial review systems (SCESD 2012). In 2003, the *Act to Amend the Canadian Environmental Assessment Act* [S.C. 2003, c.9] was passed after a multi-stakeholder review initiated in 1999 (Douglas and Hebert 2003), and in recent years government has introduced amendments to the *CEAA* through budget bills (e.g., Canada 2010). However, Bill C-38 – the 2012 budget bill – repealed the *CEAA 1992* and replaced it with the *CEAA 2012*, which doesn't require any sort of process auditing. The federal government has commissioned independent audits in the past (e.g., Stratos 2008, EMMRPIWG 2008). To its credit, the CEA Agency regularly participates in international EA fora such as International Association of Impact Assessment events. This thesis will provide the most recent comparison with international good practices.

Alberta Strategies

The Alberta government tracks EIA statistics including time taken to conduct reviews, supplemental information requests, and statistics on third party review contracts (e.g., Alberta 2011f). AESRD also tracks the performance of harmonizing EIA with federal EA (see AENV 2009a, CEA Agency 2010a). The ERCB audits its review process in terms of "efficiency and effectiveness" through their own examinations of ERCB data but also by gathering feedback from stakeholders (ERCB 2008b 1-3). The Alberta government also reports annually on budgets and performance. Annual reports for Alberta Energy (e.g., Alberta 2008a) and AESRD (e.g., Alberta 2008b) cover performance of the ERCB and the EIA program. As evidenced in the annual reports that I reviewed for this thesis, though, and like federal internal audits, the Alberta government's internal evaluations are not very rigorous.

A key problem is that evaluation methods are weak. The ERCB plays a huge role in energy regulation in Alberta, yet only two indicators are employed to evaluate its performance in the 2007-8 annual Alberta Energy report (Alberta 2008a): application resolution, and protection of public safety. (In comparison, the Alberta Environmental Appeals Board employed 57 indicators to evaluate itself in its 2005-2006 annual report (EAB 2006)). The ERCB evaluates its success at 'application resolution' by counting

how many applications filed with objections are resolved without a hearing. In that year, 95% of applications filed were concluded without a hearing. This measure and result says nothing of the satisfaction of stakeholders with the conclusion or process. Regarding the second indicator (protection of public safety), of 16,550 inspections, less than 3.5% were found to be of 'high risk noncompliant'. The power of this result relies upon definitions of what is 'high risk noncompliant', how Alberta compares with other jurisdictions (i.e., is 3.5% relatively low, high, or average?), and the sufficiency of its inspection program (which the evidence reviewed indicates is weak; see s.5.2.6). The same two weak measures are used in the 2008-9 annual Alberta Energy report (Alberta 2009b), and in the 2009-10 and 2010-11 annual reports Alberta Energy uses the same 'protection of public safety' as well as assesses the degree to which the ERCB processes applications within 180 days of initial application (Alberta 2010b, 2011e). This extremely limited evaluation of ERCB performance – a body playing a huge role in Alberta – is shocking. Adding to this extremely weak internal audit is the fact that there is no formal mechanism for external auditing of the Alberta EIA or ERCB review processes.

Use of Monitoring Results

It is critical that what is learned in compliance and effectiveness monitoring is transferred to future project review decision-making. Gosselin et al. (2010) find that few reviews examine the results of effectiveness monitoring of other projects, and the Commissioner of the Environment and Sustainable Development's (2011) recent audit found that there was little adaptation of TORs based on identified information gaps. Consistent with these findings, only 33% of survey respondents thought that there was adequate transmission of monitoring results, and non-industry respondents tended to be significantly more negative towards transmission of monitoring results than industry ($D^* 0.72 > D_{0.05} 0.36$).

5.2.9. Resources

- Process is provided with sufficient funding, staff, leadership and time.
- Funding is sufficient enough to allow government to conduct a review process that follows all good practices.
- Staff have expertise in all aspects of the process and the issues raised by the application. Staff are continuous across individual reviews.
- Sufficient leadership exists to propel the process.
- Sufficient time is provided to enable a fair and quality examination of a proposal's merits.

Funding, Staffing, and Skills

As introduced above in s.5.2.7 regarding monitoring, insufficient funding and staffing are currently issues of concern (AENV 2008c, Gosselin et al. 2010, Campanella 2012). Alberta government regulators are overloaded due to dramatic increases in the number of applications for energy projects in recent years (Alberta 2006a, Creasey and Hanna 2009). Government has increasingly come to rely upon industry self-monitoring due to insufficient government staff (s.5.2.7). A federal EA review found gaps in technical expertise, a high turnover rate which reduces 'institutional memory', and low skill levels leading to risk aversion in decision-making in EA positions across the federal government (Stratos 2008). Looking at the ERCB, Vlavianos (2007b) questions whether board members are qualified given the broad range of issues raised by bitumen development. She notes that board members "are chosen for the most part for their engineering and oil and gas expertise" (38) and argues that members should have a broader skill set and be representative of the wide range of stakeholder interests including land ownership, environment and municipal matters.

Only 10% of respondents agreed that "government bodies and staff involved in project review have adequate funding and expertise to participate effectively", and non-industry respondents tended to be significantly more negative towards resources than industry ($D^* 0.38 > D_{0.05} 0.35$). A federal government respondent wrote that

inadequate expertise in many cases... government experts in various disciplines are needed who can be devoted to EA rather than doing the reviews off the corner of their desks.

One provincial government respondent wrote that "government needs to do more to ensure that it is adequately resourced to undertake the regulatory processes that it has designed." A second provincial government respondent noted that

socio-economic issues have been the most challenging to evaluate, partly because of their inherent nature, but also due to a lack of available expertise to review the material. Either the government should acquire this expertise, or the socio-economic aspects of EIAs should be reduced or dropped.

An industry respondent observed that the government and ERCB staff are not "appropriately knowledgeable" and the "risk is [that] they can be easily swayed by 'so-called' experts and can miss the pertinent issues in favour of 'popular' issues."

Respondents offered various explanations for resource shortfalls. One provincial government respondent suggested that as there is an ebb and flow in applications it is difficult for government to assign appropriate resources year to year. One consultant respondent stated that AESRD has suffered continual cuts "about every 18 months" providing "a near constant source of upheaval and disturbance."

Time

Project reviews typically take more than two years, even up to six years (s.4.6), and this has led to various calls to control the time commitment of project review (e.g., McCarthy and Tait 2011, SCESD 2012). While 19% of survey respondents thought that the process proceeds too rapidly and 29% thought it takes an appropriate amount of time, 35% of respondents did feel that the process takes too long. An industry respondent noted that

the review process, now extending beyond two years is self-defeating in its purpose. The length requires that applications be submitted with preliminary data, knowing that there are two years of time for detailed design while a project is under review. If a review could be done in six months, the level of information available for review would be much better and a proponent and the public would be better served.

The federal government has responded with time restrictions for many steps in the *CEAA 2012* (see s.4.3.2 in Chapter 4), but the nature of the most important time limit –

that a final decision must be made within two years of a review panel being struck – is particularly concerning given the position it places government reviewers and stakeholders in. Under the *CEAA 2012* the two year time limit does not apply to proponents and thus opens the door to proponents delaying the process and preventing review panels, government scrutinizers, and stakeholders from having enough time to understand an application’s content and significance. In ss. 5.2.16 and 5.2.18 I relay how some respondents felt that proponents already delay giving information to interveners and how interveners and their experts already feel that they don’t have sufficient time to review applications.

Funding of Other Participants

Only 33% of respondents agreed that “non-industry stakeholders such as aboriginal, environmental, and community groups have sufficient resources to participate effectively in the project review process”, and non-industry respondents tended to be significantly more negative towards resources for participation than industry ($D^* 0.65 > D_{0.05} 0.35$). One aboriginal respondent wrote that

there needs to be a way to provide funding to non-treaty Aboriginal organizations so that they can be fully informed about the projects. Métis organizations in the region, from the provincial level down, do not have the funding necessary to assess how... projects will directly and adversely affect their communities.

One provincial government respondent thought that aboriginal groups are well-resourced but thought that other stakeholders do not have access to the same level of resources. An NGO respondent said that federal EA funding under the *CEAA 1992* has been inadequate

typical *CEAA* funding for the Oil Sands Environmental Coalition to review and appear at an oil sands hearing is only \$40K. This is not adequate to hire experts and prepare.

A municipal government respondent wrote that there were problems in the past with compensation to stakeholders for legal representation and that the rate the ERCB was offering was “well below what a decent lawyer goes for.” A citizen respondent felt that “non-industry stakeholders are at the mercy of the proponent to pay” for their expenses

and that interveners have little time to find experts and get them approved. Furthermore, according to this respondent, proponents' lawyers often dispute the credentials of experts that stakeholder groups hire and refuse to pay full expenses, often leaving interveners to pay the bills:

this becomes a financial burden unfairly put upon ordinary citizens with legitimate concerns about industrial projects. This is another "intimidation" tactic employed by the proponent... to discourage future intervention in industrial project applications.

In contrast, an industry respondent said that the public has "very good resources", especially aboriginal people who are often paid for involvement. An industry consultant argued that the funding provided for stakeholders "may be viewed as appropriate or excessive."

Costs to Proponents

A sound review process should also be affordable to proponents. However, only forty percent of respondents agreed that "the costs of participating in the review process are reasonable for proponents." A provincial government respondent noted, though, that while proponents complain about costs of review, these costs "pale in comparison" to project capital costs and eventual revenues.

5.2.10. Methods of Impact Assessment

- Only sound methods of impact assessment are used in project review.
- Sound methods: (1) are suited to the review context, (2) are flexible and adaptable, (3) are scientifically robust, (4) are minimally reliant upon subjective inputs, (5) are easy to understand, evaluate, and put to use, (6) create useful outputs, (7) are highly accepted by users and stakeholders, (8) are cost-effective, and (9) are participative in that stakeholders are involved in their use.
- Reference class forecasting and cost-benefit analysis are highly recommended methods of impact assessment.

Methods Used in Project Reviews

A variety of methods are used to assess the impacts of bitumen project proposals. Table 5.1 lists common methods of impact assessment and indicates which of these methods were used in the Kearl review. This list does not mean that the

Table 5.1. Methods of Impact Assessment Used in the Kearl Review

Method ¹	Explanation ¹	Used in Kearl Review? ²
Adaptive environmental assessment and management	An iterative process that combines concepts of adaptive management with methods of systems analysis and modelling workshops.	✓
Analogs	Forecasting the impacts of a project by looking at impacts of other projects.	✓
Biophysical impact assessment	Assessing impacts on non-human components of the environment, e.g., wildlife, soils, groundwater chemistry, etc.	✓
Checklists and matrices	Lists and grids to help identify and/or rank potential impacts.	✓
Cost-benefit analysis (CBA)	A method of economic impact assessment that estimates the net impacts of a project and the value of these impacts to society. Also includes methods of monetary valuation used on their own to assess the negative impacts of projects.	X
Cumulative effects assessment	Assessing whether the impacts of the project will combine or interact with the impacts of other past, present, or future projects to create greater and/or different impacts.	✓
Economic impact analysis (EconIA)	A method of economic impact assessment that estimates the gross economic impacts of a project. Often used with input-output and economic base analysis techniques.	✓
Expert opinion/expert systems	Using experts through informal consultation or structured means of gathering information/opinion (e.g., Delphi method).	✓
Geographic Information Systems (GIS)	Examining impact data spatially through computers.	✓
Heritage assessment	Assessing the impacts of a project on heritage resources such as archaeological sites, historical buildings, etc.	✓
Literature review	Assessing impacts by examining academic and other literatures.	✓
Mass-balance calculations	Comparisons of quantitative changes that may result from the project.	✓
Modelling	Developing simplified versions of reality to describe, analyze, and understand the behaviour of real systems. Models are often computer-based and represented by mathematical relationships.	✓
Multi-criteria evaluation methods	A suite of methods that examine projects based upon multiple criteria or evaluation accounts. Includes multiple accounts analysis, multiple account evaluation, and multi-attribute utility methods.	X

Method ¹	Explanation ¹	Used in Kearl Review? ²
Negotiation/mediation	Alternative dispute resolution techniques to assess impacts and resolve mitigation and compensation issues.	✓
Networks / linkage diagrams	Developing hypothesized connections or relationships between project and environmental components.	✓
Reference class forecasting	Examining realized impacts of other projects to develop forecasts of impacts of the project in question.	X
Remote sensing	Use of satellite imagery, air photos, or other means of remote data gathering.	✓
Risk analysis and evaluation	Identifying and assessing uncertain impacts. Often includes quantification of risk and identification of mitigation measures.	✓
Scenario building	Developing alternative visions of the future by extrapolating from differing sets of initial assumptions.	✓
Social impact assessment	Assessing impacts that affect people, e.g., cultural, heritage, community, etc.	✓
Stakeholder involvement	Methods of involving and gathering information from the public and groups.	✓
Traditional ecological knowledge	Gathering information on potential impacts from aboriginals and other people with longstanding roots to a place.	✓
Trend extrapolation	Analyzing historical trends and extrapolating into the future based upon assumptions related to either continuing or changed conditions.	✓

Notes. 1. Materials adapted from Sadar (1996), Porter (1998), Maclaren (1985), and Folk (1982). 2. Kearl data from Imperial Oil (2005) and AEUB and Canada (2007).

methods identified were or were not used well in the Kearl review, simply that they were used. Similar methods have been used in other recent bitumen reviews.

It is striking that the two methods highlighted in the literature (s.3.3.3.3) as key to sound megaproject review – CBA and reference class forecasting – are not used in bitumen project review. The lack of use of CBA (or monetary valuation on its own) is surprising for several reasons. First, CBA is considered good practice in megaproject impact assessment – while CBA has important limitations (see Chapter 7), the literature strongly supports its use, and survey respondents are largely in favour of its use. Second, the ERCB's *Directive 023* calls for the use of CBA (s.4.4.4). *Directive 023* states that CBAs should be done by proponents seeking ERCB approval – a

requirement consistent with good practices – but proponents do not use CBA, even though they say they do (see s.5.2.5). In the reviews examined for this thesis, EconIA is used to examine economic impacts, despite its weaknesses (see s.6.2.1). Third, it would appear that CBA has important analytical advantages compared to other methods. CBA appears to be a means to assess both of the key decision criteria of bitumen project review: valuations of individual impacts would appear to relate to the *CEAA 2012*'s impact significance criterion, and valuation of the benefits and costs of projects in their entirety as a whole would appear to relate to the ERCB's public interest criterion. Fourth, CBA would appear to provide a means to address two challenges posed by megaprojects: examining the wide breadth of issues that megaprojects cause, and 'understanding the big picture' of all of this impact data. Importantly, very few practices identified in Chapter 3 (see Table 3.14) exist to address the challenge of 'understanding the big picture'. While analogs were used in Kearl, and perhaps other projects, I found no evidence that the more sophisticated comparison of project impacts with those of other projects as is done with reference class forecasting was performed. It would seem that bitumen project review is a prime setting for the use of this method given that numerous projects of similar characteristics are routinely being examined through the bitumen review process. The lack of CBA and reference class forecasting is counter-intuitive given the benefits that these methods are reported to provide.

Survey Respondent Opinions of Impact Assessment Methodology

Only 40% of respondents agreed that the methods of impact assessment used in bitumen project reviews are appropriate. Numerous respondents commented on methodological problems, including a lawyer who stressed that the baselines from which impacts are measured are highly problematic:

a major deficit in the ... process at present, is the Alberta government's view that all the impacts of all existing and approved developments (oil sands, forestry, etc.) have been approved and are therefore acceptable so can be removed from the assessment. This means only the incremental effects of a project are considered which leads to the current ludicrous position where each major project has a smaller impact than the last one, relative to an increasingly impacted 'baseline'.

A citizen respondent noted that interveners will often ask in hearings that different methods be used but that the ERCB is “reluctant to carry out or validate any suggestions from the interveners’ experts”. An academic respondent made a call for a broad lens in impact assessment noting that

a danger is an inappropriately narrow "accounting stance" whereas public funding of infrastructure and public services is assumed rather than analyzed by benefit-cost methods.

Non-industry respondents tended to be significantly more negative towards the methods used than industry ($D^* 0.68 > D_{0.05} 0.35$).

Rationale for Closer Inspection of CBA

In the ideal situation all impact assessment methods used in the current review process, as well as any other prominent methods that might be used in project reviews, are evaluated in terms of the nine criteria of method soundness (s.3.3.3.3). Such an endeavour is beyond the scope of this thesis, but one method does deserve closer scrutiny in terms of its role in megaproject review – CBA – for the four reasons identified above. Given the discrepancy between the supposed advantages of CBA and the lack of use of CBA in bitumen reviews I apply CBA in Chapter 6 to a case study – the Kearl mine, a bitumen project currently under construction – and then in Chapter 7 I evaluate this method using the characteristics of a sound method of impact assessment (s.3.3.3.3) as criteria to structure the evaluation. This evaluation goes beyond the wide array of literature discussing the advantages and disadvantages of CBA by providing a systematic, criteria-based evaluation specifically focused on the megaproject review context. Future researchers should closely examine reference class forecasting and other methods in terms of the criteria in s.3.3.3.3 and with respect to the demands and challenges of the megaproject review context.

5.2.11. Consolidated Review Process Managed by Independent Review Body

- Review process consolidates all government reviews and decision-making into one single review instead of multiple reviews.
- Review is led and managed by an independent review body (IRB) at arm's length from government. The IRB is focused on ensuring rational review.
- The IRB has adequate resources, authority, and is unbiased, and publicly accountable.

Harmonization Agreements

The 1996 MOU between the ERCB and AESRD, the 2005 *Canada-Alberta Agreement* over multijurisdictional EA, and the individual agreements established between the Alberta and federal governments when JRPs are struck all seek to 'harmonize' the bitumen project review process. These agreements make the process more efficient, such as by establishing the need for a single submission from proponents and a single hearing process, but federal and Alberta agencies and the ERCB work through the process on their own in their own ways and no single IRB is established.

Under these arrangements, only 30% of survey respondents thought that the process was appropriately consolidated (12% thought that the current process was too consolidated, and 45% thought that it should be more consolidated). A significant difference existed between industry and non-industry respondents: the latter tended to think the process was too consolidated ($D^* 0.46 > D_{0.05} 0.34$).

Integration of Actors

While the ERCB and JRPs play leading roles in the process, there are many other government actors involved. When many actors are involved, there can be issues of integration. According to one recent study, federal actors demonstrate insufficient knowledge sharing, information transfer, and trust among one another in EA (Stratos 2008). More than half (56%) of respondents also thought staff across departments, agencies, and levels of government do not work closely enough together. Non-government respondents tended to feel significantly more than government respondents that the process was not integrated enough ($D^* 0.374 > D_{0.05} 0.369$). One industry respondent exclaimed that

in reality, the feds are a nightmare and do not coordinate with provincial counterparts... the ERCB and AENV “do coordinate [themselves] but are not always on the same page or timeline creating disconnects.

One federal government respondent wrote that

the current regulatory set-up subsumes federal reviewers into the provincial process. The provincial process separates review into compartments (air, water, terrestrial, health, etc.), and there is little mechanism for review or communication across compartments. Mechanisms are needed to (a) allow federal interests and approaches to express [themselves] outside of the provincial process, particularly under the new model of the province contracting out reviews, and (b) there needs to be cross-compartment communication, so that things like acid rain, toxicology, etc. do not fall between the cracks.

A different perspective was provided by a lawyer respondent who saw problems from both angles. The lawyer felt that there is insufficient coordination between federal, Alberta, and municipal governments, but that within the Government of Alberta there is

too much integration in that one cannot tell the difference between a department of energy and department of environment position... There does not seem to be a separation of function as we have the department of environment including the minister defending oil sands development for economic reasons and diminishing environmental management and requirements and impacts to serve - at least it appears this way - the department of energy's goal of increasing oil sands development.

Many Actors Involved

Almost half of respondents (49%) thought that the number of bodies currently involved was appropriate; 25% thought that too many bodies were involved, and 11% thought that there weren't enough. A federal government respondent questioned the role of the MPMO, writing that it is

not clear what benefit the MPMO brings. Adding another layer of process to the already large inverted pyramid of federal process (which was resting on the backs of the three people who actually did the reviewing) does not seem to add value. Using some or all of the money spent on MPMO to hire more technical experts so that the review can proceed more effectively would seem to make more sense.

An industry respondent felt that government agencies overlap too much in orientation, causing overlap and duplication. A second industry respondent wrote that

the ERCB is confused at times between public interest determination and environmental impact assessment matters. Perhaps consolidation of ERCB and AENV somehow would [address] this, both for proponents and stakeholders.

However, a provincial government respondent felt that “without as many bodies as currently exists” the government “might not be able to manage [the] complexity of projects.” A third industry respondent wrote that “the number of players involved is fine and maybe should be more” and indicated that the key issues were coordination and timeliness.

Bias in Review Bodies

Each actor brings its own bias to project review, and as there is no IRB managing the process and leading the review, these biases matter all the more. The MPMO is an office within Natural Resources Canada, a department which has a pro-development mandate (NRCan Undated), which may translate into bias in the MPMO’s policy and activities. The CEA Agency is an arm of Environment Canada, and so there may be some pro-environment influence injected into the CEA Agency’s policy and activities. Similarly, AESRD may have a pro-environment bias which may transfer into project review policy and activity.

The ERCB is intended to be an independent arm’s length agency of the Alberta government, but even it may inject bias to project review. As the Alberta cabinet appoints members to the ERCB board and retains them as long as members exhibit ‘good behaviour’ (s.4.4.4), Alberta government bias may be transferred into the ERCB. Independence from industry may be a greater problem, though: 60% of the ERCB’s funding comes from industry, and five of eight (63%) members of the current ERCB board have ties with industry (Nikiforuk 2008, Vlavianos 2007b, ERCB Undated-c).

JRPs are supposed to be composed of members that are “unbiased and free from any conflict of interest relative to the project and are to have knowledge or experience relevant to the anticipated environmental effects of the project” (Canada and

Alberta 2005 s.3.4 of Appendix 2, also s.42 of the CEAA). I did not examine patterns in the membership of past JRPs to see whether or not JRP membership fits with these requirements, but it is notable that these requirements are mentioned: the *ERCA* does not specify at all who ERCB board members are to be, their qualifications, or anything regarding potential conflicts of interest.

Only 25% of survey respondents agreed that government bodies involved in project review exhibit no bias for or against development, and non-industry respondents tended to be significantly more suspicious of bias than industry respondents ($D^* 0.38 > D_{0.05} 0.34$). While three respondents felt that biases in government bodies “tend to average each other out”, a large proportion of respondents felt that there was a pro-development bias on the whole among review bodies. A federal government respondent wrote that the ERCB and other Alberta government bodies “are pushing oil sands development” and another federal government respondent observed a “strong pro-industry bias” in the Alberta government “at odds with the federal review.” An aboriginal respondent wrote that there is an “inherent conflict with the ERCB making the decision since their mandate is to develop the resource. A decision against a project is highly unlikely.” Likewise, a lawyer respondent suggested that the bias for development stems from legislation “that encourages and promotes development and resource recovery as being in the public interest.” An industry respondent admitted that

all the projects seem to get approved... they go through a tough process, but then they are approved... so the bias may be that everything goes ahead.

An aboriginal respondent felt that the Alberta government may have a bias for development due to its receipt of royalties from development. A citizen respondent wrote that the ERCB’s ‘public interest’ decisions

seem to be weighted more towards increased jobs and taxes for various levels of government than aesthetics, health, environment and community values of “John Q Public”.

A consultant respondent and two citizen respondents felt that a pro-development bias in the ERCB is due to its tight connection with industry. Another consultant respondent felt that

it isn't the structure that is the problem, but the politicization of the entire review process... As it is, industry and government (federal and provincial) 'scientists' are usually put in the position where they are told directly - or volunteer knowing what is expected of them - to promote the proponent's desired project and to find any way that might possibly help conclusions related to such.

Public Accountability of Review Bodies

ERCB board members and JRP members are not elected and thus are not directly accountable to voters. Board and panel members are selected by elected officials, retained only if members demonstrate 'good behaviour', and elected officials retain final decision-making power. Beyond elections – a blunt instrument from which to communicate dissatisfaction with ERCB and JRP decisions – and use of the media to shame board and panel members and politicians – also a challenging means for stakeholders to confront the matter – the only means of holding ERCB and JRP members to account is through appeals, a topic which I take up below in s.5.2.20.

Dedication to Project Review Tasks

According to one provincial government respondent, review work is done on the “corner-of-the-desk” because dedicated review teams are not established. This respondent explained that

the people currently assigned to the reviews are doing them as a side part of their core job rather than as their core work. As a result they devote less time to do the required work (and usually leave it until the last minute) and have less buy-in to the final product and certainly to the concept of timely delivery.

This respondent's comment fits with findings presented in s.5.2.9 regarding lack of resources put toward project review. This situation goes against the ideal where review is conducted by a body dedicated to project review.

Authority in the Process

The ERCB and JRPs exhibit a pattern of approving projects while repeatedly identifying failures of other actors to address the impacts of development. Within this routine, the ERCB and JRPs repeatedly use non-binding recommendations and weakly

enforceable commitments of proponents and other actors to mitigate impacts, instead of forcing governments and other parties to finalize impact mitigation frameworks (see s.5.2.6).

In the Kearl review the JRP concluded that the project would not likely cause any significant adverse effects and was in the public interest provided that planned and prescribed mitigation measures were implemented (AEUB and Canada 2007 viii). The key factor to this decision was mitigation, and yet by the JRP's own admission, there has been a routine failure for governments to do their part to implement mitigation measures:

the Joint Panel emphasizes the importance of the Governments of Alberta and Canada taking a more aggressive leadership role in urgently addressing both the critical socioeconomic issues facing the community of Fort McMurray and the completion of the management frameworks and integrated plans that will establish the context for management of the cumulative environmental and land-use impacts of mineable oil sands development (*AEUB and Canada 2007 5*)

and

as has been stated in two recent decisions on mineable oil sands applications, these key issues must be addressed with urgency if oil sands development is to continue at the current pace (4)

and

the onus is now on the Governments of Canada and Alberta to finalize and implement the regulatory framework for GHGs in a timely manner (9).

The JRP approved the Kearl project ostensibly under the assumption that impact mitigation frameworks would be implemented in a timely fashion and would be effective. At time of writing (January 2013, five years after Kearl's approval) many of the above-noted mitigation gaps are still not addressed: while the ERCB has helped address tailings ponds and persistent reclamation problems with their introduction of *Directive 074*, Kearl is nearly in operation and Fort McMurray continues to face infrastructure gaps, RAMP continues to be heavily critiqued and improved monitoring will not fully be in place until at least 2015 (Canada and Alberta 2012), critical cumulative effects information gaps remain unfilled (CESD 2011), phase 2 of the instream flow needs water

framework has not yet been finalized, and there is no federal GHG regulatory framework for bitumen development in place.

The same pattern is evident in the more recent Total upgrader review:

[t]he Board notes the concerns of the Citizens for Responsible Development on the lack of progress for the proposed plans to deal with regional air quality. The Board understands that emissions caps have been proposed for the region but not finalized and that management plans for pollutants such as O₃ are currently being developed. The Board finds it important to complete these frameworks and management plans in order to provide certainty and direction for all stakeholders. Therefore, the Board encourages AENV to expedite the completion of these air management frameworks and management plans (ERCB 2010a).

Yet, as with the Kearl JRP, the ERCB approved the project.

The ERCB and JRPs could apply conditions to approval that suspend development until governments and other stakeholders fill identified gaps in impact mitigation frameworks – indeed this is what the City of Edmonton requested in the review of the North West Upgrader to address municipal infrastructure overload (AEUB 2007 11) – but they do not. Instead, the ERCB and JRPs make recommendations to stakeholders and identify commitments of proponents and others to address persistent issues and approve projects while noting that responsible parties haven't done their work.

One possible explanation is that the ERCB and JRPs lack real authority to shape the course of development and fulfil their mandates to prevent significant adverse effects and protect the public interest. The ERCB and JRPs may be pressured by governments and/or proponents to approve projects despite failures by these parties to develop the necessary impact mitigation frameworks. Indeed, 41% of survey respondents thought that the ERCB does not have adequate authority, and non-industry respondents tended to be significantly more negative towards adequacy of ERCB authority than industry ($D^* 0.63 > D_{0.05} 0.36$). One consultant wrote

the fact that the ERCB has stated it is not to deny applications suggests they either lack the appropriate authority to conduct effective reviews, or have chosen to interpret their mandate thusly. If a review process does not include the possibility of the chief government actor... determining that

a proposed project should not be approved, then by definition it cannot be an effective body or process.

There are alternative explanations revolving around a choice not to exercise authority. The ERCB and JRPs may be captured agencies that promote development despite its negative impacts and thereby may consciously choose to approve projects under the guise of concern for the need for mitigation. Or, the ERCB and JRPs may suffer from cognitive bias: they may suffer serious over-optimism about mitigation and fail to learn from their past mistakes, and they may be under-weighting uncertain future mitigation effectiveness and over-weighting more tangible project development benefits. Whatever the reason, the ERCB and JRPs exhibit a pattern of behaviour that repeatedly discounts the major impact issues that are routinely raised in bitumen project reviews, to the serious detriment of the Alberta and Canadian public interests.

5.2.12. Mitigation and Maximizing Net Benefits

- Project review is focused on maximizing net benefits in economic but also ecological, social, and other indicators of sustainability.
- Mitigation strategies avoid impacts at the source, where possible, and otherwise, in order of preference, minimize, abate, repair, or compensate. Mitigation tackles harms early rather than later.
- Proponents are legally required to mitigate negative impacts and compensate stakeholder groups for any losses that can't otherwise be mitigated.
- Project review propels development to make an overall positive contribution, instead of just ensuring that negative impacts of projects are reduced to an acceptable level.

Weak Promotion of Sustainability

Project review law puts a focus on sustainability, but it does not push proponents and decision-makers to ensure that projects make tangible gains in non-economic indicators. Section 4 of the *CEAA 2012* states that one of the purposes of federal EA is

to encourage responsible authorities to take actions that promote sustainable development and thereby achieve or maintain a healthy environment and a healthy economy

but the legal structure of the *CEAA 2012* is focused merely on ensuring that any 'significant adverse environmental effects' are mitigated to an acceptable level; the *CEAA 2012* is not focused on ensuring that development makes an overall positive

contribution. Similarly, s.40 of the *EPEA* indicates that a purpose of EIA is “to support the goals of environmental protection and sustainable development”, but nothing in the law propels developers further. EIA is simply a means to inform ERCB review, and the *ERCA* and *OSCA* are also not oriented towards propelling sustainability. The ERCB’s governing legislation merely instructs all involved to consider the economic benefits of projects relative to their negative effects. Illustrating this, the Kearl application was not focused on propelling sustainability in non-economic indicators, the Kearl JRP did not discuss at all how the project could ensure gains in non-economic indicators, and the conditions and recommendations given by the JRP did not propel the proponents at all towards making any significant contribution to sustainability. The Kearl review was ‘traditional’ in that it focused not on pushing Alberta or Canada to new heights of community, cultural, environmental, or social sustainability but simply on ensuring that no negative effects were too impactful for the economic benefits that were expected. Other bitumen project reviews that I examined evidenced a similar pattern.

Requirements to Mitigate

Section 19 of the *CEAA 2012* requires that mitigation measures be reviewed in EA, s.49 of the *EPEA* similarly requires that proponents describe mitigation measures, and one of the purposes of EIA under the Alberta *EPEA* is to “mitigate any adverse impacts” of projects (s.40). There is no language in the ERCB’s governing legislation pertaining specifically to mitigation, but the initial stages of the ERCB’s application process is oriented towards mitigation by pushing proponents to address conflicts with landowners and others who are ‘directly affected’, the ERCB has various dispute resolution tools to help mitigate project impacts (s.4.4.4), and the ERCB’s *Directive 023* requests that proponents outline proposed mitigation measures such as environmental protection plans.

However, despite all of the above, there are few requirements that the impacts of projects must actually be mitigated. The *CEAA 2012* does not require mitigation: the *CEAA 2012* demands that any project approved does not cause ‘significant adverse effects that cannot be justified’, and thus it can be said that the *CEAA 2012* impels mitigation. However, these mechanics only establish the need to mitigate (i.e., reduce) negative effects to the point of ‘insignificance’ as judged by JRPs and political final

decision-makers, a threshold which is only weakly defined in dated federal policy and which may or may not align with the perspectives of stakeholders (s.5.2.14). The only absolute federal requirement for mitigation is the requirement for habitat compensation if there is 'harmful alteration, disruption or destruction' authorized under s.35(2) of the *Fisheries Act*. Neither the *EPEA* nor any legislation governing ERCB activities expressly require mitigation. The only Alberta legal requirement for mitigation is that energy developers must gain approval from landowners for development on or across their lands, and failing this, that compensation must be negotiated through the *Surface Rights Act* [R.S.A. 2000, c.s-24]. No Alberta laws or policy direct decision-makers in terms of what level of impacts is acceptable.

Survey Respondent Opinions of Mitigation

Only 36% of survey respondents felt that "the review process adequately ensures that when oil sands projects are approved all serious negative impacts of projects are mitigated", and non-industry respondents tended to be significantly more negative towards the adequacy of mitigation than industry ($D^* 0.69 > D_{0.05} 0.36$). While a provincial government respondent felt that the "big stuff is usually caught", another provincial government respondent wrote that "applicants need only go through the process" with mitigation, and an industry respondent noted that "government should... be held to task" regarding mitigation pertaining to pressures on infrastructure. Another provincial government respondent wrote that mitigation of socio-economic impacts "suffers from a lack of clear mandates, policies, [and] responsibilities". An NGO respondent wrote that

most proponents and government take a very narrow view of mitigation - focusing on "minimizing" only, rather than the full suite of avoidance and compensation options for most impacts.

A consultant respondent exclaimed that

there is no evidence whatsoever that the 'no net harm' mantra is being met by allowing proponents to preserve habitat, lakes, rivers, streams, and elsewhere as a means of allowing them to destroy something that is interfering with their desire for private profit. For example, freshwater fisheries are collapsing across Alberta as the result of industrial development and its effect on fisheries habitat, and yet on paper every project has been approved on the basis of "no net loss" of fisheries

habitat. It's simply a hoop industry is jumping through with each application, and DFO (and other federal and provincial ministries) are allowing them to because their political masters are forcing them to do so.

Similarly, a citizen respondent observed that a Petro-Canada mine entails the destruction of a rare patterned fen ecosystem but that

the project was approved because the company put forward a plan of moving rare plants, and eventually restoring the fen when the project life is done. What is missing here is the fact that no one has or can return a fen to life. This ecosystem has taken thousands of years to evolve. The company involved here gets their project and when the time comes for reclamation, they will fail dismally, and there will be few if any consequences, because they reclaimed it to "an ecosystem" but not a "fen ecosystem". In these cases, reclamation usually consists of grass covered monoculture tree uplands, a far cry from the original landscape and ecosystem.

These comments are consistent with evidence reviewed in s.5.2.5 regarding scrutiny of mitigation content in applications.

Some industry respondents pointed out the challenges of mitigation. One industry respondent questioned the logic of typical mitigation strategies employed or discussed by proponents, regulators, and other stakeholders. The respondent explained that

the creation of off-stream storage to reduce water withdrawal in low flow... appears to be mitigation of water use... water storage is put forward as the mitigation, so during low flow water can be taken from a pond rather than the river. In my opinion, this is an additional impact, not mitigation. The reality is greater land disturbance to mitigate what has publicly been presented as an impact that unfortunately cannot be quantified as having any change to the aquatic ecosystem... Unfortunately, we don't even know what we destroy with some mitigation measures and therefore we truly don't understand if we are doing the right thing... I do support and undertake mitigation where required and where we believe it works. I do not believe we are smart enough to do it well yet.

The respondent went on to question the economic effectiveness of mitigation:

[m]y other concern is the resources, primarily money, spent on mitigation that may have been much better spent doing something else. We may

actually trade off a good mitigation for a less valuable one because from a human perspective it seems like the correct choice. An example of this is pipeline heights for wildlife crossing. We add lots of these in the belief that they are essential to wildlife movement despite the scientists telling us that these impediments to movement are not the issue. The issue is access by people and predators and the decline of key species such as caribou. But, governments and others insist on movement because it is tangible. So, the cost of building the crossings may negate the ability to provide access controls... and in the end we do the wrong mitigation because it "seemed" right... So we self-defeat our end goal by spending money to make it look like an issue is being addressed.

5.2.13. Process Description

- The review process is fully and explicitly described in publicly-available documentation.
- The description clearly outlines the purposes and objectives of the process, the roles, responsibilities, and authority of all involved, and how all parties may participate.
- The purposes and objectives of the review process are oriented around rational decision-making that seeks to promote development in the public interest.

Documentation of the Process

The current process is described in a large number of publicly available documents and websites. In Chapter 4 I identify the main documents including laws and policies directing the process, but there are more available through the many government actors involved, especially the ERCB and its many bulletins, directives, guides, information letters, interim directives, and manuals.

Together, this documentation provides a clear explanation of the purposes of project review. The *CEAA 2012*, *EPEA*, *ERCA*, and *OSCA* all spell out the purposes of federal EA, EIA, and ERCB review. While none of the laws specifically mention that their focus is to provide for 'rational' decision-making, they each spell out intentions to provide for sound decision-making, and the laws governing ERCB review orient the process towards promoting development in the public interest.

The documentation also spells out the roles, responsibilities, and authorities of the major government actors in the process. Both the CEA Agency and the ERCB publish useful guides to participants, and these are written in language that should be understandable by the layperson, e.g., the CEA Agency's overview of federal EA (CEA Agency 2011a), *Public Participation Guide* (CEA Agency 2008b) and guide to follow-up

(CEA Agency 2007a), the ERCB's *Directive 056* which is a guide to proponents, and the ERCB's *Directive 029* which is a guide to public stakeholders. However, as the *CEAA 2012* provides less detail than the 1992 version on steps in EA – such as exactly how scoping is to proceed – new, additional documentation seems necessary. The Alberta government has recently released a guide (Alberta 2011g) to upstream oil and gas development which tries to explain the process, and the ERCB (2011b) recently published a case study of a recent bitumen review to help explain the process.

Decision criteria are also described. The federal EA criterion appears in several locations in the *CEAA 2012*, e.g., s.19(1), and s.3 of the *ERCA* presents the public interest criterion.

While the ERCB has put effort into reducing the number of documents that exist to guide and explain its process (Alberta 2010b), there is still a lot to cover for anyone who wishes to develop a good understanding of the whole process. Vlavianos (2007b) points out that it is inevitable that the process is going to be complex and that any suggestions that it should be simple and quickly grasped are naïve. The question is then: does the existing description of the framework provide interested parties with a good foundation from which to participate?

Apparently so, as 62% of respondents agreed that existing, publicly-available documentation provides a clear description of the process and clear instructions on how to participate, though non-industry respondents tended to be significantly more negative towards the state of documentation than industry ($D^* 0.52 > D_{0.05} 0.36$). A federal government respondent suggested "the only people who might not be informed are outsiders who should not be considered stakeholders" though a regulator respondent wrote that documentation is not well known and "the presentation is not as user friendly as it could be" and a provincial respondent thought that descriptions could be improved for laypeople. An NGO respondent felt that

the information is there and instructions are relatively clear, but the ... legalese is difficult, if not impossible, for a concerned member of the public to participate effectively (without the funds to hire a lawyer).

Another provincial government respondent thought that proponents have a clear description of the process but "everyone else, judging by how much confusion with aboriginals and others probably not... because of the complexity of the process."

Ambiguities in the Current Description

Vlavianos (2007b) argues that the MOU between AESRD and the ERCB (AEUB 1996) is ambiguous and creates confusion and legal uncertainty. The MOU provides both AESRD and the ERCB with responsibilities regarding environmental protection, yet leaves various items of 'shared responsibility' such as land reclamation unclarified making it unclear who has final authority. Similarly the MOU indicates that the ERCB has primary responsibility over determining if a project is in the 'public interest', yet as Vlavianos points out, AESRD decisions over the environment are inherently concerned with the public interest because evaluating environmental impacts and risks demands weighing these against economic, social, and other factors, and the MOU spells out a supposed balance of authority on public interest matters. The MOU is an attempt to clarify the overlapping roles and mandates of AESRD and the ERCB, but it doesn't do this well. Vlavianos finds a similar problem of overlapping and ambiguous mandates and authorities among the Alberta Surface Rights Board, AESRD, and the ERCB.

The above ambiguities are compounded by, and may stem from, the conflicting mandate of the ERCB. The ERCB's mandate (see s.4.4.4) includes promoting development while protecting the public interest and the environment. These are objectives that can obviously and easily conflict (Dusseault 2002, Hiemstra 2008, Nikiforuk 2008). I discuss this issue with respect to decision criteria in s.5.2.15.

Two other ambiguities exist. It is unclear how the arrangements laid out in the MOU change when a review is conducted by a JRP. While regulatory arrangements such as oversight of permitting and operations would remain as described in the MOU, it is unclear what are the roles and authorities of the JRP, the CEA Agency, AESRD, and the ERCB. Second, the ERCB's *Directive 056* is unclear regarding stakeholder involvement in terms of who must be involved, when and how they are to be involved (Vlavianos 2007b).

Documentation Out of Date

Another problem is that a document central to bitumen project review is woefully out of date. *Directive 023* details ERCB expectations of application content, and yet this directive, published in 1991, has never been revised from its draft form. As of June 22, 2012, the ERCB (2012) still lists the document in progress for revision. Given the rapid pace of bitumen development it might be expected that government could fall behind with documentation, however the status of *Directive 023*, which is a centrepiece of the bitumen project review framework, is remarkable.

5.2.14. Legal Foundation

- All key elements of the process are established in law.
- Legal text is clear, specific, unambiguous, consistent, and distinguishes the project review process from other legal requirements and processes.
- Legal text uses mandatory language (e.g., “must” and “shall”) and minimizes discretion. Flexibility is retained only where necessary to enable the process to be appropriately adapted to context.
- The purpose of project review is written into law and is to inform decision-making and promote sustainability.

The bitumen project review process is codified in four pieces of legislation – the *CEAA 2012*, the *EPEA*, the *ERCA*, and the *OSCA* – and associated regulations. These laws describe and explain much of the process, but many components are not codified into law and instead lie in policy statements, some of which are of uncertain legal weight.

Federal Law

The *CEAA 2012* establishes federal EA as its own distinct administrative process. The *CEAA 2012* contains many important details and specifies many ideal review process components, but there are several notable gaps. The most important gap in the *CEAA 2012* is that the key federal EA decision criterion – whether or not a project is likely to cause significant adverse effects that cannot be justified in the circumstances – is not defined anywhere in the law or its regulations. Other significant gaps include:

- the mechanics and nature of the scoping process;
- the linkages between project review and other land and resource decision-making, such as regional planning;

- how aboriginals and experts are to be involved;
- content of approval conditions and how they will be enforced;
- resource allocations (e.g., funding, staffing, etc.); and
- compensation schemes for those left worse off by decisions.

Related to these legal gaps is the widespread use of discretionary language in the *CEAA 2012*, what Boyd (2003) called one of *CEAA 1992*'s “fundamental flaws” (154). For example, s.38 of the *CEAA 2012* indicates that the Minister “may” refer a project to a review panel if in their opinion it is in the public interest to do so. Vlavianos (2007b) argues that the breadth of discretionary language in the *CEAA 2012* (and other federal legislation) has contributed to little federal government involvement in bitumen project review and environmental management.

Alberta Law

Alberta law also fails to legally codify some key elements of the review process:

- that EIA or ERCB review is intended to inform decision-making on projects – the purposes of EIA (s.40 of the *EPEA*) and the purposes of the ERCB review (s.2 of the *ERCA* and s.3 of the *OSCA*) do not expressly indicate that review is intended to influence approval decision-making;
- how project review relates to other stages of land and resource decision-making, such as a lack of connection between project review and regional plans being established under the *Alberta Land Stewardship Act* [S.A. 2009, c.A-26.8];
- the legal test of the ERCB’s ‘public interest’ decision criterion;
- how experts and aboriginal people are to be involved;
- how follow-up is to occur;
- how terms and conditions will be enforced; and
- penalties for malpractice in the ERCB process.

There is also substantial discretion built into Alberta project review, to the detriment of EIA and ERCB review:

- the nature of EIA consultation with stakeholders is at the discretion of the EIA Director, and the EIA Director can vary EIA report content requirements (s.49, *EPEA*);
- the *EPEA* requires the applicants to describe how they will mitigate and monitor impacts, but no law actually requires that these things are done;

- s.26(1) of the *ERCA* gives the ERCB discretion over who is given standing;
- nothing requires the ERCB to consider the content of EIA reports in its public interest determination;
- no law requires that EIA reports and the content of ERCB applications are considered by final decision-makers before decisions are made; and
- s.18(8) of the *OSCA* allows discretion over the extent of compensation.

There is some appropriate discretion built into the EIA process, though. In case the *EPEA* doesn't automatically lead to EIA, s.41 of the *EPEA* empowers any AESRD Director to require that a proposal undergoes initial review, s.44 empowers the EIA Director to initiate initial review, and s.47 empowers the Minister of Environment to order an EIA even if the proposed activity is exempt under regulations and the Director hasn't done so.

Legal Status of ERCB Directives

Some of the above-listed shortfalls of Alberta law are addressed by ERCB directives, but the legal status and thus the strength of any 'requirements' listed in directives are unclear. According to Patricia Johnston, Q.C. and past member of the ERCB board, directives are given legal status by their reference in laws:

reference to ERCB directives are typically found in the statutes administered or regulations adopted by the ERCB. For example, *Directive 56* is referenced in Part 2 of the *Oil and Gas Conservation Regulations*, which requires applicants to comply with *Directive 56* when making application to the ERCB. In this way, ERCB directives are grounded in instruments that are legally binding and are therefore enforceable against parties under the jurisdiction of the ERCB.⁵³

However, there is an inconsistency in the legal status of directives, particularly that of the most important directive in guiding bitumen project review.

Directive 023 is not referenced in any legislation. While *Directive 023* quite clearly specifies the content of bitumen applications, the ERCB does not enforce these requirements. According to a manager at the ERCB,

⁵³ Patricia Johnston, General Counsel to the ERCB and former board member of the ERCB, email message to author, July 21, 2009.

Directive 23 currently provides a listing of the information that may be required for a commercial oil sands scheme. Depending on the nature of the scheme, the information required will vary and some discretion is needed. The ERCB cannot force an applicant to file information that the ERCB may need in the decision making process. However, if an applicant cannot or will not provide information that is needed/requested by the ERCB, this could impact the timing of a decision and/or could ultimately result in the application being denied or perhaps approved with conditions.⁵⁴

Directive 029, which describes the ERCB's hearing process, is also not referenced in any legislation. Many other ERCB directives are referred to in the *Oil and Gas Conservation Regulations* [A.R.1971-151] and the *Oil Sands Conservation Regulations* [A.R./1988-76], but as some directives are not, stakeholders are left with an ambiguous legal framework.

Harmonization of Federal EA with Alberta Review

Sections 42 and 43 of the *CEAA 2012* establish that the requirements of a review panel set out in the *CEAA 2012*, such as time limits and the need for impact assessment information to be public, must still be met when JRPs are established with Alberta. In contrast, no requirements are specified in the *EPEA* or *ERCA* with respect to how EIA or public interest review is to be carried out when harmonized with federal EA. The majority of the mechanics of a harmonized review are laid out in the MOU between AESRD and the ERCB (AEUB 1996), ss. 42 and 43 of the *CEAA 2012*, the harmonization agreement between the federal and Alberta governments (Canada and Alberta 2005), and in individual agreements established each time a JRP is struck, but as all but the *CEAA 2012* provisions do not carry legal weight there is some legal uncertainty as to how harmonized reviews must be conducted.

Survey Respondent Opinions of Project Review Law

Fifty percent of respondents agreed that the process is adequately established in law, but non-industry respondents tended to be significantly more negative about the legal situation than industry ($D^* 0.59 > D_{0.05} 0.36$). One consultant complained that there is too much discretion in the laws providing for project review in Alberta:

⁵⁴ Ken Schuldhuis, Manager, ERCB, email message to author, January 26, 2009.

[t]oo often terms and conditions of approvals are meaningless, because the ERCB only makes recommendations, and governing laws and regulations are discretionary. Discretion must be minimized, and laws applied.

Role of Project Review

A common critique of project review is that it is merely a 'rubber stamping exercise', i.e., that review has no bearing on the outcome and that projects get approved regardless (Creasey and Hanna 2009, Boyd 2003). To help ensure that this is not the case, a key element of a good practice review process is that its purpose is to genuinely inform decision-making with respect to whether a proposal should be approved or not. Only 48% of survey respondents perceived that "the primary function of review is to determine whether or not oil sands projects should be approved or rejected and the secondary function is to identify ways of mitigating negative impacts." Indeed, much more so than industry respondents, non-industry respondents tended to think that "the primary function of review is to identify ways to mitigate negative impacts of oil sands projects so that development proceeds in the most beneficial manner" ($D^* 0.38 > D_{0.05} 0.37$). One municipal government respondent commented that

an impact assessment is typically about lessening the impacts of a project, not asking the question of whether the project is needed and if it is in the best location... It is viewing the project from inside to outward, without necessarily having the outward context.

An NGO respondent noted:

I have had senior Alberta government bureaucrats tell me that oil sands environmental assessments are "virtually useless". Generally cut and paste impact assessments and approaches from previous studies and a pre-ordained outcome.

Available data indicate that the vast majority of bitumen applications are approved (s.4.6).

The top three explanations for regular approval of projects among survey respondents were that government is unwilling to reject proposals (49%), the decision to develop was effectively made when tenure was awarded (44%), and the review process

is successful at identifying ways to mitigate negative impacts and ensure that the project is in the public interest (35%). These data provide support that there is a bias in review towards projects once tenure is awarded (s.5.2.5). Several respondents felt that high approval rates are explained by the economic gains provided by projects to governments, the stated policy of Alberta to 'grow the pie', and a belief among government that development is inherently in the public interest. One provincial government respondent said that during their time at AENV they were told "this is approvals not denials."

However, many respondents wrote that the process naturally leads to development in the public interest. An industry respondent wrote that

it is no surprise, or should not be, that projects meet the requirements for approvals. The rules are clearly articulated and the past project approvals have laid out stringent requirements that must be met and any reasonable proponent would not entertain submission without meeting or exceeding all these requirements.

A second industry respondent explained that they think approvals are always granted because "the issues associated with a proposed development, as well as uncertainties re mitigation or monitoring are worked out [in] the review."

A third industry respondent wrote

proponents continually improve and amend project applications such that the projects meet the standards required for approval, meet the test of public interest and incorporate appropriate technology and environmental mitigation so that the projects can be approved. Most projects are approved only after they meet the required thresholds. Projects that do not meet the thresholds generally do not make it through the approval process.

One provincial government respondent noted that

the projects are scoped and reviewed extensively prior to and during the review process. A project that is not technically or economically feasible will drop out long before the final review and hearing process.

A municipal government respondent observed that

before projects go to a hearing, they are subjected to internal reviews and informal discussions with the government. If it is determined that there are impacts that will cause significant harm, then companies will not take these forward and tend to resolve the issues to what is considered to be "acceptable" standards. A full project review and hearing cost for a company can run in excess of \$10 million and companies do not want to waste this until they feel they have met most of the expectations that will be imposed on them.

These respondents' comments fit with the ERCB's explanation that the review process itself can substantially modify a proposal to bring it in line with the public interest (ERCB 2011b).

Several other comments in the survey highlighted the great degree of distrust that many have with the project review process. Four respondents felt that political interference in the process explains high approval rates – one of these argued that

proposed projects WILL be approved in Alberta... the primary function of review is to legitimize what is ultimately a corrupted and dysfunctional review process, and provide the public with the impression that proposed oil sands projects have been adequately reviewed for environmental impacts and that harm will be avoided or mitigated. It's all a game of obfuscation and avoidance of responsibility, played by government and industry [emphasis in original].

Another explanation offered by a NGO respondent is that the full range of impacts of projects are out of the scope of reviews, and so decision-makers are more likely to find that projects are in the public interest. Certainly the change to the *CEAA 1992* in 2010 which gave the federal Minister of Environment the discretion to exclude portions of a project from EA (s.4.3.2 of Chapter 4) is consistent with this respondent's view. All considered, it is not clear that project review genuinely serves the purpose of helping inform decision-makers, and that the vast majority of projects are not assured of approval.

5.2.15. Structured Decision Procedures

- All major decision-making is structured and guided by tightly defined decision-making criteria.
- Decision criteria are clear and follow from high-level policy.
- There is minimal discretion given to decision-makers.

Decision Criteria in Federal EA

The first major decision in federal EA is whether or not EA is required. In the *CEAA 2012*, most megaprojects (including bitumen projects) are identified in the regulations as requiring review. For those projects not identified in the regulations, the CEA Agency must make a subjective judgement based upon the potential of the activity to cause significant adverse effects and public comments on the matter (s.10, *CEAA 2012*). The sole guidance for significance determinations is a 1994 policy document (FEARO 1994) that articulates factors of significance but ultimately leaves decision-makers with much room for interpretation and potential abuse. The FEARO guidance could be updated to explicitly indicate, for example, that magnitude of effects should be interpreted in the context of objectives for valued components, such as cumulative effects thresholds. The bigger gap, though, is the complete lack of articulation of the decision criteria for what makes significant adverse effects justifiable or not. As it stands, the federal cabinet's justification decision is completely unstructured. It's also unclear from the *CEAA 2012* how decision-makers are to weigh public comments. The next major decision in federal EA is whether or not a review panel is required (s.38, *CEAA 2012*). This decision is based upon the 'public interest', which is defined in terms of 'potential for significant adverse effects', public comments, but also opportunities for cooperation with other jurisdictions, presumably meaning that decision-makers might decide not to refer EA to a review panel if another jurisdiction could review the project as a substitute process. The most critical decision in federal EA – whether or not a project should be approved – again relies upon determining if a project causes significant adverse effects that cannot be justified (s.52, *CEAA 2012*).

Decision Criteria in Alberta EIA

In EIA the first major decision is whether or not it is necessary. Regulations indicate unambiguously what activities require EIA and which are exempt; activities not specifically mentioned are "discretionary activities" and EIA may still be triggered if the Director decides that EIA is necessary. This major decision is guided by criteria in s.44.3 of the *EPEA* including the location, size, nature, complexity, and technology of the activity. While these criteria are put in perspective by the purposes of EIA (s.40, *EPEA*), these criteria are still open to interpretation. The final major decision in EIA is whether or

not an EIA report is complete, but the *EPEA* provides no decision criteria to guide this decision.

Decision Criteria in ERCB Review

A first major decision in the ERCB's review process is determining if review is necessary. This decision is clearly guided by ss. 10 and 11 of the *OSCA* which indicate that bitumen projects require review. The next major decision in the ERCB process – and the most important one – is determining whether or not the project is in the 'public interest'. The ERCB's governing legislation lists a variety of factors that contribute to the 'public interest' including resource conservation, safety, and environmental impacts (s.4.4.4), but these factors are relatively ambiguous and the legislation does not prioritize among them (Vlavianos 2007b). Vlavianos (2007b) also notes that the ERCB has articulated factors of the decision criterion in decision reports; factors include project need, alternatives, stakeholder concerns, and health impacts. All considered, the ERCB's prime decision criterion is very broad, and as a consequence of this loose definition of the public interest, ERCB decision-making is unconstrained in terms of how it chooses to interpret what is or is not in the public interest. The ERCB even acknowledges the issue:

[i]t is difficult to define concretely what is meant by the public interest and how the board will apply consideration of this interest in any given situation (ERCB 2005 in Vlavianos 2007b 39).

As a result, decisions on approval may be inconsistent and uncertain, and it is difficult to hold the ERCB accountable for their decision-making (Vlavianos 2007b). This problem is compounded by the fact that the ERCB is not legally required to explain its decision (s.5.2.6).

According to Hierlmeier (2008a, b) the public interest criterion needn't be so undefined. While there are many definitions of the 'public interest' including the common interest, the majority interest, balance of interests, and others (Hierlmeier 2008a, Adie and Thomas 1987), it is not necessary to leave the decision criterion so open to interpretation. Alaska, Australia, and other jurisdictions use the same criterion but have articulated it to such a degree that, according to Hierlmeier (2008a), decision-making is

guided and constrained. For example, in Queensland, Australia the public interest value of projects is defined in terms of:

- a) government policy;
- b) value of commodity production (including time value);
- c) employment creation;
- d) total return to the State and to Australia (including royalty and rent), assessed on both a direct and indirect basis, so that, for example, downstream value adding is included;
- e) social impacts;
- f) the overall economic benefit for the State, or a part of the State, in the short and long term;
- g) impacts on aesthetic, amenity, cultural or environmental values (Petroleum and Gas (Production and Safety) Act 2004 in Hierlmeier 2008a 292).

Hierlmeier sees two consequences of such discretion in ERCB decisions. First, the public interest is used to justify decisions that have already been made. She notes that justifications are short (i.e., one phrase) and

the danger is that the public interest becomes shorthand that replaces the reasoning for decisions. A decision-maker can simply hide under the cover of a public interest test to legitimize a decision (2008b 4).

Second, decision-makers can become vulnerable to the “loudest and most consistent voice it hears, that of the parties it regulates” (2008a 294).

Survey Respondent Opinions of Decision Criteria

Only 23% of respondents agreed that elected officials making final approval decisions are guided by clear criteria, and only 44% of respondents thought that the level of discretion of elected officials was about right. Only 41% thought that the level of discretion of non-elected officials was about right. Non-industry respondents were significantly more negative towards the clarity of decision criteria than industry ($D^* 0.70 > D_{0.05} 0.35$), and non-industry respondents were significantly more negative towards the discretion offered to elected officials than industry ($D^* 0.64 > D_{0.05} 0.35$; $D^* 0.36 > D_{0.05} 0.35$). An industry respondent wrote that non-elected decision-makers need “far more

clear-cut criteria for reviews”, and an NGO respondent felt that “criteria are unclear and not informed by thresholds or outcomes.” An academic wrote that

there should be specific guidelines or criteria that guide the Board's decision making. We all suspect what those are, but it behooves the government to make them more transparent and thus subject to debate.

A consultant respondent felt that Alberta laws are “far too permissive when it comes to ministerial discretion.”

5.2.16. Communication

- Communication is clear, consistent, timely, precise, regular, ongoing, but limited to what is necessary.
- Communication supports the participation of all parties in the process; confidentiality provisions do not inhibit participation.
- Communication is made publicly available, free and easy to access, and is tailored to the audience.
- Communication is run through a ‘single window portal’.

Legal Requirements

Both written and verbal communication is ongoing during project reviews. All of the main laws require that notices are given of new proposals and key milestones in reviews, and key decisions and documents must be published. For example, s.46 of the *CEAA 2012* requires that the Minister make the review panel report available to the public and advise the public that the report is available, and ss.78 and 79 of the *CEAA 2012* require that notices and records are published and publicly available over an internet-based registry of project review documents (the ‘Canadian Environmental Assessment Registry’).⁵⁵ A recent audit found that the registry performs fairly well in terms of technical function, completeness, and timeliness of publication (OAGC 2009b). The *EPEA* similarly requires notices related to EIA to be given, such as when final EIA reports are published. Section 56 of the *EPEA* also mandates a public registry of EIA documents, and an on-line *Summary of Environmental Assessment Activity* provides public access to stakeholder comments on EIA TORs and government responses.⁵⁶

⁵⁵ http://www.ceaa.gc.ca/050/index_e.cfm

⁵⁶ <http://environment.alberta.ca/1283.html>

The ERCB website also lists new applications, and the ERCB is legally required to publish a variety of notices such as when applications are submitted (see s.4.4.4).⁵⁷

Other Communication Issues

The majority of written communications during project reviews are of a technical nature, and so people without specialized technical knowledge may find it hard to understand documents. Documentation specifically designed to assist people in understanding the process helps address this to some extent (see s.5.2.13). Another gap is with respect to the lack of explanations of approval decisions, as discussed in some detail in s.5.2.6 above. Gaps also exist in terms of the communication of monitoring results. Droitsch (2009) argues that there is no public access to environmental monitoring information, such as for groundwater, and participants in the Alberta multi-stakeholder consultation process indicated that transparency and access to information are poor (OSCG 2006). This lack of public access to data means that independent observers are not able to monitor industry environmental performance (Price 2008, Dyer et al. 2008). Part of the problem may be poor organization of the information in the first place: information is currently spread across the databases of multiple actors and is not well linked or easily accessed (Banister 2009).

Survey Respondent Opinions of Communication

Only 39% of respondents agreed that government communicates well with proponents and stakeholders during review, and non-industry respondents tended to be significantly more negative towards communication than industry ($D^* 0.48 > D_{0.05} 0.36$). An industry respondent wrote that

the functionality of government communication is open to some debate as it is highly variable... The issue is one of timeliness, accuracy, details, iterative process and transparency.

Another industry respondent said that communication and consultation between government and stakeholders “needs to be improved.” An NGO respondent thought that government

⁵⁷ <http://www.ercb.ca/portal/server.pt?>

may communicate effectively with those "in" the review process but they do not communicate with those stakeholders outside of the process effectively.

Reflecting issues with stakeholder involvement in high-level policy development (s.5.2.1), one aboriginal respondent wrote that the Government of Alberta "will not even talk to the Métis." A provincial government respondent admitted that there is insufficient disclosure of key data regarding costs and benefits of projects, and another provincial government respondent felt that a better job needs to be done communicating to the public how the review process identifies ways to mitigate the negative impacts. A consultant respondent saw government communication in terms of bias:

[g]overnment has become an advocate and defender of oil sands development, and its communications are slanted towards that.

A regulator respondent wrote that communication

may be the major weakness in the review process. It is being done for the public good and communications with the public should be free flowing. Too often, the quasi-judicial aspects of a process stand in the way of effective communication.

A provincial government respondent said that

government becomes more secretive than ever after a hearing is announced. This is the time for the MLAs and MPs to be in the communities and sit through every hearing, without watch dogs at their sides.

Two respondents explained poor government communication as a matter of resources. A provincial government respondent said that communication "needs to have a higher priority and sufficient resources in order for it to be done better" and one federal government respondent explained that staff have "too much to do and not enough time for any one thing". Resource issues are discussed in detail in s.5.2.9.

Several respondents commented on the difficulty of accessing information. A municipal government respondent wrote that "the ERCB website is a nightmare" and there are "few bulletins (mail, email, etc.) to stakeholders after initial consultation is

complete”, but that industry in contrast communicates well with stakeholders. An industry respondent felt that it is hard to review old applications and submissions, much information is not available on the web, and it is hard for the public to get the information, especially for private citizens. An aboriginal respondent wrote that

the documents may be publicly available but most people don't know this or know how to access information and how to use the information provided.

A citizen respondent felt that there is often very little time for getting information and getting it is a “stressful, almost impossible process.” The respondent went on to write that

many information requests [to proponents] are not answered in a timely fashion and then, when the eleventh hour comes, [companies say they] cannot supply the requested information for various reasons. The whole process is too time restricted for interveners to present a well-resourced, adequately informed case.

However, an industry respondent felt that the issue was not one of availability of information but initiative, writing that

there needs to be some "fairness". Project proponents are expected to know, understand and use all available relevant data when they propose and complete the assessment of their project. However, some stakeholders believe it is up to someone else to ensure they are aware of all the background information.

5.2.17. Stakeholder Participation

- Mechanisms are in place providing stakeholders with the genuine capacity to influence outcomes.
- All stakeholder groups are given the opportunity to be involved.
- Involvement is extended to all steps in the process.
- There are ample opportunities for learning.
- Power imbalances among stakeholders are levelled.
- The means in which stakeholders are involved facilitates conflict resolution.

Government Commitment

Law and policy suggest that government is not wholly committed to stakeholder involvement in project review. Section 4 of the *CEAA 2012* explains that EA is intended to

promote communication and cooperation with aboriginal peoples with respect to environmental assessments [and] to ensure that opportunities are provided for meaningful public participation during an environmental assessment

The latter part of the above changed appreciably from the *CEAA 1992* – in that version a purpose was to "ensure that there be opportunities for timely and meaningful public participation throughout the... process" (*no underlining in original*).

Section 2 of the *EPEA* indicates that the purpose of the Alberta law is to, among other things, provide citizens with opportunities to “provide advice on decisions affecting the environment”, and s.40 of the *EPEA* indicates that a purpose of EIA is “to provide for the involvement of the public, proponents, the Government and Government agencies in the review of proposed activities”. However, despite the ‘public interest’ being the ERCB’s prime decision criterion, neither the *ERCA* nor *OSCA* mention stakeholder involvement. Only *Directive 029* and *Directive 056* provide some articulation of the ERCB’s approach to stakeholder involvement. *Directive 029* explains that

the [ERCB] believes that everyone potentially affected—landowners, occupants, local residents, communities, local governments, nongovernment organizations, and companies—must work together in an open and honest manner from the beginning of an energy or utility project’s development throughout the application process and, should it be approved, throughout the project’s life. Effective communication must take place between industry and the public, with all parties working cooperatively (2).

These words are positive but contradictory to some of the ERCB’s practices with respect to stakeholder involvement. For example, if deficiencies in proponent consultation are identified, the ERCB typically just asks proponents to improve future efforts, an approach that does not demonstrate commitment to stakeholder involvement (Vlavianos 2007b). Several survey respondents were critical of the ERCB’s approach to stakeholder

involvement. One citizen respondent wrote that interveners feel hostility from not just the proponent, but also from the ERCB. A second citizen respondent wrote that stakeholders have no confidence that they are being heard or that decision makers want to hear them, and that government's "ideal would be to have every project come before the ERCB with no interveners."

Who is Involved

The current process provides opportunities for a wide range of stakeholders to be involved, but there are important gaps with respect to who exactly is provided which opportunities. According to the CEA Agency's participation guide (CEA Agency 2008b), opportunities through the *CEAA 2012* are open to the 'public' which is defined in as "all members of the civic population, including Aboriginal peoples" (1-3). However in the new version of the law, standing in hearings is only open to "interested parties" (s.43, *CEAA 2012*) who are defined in s.2 of the *CEAA 2012* as persons directly affected by a project or that have relevant information or expertise. Who constitutes such a person is a discretionary decision of review panels (s.2, *CEAA 2012*). This potential restriction of standing did not exist in the *CEAA 1992*; this change in the law might be traced to the controversy surrounding how many people received standing in the Enbridge Northern Gateway pipeline hearings.

Opportunities for involvement in EIA under the *EPEA* are similarly restricted. The AENV's guide to preparing EIA reports (2010b) indicates that proponents should consult with all groups and sub-groups of the public, but the main decision within the EIA process is whether or not an EIA is required, and s.44.6 of the *EPEA* states that only those people "directly affected" by a proposal may submit Statements of Concern to the EIA Director. The *EPEA* provides no definition of what constitutes 'directly affected'. Another problem is that AESRD does not expressly specify the need for proponents to consult with the Métis, an aboriginal group recognized in the Canadian constitution with interests distinct from those of First Nations, and the Alberta government does not have a Métis consultation strategy (Alberta only has a consultation strategy for First Nations; see s.5.2.21).

The ERCB also limits stakeholder involvement to only those who may be 'directly and adversely affected' by proposals (s.4.4.4). Vlavianos (2007b) confirms that the

ERCB has tended to limit standing in hearings to only those who have legal ownership of lands or economic interests that may be adversely affected by a proposal. Environmental groups, recreation groups, and even local government authorities – all of which represent aspects of the public interest – are often denied standing, translating into lopsided representation in ERCB reviews (Vlavianos 2007b, Hierlmeier 2008b).

Many respondents expressed their dislike of the ERCB's standing rule. An NGO respondent labelled it "terribly flawed" and said that

for large projects, communities directly affected span far beyond the immediate vicinity and impacts are felt by society as a whole, this perspective needs to be given adequate space and opportunity in project hearings.

An industry respondent felt that

the directly and adversely affected test is insufficient and too narrow... inappropriate when cumulative effects are significant such as air pollution, or when socio-economic impacts are significant such as impacts on a municipality's infrastructure.

A government respondent said that the criterion

means that interveners can only bring up matters particular to them and their land holdings. This precludes discussion of broader public interests... for example residents of Fort McMurray should be permitted to express concern that additional projects in that region will (and already have) over-taxed municipal services.

Several respondents pointed out how many bitumen projects were far away from private lands and thus, as one academic respondent wrote, "there is often no one who meets the test for standing in order to trigger a hearing" and thus "the project will not be subject to the more rigorous review that a public hearing brings." A consultant respondent felt that

there's usually no place for anyone who's not 'directly' affected by a project, meaning that the majority of Albertans and Canadians have no say in the issue of development of oil sands projects. In this way, provincial and federal governments have been able to avoid having a

public discussion and debate as to the impacts and appropriateness of continued unlimited oil sands development.

The ERCB's standing limitations are important as many bitumen projects do not undergo federal EA and thus are not subject to *CEAA 2012* stakeholder involvement rules which provide the possibility for standing to be expanded. While mines often trigger federal EA, *in situ* and upgrader projects and mine expansions (e.g., the Total SA upgrader, Statoil's Leismer *in situ* expansion, and Syncrude's Southwest Sand Storage Conversion) often do not trigger federal EA and so in these latter cases the more restrictive ERCB standing rules apply.

Range of Opportunities

A range of opportunities for involvement exist throughout the review process, from influencing scoping, to submitting statements of concern on the need for Alberta EIA, to participating in hearings. The ERCB's *Directive 056* explains that 'participant involvement' should begin once development plans are conceived and should continue during the life of projects. Reflecting this range of opportunities, more than half (56%) of survey respondents agreed that all parties potentially affected by projects are provided with adequate opportunity to participate in the project review process, but non-industry respondents were significantly more negative towards participation opportunities than industry ($D^* 0.74 > D_{0.05} 0.35$).⁵⁸

Stakeholder Learning

The only clear indication that stakeholder learning is a part of the current review process is that the ERCB is legally required to provide it. As discussed in *Directive 029*, the ERCB is obliged to enable those who are potentially directly and adversely affected to learn about proposals, and s.26(2)(b) of the *ERCA* requires the ERCB to give a person potentially 'directly and adversely affected' "a reasonable opportunity of learning the facts". Despite these requirements, though, there are no specific mechanisms that

⁵⁸ This survey question unfortunately confounded two topics: (1) whether all affected opportunities are given opportunities, and (2) whether the opportunities are adequate. However, the results are still a useful indicator of the quality of stakeholder involvement in the current review process.

the ERCB uses to enable stakeholders to learn. Documentation and the ability to participate in hearings are necessary foundations to learning, but hardly proactive mechanisms of education. There are also no federal mechanisms to facilitate stakeholder learning, though the *CEAA Public Participation Guide* (CEA Agency 2008b) indicates means which could be employed to do so.

Despite this lack of mechanisms to propel learning, survey respondents indicated that there is sufficient learning. Sixty-two percent of respondents agreed that “stakeholders are given sufficient opportunities to learn and become informed of the issues raised by project applications” though non-industry respondents tended to be significantly more negative towards learning opportunities than industry ($D^* 0.59 > D_{0.05} 0.35$).

Levelling Power Imbalances

CEAA 2012's Participant Funding Program helps participants with expenses such as travel costs and fees to retain experts. The ERCB also has a funding program, but it is available only to those who not only have been granted intervener status in hearings under the ‘directly and adversely affected’ test but who fit an even stricter discretionary funding test limited to ‘local interveners’ (s.28(1), *ERCA*). Further, the ERCB retains discretion over what costs are eligible for funding. Vlavianos (2007b) notes that the ERCB has denied funding to local government bodies including the Regional Municipality of Wood Buffalo and the Northern Lights Regional Health Authority. An academic noted that many stakeholders do not have the resources to “compete” with proponents and that “it is not a fair opportunity.” A citizen respondent indicated that intervening is financially and socially ruinous:

I have suffered loss of friendship and community, as well as personal threats. Most people will not willingly suffer these consequences... Who would be crazy enough to be an intervener in Alberta these days?

Another power imbalance relates to the quasi-judicial nature of the hearing process. Hearings may be intimidating or simply difficult for some parties to participate in, as well as costly as lawyers and experts may need to be retained (Fitzpatrick and Sinclair 2009). These issues are particularly significant for private individuals, volunteer groups, and Aboriginal groups (Passelac-Ross and Potes 2007). The ERCB, to its

credit, acknowledges this obstacle, having indicated in the Northwest Upgrading decision statement that

the Board appreciates the concerns of some of the interveners that it can be an onerous task for stakeholders to review large and complex upgrader applications (AEUB 2007 8).

It is also commendable that the ERCB schedules hearings near where projects are proposed and provides the option for written and electronic hearings when travel to hearings is difficult for participants.

Addressing Conflict Among Stakeholders

The means with which stakeholders are involved likely helps reduce conflict. The ERCB's requirement of proponents to consult with potentially affected parties provides a foundation for conflict resolution, as does the ERCB's field facilitation and dispute resolution programs. Hearings may resolve some conflicts by providing a forum for learning, though their quasi-judicial nature may have the opposite effect (Fitzpatrick and Sinclair 2009).

Several respondents suggested that the current process is not very successful at resolving conflict, though. An industry respondent observed that stakeholder involvement is typically through litigation "to force delays". A government respondent felt that the current process provides "too much opportunity... to hold the process at ransom." Similarly, another industry respondent felt that regulators are afraid to move projects forward for fear of appeal "from a stakeholder who is unhappy with outcomes". These comments are likely traceable to the fact that quasi-judicial hearings – a centrepiece of the current review process – are at heart adversarial in nature.

No Substantial Avenue of Influence

The most fundamental characteristic of stakeholder participation is genuine capacity to influence outcomes. The current process does not share decision-making power in any substantive way; final decision-making power lies in the hands of the ERCB, JRPs, and elected officials in the federal and Alberta governments. This arrangement fits with good practices pertaining to final decision-making by providing some democratic accountability (s.5.2.6), but not with good practices pertaining to

stakeholder participation as there are no means for stakeholders to substantially influence decisions other than the power of persuasion during the hearing process or through political activism outside of the review process. Opportunities are limited to being notified, being able to provide comments, being able to present arguments in hearings, and appealing decisions. The current process does not provide for 'stakeholder participation' but instead fits with Arnstein's (1969) notions of 'informing', 'consultation', and 'placation'.

5.2.18. Expert Involvement

- Experts are involved in a manner that is wary of their limits and fallability.
- Peer-reviewed inputs are favoured, and any research done for project review is opened to public scrutiny.
- When experts are convened for input, the process is formal, structured, and transparent. Experts are hired by the review body for independence, and are vetted for true expertise. A range of opinions are gathered from multiple experts. The process probes assumptions and reasoning, examines areas of agreement and disagreement, and highlights strengths and weaknesses in understanding. Results of expert input sessions are documented and publicly reported.
- Expert input is treated as one input alongside other valid sources of information.

Experts are commonly used in the review process. A strength is that s.14 of the ERCB *Rules of Practice* requires that the technical qualifications of persons contributing to technical reports are included in applications, and even though there are no similar requirements for federal EA, the ERCB requirement ensures that the qualifications of experts are checked as JRPs must follow Alberta law. Another strength is that expert opinion is gathered in a formal, structured, and transparent manner – hearings – that is governed by established rules, and testimony is recorded and publicly-available. A range of opinions are typically gathered in hearings from multiple experts, and each stakeholder's lawyers typically examine the assumptions and reasoning of experts. Areas of agreement and disagreement are documented and publicly reported through hearing minutes and decision statements.

Perhaps the most obvious weakness of the current process is that experts are pitted against one another in the confrontational hearing setting. Experts are hired by proponents and other stakeholders, not by the ERCB and JRPs for independent opinion, and so experts are likely to have some bias towards the positions of those paying them.

In hearings, each stakeholder's lawyers argue for or against the legitimacy of other stakeholders' experts, and the process of gathering expert opinion can be more about 'character assassination' than constructing the highest quality group knowledge possible. The confrontational nature of hearings is exacerbated by the uneven playing field between stakeholders in terms of the resources they have available for hiring experts and lawyers – industry, government, and the ERCB typically have many more resources than other stakeholders.

Only 49% of survey respondents felt that expert contributions are sufficiently scrutinized prior to their use, and non-industry respondents tended to be significantly more negative towards how expert inputs are evaluated than industry ($D^* 0.67 > D_{0.05} 0.35$). A regulator respondent quoted a government guide which explains how AESRD doesn't question modelling work:

[i]t is assumed that modellers are the experts in the field and that they have set up the models as described in the EIA report (Guide to Reviewing EIA Reports, Alberta Environment, EA Guide 2008-3, Page 5).

A lawyer respondent observed that applications rely upon a lot of 'grey' data and literature that is not peer-reviewed. One academic respondent wrote that payment for expertise "puts into doubt [consultants'] degree of impartiality and accurateness" and a municipal government respondent said that they've "seen cases where parties opposed to a project will shop around for an "expert" who will say what they want them to say." A federal government respondent thought that cross-examination in hearings provides a good check on expert inputs, but an industry respondent felt that while expert inputs in applications go through "extensive and detailed multidisciplinary review that is highly credible", experts can give input to a hearing without being subject to the same level of scrutiny.

According to several respondents, the ERCB has a biased attitude towards experts. One citizen respondent observed that proponents' experts are often in-house and their CVs are not scrutinized, yet intervener experts

often have spectacular curriculum vitae which are routinely questioned and denigrated by the proponents' counsel. Equal weight is not given to the intervener's experts no matter their standing in the various disciplines.

The proponent's experts, I feel, are given more weight, often unsubstantiated, by the ERCB.

A second citizen respondent felt that the ERCB's "objectiveness is weighted to the status quo" and the ERCB routinely dismisses expert evidence that puts proposals in a bad light.

A federal government respondent noted that "sufficient expertise is always lacking." A lawyer respondent argued that it is difficult to find qualified experts, but argued that this is because most qualified people either work for proponents or are trying to get work from them. A citizen respondent noted a resource gap in terms of funding experts: the "table is slanted towards development" as intervener experts "don't have the time or resources to do an adequate job" of reviewing applications. I discuss resource issues in detail in s.5.2.9.

5.2.19. Precautionary Process

- The process exhibits precaution in its procedures and practice to address the uncertainties and risks associated with megaproject development.
- Precautionary practices include: (a) risk assessment, (b) adaptive management, (c) caution with new technology, and (d) transparent risk communication.

Risk Assessment

Risk assessment is discussed in various policy documents and guidance manuals (e.g., AENV 2010b) and is commonly performed in project review, but according to Gosselin et al. (2010), the quality of these efforts are not high. One problem they note is scope: risk assessment is largely focused on human health and typically focuses on chemical exposures and ignores other health determinants. A second problem they find is lack of sensitivity analysis in socio-economic impact assessment. Third, Gosselin et al. find that risk assessments of 'technological disasters' and 'environmental catastrophes', such as tailings pond dam failures, are not always sound. For example, they explain that the 2010 Deer Creek Energy project review

provided an extensive analysis of a large number of potential "accidents" (dyke failures, flooding, spills, etc.) in response to a request for more information on this topic, [but] it was not clear that a holistic analysis of *what could go wrong* informed by past experience (process fires),

predicted futures (i.e., climate change impacts such as extreme winds, forest fires, etc.) was performed (*Gosselin et al. 2010 234, emphasis in original*).

Finally, Gosselin et al. relay the Auditor General of Alberta's concerns about insufficient risk management in the review process and argue that the process inadequately examines financial risks to taxpayers that may stem from reclamation failure (also see Grant, Dyer, and Woynillowicz 2008).

Only 32% of survey respondents agreed that uncertainty and risk associated with applications for new projects are adequately analyzed, and non-industry respondents tended to be significantly more negative towards uncertainty and risk in review than industry ($D^* 0.85 > D_{0.05} 0.35$). While one industry respondent wrote that

predictions are made using worst case scenarios...if anything stakeholders and government folks are under informed as they believe these may be real case scenarios being modelled

and another industry respondent wrote that

after 40 years of monitoring of existing operations, impacts are well defined and measurable. The impact predictions have, for the most part, been proven to be inaccurate in that they indicate a level of impact that has not occurred or is not measurable.

Many other respondents felt that uncertainty and risk are inadequately addressed. One citizen respondent noted that accidents do occur (at upgraders, for instance) and that the ERCB "seems to have no carry over or recording process of past approvals to graph the success or failure of [emergency response plans]". An NGO respondent wrote that

in projects that I've been a part of, proponents tend to argue that areas of uncertainty are either not of concern or will be mitigated. The level of risk and/or uncertainty is significantly down played.

A federal government respondent felt "uncertainty is the key and it is swept under the rug". One consultant respondent felt that low probability events are poorly distinguished

in terms of their risk potential, and that review doesn't distinguish well between the 'risks' of

tipping over of a barrel of fuel and the breaching of a tailings pond perched on the banks of the Athabasca River; in both cases, if there is found to be a low chance of it happening, then it may be discounted. This is ridiculous.

Risk, formally defined, is the product of the magnitude of a hazard and its probability, and according to the above-quoted consultant, the review process pays little attention to the magnitude side of the equation. A citizen respondent wrote that "it is up to interveners to prove they will be affected. Industry doesn't have to prove they will not." This is an interesting statement as – if it reflects project review practice – it goes against the precautionary approach which holds that uncertainty in impact predictions should not forestall mitigative action.

Adaptive Management

Elements of adaptive management are common in bitumen project review, but the scope of adaptive management practiced in bitumen review is limited. The CEA Agency (Undated-a) defines adaptive management as

a planned and systematic process for continuously improving environmental management practices by learning about their outcomes. Adaptive management provides flexibility to identify and implement new mitigation measures or to modify existing ones during the life of a project...in response to data generated by the follow-up program or monitoring, the proponent, the responsible authority or the regulated authority should be prepared to initiate adaptive management measures if mitigation is not adequate to eliminate, reduce or control adverse environmental effects (1,2).

The above suggests that adaptive management in federal EA simply means changing practices based upon effectiveness monitoring results, not 'active adaptive management' in which uncertainties are probed so that they might be reduced. Alberta documentation echoes this limited 'passive adaptive management' approach (AENV and ASRD 2001, AEUB, AENV, and NRCB Undated). Several respondents suggested that adaptive management in bitumen reviews is only passive adaptive management. A lawyer respondent said that

adaptive management sounds nice in theory; but as far as I can tell, it just means that projects will be developed as before and if something adverse arises, the proponents will try to think of a solution.

No bitumen laws or policies prescribe or even recommend active experimentation to reduce uncertainties through approval conditions or other aspects of project review, to the detriment of resolving the many serious uncertainties that plague bitumen science.

Caution with New Technology

There is nothing in bitumen project review law or policy that specifically addresses the uncertainties and risks of new technology; such uncertainties and risks are addressed on a case-by-case basis through standard project review.

Risk Communication

Only 33% of survey respondents agreed that “the uncertainty of impact predictions is adequately communicated to decision-makers and stakeholders”, and non-industry respondents tended to be significantly more negative towards risk communication than industry ($D^* 0.89 > D_{0.05} 0.35$). While one industry respondent felt that limitations of assessments are clearly communicated, one lawyer respondent complained that confidence intervals were not reported, and an aboriginal respondent asked how “esoteric engineering, technical terms, [and] scientific terms” could be communicated to the general public better. I discuss other issues with communication in s.5.2.17.

Attention to Risk in Project Review Legislation

The above results may partly be explained by the limited attention to risk in project review law. The *EPEA*, *ERCA*, and *OSCA* make no explicit mention of risk in the EIA process. In contrast, s.4 of the *CEAA 2012* notes that projects must be considered in a “precautionary manner” and that the precautionary principle should be applied by government in its administration of the act and that the precautionary principle must be applied by the government – both bureaucrats and elected officials – in federal EA, though the *CEAA 2012* does not define what these terms mean nor how they should be used to guide decision-making.

5.2.20. Appeal Mechanisms

- Appeals are allowed on major decisions of matters of both procedure and substance.
- The appeal system is enshrined in the laws that provide for the project review process.
- Requests for appeals must pass a test to ensure that appeals are not groundless.
- Standing for appeals is extended at least to proponents and others with direct material interests.
- Appeals are not heard by original decision-makers but on matters of procedure are heard by the courts, and on matters of substance are heard by an independent appellate body with expertise in the matters.
- Courts addressing appeals on procedure have the authority to rule on the matters at hand, while appeal bodies addressing appeals on substance have the only authorities to consider the evidence and overturn decisions and return them to the original decision-maker for reconsideration.

Scope of Appeals and Legal Basis

Under the current system stakeholders may appeal major decisions on matters of both procedure and substance, but their capacity to do so is constrained by the fact that only the *ERCA* provides statutory rights of appeal, and the fact that appeals on substance go to the courts who tend to defer to the original decision-makers ('curial deference'; see Appellate Bodies subsection below). Neither the *CEAA 2012* or the *EPEA* provide statutory rights to appeal, and thus stakeholders with complaints about the procedures followed or substance of major decisions made under these acts have only the limited opportunities to appeal provided by administrative law.

Standing and Preventing Frivolous Appeals

There are several standard means to prevent frivolous appeals including: tests and criteria regarding the worthiness of an appeal examined in a leave for appeal application, the costs to initiate appeals, the requirement that unsuccessful appellants cover a portion of the costs of the defendants, and penalties and sanctions to prevent delays (Petersson 2007). These serve as mechanisms to filter out frivolous appeals over project review decisions, and complement standing rules for appeals which in Canadian administrative law generally extend at least to all those with direct material interests (Tollefson 2003).

The chief test used by the ERCB in deciding whether to grant appeals is the 'directly and adversely affected' test. This standing rule was critiqued in s.5.2.18, and one academic respondent complained about these standing rules specifically in reference to standing for appeals. In certain situations the ERCB allows other

stakeholders to comment on whether parties should be granted appeal, but *Directive 029* which enables this form of appeal does not guide the ERCB's discretion in terms of how it should weigh the comments of stakeholders. Another test that the ERCB uses to prevent groundless appeals is the requirement for stakeholders to state the facts and grounds for appeal in applications to appeal (e.g., s.49(2) of the *Rules of Practice*), but again no laws governing the ERCB direct it in terms of how it should treat these statements.

Appellate Bodies

The courts hear appeals pertaining to decisions made under the *CEAA 2012* or *EPEA*. This is a problem if appeals are made on matters of substance, given that the courts tend to defer to original decision-makers (s.3.3.3.14). On matters of procedure, though, and appropriately, the courts do retain the authority to make rulings. The federal court's ruling regarding the JRP's lack of explanation for how Kearsley's GHG emissions would not cause a significant adverse effect is an example (s.4.6).

Appeals related to decisions made under the *ERCA* may be made to the ERCB, and in cases of substantive matters, the appellate body – the ERCB – has expertise in these matters, but of course in both cases, the appellate body is the same body that made the original decision, and so there is no independent appellate body for appeals under the *ERCA*. In some situations involving some matters of procedure, though, stakeholders have the opportunity to present their cases to the courts (s.4.4.4).

Survey Respondent Opinions of the Appeal System

Only 45% of survey respondents agreed that “the current appeal system provides stakeholders with an effective means to address their concerns”; non-industry respondents were significantly more negative towards the appeal system than industry ($D^* 0.82 > D_{0.05} 0.36$). One complaint made by a mix of seven government and non-government respondents is that appealing is expensive. A citizen respondent wrote that

directly affected people don't have the resources to appeal [ERCB] decisions. If they lose their appeal they must pay legal and court costs which generally prohibit them from appealing in the first place

and a consultant respondent wrote

you can bet that the oil industry and Alberta would appeal any negative appellate decision all the way to the Supreme Court. Most interveners wouldn't be able to afford that, and most projects would be sufficiently far along as to render the ultimate decision meaningless.

5.2.21. Obligations to Indigenous Peoples Met

- Government ensures that the project review process adheres to and promotes the principles in the *UN Declaration on the Rights of Indigenous Peoples* as well as any obligations established in the nation's constitution.

Bitumen development is taking place on the traditional lands of numerous Dene, Cree, and Métis people (Passelac-Ross and Potes 2007 Figure 5.1). Most bitumen development is taking place within Treaty 8 lands, but some – notably development in the Cold Lake area – is occurring within Treaty 6 lands. Treaty 8, signed at Lesser Slave Lake in 1899, states that Indians⁵⁹

shall have right to pursue their usual vocations of hunting, trapping and fishing throughout the tract surrendered (IAND 1899)

but that these rights are

subject to such regulations as may from time to time be made by the Government of the country, acting under the authority of Her Majesty, and saving and excepting such tracts as may be required or taken up from time to time for settlement, mining, lumbering, trading or other purposes (IAND 1899).

The treaty thus allows for the possibility of such things as bitumen development, but also provides rights to Aboriginal groups to practice their culture. Section 35 of the *Constitution Act, 1982* affirms these protections and affirms that aboriginal rights extend to both First Nations and Métis. These protections are consistent with the *UN Declaration on the Rights of Indigenous Peoples*, though these protections are only a small portion of what is described in the declaration.

⁵⁹ At the time Aboriginal people were referred to as “Indians”.

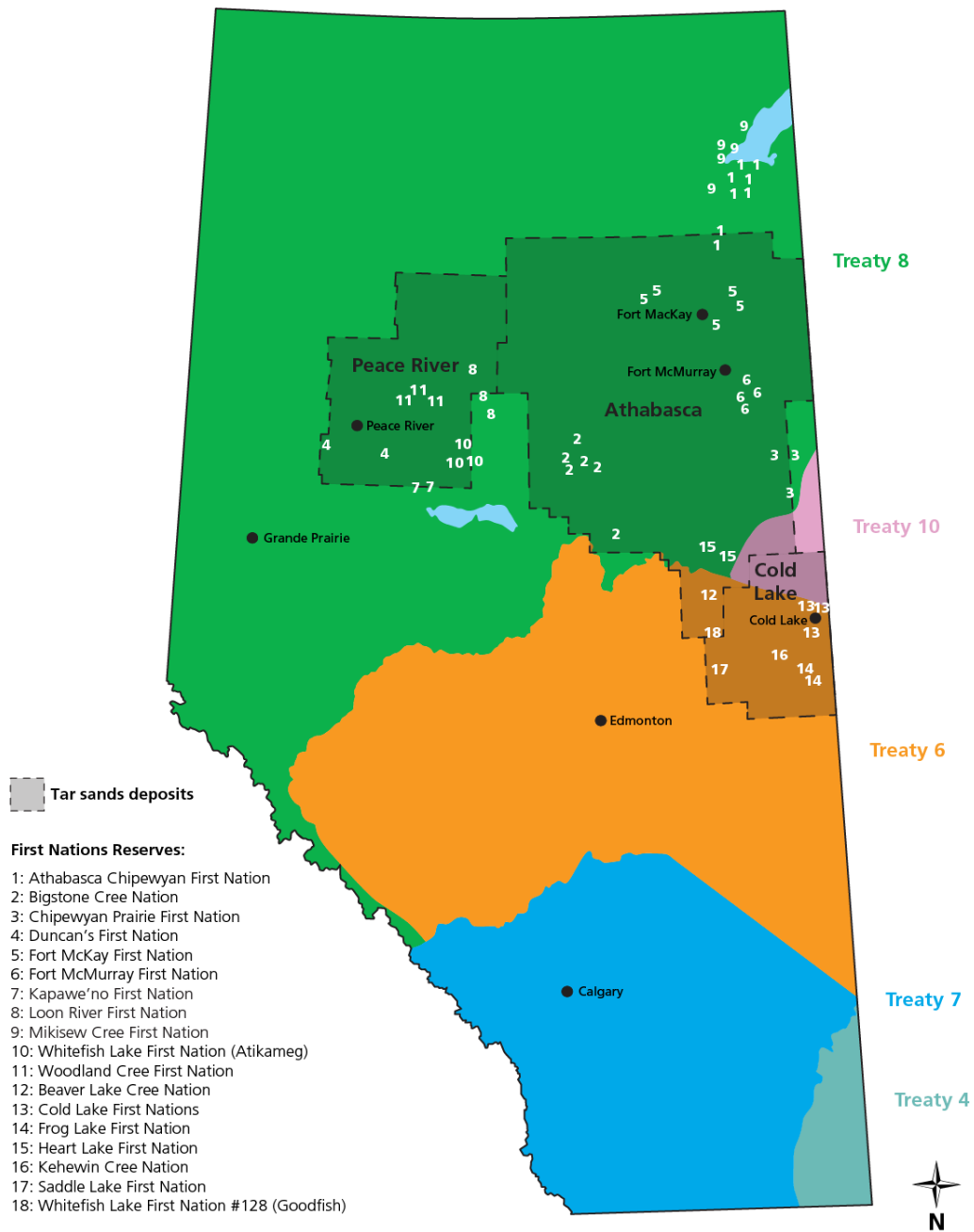


Figure 5.1. Bitumen Deposits and Nearby First Nations Reserves

Source: Map adapted from INAC (2011) and ERCB (Undated-d) by Tracey Saxby.

Through case law, the rights and extent of aboriginal rights in Canada are being clarified over time, and in many ways these rights are consistent with the UN declaration. *Delgamuukw v. British Columbia* [(1997) 3 S.C.R. 1010], for example, affirmed that

economic objectives can be valid justifications for impingement as long as adequate consultation and accommodation take place. *Mikisew Cree First Nation v. Canada (Minister of Canadian Heritage)* [(2005) S.C.C. 69] established that the Crown still has to uphold its honour and must still consult and accommodate despite Treaty 8 providing the Crown with the ability to ‘take up’ the land (Passelac-Ross and Potes 2007).

At present, government has a fiduciary obligation towards Aboriginals (i.e., a duty to protect) including: a duty not to unjustifiably infringe upon aboriginal rights, a duty to consult and accommodate if activities being contemplated “infringe upon” Aboriginal rights and lands or might infringe upon the abilities of Aboriginals to practice their culture. Consultation must be conducted in good faith and with the intention of substantially addressing concerns, and infringement can only be justified if there are “compelling and substantial” reasons (McNeil 1998). As Passelac-Ross and Potes (2007) note, these obligations are not simply about procedural fairness but are about advancing the process of reconciliation between the Aboriginal and settler societies of Canada. In essence, in the project review context, the federal and Alberta governments are legally required to consult and accommodate First Nations and Métis interests when proposed projects have the potential to infringe upon their rights and interests (Passelac-Ross and Potes 2007, Van Hinte, Gunton, and Day 2007). While a detailed legal assessment of the manners in which the current bitumen project review process addresses these requirements and obligations is beyond the scope of this thesis, several observations can be made.

Complaints from Aboriginals

In Alberta’s Oil Sands Consultation process (Alberta 2007b), Aboriginal people raised numerous issues including:

- a request to government to honour treaties and the constitutionally-protected rights of First Nations;
- the need to settle outstanding land claims;
- a request to government to protect and accommodate First Nations rights and interests;
- First Nation rejection of Alberta consultation policy and guidelines;
- the need for a Métis consultation policy;
- the desire to be involved in environmental monitoring;

- mistrust of the ERCB and bitumen approval processes;
- a request to the ERCB to revise its 'directly and adversely affected' test to expand standing to First Nations such that they are better equipped to protect their rights and traditional uses; and
- a request to government to revise the current review process such that projects are assessed regionally rather than individually.

In short, the wide cross-section of Aboriginals who participated in the oil sands consultation process are not satisfied with how they are consulted in project review and other land and resource decision-making. Alberta First Nation chiefs reject Alberta's First Nations consultation policy in part because the consultation process itself was not designed through consultation with them, and the lack of a Métis consultation policy conflicts with the need for consultation to include all Aboriginal peoples potentially impacted by development (Environmental Defence, Pembina Institute, and Equiterre 2010, Passelac-Ross and Potes 2007).

Duty to Consult

The evidence also suggests that the Alberta government does not adequately fulfill its duty to consult. The Alberta government relies on proponents to satisfy consultation requirements, and the roles for AESRD and the ERCB, according to Alberta policy, are solely to determine if proponents have performed adequate consultation and if Aboriginal and treaty rights have been respected (s.4.4.2). According to Passelac-Ross and Potes (2007), this practice of delegating consultation to proponents means that government does not engage pro-actively in protecting Aboriginal rights and promoting intercultural reconciliation (the Crown's fiduciary responsibilities) and instead acts as a "detached 'neutral arbiter'". According to Passelac-Ross and Potes, the Alberta government treats Aboriginal consultation as just another form of public consultation and not a special type of consultation stemming from the rights enshrined in s.35 of the *Constitution Act, 1982*. Passelac-Ross and Potes argue that this

violates the principles set out by the judicial doctrine, particularly the requirement of a two-way, good faith engagement between the Crown and the First Nations aimed at adequately incorporating the concerns of the latter towards rights protection and reconciliation (47).

and that this

limited government involvement [is] to the detriment of the Crown's honour and, more importantly, the constitutional rights involved and the ultimate purpose of reconciliation (51).

Two survey respondents felt similarly. An industry respondent noted that government does not carry out its consultation responsibilities effectively, and a provincial government respondent noted that AESRD's delegation of Aboriginal consultation to proponents "diminishes the real opportunities for native groups to participate".

Substantive Accommodation

Alberta has no criteria with respect to determining what is or is not 'substantive accommodation' (Passelac-Ross and Potes 2007). Passelac-Ross and Potes argue that this leaves ample room for "unstructured discretion" among government decision-makers and for economic gains from bitumen development to outweigh any concerns over detrimental impacts on Aboriginals (51).

Curtailment of Scope of Responsibilities

Another criticism of Passelac-Ross and Potes (2007) is that the Alberta government oversteps its authority by narrowly defining concepts of 'traditional use', 'culture', and 'identity' and uses these definitions to curtail the scope of consultation and the universe of accommodation measures. For example, in Alberta's First Nations consultation policy, "Rights and traditional uses" are defined as

uses of public lands such as burial grounds, gathering sites, and historic or ceremonial locations, and existing constitutionally protected rights to hunt, trap and fish and does refer to proprietary interests in the land (Alberta 2007a 1).

Treaty 8 First Nations contest this definition and feel that it narrows the scope of their rights (Passelac-Ross and Potes 2007).

Lack of Strategic Engagement

A final issue is that the pattern of bitumen development and associated decision-making may be leading to the "*de facto* extinguishing" of Aboriginal rights (Passelac-

Ross and Potes 2007 51). The Alberta government has a policy of not engaging Aboriginals at the strategic decision-making stages of bitumen development (e.g., during land-use planning, policy setting, and tenure decision-making)(Environmental Defence, Pembina Institute, and Equiterre 2010, Passelac-Ross and Potes 2007), and according to Passelac-Ross and Potes, this has limited the opportunities that Aboriginals have had to ensure that their rights and interests are addressed, with the consequence of more development occurring than perhaps would otherwise. If this pattern continues, argue Passelac-Ross and Potes, it may soon be impossible for Aboriginals to exercise their Aboriginal and treaty rights at all.

5.2.22. *Minimal Public Investment in Projects*

- Government focuses on playing the role of public safeguard.
- Projects are privately funded; government abstains from funding, subsidizing, or otherwise directly or indirectly investing in megaproject development.
- If investment is deemed absolutely necessary for public interest reasons it is limited so that private partners provide the majority of the capital.

Given that the Alberta and federal governments earn substantial royalty and tax revenue from bitumen development in their roles as collectors of rent earned from the exploitation of oil, a publicly-owned resource, some bias in project review favouring development is probably unavoidable, especially by the Alberta government. However, government can minimize this bias by minimizing investment in projects, and in so doing it can also help prevent uneconomic development, both of which can help prevent megaproject failure. The question is, therefore, are governments minimizing investment?

Historically, the Alberta and federal governments directly invested in bitumen projects, but they no longer do so. The governments do, however, continue to promote development through indirect means of investment. As relayed in Chapter 2, governments regularly sponsor marketing initiatives and research. Two other forms of indirect investment are government subsidization of development through a favourable royalty regime, and covering the private costs (i.e., externalities) of development.

Favourable Royalty Regime

The bitumen royalty regime of the Alberta government has long been criticized as being favourable to developers. In 1997, following recommendations of the National Task Force on Oil Sands Strategies, the Alberta government introduced the 'generic royalty regime' to achieve three objectives: (1) accelerate development, (2) facilitate private development of bitumen, and (3) ensure that the industry is competitive with other global oil opportunities (Masson and Remillard 1996). Critics argued that the regime was overly-favourable to developers, especially with the run-up in oil prices in the mid-2000s (e.g., Alberta 2006b, Taylor and Reynolds 2006, Nikiforuk 2008, Campanella 2012).

In 2007, responding to growing public concern, the Alberta government established the Alberta Royalty Review Panel to examine the royalty system and make recommendations. The Alberta Royalty Review Panel (2007) concluded that the public had not been receiving "a fair share" of the proceeds from energy development. In response, the Alberta government announced a change to the royalty system (the "New Royalty Framework") in late 2007, a system that remains in place at time of writing (January 2013). However, despite government statements that the public is now getting its fair share, Plourde (2009, 2010) finds that industry continues to receive a similar flow of rent as it did before the changes to the royalty system, and Campenella (2012) concludes that public take of oil and gas revenues in Alberta has shrunk markedly in recent decades.

There are many factors that influence royalty regimes, but it appears that the Alberta government's approach is to continue to promote development through favourable fiscal terms. This approach compounds with other subsidies (Dillon, Thomson, and Orrange 2008, EnviroEconomics Inc., Sawyer, and Stieber 2010) to provide an incentive for uneconomic development.

Government Internalization of Externalities

Government internalization of externalities of development is another way in which uneconomic development may be promoted. The 2011 Alberta *Inventory of Major Alberta Projects* (AFE 2011a) lists over \$3 billion in infrastructure investments, such as

highway construction projects, planned by the Alberta government and the Regional Municipality of Wood Buffalo in the Fort McMurray area alone. While some of this investment is normal and associated with general tax revenue, a portion of this investment is internalization of private externalities of rapid bitumen development. Government's \$3 billion investment in carbon capture and storage (Canada Undated-a, 2008b, Alberta 2009a) is another example of internalization of the industry's externalities.

Lack of Need for Government Investment

There is little indication that government financial support of bitumen development is necessary. Compared to other locales open to investment by the international oil industry, bitumen development has very low exploration costs (the bitumen deposits are well-delineated), Canada has a stable political climate, much of the world's remaining oil reserves outside of Alberta's bitumen resources are off-limits to private investors, and bitumen development is already well linked to the world's largest oil market, the United States. Private capital from around the globe is flowing into Alberta, suggesting strongly that there is a good return to be made. It would thus appear that there is very little need for the Alberta and Canadian governments to incent private investors by reducing their costs, meaning that government could presumably reduce its financial involvement in bitumen development.

5.2.23. Evaluation of the Process Overall

On a scale of 1 to 10, with 10 being excellent and 1 being very poor, respondents rated the process as a whole an average score of 5. Government respondents rated the process a 5.7, and non-government respondents rated it a 4.7. A provincial government respondent wrote:

[w]hile improvements are necessary, it is important to reflect on the enormity of information, impact analysis and public consultation necessary for project reviews and decisions. This is a success in itself.

I would suggest that while it may be a feat to conduct the project review process, as this respondent indicates, the process is little important compared to the outcome. Industry respondents rated the process a 6.5, and non-industry rated it 4.4.

5.3. Outcome Evaluation

While a detailed evaluation of the outcomes of bitumen project review is outside of the scope of this thesis, it is nonetheless important to link outcomes with process (Calbick 2003). In theory, good outcomes are a result of a process that follows good practices. Below I review data pertaining to how well the process achieves a key intermediary outcome – adequate information to support decision-making and implementation – but also review of the process' performance in terms of final outcomes.

5.3.1. Adequate Information

Adequate information is often considered a good practice in project review but is more appropriately considered an intermediate outcome of a sound process; adequate information is the product of attention to many of the good practices of sound project review (s.3.5) and a key foundation for good decision-making. As this chapter indicates, there are many deficiencies in the bitumen project review process. Many of these deficiencies affect the quality of information generated in project reviews:

- poor scoping of reviews including lack of guidance on how information should be generated and appropriate methods, and insufficient attention to socio-economic impacts, cumulative effects, and other topics (s.5.2.3);
- reliance on proponent self-assessment and few mechanisms to prevent biased content in applications (s.5.2.4);
- inadequate scrutiny of applications including no commitment from federal government and ERCB to examine soundness of impact assessment methodology and poor scrutiny of application content pertaining to essential topics (s.5.2.5);
- widespread reliance on industry self-monitoring, consistent problems with monitoring programs, insufficient resources provided for monitoring, poor federal involvement in monitoring, and poor transparency in monitoring (s.5.2.7);
- inadequate provision of funding and skilled staff (s.5.2.9);

- frequent use of inappropriate methods of impact assessment, and no use of two key methods of impact assessment (CBA and reference class forecasting) (s.5.2.10);
- poor integration among government actors (impeding understanding of what is going on across government decision-making), and evidence of bias among government actors and the review management body (s.5.2.11);
- obstacles to stakeholder involvement, weakening input (s.5.2.17);
- institutional laxity towards quality of expert input, and hearings that promote 'duelling experts' as opposed to constructing high-quality knowledge (s.5.2.18); and
- passive adaptive management which is a weak means to resolve uncertainties, and poor risk communication (s.5.2.19).

Recent reviews of federal EA (Stratos 2008, OAGC 2009b, CESD 2011) have concluded that there is often insufficient information to support project review, and survey respondents also thought that information resources are poor. One academic respondent wrote that

the biggest problem is the lack of adequate information - or of knowing when we have adequate information. The ERCB endeavours to consider cumulative effects but yet there are no baselines or thresholds that can be used in this analysis.

One consultant suggested that a process of obfuscation occurs, that negative information on a project is put aside and instead unrelated and irrelevant information is included:

[g]enerally, there is too much information in EIAs that is not important - and it is often included to present a picture of detailed study, when usually the most important issues are studied only cursorily. Alternatively, additional unrelated and irrelevant information is included when the appropriate data or information casts a negative view on the impacts of the proposed project.

The current process appears to be failing to construct high-quality information – the foundation of sound decision-making.

5.3.2. Final Outcomes

One can use both objective and subjective criteria to assess the final outcomes of project review (Wood 2003), but there is some consensus in the literature that effective project review is signalled by:

- improvement in the quality of decisions;
- development that is more sustainable;
- satisfaction among participants with the process;
- declining costs and time to complete the process; and
- meeting the objectives set out in project review legislation (Wood 2003, Sadler 1996, Soumelis 1977, Doyle and Sadler 1996).

Examples of the latter include the *CEAA 2012*'s objectives of promoting cooperation and communication with aboriginal people in decision-making (s.4, *CEAA 2012*), the ERCB's focus on the 'public interest', and the *EPEA*'s objective of environmental protection and sustainable development (s.40, *CEAA 2012*). Considering this range of outcome criteria I asked respondents their perspective on a variety of these matters through a final series of questions (Table 5.2). Only 51% of respondents thought that the process has been successful at serving the public interest, only 49% thought that the process has been successful at improving decisions, and only 46% thought the process was succeeding at integrating public perspectives into decisions. Respondents thought the performance of the process is even worse in terms of integrating Aboriginal perspectives into decisions, improving relationships and reducing conflict, cost-effectiveness, and moving society toward sustainability.

These mediocre reviews of the performance of the process may be a product of overly-rapid development: 60% of survey respondents thought that the industry's growth should be slowed down or stopped (37% felt that the current rate and nature of development is about right, and 3% thought that development is not fast enough). An NGO respondent said that development needs a 'time-out' so that thresholds and plans can be established:

Table 5.2. Survey Respondent Perceptions of the Success of the Project Review Process

Success Criterion	Successful	Don't Know	Unsuccessful
serving the public interest	51%	6%	43%
improving decisions on project development	49%	15%	35%
integrating public perspectives into decision-making	46%	8%	45%
integrating Aboriginal perspectives into decision-making	38%	15%	46%
improving relationships and reducing conflict	31%	7%	61%
being cost-effective	28%	31%	40%
helping society move toward sustainability	32%	10%	58%

in absence of these thresholds we are making irrational and dangerous decisions that are putting communities (both human and natural) at risk.

An academic called for development to be more orderly in order to maximize the economic multiplier and lessen the risks. Perhaps the greatest critique came from a regulator respondent:

[u]ntil the government has committed sufficient financial resources for the ERCB, Alberta Environment and Sustainable Resource Development to adequately enforce regulatory requirements, further oil sands development should not be approved. The current status of oil sands tailing reclamation – well in excess of \$2 billion in tailings reclamation work that was required but has not been completed – is symptomatic of a government that actually believes that ‘market forces’ are a substitute for government oversight. Until the Alberta government can behave like a true regulator, further applications for oil sand development should not be considered.

An academic wrote "we need some big questions answered first before we continue to approve of individual projects in a piecemeal fashion."

In contrast a consultant respondent felt that the current pace of development is appropriate, stating that the review process and limitations on resources are “adequate controllers of growth”, and another consultant and a federal government respondent felt that the market has now slowed the pace to a reasonable one. An industry respondent

felt that the rate of development is appropriate and is constrained by “broader constraints regarding the capability to resource and manage one megaproject at a time.”

This outcome evaluation helps build the limited evidence available on the relationship between good practices and process performance. Little empirical evidence exists indicating the strength of the relationship between good practices and outcomes, but this study shows that good practices are only somewhat adhered to in bitumen project review process and that experts involved in this process feel that the process is mediocre in performance at best. While these results do not support the notion that adherence to good practices lead to good outcomes, these results do at least show an association between failure to adhere to good practices and poor performance. Further investigation of this topic should gather more data on performance to link good practices and performance outcomes, such as subjective data from other participants in the process as well as objective data on process performance such as time requirements for review, costs, and indicators of sustainability.

5.4. Discussion

5.4.1. *Key Lessons of the Evaluation*

Table 5.3 provides a summary of the strengths and weaknesses of the current bitumen project review process as identified in this chapter through the review of relevant literature, the expert survey, and personal observations. Detailed survey results are presented in Appendix C. While the bitumen project review process has some important strengths which support its ability to facilitate sound development, the weaknesses identified are much greater in number and arguably, given the outcome data gathered, help explain why the process is failing to deliver.

Table 5.3. Summary of Evaluation Results

Good Practice Set	Key Strengths	Key Weaknesses
Integration with Broader Management System	<ul style="list-style-type: none"> • project review lies within a broader system of land and resource decision-making • project review guided by a variety of high-level policy 	<ul style="list-style-type: none"> • important gaps in high level policy that have yet to be filled (e.g., cumulative effects thresholds for some impact issues) • little use of SEA, regional EA, class EA, and planning • insufficient stakeholder and Aboriginal involvement in high-level policy development • lack of federal leadership in bitumen planning
Initial Review	<ul style="list-style-type: none"> • process entails initial review, and certain types of projects require detailed review 	<ul style="list-style-type: none"> • poor government feedback following initial review
Scoping	<ul style="list-style-type: none"> • scoping follows a structured and formal process • requirements to review project justification, impacts and mitigation plans, and alternatives • ERCB provides guidance on impact assessment methodology 	<ul style="list-style-type: none"> • no requirements to examine distribution of impacts or likelihood of project financial viability • projects scoped poorly, paying inadequate attention to some types of impacts including socio-economics and cumulative effects • lack of guidance from federal government and AESRD on appropriate methods of impact assessment
Application Preparation		<ul style="list-style-type: none"> • insufficient mechanisms to prevent biased impact assessment by proponents in their self-assessments
Scrutiny of Application	<ul style="list-style-type: none"> • applications must be reviewed prior to final decision-making in terms of consistency of content with TORs and the significance of impacts • AESRD examines for sound methodology • government has legal ability to request more information • government required to publish all documentation 	<ul style="list-style-type: none"> • application inadequately scrutinized for quality and bias, especially EIA content and content regarding socio-economic impacts, cumulative effects, mitigation plans, project alternatives, and project success potential • methods of impact assessment inadequately scrutinized • federal reviewers and ERCB make no commitments to review impact assessment methods • <i>Directive 023</i> requirement for CBA ignored • information and analysis gaps don't

Good Practice Set	Key Strengths	Key Weaknesses
		always get filled
Final Decision-making	<ul style="list-style-type: none"> • <i>CEAA 2012</i> requires federal elected decision-makers and JRPs to take into consideration the findings of project reviews and to explain their decisions • terms and conditions are typically clear 	<ul style="list-style-type: none"> • Alberta law does not require provincial final decision-makers to link their decisions to review findings and does not require the ERCB to explain its decision recommendations, contributing to poor explanations of approval decisions • no time buffer for appeals to approval decisions • non-elected officials play a strong role influencing final decision-making, and little means to hold them to account for their decisions • few defences against bias towards approval associated with prior tenure decision-making • terms and conditions rarely specify required outcomes and are typically expressed in non-binding recommendations and commitments to address impacts, which altogether weakens effectiveness monitoring and accountability • non-environmental impacts, such as social impacts, receive little attention in terms and conditions • no guidance for minimum content of terms and conditions of approval in law
Monitoring and Enforcement	<ul style="list-style-type: none"> • system of compliance monitoring and enforcement exists • variety of mechanisms of effectiveness monitoring, including some multi-stakeholder effectiveness monitoring programs 	<ul style="list-style-type: none"> • few requirements for proponents to take remedial action to address poor mitigation effectiveness • widespread reliance on industry self-monitoring • persistent problems with existing effectiveness monitoring programs in terms of bias and quality
Process Management	<ul style="list-style-type: none"> • work planning, setting of timelines, and internal auditing • federal training • external audits of federal EA 	<ul style="list-style-type: none"> • no Alberta staff training program • no external audit of Alberta process • internal auditing programs are weak • no auditing of process with respect to international best standards • lessons from monitoring not being passed on to future project reviews

Good Practice Set	Key Strengths	Key Weaknesses
Resources	<ul style="list-style-type: none"> costs to proponents of going through project review appear to be reasonable 	<ul style="list-style-type: none"> inadequate resourcing by government in terms of funding, staffing, expertise non-industry stakeholders not supported well enough
Methods of Impact Assessment		<ul style="list-style-type: none"> methods of impact assessment often inappropriate neither CBA nor reference class forecasting are used, despite both being 'good practice' methods of impact assessment
Consolidated Review Process Run by Independent Review Agency	<ul style="list-style-type: none"> harmonization agreements between federal and Alberta governments, and between AESRD and ERCB 	<ul style="list-style-type: none"> process is not well consolidated, and parties involved are not well integrated few government review staff are dedicated to project review tasks government actors and the ERCB bring their biases to project review lack of accountability of ERCB and JRP members the ERCB and JRPs routinely approve projects despite obvious and persistent mitigation failure, suggesting lack of genuine authority, agency capture, or some other problem
Mitigation and Maximizing Net Gains	<ul style="list-style-type: none"> federal EA and Alberta EIA process oriented towards sustainability, ERCB review oriented towards mitigation legal requirement for applicants to explain their mitigation plans and that these plans are reviewed 	<ul style="list-style-type: none"> no strong requirements for projects to substantially mitigate impacts or achieve gains in non-economic indicators only a small subset of negative impacts must be fully mitigated; most impacts must only be mitigated to point of 'acceptability' yet no guidance on what this point is poor mitigation success
Process Description	<ul style="list-style-type: none"> process is documented in detail 	<ul style="list-style-type: none"> roles, responsibilities, and authorities of involved actors not clear new federal EA process yet to be described ERCB has internally conflicting mandates ambiguities in roles of AESRD, ERCB, and JRPs unclear stakeholder involvement requirements in <i>Directive 056</i> <i>Directive 023</i> is out of date

Good Practice Set	Key Strengths	Key Weaknesses
		<ul style="list-style-type: none"> documentation explaining how the project review process is spread very wide
Legal Foundation	<ul style="list-style-type: none"> much of the process codified in law <i>CEAA 2012</i> establishes federal EA as a distinct administrative process <i>EPEA</i> provides discretion to allow for EIA when regulations and even if AESRD directors don't initiate it 	<ul style="list-style-type: none"> much discretion built into the <i>CEAA 2012</i> no legal test of <i>CEAA 2012</i>'s 'significantly adverse effect' and justification criteria no legal test for ERCB public interest criterion purpose of project review to inform decision-making not listed in Alberta law evidence that project review may not be genuinely intended to assist decision-makers in informing approval decisions high levels of discretion in Alberta legal framework legal status of ERCB directives unclear Alberta process has few legal protections when harmonized with federal EA
Structured Decision Procedures	<ul style="list-style-type: none"> decision-making is structured and guided by decision criteria 	<ul style="list-style-type: none"> key decision criteria related to project approval decisions are poorly defined
Communication	<ul style="list-style-type: none"> legal requirement for notices, publication of documents, and keeping of registries 	<ul style="list-style-type: none"> poor communication of monitoring results stakeholder dissatisfaction with government and industry communication
Stakeholder Participation	<ul style="list-style-type: none"> government statements of commitment to stakeholder involvement the range of involvement opportunities is fairly wide stakeholder inputs kept in check in hearings and elsewhere in the process mechanisms for leveling power among stakeholders 	<ul style="list-style-type: none"> new <i>CEAA 2012</i> extends wide discretion to review panels to restrict standing in hearings key decision in Alberta EIA limited to those stakeholders that are potentially 'directly affected' no commitment to stakeholder involvement in ERCB's governing legislation ERCB limits standing to those potentially 'directly and adversely' affected no obvious mechanisms for stakeholder learning no involvement opportunities in terms of monitoring ERCB heavily restricts who can receive funding support process is relatively unsuccessful at resolving conflict between involved parties

Good Practice Set	Key Strengths	Key Weaknesses
Expert Involvement		<ul style="list-style-type: none"> • involvement constitutes 'placation' at best • institutional laxity regarding quality of expert input • little concern for peer-reviewed input • undue faith in the quality of application content • qualifications of experts are often checked in confrontational environment of 'duelling experts' • hearings not focused on constructing shared, high-quality knowledge • experts not used in a manner that checks their bias
Precautionary Process	<ul style="list-style-type: none"> • all federal decision-makers must apply the precautionary principle in EA decision-making 	<ul style="list-style-type: none"> • precautionary principle not defined in federal EA law • quality of risk assessment low • passive adaptive management, not active • no specific mechanisms to address risks associated with new technology • poor risk communication to decision-makers and stakeholders • Alberta laws pay little explicit attention to risk
Appeal Mechanisms	<ul style="list-style-type: none"> • tests exist to help prevent groundless appeals • statutory rights to appeal granted in <i>ERCA</i> 	<ul style="list-style-type: none"> • no statutory rights to appeal granted in <i>CEAA 2012</i> or <i>EPEA</i> • standing rules are limiting when appeals go to the ERCB • appeals to the courts expensive • appeals on matters of substance go to the ERCB, therefore no independent appellate body
Obligations to Indigenous Peoples Met	<ul style="list-style-type: none"> • subset of rights set out in the <i>UN Declaration on the Rights of Indigenous Peoples</i> are established and protected by the Canadian constitution and case law 	<ul style="list-style-type: none"> • Aboriginals in Alberta strongly dissatisfied with review process • delegation of consultation to proponents • consultation policy rejected by Alberta First Nations • lack of Métis consultation strategy • lack of criteria structuring decisions over the sufficiency of accommodation • Alberta has unilaterally curtailed scope of issues and obligations

Good Practice Set	Key Strengths	Key Weaknesses
		<ul style="list-style-type: none"> • lack of engagement of Aboriginals in strategic decision-making
Minimal Public Investment in Projects		<ul style="list-style-type: none"> • government indirect investment more than necessary • Alberta government provides incentives for uneconomic development

One pattern in the evaluation data, which is perhaps the most alarming, is that the current process appears to rest in significant part on a ‘foundation of unfounded faith’. Section 5.3.1 highlights a lengthy list of factors that contribute to a weak information base from which decisions are made. This wide range of obstacles to sound information obstructs the process’ ability to support sound decision-making – conclusions seem to be reached without the basis necessary to make them, and it appears that many of those in positions of power that could fix the problems are little interested or unable to do so. Some gaps – such as reliance on passive adaptive management instead of active experimentation – are commonplace and are somewhat understandable as their resolution is complex and/or controversial, but other gaps – such as continued reliance on industry self-monitoring programs that are logically going to be weak and are repeatedly shown to be failing – strongly suggest either incompetence or contempt.

A second pattern in the data is that it is clear that more funding, skilled staffing, and time is needed to support the review process, including more resources for the underlying activities that support project review. Governments are only starting to catch up with development of much needed high-level policy such as regional plans. Without high-level policy in place, project reviews cannot be expected to perform well because they lack the direction from which impacts (especially cumulative effects) can be interpreted and mitigation measures can be designed. Given the preponderance of evidence of cumulative effects and nature of megaprojects and megaprograms with respect to their tendency to lead to cumulative effects, much greater effort is necessary to lay the foundation for effect cumulative effects assessment and management. The regulatory framework is also in need of upkeep. The ERCB’s *Directive 023*, which guides proponents in terms of how they should prepare their applications and signals the

ERCB's understanding of what it needs to make good decisions on applications, has never been released beyond its 1991 draft form, and has been in the process of revision for years. If the pace of development was slowed – as a large proportion of respondents suggest it should be – government might be able to catch up, but if the pace of development is not slowed then government ought to provide many more resources so that gaps can be filled.

A third pattern evident in the data is that the current process does not involve stakeholders and experts in ways that reduce conflict and political controversy. The hearing process is perhaps the best example of this – it establishes an adversarial environment of confrontation, often between parties with vastly different resources, and it excludes many stakeholders from the process, especially with the change in the *CEAA 2012* from the *CEAA 1992* that allows review panels wide discretion to decide who exactly is an 'interested party'. By opening up the process to the very public it is supposedly there to serve the federal and Alberta governments could probably substantially reduce conflict and political controversy, and by changing how experts are involved, information could be improved with further gains in terms of reduced conflict and controversy.

A fourth observation is that the process is very complex. Many survey respondents, including government respondents, evidenced confusion with the process. This confusion doesn't seem to be an indication that these respondents are not 'experts' in the process but that the process is very complex and that there is insufficient integration among involved parties, insufficient training of participants, and inadequate documentation. This confusion is also now compounded with the introduction of the *CEAA 2012*.

Fifth, like many project review processes around the world, the bitumen review process appears to generate a large inventory of data that fails to bring to the surface the critical information necessary to make approval decisions. Scope and methodology appear to be incorrectly focused and applied which often lead to only poor information being generated, there is insufficient guidance for proponents on how to develop good applications, and there is insufficient scrutiny of applications which appears to allow

weak applications to be written that don't examine very well a proposal's key issues, such as the project's public interest value.

A sixth observation is that in many ways projects that only undergo Alberta review are reviewed in a less rigorous manner than reviews that include federal EA. In Alberta-only reviews, environmental impacts are likely to be reviewed to a much weaker extent because AESRD doesn't scrutinize EIA content, the review body (ERCB) is more likely to suffer from pro-development bias than JRPs, final decisions need not be justified with respect to review panel findings, and process auditing is weaker. Fortunately, most bitumen megaprojects should trigger federal EA, and so these weaknesses should only occur with less risky bitumen projects.

A final observation that is interesting is the lack of use of CBA in bitumen project reviews. CBA is a good practice method of megaproject impact assessment, according to the data gathered – it is requested in the ERCB's *Directive 023*, it is argued in the literature to have the ability to assess the significance of project impacts and a project's 'public interest value', and it would seem to be able to help impact assessors understand the wide breadth of impact issues and understanding the big picture. Further scrutiny of the method is warranted to determine more conclusively the appropriateness of this method in megaproject impact assessment. In the next chapter I apply CBA to a bitumen case study and then in Chapter 7 I systematically evaluate the method in this context.

5.4.2. Validity of the Results

Like all research projects, there were several challenges in this evaluation. As a major component of the evaluation findings are based on surveying participants in the process, it is critical that the participants offer accurate and representative data. The survey data are based on perceptions of these participants, and perceptions are influenced by many factors such as experience and knowledge, worldviews, and any underlying agendas that respondents may have. It is therefore critical that all of these factors are addressed.

As discussed in s.3.2 and detailed in Appendix A, survey respondents represented a range of perspectives, but there was an important sampling gap in that only one employee of two of the most important agencies in the process – the ERCB and the CEA Agency – participated. This gap is partly addressed by the fact that some respondents had past employment experience with these bodies, and some of these respondents had long careers with some of these bodies. Numerous survey respondents from other government agencies participated. Nonetheless, a consequence of this sampling gap is that all statistical tests examining differences between government and non-government respondents cannot be taken to accurately reflect whatever opinions on the matters at hand that the ERCB and CEA Agency may have, and more broadly, all survey results may be skewed from the relative lack of participation from the CEA Agency and ERCB.

Survey data may be affected by strategic behaviour – critics may answer more negatively than they actually feel in order to contribute to their agenda of raising the negative profile of bitumen development or the government, and supporters may do the opposite to help create a more positive image. This issue was addressed by having a wide range of participants across sectors, the assumption being that strategic behaviour of respondents would be offset.

Another concern is that respondents may not be willing to give complete or accurate data due to concerns of reprisals for doing so. This issue is typically addressed by providing for a confidential data collection process. The need for confidentiality was immediately apparent when I began collecting names and contacting people regarding their participation in the survey, as numerous people asked how I got their number, requested that I only contact them through personal email addresses instead of work addresses, or indicated outright that either I could not quote them or that they would not participate. I assured confidentiality to participants by stating that the study was confidential, but following SFU's research ethics protocols and indicating to participants that I was doing so, and by providing confidentiality through my contacts with participants.

A concern with any evaluation of a government process is that government respondents may bias their responses because they are rating themselves and they

have responsibility for the results (Slotterback 2008, Samset 2003, Cullen et al. 2010). On the other hand, government respondents have a different perspective than non-government respondents because they are 'on the inside' and as such they may be able to provide more accurate data (Samset 2003). Bias stemming from industry and non-industry affiliation may also affect the data and may stem from respondents' perceptions on the outcomes of the process (see s.5.3.2). The statistical tests reported in this chapter testing for significant differences between respondent types find few cases of differences of opinion between government and non-government, but many cases of differences among industry and non-industry respondents. In most cases, industry respondents were much more positive about the current review process, suggesting that the process might be skewed towards industry, and/or that efforts to improve the process should perhaps focus on addressing problems identified by non-industry respondents.

Another concern is that the survey was conducted in the summer of 2010 and so survey data reflect the process as it existed at that time. The nature of the review process is dynamic, some aspects more so than others, though many aspects are relatively stable, such as legal frameworks (the *CEAA 2012* being one exception over the study period). This issue is partly addressed by drawing upon the most recent literature and keeping the evaluation, as well as the description of the process (Chapter 4), up to date. Regardless, the conclusions of this research should be considered with the knowledge that the survey data are from 2010.

The literature used in this evaluation may have errors in fact, bias, or other problems, reducing its usefulness and validity as a source of evaluation data. However, the three literature sources that are most relied upon in this chapter are from established academic bodies (the Canadian Institute of Resources Law, and the Royal Society of Canada). My personal observations rely upon a detailed examination of the documentation of the Kearl mine review as well as six other recent bitumen reviews (s.5.1). A wider and more systematic review of other bitumen project reviews may possibly lead to different conclusions, but it must be noted that the data from all three sources – the survey, the literature, and my personal review of bitumen review documentation – are convergent; in no cases were there major conflicts between the three data sources.

5.4.3. *Concluding Thoughts*

We can expect more negativity than positivity in the evaluation given that the measuring stick for the evaluation – good practices – is the ideal. Further, as people tend to focus on the negative, the literature sources used in this evaluation and the survey results may focus disproportionately on the negative. Despite these realities, though, what has been learned from this evaluation? More to the point, has this evaluation revealed real problems with the current process that are likely to prevent it from facilitating sound development in the Albertan and Canadian public interest? As this chapter demonstrates quite clearly, the answer is yes.

6. Cost-Benefit Analysis of Kearl Mine

We have always assumed that large-scale industrial projects... are good in and of themselves. Our whole economic history, which is one of earning and spending, saving and investing, encourages this belief. If a project achieves a measurable surplus or gain, such as increased profits, additional tax revenues or higher employment, that is thought to be sufficient justification for it; no other test need be met. This assumption should be looked at more closely. Can the ... project and its aftermath be subjected to any realistic cost-benefit analysis? What is the purpose of the project? In whose interest it is being undertaken? What economic gains will be made? How should the gains be shared? Is anyone likely to be hurt by it? Can the negative impacts be ameliorated? ... But suppose we consider the project from the point of view of its external economics - from the point of view of society's profits and losses. We might then urge that the project be delayed, that its construction phase be spread over a longer period to maximize employment and income for northerners. We might urge the building of a smaller ... project... and extend the operating phase. These measures might well reduce social costs and result in a net saving to the Government of Canada. (*Berger 1988 172*)

6.1. Introduction

In this chapter I present a CBA of the Imperial Oil – Exxon-Mobil Kearl mine. As the above quote from Justice Thomas Berger in his report from the Mackenzie Valley Pipeline Inquiry suggests, CBA would appear to be an important analytical piece in the project review puzzle. This case study provides a unique perspective on the impacts of bitumen development, as no comprehensive CBA has yet been conducted of a bitumen project, but more importantly, for the purposes of this thesis, this case study is part of a test of the method in the project review context. In Chapter 7 I next evaluate CBA with respect to its usefulness in this review context.

In the next section of this chapter I present an overview of past economic impact research of bitumen development and show how CBA has only been used to a limited extent. In s.6.3 I provide an overview of the case study and then in s.6.4 I present the

methods, data, and results of the CBA. In ss. 6.5 and 6.6 of this chapter I discuss the results of the CBA, their significance, and limitations of the study.

6.2. Overview of Economic Impact Research on Bitumen Development

There have been numerous studies conducted to date of the economic impacts of bitumen development. The following overview of these economic impact studies demonstrates this range of methodology and forms the foundation upon which debates on the economic merits of bitumen development are made.

6.2.1. *Economic Impact Analysis*⁶⁰

Economic impact analysis (EconIA) is the most commonly used method to assess the economic contribution of bitumen development. EconIA begins with identifying a project's expected capital and operating costs and labour needs. These data are then used to estimate the project's direct, indirect, and induced economic effects on indicators such as GDP, employment, labour income, and government revenue. Indirect and induced effects are estimated using multipliers derived from input-output modelling or other techniques (see Davis 1990, Armstrong and Taylor 2000, Ontario 2008, Gunton 1992). In EconIA, all of these direct, indirect, and induced effects are considered 'economic benefits'.

The Canadian Energy Research Institute (CERI) has conducted numerous EconIAs in recent years to estimate the economic impacts of bitumen development

⁶⁰ There is no universal terminology for this group of methods. Various labels are used, including economic impact study (e.g., Davis 1990), economic impact analysis (e.g., Davis 1990, Armstrong and Taylor 2000, Vining and Boardman 2007), and regional economic impact assessment (e.g., Gunton 2003a, Knight 1990, Gunton 1992). Often the acronym EIA is used. In the interest of distinguishing this group of methods from environmental impact assessment, also often abbreviated to EIA, I use the term economic impact analysis (and the acronym EconIA) as a label for these methods, and I use the term 'economic impact assessment' to mean more generally the act of assessing the economic impacts of a project independent of the particular method used.

(Table 6.1). Proponents of development use these estimates to argue that development generates significant economic benefits to Alberta and Canada.

Table 6.1. Results of CERl's 2005, 2009 and 2011 Economic Impact Analyses of Bitumen Development in Alberta¹

	Timilsina et al. (2005)	Timilsina et al. (2005)	Howard et al. (2009)	Honarvar et al. (2011)
Time period	2000-2015	2000-2020	2009-2032	2010-2035
Assumptions	\$87 billion investment \$371 billion production	\$101 billion investment \$531 billion production	\$218 billion investment over 2009-2020 period	\$253 billion investment
Impacts to Canada				
GDP	\$541 billion	\$789 billion	\$1.7 trillion	\$2.1 trillion
person-years employment (person-years)	4.4 million	5.5 million	11.4 million	11.7 million
tax revenue	\$93 billion	\$123 billion	\$491 billion	\$766 billion

Note: 1. Impact results are solely for Canada. There are additional economic impacts outside of Canada.

EconIA is also commonly used by proponents as a method of economic impact assessment for the purposes of regulatory approval. Kearl's proponents, as part of their 2005 application for the Kearl mine, used EconIA to estimate the following impacts of the project:

- 20,800 person-years of total direct, indirect, and induced "employment creation" during construction;
- 2,660 person-years annually of total direct, indirect, and induced "employment creation" during operations;
- \$5.5 billion in "new economic activity" associated with capital investment, leading to an increase in Alberta's GDP and household income by a cumulative \$4.3 billion and \$2.6 billion respectively;
- \$1 billion per year in provincial GDP and a household income effect of about \$500 million per year associated with operations; and a
- "total direct benefit" of \$24 billion in royalty and corporate tax earnings to the provincial and federal governments over the life of the project, and annual property tax earnings to the Regional Municipality of Wood Buffalo of \$14.5 million (Imperial Oil 2005, Volumes 1 and 9).

The proponents argue that Kearl will provide sizeable positive economic benefits.

EconIA is the most commonly used method of economic impact assessment (Vining and Boardman 2007), but it is also widely critiqued, largely owing to the fact that EconIA does not estimate net benefits of development and is therefore not capable of assessing if development is or is not in the public interest.

In EconIA it is assumed that there are no opportunity costs of project inputs (Armstrong and Taylor 2000, Vining and Boardman 2007, Barclay 2009). Opportunity costs are what labour and investment capital would earn if they were not employed in the project being assessed. In a well-functioning economy like Canada's, most labour and capital is close to, if not fully, employed. Under this condition, the labour and capital used by a project such as Kearl has an opportunity cost: the labour and capital employed in Kearl is not free but a real cost to the economy since if used in Kearl it cannot be employed elsewhere. However, in EconIA opportunity costs are ignored, and project costs are instead treated as benefits generated by the project.⁶¹ An illogical consequence of ignoring opportunity costs is that EconIA indicates that a project is more 'beneficial' if the project costs more per unit of output compared to a project that costs less – higher costs are interpreted in EconIA as inherently beneficial.

The explanation for why EconIA treats gross costs as net benefits is that EconIA is designed to examine the local economic impacts of development. At a local scale, with investment coming in from outside, EconIA can be used to provide information on the incremental economic impacts of development – investment in the local area is not assured, and thus there may not be any opportunity costs locally. However, when EconIA is applied to larger geographic scales, this assumption of no opportunity costs is inappropriate.

A second shortcoming of EconIA is that it ignores many project costs such as environmental costs and costs to government. For example, gross tax revenue to government is estimated without deducting government expenditures that may result from a project such as investment in infrastructure or services. Similarly, environmental impacts, such as the public health costs of air pollution, are omitted. This omission of

⁶¹ If the investment capital was foreign, then from the perspective of Canada there is no opportunity cost to that capital.

various types of impacts in EconIA further contributes to EconIA's inability to examine the net impacts of projects.

6.2.2. Cost-benefit Analysis

CBA is based upon welfare economics and stems from simple comparisons of pros and cons of alternative courses of action (Boardman et al. 2011). According to Pearce (1998) the French engineer and economist Jules Dupuit first developed the underlying mechanics and theory of the modern form of the method. The method is widely believed to have first come into practical use in the 1930s in the US to address water resource management issues (Pearce 1998, Major and Frederick 1997). By the 1950s much of the theoretical and practical foundation for CBA had been developed, and today, CBA is considered among many policy scientists, economists, and planners to be the principal method available to examine the net impacts and value of projects to society (Davis 1990, Barget and Gouguet 2010, Gunton 1992).

CBA revolves around the notion that the welfare of society is equal to the sum of the welfare of all individuals (McAllister 1982). This is called the social welfare function. The objective of CBA is to identify how a project (or policy) will affect different people's welfare and to aggregate all of these effects to indicate whether a project creates a net gain or loss in social welfare. Thus, CBA is normative in that its output implies what should be done. In a project review context, CBA's techniques of monetary valuation can be used on their own to provide perspective on the magnitude of impacts, and CBA in its traditional and more complete form can be used to examine both benefits and costs and provide perspective on whether a project, given all of its impacts, should be approved.

The basic steps in CBA in its traditional and complete form are: (1) specify alternative scenarios, (2) determine standing (i.e., to who impacts are tracked), (3) catalogue potential impacts of the project, (4) predict impacts quantitatively over the life of the project, (5) monetize any non-monetary impacts being tracked in the CBA, (6) discount benefits and costs, (7) compute net present values (NPV) of each alternative scenario, (8) perform sensitivity analyses, and (9) make a recommendation (Boardman et al. 2011). Benefits are measured in terms of willingness to pay, and costs in terms of

what people require as compensation for giving up some opportunity. These measures are assumed to represent the value to individuals of gains and losses, and this reliance on individuals' valuations (or preferences) is based on CBA's fundamental assumption that human preferences should count (Pearce 1998). In doing so, CBA evaluates the net impacts accruing to society as a whole instead of gross benefits or gross costs that might occur to any one individual party.

It's important to distinguish impact assessment through CBA compared to standard practices in environmental assessment. Environmental assessment is typically preoccupied with determining if impacts are 'significant' or not, and significance is typically determined subjectively in reference to criteria such as impact magnitude and duration. This approach differs markedly from CBA where the relative significance of impacts is indicated by the monetary value of each, and the significance of the project is indicated by its NPV. In other words, in typical environmental assessment, an impact is either significant or not in a binary sense, whereas in CBA all impacts have some level of 'significance'.

CBA has a variety of limitations, and it is critiqued from many angles. Some of the most common critiques of CBA include: difficulties valuing all types of impacts (especially non-market, environmental impacts), cognitive challenges and bias in non-market valuation, a focus on individualistic vs. collective preferences, CBA's 'one dollar-one vote' logic, controversy over key parameters such as the appropriate discount rate, and lack of understanding and mistrust (e.g., Vatn and Bromley 1994, Sen 2000, Boardman et al. 2011, Anonymous 1992, Knetsch 2007, Brown 1984, Sagoff 1988, Jacobs 1997, Boardman, Moore, and Vining 2010).

Perhaps because of these limitations, despite the apparent advantages of CBA over EconIA, and contrary to current Alberta policy (ERCB 1991) calling on proponents of bitumen projects to assess economic impacts using CBA, the method of CBA has not been used in the preparation of any applications for bitumen projects. Proponents state in their applications that they conduct CBA, but they only use EconIA (e.g., see Appendix B and Volume 9 in Imperial Oil (2005), page 1-28 and Volume 2, s.19 in Syncrude (2008)(2008), and page B-3 and Volume 1 of Petro-Canada (2006)).

With respect to bitumen development, CBA techniques have only been used in two studies conducted independent of the regulatory process. Kerr (2004) uses CBA valuation techniques to value the human health costs of air pollution from bitumen development over the years 1995 to 2002. Kerr estimates NO_x damage costs of between \$96 and \$141 million, and sulphur dioxide (SO₂) damage costs of between \$19 and \$42 million. Shiell and Loney (2007) examine the effect of GHG emissions on the social value of production at the Suncor mine over the years 2004 and 2005. They find that GHG damages reduce the net benefit of Suncor's operations by between 5.5% and 33% and conclude that their

results call into question the wisdom of planning major investments in the oil sands...at the global level, exploitation of the oil sands may in fact reduce aggregate welfare rather than increase it (2007 434).

To date no one has conducted a CBA in which the complete set of a project's costs and benefits are examined simultaneously to provide information on the net benefits of a project.

6.2.3. Other Methods

Private financial feasibility analysis is another method of economic analysis that is used to gauge the economics of bitumen development, but it is typically only used by proponents to examine the private viability of their own project proposals. Private financial feasibility analysis entails aggregating and discounting a company's expected costs and revenues. This method is essentially CBA but from a private perspective as it only examines costs and benefits to the proponent. One private financial feasibility analysis made public was Brandie et al.'s (1982) analysis of a hypothetical bitumen mine. Brandie et al. were interested in the financial viability of a bitumen project at a time of low oil prices and uncertain plant performance. They concluded that, under conditions at the time, such a mine would be uneconomic unless oil prices rose. CERl has conducted several studies of the supply costs of bitumen production using a method similar to private financial feasibility analysis. In their most recent study (Millington et al. 2012) they find that non-integrated mines (i.e., mines without upgraders) break even at bitumen prices of \$61 per barrel.

Another method is resource valuation which is somewhat like a CBA in that costs and benefits are assessed and discounted but unlike CBA the objective is to develop an understanding of the value of exploiting a whole resource within a jurisdiction. Statistics Canada annually tracks the monetary value of crude bitumen reserves as part of its tracking of national wealth in Canada's system of national accounts (STC Undated-a). They write that "much of Canada's wealth is attributable to the nation's substantial stocks of natural resources" and that proper accounting of this wealth is necessary to enable proper management (STC 2006 23). Statistics Canada estimates the value of bitumen reserves by estimating the NPV of the economic rent that could be generated if it all was developed, where rent is the difference between the revenue generated from selling bitumen and the costs of extraction. In 2010 the volume of established reserves under active development was 4.1 billion m³ (STC Undated-b), valued at about \$460 billion (STC Undated-e). Sharpe et al. (2008) conducted a similar valuation of bitumen development with the intent of improving upon Statistics Canada's annual valuations by using what they thought to be more realistic assumptions and parameters, including a higher resource base, a rising rate of extraction, higher oil prices, and the damage costs of GHG emissions. Sharpe et al.'s base case analysis puts the value of the bitumen at \$1,413 billion.

A final type of economic study of bitumen development is Plourde's studies of the distribution of rent flows under different tax and royalty regimes. Using simulation modelling, Plourde (2009, 2010) examines how regimes have changed over the years and how flows of this rent to producers, the Alberta government, and the federal government have been affected. Plourde finds positive rents under all oil prices considered and that changes to the fiscal regime have substantial effects on the distribution of rent.

6.2.4. Comparison of Studies

There has certainly not been a lack of study of the economic impacts of bitumen development, but all existing studies have important gaps from the perspective of sound project review (Table 6.2). In short, there has been limited study of the social value of bitumen development. Only four studies provide insight on social value, but these studies cover few impacts. Other limitations in existing research include very short or

very long time frames, a lack of examination of the distribution of impacts, and little attention to uncertainty. The CBA presented in this chapter fills in the current gaps in bitumen economic impact research by providing a comprehensive review of the economic and environmental impacts of a project over its whole lifespan, the distribution of these impacts, and extensive consideration of uncertainty.

Table 6.2. Overview of Bitumen Economic Impact Assessment Studies

Study	Method	Ability to Inform of social value?	Physical Scope	Impact Coverage	Time Frame of Analysis	Examined Distribution of Impacts?	Attention Paid to Uncertainties?
studies prepared for project reviews	EconIA	X	project	economic impacts	project life	✓	X
Informetrica (1995)	EconIA	X	industry	economic impacts	1995-2025	✓	X
Timilsina et al. (2005)	EconIA	X	industry	economic impacts	2000-2015	✓	X
Timilsina et al. (2005)	EconIA	X	industry	economic impacts	2000-2020	✓	X
Howard et al. (2009)	EconIA	X	industry	economic impacts	2009-2032	✓	X
Honarvar et al. (2011)	EconIA	X	industry (new projects)	economic impacts	2010-2035	✓	X
Kerr (2004)	CBA	✓	industry	air pollution and rent	1995-2005	X	✓
Shiell and Loney (2007)	CBA	✓	Suncor project	economic impacts and GHGs	2004-2005	X	✓
studies prepared by proponents	private financial feasibility analysis	X	project	private economic impacts	project life	X	likely

Study	Method	Ability to Inform of social value?	Physical Scope	Impact Coverage	Time Frame of Analysis	Examined Distribution of Impacts?	Attention Paid to Uncertainties?
Brandie et al. (1982)	private financial feasibility analysis	X	hypothetical project	economic impacts	life of project	X	✓
Millington and Mei (2011)	supply cost modelling	X	hypothetical projects	economic impacts	2010-2044	X	✓
Bayoumi and Mühleisen (2006)	econometric modelling	X	industry	economic impacts	2000-2020	X	X
Bergevin (2006)	qualitative	X	industry	economic impacts	2001-2006	X	X
Statistics Canada (Undated-e)	resource valuation	✓	bitumen reserves under active development	economic impacts	life of reserves	X	X
Sharpe et al. (2008)	resource valuation	✓	established bitumen reserves	economic impacts and GHGs	life of reserves	X	✓
Plourde (2009)	financial modelling	X	industry	economic impacts	historical	✓	✓
Plourde (2010)	financial modelling	X	industry	economic impacts	historical	✓	✓

6.3. Overview of the Case Study

The Kearl mine is a standalone extraction project currently under construction north of Fort McMurray, Alberta targeting 4.6 billion barrels (bbl) of bitumen reserves (Imperial Oil 2011a)(Figure 6.1). Kearl is being developed by Imperial Oil (71% interest) and Exxon-Mobil Canada (29%). The project as proposed does not include an upgrader; bitumen will be exported via pipeline to the US (Imperial Oil 2012a, CAPP 2011a). See s.4.7 in Chapter 4 for Kearl's history.

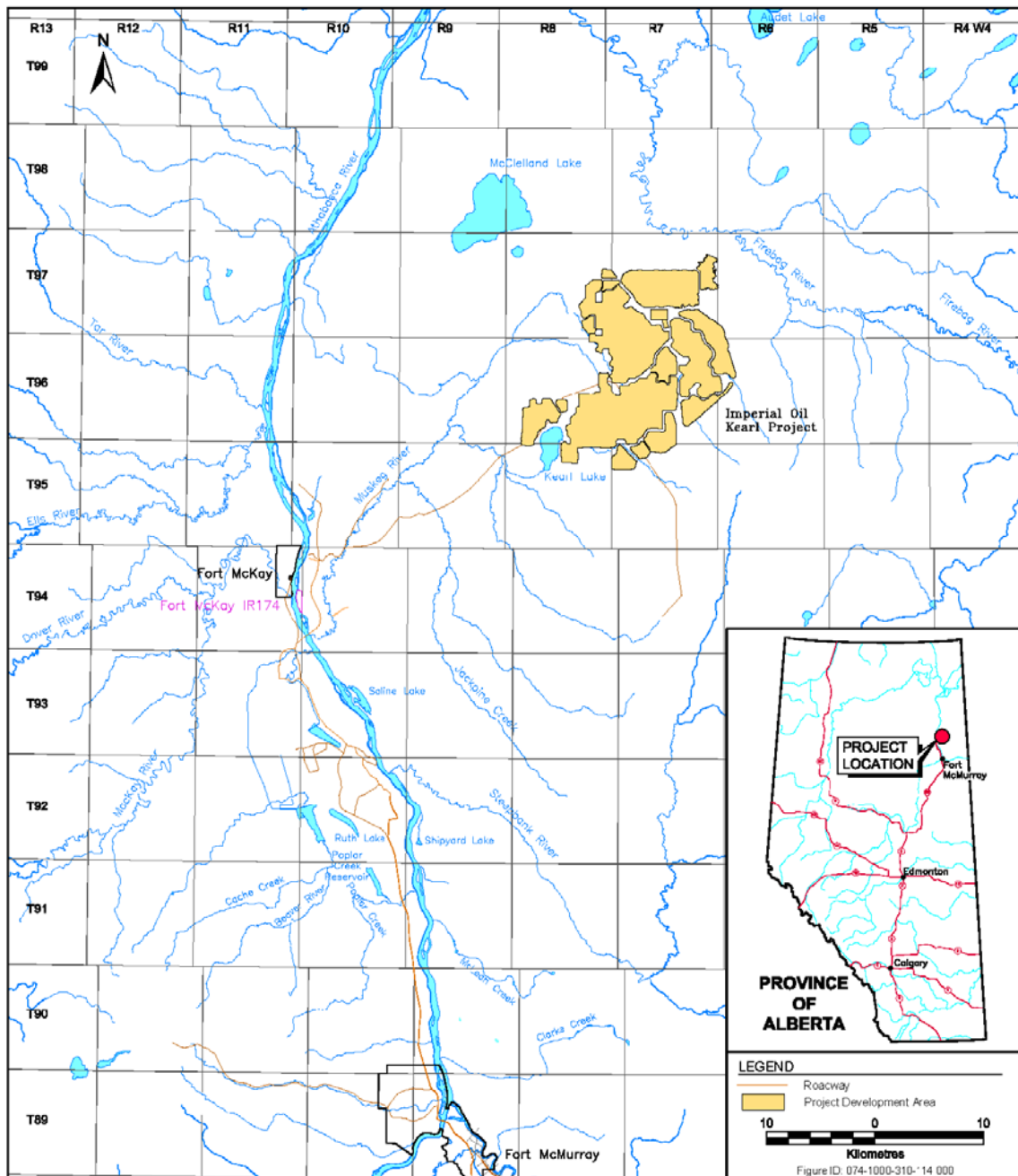


Figure 6.1. Location of Kearl Project

Source: Used with permission from Imperial Oil (2005 Volume 4, p3-4).

Kearl is used for the case study application of CBA for three reasons. First, the project is comparable to other bitumen mines in size and technology (Table 6.3). Second, the project was recently approved (2008) and so the data in the regulatory

documentation is fairly current. Third, the project is simple in that it is not integrated with an upgrader, making it easier to model.

Table 6.3. Bitumen Mines in Operation and in Development

Mine	Start-up	Capacity (barrels / day)
<i>Kearl</i>	2012	345,000 upon completion
CNRL Horizon	2008	135,000 currently 577,000 upon completion
Shell (Athabasca Oil Sands Project) Jackpine	2010	100,000 currently 300,000 upon completion
Shell (Athabasca Oil Sands Project) Muskeg River	2002	155,000 currently 270,000 upon completion
Shell (Athabasca Oil Sands Project) Pierre River	to be decided	200,000 upon completion
Silver Birch Energy	to be decided	210,000 upon completion
Suncor Fort Hills	to be decided	190,000 upon completion
Suncor Millenium & North Steepbank	1967	321,000 currently
Suncor Voyageur South	to be decided	120,000 upon completion
Syncrude Mildred Lake, Aurora North & Aurora South	1978	407,000 currently 607,000 upon completion
Total Joslyn	to be decided	200,000 upon completion

Source: Dunbar (2011).

6.4. Overview of Method of CBA

The value of the project to society is defined as the net present value (NPV) it generates. Formally, the analysis entails solving the following equation:

$$NPV = \sum_{t=0}^n \frac{B_t - C_t}{(1 + r)^t}$$

where B is benefits, C is the cost of production, r is the social discount rate, t is the year, and n is the number of years in the project. Simply put, the analysis involves estimating

resource revenue, subtracting out forecasted costs of production, and then making a variety of “social” adjustments to ensure that the analysis is conducted from a societal perspective. I examine all economic and environmental costs and benefits of the project from initial acquisition of land and mineral leases in the 1950s to the end of the project. All monetary values are reported in 2010 Canadian dollars (CDN). Financial data from earlier years are converted to 2010 dollars using the Consumer Price Index (Bank of Canada 2011). I assume that the bitumen is sold to an arm’s length buyer at a competitive market price. The objective of the CBA is to assess the social value of the project to *Canada*, though given the worldwide impact of the project’s GHG emissions, standing is extended to the globe for GHG damage costing (see s.6.5.11). In sensitivity analysis I examine GHG damages incurred solely by Canadians.

6.5. Results

6.5.1. Development Schedule

The base case development scenario is based on information presented in Imperial Oil investor reports available by July 2012 (Imperial Oil 2012a, 2011a, 2012b), the 2005 regulatory application (Imperial Oil 2005), and personal communications with Imperial Oil.⁶² The project involves construction of 345,000 barrels per day (bpd) of bitumen production capacity.⁶³ The initial phase is expected to begin operation in the fourth quarter of 2012 and reach 110,000 bpd capacity by the end of first quarter 2013. An expansion phase is planned with operations starting fourth quarter 2014 and reaching an additional 110,000 bpd by the end of first quarter 2015 (giving the mine a total production capacity of 220,000 bpd). Finally, Imperial Oil plans a new production train and debottlenecking giving an additional 125,000 bpd of capacity by 2020. As duration of operations is a function of total reserves (4.6 billion bbl) and capacity utilization (see s.6.5.2 below), I estimate that operations will last 44 years (from 2012

⁶² George Bezaire, Director, Imperial Oil, email message to author, July 10, 2012.

⁶³ These production volumes do not include diluent volumes. According to George Bezaire, Director, Imperial Oil (email message to author, July 10, 2012), Kearn’s bitumen will be blended with diluents at a ratio of 1 bbl bitumen to 0.3 bbl diluent.

through 2055). Consistent with the application, I assume that final reclamation will occur over five years following the last year of operations.

6.5.2. Revenue

Revenue is calculated as the product of bitumen production times price for each year of operations. Annual bitumen production is calculated as forecasted production capacity multiplied by production capacity utilization which is typically less than 100% due to maintenance shutdowns, accidents, or other operation problems. Imperial Oil expects Kearn to produce at near full capacity; Imperial Oil say that they have already accounted for a utilization factor in their production calculations, and thus they expect little difference between their published production capacities and full production.⁶⁴ Imperial Oil notes that in its Cold Lake *in situ* operations it has achieved close to 100% utilization (Imperial Oil 2012a). However, mining (as in Kearn) is different technologically than *in situ* (Cold Lake) and near 100% utilization has no precedent in bitumen mining. Further, CERL assumes a utilization factor of 89% for a generic standalone bitumen mine based upon production rates at current bitumen mines (Millington et al. 2012, Millington 2012), and data for production at the Syncrude and Suncor mines from 2002 to 2012 indicate that these mining operations achieved an average 75.7% utilization.⁶⁵ Therefore, for my base case I examine an alternative scenario using an 89% utilization factor, and in sensitivity analyses I use utilization factors of 75.7% and 95%. Using the 89% factor for the base case, and based on Kearn's expected production capacity over time (s.6.5.1), production begins with 32,601 bpd in 2012, ramps up over time to 307,050 bpd in 2020 when the project is fully operational, and then halts in 2056 at the end of the project's life (Figure 6.2). My production forecast likely overestimates production in later years given that the best ores are likely to be mined first.

⁶⁴ George Bezaire, Director, Imperial Oil, email message to author, July 10, 2012.

⁶⁵ The production capacity utilization factor is average annual production as a percentage of total production capacity. I calculated the average utilization factor for Suncor and Syncrude mines (bitumen production) using data from Dunbar (2011), Suncor Energy (Undated-c), and Canadian Oil Sands (Undated-b, a). Over the years 2004 to first quarter 2012 Suncor's production capacity factor averaged 65.3%, and over the years 2002 to 2011 Syncrude's factor averaged 86.1%. I was not able to locate data for other mines. Imperial Oil is a partner in Syncrude.

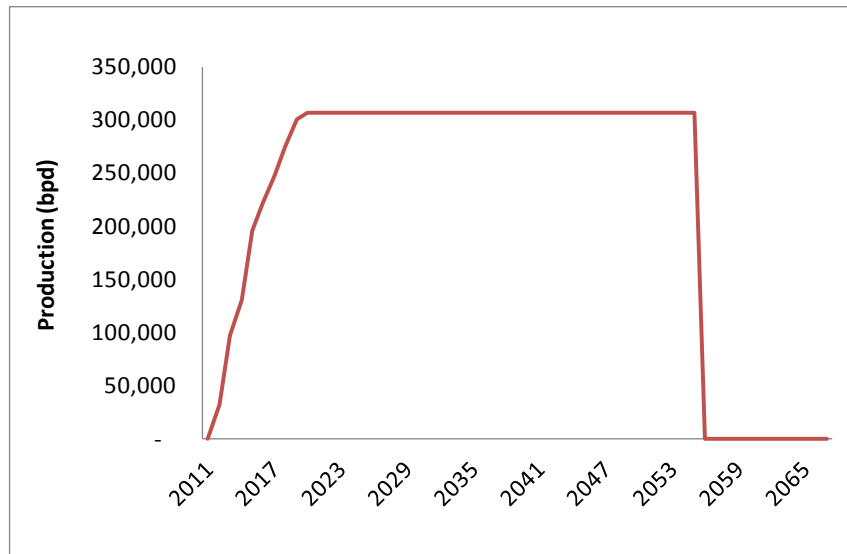


Figure 6.2. Forecast of Base Case Bitumen Production Over the Life of the Project

The price of bitumen is difficult to determine because of the lack of a well-developed bitumen market. Consequently, the bitumen price is normally forecast as a ratio of the price of West Texas Intermediate (WTI) oil. In their 2005 application, Kearl’s proponents assumed that Kearl’s bitumen would have a market value of 60% of WTI at Cushing, Oklahoma, a major trading hub for oil in North America (Imperial Oil 2005). This differential reflects two facts about bitumen: (1) it is extracted at a distance from market and requires transport to market, and (2), bitumen is a crude oil of low quality and requires upgrading before refining. This same ‘percentage differential’ approach was used by the Alberta Royalty Review Panel (ARRP 2007) and Plourde (2010, 2009) who both valued bitumen produced in the Athabasca area at 45% of WTI, reflecting bitumen values in ERCB (Undated-b) statistics at the time.

A problem with using the percentage differential approach is that it assumes that the cost of transport, upgrading (or diluent costs when bitumen is shipped without upgrading), and any quality adjustments change proportionally with the change in WTI price. An alternative approach is to start with a benchmark crude price and subtract costs and adjustments to obtain a netback price at the mine. This ‘cost differential’ approach is used by the Alberta government to value bitumen for the purposes of royalty calculation (the “bitumen valuation methodology”). The cost differential approach is also used by the ERCB, and by CERl (Millington et al. 2012) who in their most recent supply

cost study estimate a roughly \$20 cost differential for stand-alone mines exporting dilbit, a blend of bitumen and condensate or other diluent.

A problem with both approaches to forecasting bitumen prices is that, historically, both the percentage and cost difference between bitumen and WTI prices have varied widely. The ERCB provides prices of bitumen at Edmonton, and after deducting the cost of transportation to Cushing and comparing to WTI (Cushing) prices, I derived percentage and cost differentials over the 2002 to 2011 period (Figure 6.3). Interpretation of the price data are further complicated by the fact that bitumen price data (from which both differentials are calculated) is based solely on reporting by two producers, Suncor and Syncrude that may use intra-company transfer pricing to understate bitumen values (ARRP 2007).⁶⁶

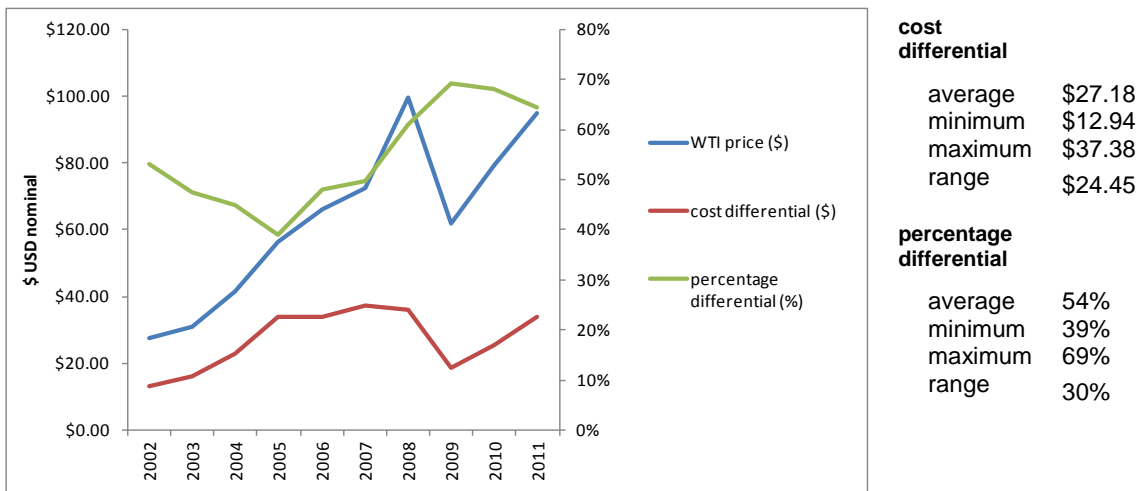


Figure 6.3. Oil Price and Bitumen:WTI Differentials, 2002 to 2011

Sources: ERCB (Undated-b), personal communications with Mussie Yemane (Economist, ERCB, email message to author, January 25, 2012), and Index Mundi (Undated). WTI prices are for Midland, Texas; this location is used as a proxy for Cushing price.

Given uncertainty in the differential I conduct a series of sensitivity analyses using a range of values. For the base case, I adopt the 60% differential that Kearl's

⁶⁶ Mussie Yemane, Economist, ERCB, email message to author, January 25, 2012.

proponents assumed in their 2005 application.⁶⁷ In using this percentage differential approach, the model allows for growth in the differential over time as the oil price rises, consistent with ERCB statistics over the past decade. In sensitivity analyses I use the average percentage differential (54%) in ERCB statistics to represent the 'low value case', and I use CERl's \$20 cost differential (2010 CDN real) for the 'high value case'.

The next step is to develop a price forecast for WTI. I use the National Energy Board's (NEB 2011) 'reference case' WTI price forecast to 2035 as the basis for my base case price forecast. I extrapolate the National Energy Board forecast to 2062 (the end of Kearn's operational life) based upon the average rate of growth in the National Energy Board's forecast to 2035. Next I use the bitumen differential to forecast a bitumen price for the years 2012 to 2062. Given uncertainty in the future price of oil, I complete a sensitivity analysis using the National Energy Board's low and high WTI price cases. Figure 6.4 shows the alternative bitumen price forecasts. Note that these price forecasts do not reflect potential effects of expanded supply of oil into the North American market from Kearn, a topic that I discuss in more detail in s.6.5.7 below.

6.5.3. *Employment Benefits*

From a CBA perspective, a project only provides employment benefits if it employs people who would otherwise be unemployed or pays more than what they would otherwise earn. In both these cases the opportunity cost of labour would be less than the compensation paid for labour employed by the project. I have no evidence that either situation applies to Kearn.

The oil and gas sector is currently experiencing and is forecast to further continue to experience labour shortages (e.g., Vanderklippe 2011a, Tait 2011b, NEB 2011, Tait and McCarthy 2011, PHRCC 2011, Lang and Smillie 2012). The Petroleum Human Resources Council of Canada, for example, notes that "Canada's oil and gas industry is

⁶⁷ Personal communications with Imperial Oil (George Bezaire, Director, Imperial Oil, email message to author, July 10, 2012) and recent Imperial Oil documentation (Imperial Oil Undated-b) did not provide updated information on what Kearn's bitumen might be worth.

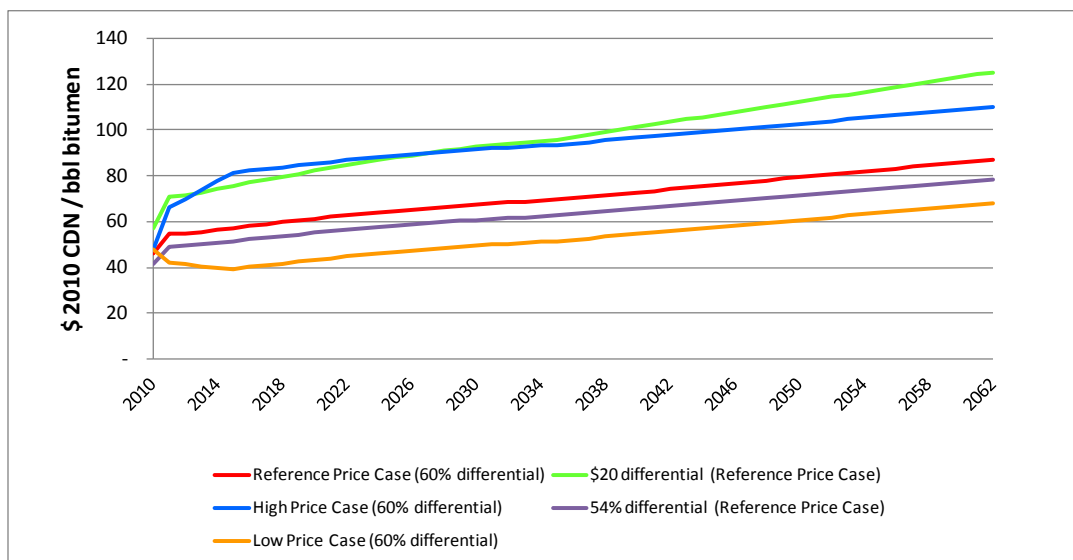


Figure 6.4. Future Bitumen Prices Under the National Energy Board’s Reference, Low Price, and High Price Cases with a 60% Differential, and the Reference Case Forecast Under 54% and \$20 Differentials

already experiencing challenges finding workers – and this will continue if not worsen over the next decade" (PHRCC 2011 4).

Many bitumen and other projects are currently planned (AFE 2011a), and most of these will require labour with the same skill sets. Consequently, it is reasonable to assume that any worker employed on Kearn would be able to find alternative employment at similar wages if Kearn was not built.⁶⁸

Even if there were some employment benefits from the project, these benefits would have little effect on Kearn’s social value. For example, if 15% of the employees of the project are drawn from the unemployed and the average social opportunity cost of labour for the unemployed is 56% of what project employees are paid, then the reduction

⁶⁸ The question of whether bitumen development as a whole provides incremental employment is a different question than that asked in a CBA of an individual project. The incremental employment benefits of bitumen development as a whole would need to be examined at the megaprogram level with regard to what employment opportunities might exist in the absence of bitumen development. In addition, at this larger scale of analysis, the question of distortion of the labour market from demand bidding up wages may be relevant, and thus labour may extract some of the rent in the form of wages above the opportunity cost of labour and therefore the net benefits of development may be underestimated by the rent earned by labour. See Copithorne (1979) and Gunton and Richards (1987) for a discussion of this issue in the natural resource sector.

in construction labour costs would be on the order of 7%, which translates to a 1% reduction in total project capital costs (CAPEX).⁶⁹ If 30% of labour comes from the unemployed then CAPEX is reduced by only 3%. Therefore different assumptions regarding employment benefits have a negligible impact on the CBA results.

6.5.4. Project Costs⁷⁰

In 2005 the proponents estimated \$5.5 billion CAPEX for all phases of the project, including project design and engineering with a capacity of 300,000 bpd (Imperial Oil 2005). In 2011 the proponents indicated that project capacity was being expanded to 345,000 bpd and that the capacity of the first phase was now planned at 110,000 bpd (up from 100,000 bpd)(Imperial Oil 2011b) at an estimated cost of \$10.9 billion (2011 CDN, or \$10.6 billion 2010 CDN)(Imperial Oil 2011a) I assume that the phase one 2011 CAPEX estimate is relatively accurate given that phase 1 is almost fully constructed (first production is planned for late 2012). In 2011, the proponents also indicated that the second phase would cost \$8.9 billion (2011 CDN)(Imperial Oil 2011a). At this time the proponents also indicated that they expected CAPEX for the whole project to be \$6.20 (2011 CDN) per bbl capacity and total extraction of 4.6 billion bbls of bitumen, resulting in a total CAPEX for the project of \$28.5 billion (2011 CDN), and implying that the third phase CAPEX will be \$8.5 billion (2010 CDN). Total CAPEX over time is shown in Figure 6.5. Given the pattern of cost inflation with Kearl and historical trends of cost inflation in bitumen development (McCull et al. 2008, Millington and Mei 2011), I adjust capital costs by +10% in sensitivity analysis to illustrate the impact of changes to CAPEX on the results.

⁶⁹ For this exploratory analysis I assume that half of the unemployed is voluntarily unemployed and the other half involuntarily unemployed. The social opportunity cost of labour (SOCL) of the voluntarily unemployed is wages net-of-tax (Townley 1998): the income tax rate in 2012 is 33% (federal plus Alberta), giving a SOCL of 67% of what project employees are paid. The SOCL of the involuntarily unemployed is in between an upper bound of wages net-of-tax plus benefits (assumed to be 67%) and a lower bound, the value they put on their leisure time, also called their reservation rate (assumed to be 20%)(Townley 1998) – 44%. Averaging the two SOCLs gives an average SOCL of 56% for the unemployed.

⁷⁰ Bitumen transportation costs are not assessed here as they are addressed through the price differential – see s.6.5.2.

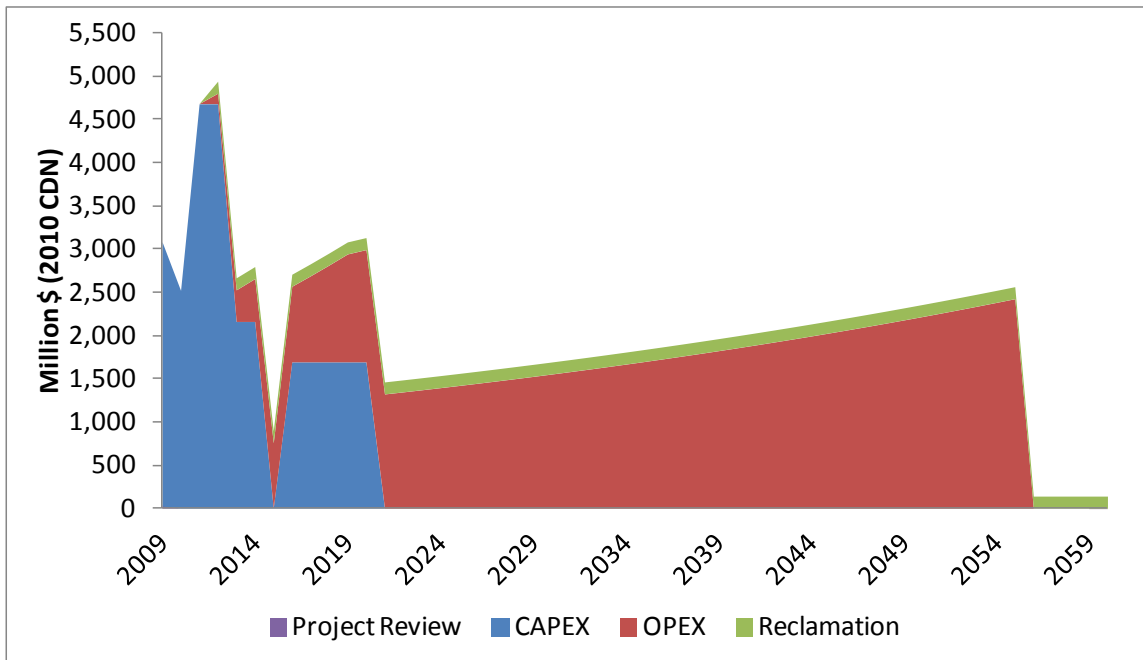


Figure 6.5. Total Costs of Production Incurred by Proponents by Type by Year in the Base Case¹

Note: 1. Pre-2009 costs carried forward to 2009. Project review, leasing, and exploration costs not shown due to their relative small size.

Modelling of operating costs (OPEX) is based on the proponents' 2005 forecast, adjusted by a real annual increase of 1.8%, which is the increase forecast by CERI (Millington et al. 2012).⁷¹ Averaged across operational years, OPEX per bbl production is \$15.10/bbl.⁷² This OPEX estimate may be low, though, considering growth in Kearn CAPEX estimates over time and the real cost increases in OPEX observed by McColl et al. (2008) in existing bitumen projects of 11.2% per year. Therefore I did a sensitivity analysis based on 10% higher OPEX. I assume that CERI's cost inflation factor (1.8% per year) reflects the lower bound of cost rises and thus do not consider a lower cost OPEX scenario.

A third cost to proponents is reclamation. The proponents indicated they would be conducting reclamation "progressively" over the life of the project, but they did not estimate these costs. CERI (Millington et al. 2012) assumes reclamation costs of 2% of

⁷¹ I assume that the proponents incorporated 'sustaining capital' in their OPEX estimate.

⁷² CERI (Millington et al. 2012) estimate OPEX of \$14.74/bbl capacity for mining.

CAPEX, which in the case of Kearn is \$555 million total, but does not explain how they derive this estimate. In a recent study focused specifically on reclamation, Lemphers et al. (2010) report that reclamation will likely cost \$220,000 to \$320,000 per hectare. Lemphers et al.'s average value of \$270,000 per hectare (ha) across the project's whole 23,000 ha gives annual costs of \$102 million. I use this value in my base case analysis. It is likely that the rate and costs of reclamation will be higher in the later years relative to early, but without more information I assume uniform annual reclamation costs across operational and final reclamation years.

The proponents incurred \$17 million in costs to pass through project review, \$5 million of which was incurred during the review panel process in 2007 alone.⁷³ To account for these costs I spread the \$12 million equally across the 2003 to 2007 years (\$2.4 million a year) and added the \$5 million for the review panel costs for 2007. These figures do not include costs incurred prior to 2003 in an initial start to the project review process over the years 1997 to 1999, but this omission should not significantly impact the final results of my CBA.

A final set of costs to proponents are payments to government for attaining and holding leases on the project lands and minerals since the 1950s, and exploration costs. Lease payments are rent payments to government and are only relevant in CBA in terms of distributional analysis. I have been unable to determine historical lease payments to government but these can be approximated using the current system (in place since 1997) of annual rental payments of \$3.50 per ha (AE 2006 #1992) – see s.6.5.17 below.⁷⁴ Exploration work occurred in the 1950s, 1998, and the winters of 2003 and 2005 (Imperial Oil and Mobil 2003, Anonymous 1998, Robertson 2003, Haggett 2003). I have no information on how much the proponents invested in exploration, but in sensitivity analysis I assume exploration costs of \$10 million (\$ 2010 CDN) in each of the years that exploration took place (1995, 1998, 2003, and 2005) to get a sense of the

⁷³ Stuart Nadeau, Environmental and Regulatory Manager, Imperial Oil, email message to author, April 26, 2011.

⁷⁴ Besides assuming that the pre-1997 tenure system charged developers the same rate as the present system, this method to estimate rental payments also ignores potential credits for exploration work (reducing rental payments to government) and potential charges for lack of development activity.

effect of exploration costs on the project's social value. Exploration costs of \$10 million for each of these years is in the right order of magnitude considering that Imperial Oil spent between \$32 and \$132 million per year on exploration across its entire Canadian operations over the years 2004 to 2008 (Imperial Oil 2009).

6.5.5. Government Costs

Many government costs related to providing infrastructure and services are implicitly accounted for by the inclusion of sales and other taxes in CAPEX and OPEX. However, these tax payments are designed to cover normal costs to government and not incremental government costs unique to a project.

One incremental cost relates to government regulatory activities during Kearl's life. As no estimate of the government's regulatory costs associated with Kearl is publicly available, I estimate government costs by assuming that the cost is proportionate to Kearl's size relative to other development. From a capacity perspective, Kearl will be 8% of all bitumen production capacity listed in 2011 to be in operation, construction, or approved for development in Alberta (Dunbar 2011) ; from an investment perspective, Kearl is 15% of all planned investment in the most recent *Alberta Inventory of Major Alberta Projects* (AFE 2011a).⁷⁵ The total costs of Alberta Environment, Alberta Energy (including the ERCB), and the Oil Sands Sustainable Development Secretariat (part of the Alberta Treasury Board) from 1997 to 2013 related to the management of bitumen development are shown in Table 6.4. Note that Kearl first entered the project review process in 1997 but then withdrew in 1999 until it re-entered the process in 2003; I assume that Kearl did not cause costs to government during the 1999-2003 period. I assume that the portion of the current and historical cost lines in Table 2 that can be attributed to Kearl are proportionate to the average of Kearl's production capacity (8%) and Kearl's CAPEX relative to other development (15%), i.e., 11.5% for the years that Kearl was under review from 1997 to 1999 and from 2003 to 2012. For the years after 2013 I assume that government will incur the average of the

⁷⁵ While the total investment listed in AFE (2011a) may be outdated given how much Imperial Oil's estimates for Kearl have risen, if all projects are more expensive then this ratio still holds.

costs in the years since Kearl was approved, i.e., from 2009 on – an average of \$20 million a year. I assume that the project posed a negligible burden on the federal government budget.⁷⁶

A second type of incremental cost to government relates to special investments that enable bitumen development. It is difficult to identify investments linked directly to bitumen development and that are incremental over and above normal government investment in infrastructure and services that is not already accounted for through the project's payments of sales, fuel, income, and property taxes. However, certain large capital investments clearly linked to bitumen development that I consider to be above and beyond normal government investment include:

- expansion of the Fort McMurray airport (\$238 million over 2011-2014);
- bridge expansion across the Athabasca River on the north side of Fort McMurray (\$123 million over 2008-2011);
- Highway 63 improvements (\$1.1 billion over 2007-2013); and
- carbon capture and storage (\$1.96 billion over 2010-2024).

Cost data for the above are found in AFE (2009, 2005, 2011a) and Alberta (2010a). I assume that 11.5% of the first three expenditures can be attributed to Kearl. See s.6.5.11 below for more details on how I address Kearl's portion of government investment in carbon capture and storage.

6.5.6. *Interference with Other Commercial Activities*

The proponent indicated in their application that trappers will be compensated for negative impacts (Imperial Oil 2005 Volume 4, p3-59), though they do not indicate the size of this compensation. I assume that this compensation is built into the proponents' CAPEX or OPEX estimates. The project will also interfere with Alberta-Pacific Forest

⁷⁶ The total expenses for the Canadian Environmental Assessment Agency for fiscal years 2011-10, 2010-9, and 2008-9 averaged \$33 million (CEA Agency 2009, 2011c, 2010b), and I assume that the portion of these costs associated with Kearl is small. Responsible Authorities, such as the Department of Fisheries and Oceans, will also incur costs of participation in environmental assessment, and I also assume these costs to be low relative to the other costs and benefits considered in this report.

Table 6.4. Government Budgets Associated with Bitumen Development Over the Years 1997 to 1999 and 2003 to 2013 (million \$ 2010 CDN)

Ministry	Program	1997-98 Actual	1998-99 Actual	1999-00 Actual	2003-04 Actual	2004-05 Actual	2005-06 Actual	2006-07 Actual	2007-08 Actual	2008-09 Actual	2009-10 Actual	2010-11 Forecast	2011-12 Estimate	2012-13 Target	2013-14 Target
Alberta Energy	ministry support services ¹	3	3	3	2	2	2	2	2	2	2	2	2	2	2
	resource dev't and mgm't ¹	74	74	74	78	71	72	76	132	176	128	100	98	98	95
	energy regulation ²	81	81	81	124	123	127	133	139	179					
AENV	ministry support services ¹	11	11	11	13	13	12	11	20	22	26	19	19	19	20
	monitoring, reporting, and information ³										15	14	17	17	17
	resource mgm't ⁴								14	14	15	17	19	19	19
	approvals ²	15	15	15	15	14	14	13	20						
	compliance and enforcement ³										11	11	11	12	12
	oil sands innovation and policy ⁵								4	7	2	2	2	2	2
	oil sands operations ⁶						2	4	3						
Alberta Treasury Board	Oil Sands Sustainable Development Secretariat ⁷							0.02	1	2	2	3	3	3	3
Total		185	185	185	233	224	229	239	336	402	201	168	171	172	170
Kearl costs (11.5% of total)		21	21	21	27	26	26	27	39	46	23	19	20	20	19

Source: Alberta (2011c). Notes: Italics signify assumed values based upon future years' figures. Blank cells indicate years in which this budget line was not relevant for Kearl. 1. Cost assumed relevant for all years that Kearl was undergoing environmental assessment, construction and operations. 2. Cost assumed relevant for all years that Kearl was undergoing environmental assessment. 3. Cost assumed relevant for all years Kearl in construction and operations. 4. Alberta Environment's resource management program begun in 2007; all years of this program are assumed relevant to bitumen development. 5. Program begun in 2007; costs for all years program in existence assumed relevant. 6. Program existed from 2005 to 2007; costs for all years of program in existence assumed relevant. 7. The Alberta Treasury Board's Oil Sands Sustainable Development Secretariat was established in 2007; costs for all years of program in existence assumed relevant.

Industries, a logging company operating in the area. According to the 2005 application, Kearn's proponents are working with Alberta-Pacific Forest Industries to integrate clearing requirements for Kearn with Alberta-Pacific Forest Industries' forestry plans so that forestry activities are not disrupted (Imperial Oil 2005). While Alberta-Pacific Forest Industries could forgo logging opportunities (and associated timber sales revenue) under this arrangement, I assume that Kearn's proponents will be required to compensate Alberta-Pacific Forest Industries for any such losses and that any such compensation is built into CAPEX or OPEX.

6.5.7. General Equilibrium Effects and Dutch Disease

There is evidence that inflation in bitumen development costs is related to the rapid rate of bitumen development, and that further inflation might occur (e.g., SCNR 2007, Vanderklippe 2012c, Millington and Mei 2011). This inflation suggests that bitumen development may be causing 'general equilibrium' effects in labour and/or other markets in Alberta and across Canada, i.e., influencing the prices of goods and services in the economy, which can impose additional costs on the rest of the economy that should be included in the CBA.

A key related effect is how expansion of oil supply in North America from Kearn may act to bring down the price of oil for all producers with potential consequences across the Canadian economy. A variety of studies examine the pricing implications of the Enbridge Northern Gateway Project (Muse Stancil 2012, Eglington et al. 2012, Allan 2012), a project which would enable bitumen producers (or other oil producers) to ship about 525,000 bpd, or about 400,000 bpd of bitumen plus diluent, to Asia, a volume similar to Kearn's planned full production. Muse Stancil (2012), for example, estimates that the Enbridge project would have a net benefit of \$24 billion (2012 CDN) over the years 2018-2035 flowing to Alberta oil producers from increases in the price of oil of up to \$3 per bbl relative to shipping the same volume into the US market. The implication of Muse Stancil's analysis is that incremental supply shipped to the US market will decrease export prices for all Canadian oil exports. The impact of incremental production from Kearn may vary from the impacts estimated in studies of the Enbridge project due to differences in aggregate export volumes and other market assumptions and would therefore require a separate study to estimate effects. Nonetheless, the

analysis in these Enbridge studies illustrates that incremental shipments to the US can have a significant impact on export prices in the order of \$24 billion net cost.

As well, there is evidence that bitumen development may be causing 'Dutch disease' – appreciation of the Canadian dollar with consequent negative effects on non-oil exporting sectors like manufacturing due to growth in oil exports. While both Bayoumi and Mühleisen (2006) and Bergevin (2006) concluded that no strong evidence of Dutch disease existed at their time of writing, evidence of Dutch disease has been growing in recent years (e.g., NEB 2011, Campbell 2011, Allan 2012, Bimenyimana and Vallee 2011, OECD 2008, Beine, Bos, and Coulombe 2011).

To incorporate such effects in this CBA, more data and analysis is required, and further analysis would be required to determine the role of a single (albeit large) bitumen project in causing these effects. I have not attempted to estimate these effects given the large challenges involved in doing so, and given that the more appropriate method for exploring such effects is general equilibrium analysis – CBA is a method of partial equilibrium analysis in which it is assumed that the project under examination does not affect prices. Exclusion of these potential costs in my analysis may mean that the NPV of Kearl estimated here is substantially overestimated. These exclusions are potentially huge in their ramifications for understanding the value of bitumen development to Canada and should be explored further in future studies.

6.5.8. Foreign Investment Effects

Foreign investment in Canada can provide incremental investment and tax revenue to Canada that wouldn't otherwise occur, but it can also mean that rent is leaked to foreigners (Little and Mirrlees 1974). Kearl involves substantial foreign investment: a large portion of Imperial Oil's shares are held outside of Canada, and Exxon-Mobil is an international corporation with shareholders around the world. Little and Mirrlees (1974) recommend three adjustments in CBA to account for foreign investment impacts.

To account for the opportunity costs of foreign capital, CAPEX could be reduced by the amount of foreign funds that wouldn't otherwise be invested in Canada if the

project didn't go ahead, as such funds have an opportunity cost of zero to Canada. A second adjustment entails accounting for incremental royalty and tax payments to Canadian governments that wouldn't otherwise occur. Third, to account for rent leakage, payments accruing to non-Canadians that are not reinvested in Canada need to be deducted.

These impacts are very difficult to estimate due to the complex dynamics of international capital markets and may not be as relevant to more developed economies with advanced capital markets – Little and Mirrlees discuss these adjustments for developing economies. Nonetheless, to test the magnitude of these effects I estimate the impact of the following assumptions:

- a foreign-financed CAPEX proportion of 40% (based on the average of foreign controlled assets and operating profit in 2008 in the oil and gas sector in Canada, the most recent year for which this data are available)(STC 2011a),
- 50% of foreign investment in Kearn is incremental to Canada, and
- 50% of profits are repatriated to foreign investors.

The result is that the effects essentially cancel each other out. Therefore, given the challenges of estimating the necessary parameters, and the fact that they seem to offset each other, I do not attempt to incorporate foreign investment effects in my CBA.

6.5.9. Depletion of Natural Capital

Consumption of natural capital is not income but the drawing down of the capacity to earn future income. As sustainability demands that future generations are not left worse off than the present generation (WCED 1987), a CBA of bitumen development must account for loss of natural capital – known as the user cost – on future generations.

Development of bitumen does not necessarily lead to a user cost, though. If a portion of the revenues earned from development are reinvested in other forms of capital providing a similar flow of income, then there is no net loss in capital (Mikesell 1992). This is the basis of El Serafy's (1989, 1989, 1991) method of natural resource accounting which attempts to estimate the portion of the proceeds from exploitation of

natural capital that must be reinvested so that the total stock of capital is maintained.⁷⁷

The method relies on the following formula:

$$\frac{X}{R} = 1 - \frac{1}{(1 + r)^{n+1}}$$

where X is true income (i.e., project rent exclusive of the portion of revenue that should be reinvested), R is net revenue (i.e., gross revenue minus costs of production including government and environmental costs, or project rent), r is a discount rate reflective of market interest rates, and n is the number of periods over which the resource is liquidated.

In the case of Kearl, the time period for resource liquidation (n) is 41 years (i.e., the expected project operational life), and using a discount rate of 8% (see s.6.5.15 below), X/R – the income content of net revenue – is 96.9%, meaning that there is a user cost of 3.1% of rent earned through Kearl if this portion of rent is not reinvested into other forms of capital. Applying this proportion to average annual net revenues gives an average annual user cost of \$29 million. If invested annually in capital offering an 8% return, and compounded annually over the life of the project, this annuity sums to a principal of almost \$11 billion by project end which can then, at project end, provide an annual flow of \$887 million in interest payments in perpetuity, a value which equals the average annual rent that I estimate will be earned through the Kearl project.

I have included this annual user cost (\$29 million in each year of operations) as a separate cost item in the CBA under the assumption of no reinvestment. The Alberta government has exhibited little savings of petroleum revenues in recent decades (AF Undated, SWFI 2009, Bimenyimana and Vallee 2011), though I expect that at least some portion of Kearl rent will be reinvested in education, infrastructure, or other forms of capital by the Alberta and federal governments, and the proponents' continued

⁷⁷ El Serafy's method is consistent with the notion of 'weak sustainability' given that it allows for the substitution of capital. Strong sustainability, in contrast, demands that all forms of capital are sustained.

investment in hydrocarbon development suggests that some portion of private rent will be reinvested. As such my user cost estimate should be considered an upper bound. In sensitivity analysis I examine the effect of no user cost to reflect 100% reinvestment of proceeds.

El Serafy's method has been applied in project evaluation by Mikesell (1992, 1989) and Santopietro (1998), but a variety of other methods also exist to estimate user cost, including net price (Repetto et al. 1989), sustainable price (von Amsberg 1993), the interest/depletion approach (Green 2000), and the marginal user cost method (Pearce and Markandya 1989). Like all methods, El Serafy's method has shortcomings. The method assumes substitutability among types of capital (Wilderer, Schoeder, and Kopp 2005, Kellenberg and Daly 1994), and it assumes constant rates of extraction, costs, and discount rates (Figueroa B, Orihuela R, and Calfucura T 2010). Also the rent estimate used to estimate user cost is not certain, and some of the rent may not reflect oil scarcity but be monopoly rent that is based on OPEC constraining production. Regardless, Santopietro's (1998) comparisons of methods to estimate the user costs of oil depletion in Argentina indicate that El Serafy's method is a reasonable means of assessing user cost.

6.5.10. Air Pollution

Key air emissions of the Kearl project are SO₂, NO_x, particulate matter 2.5 microns or smaller (PM_{2.5}), and volatile organic compounds (VOCs). Imperial Oil's estimates of average direct emissions for operational years are presented in Table 6.5. According to the proponents the project will have a marked effect on existing levels of regional NO_x, PM_{2.5}, and VOCs, but relatively little effect on SO₂ emissions.

Estimating the damage costs of air pollution to human health – the largest impact of air pollution cost-wise (Rabl 2005, Rabl and Spadaro 2000, European Commission 2003, Venema and Barg 2003) – follows four steps including (1) determining emissions, (2) examining dispersion and estimating increased pollutant concentrations in the region, (3) estimating dose from the increased pollution and quantifying associated health

Table 6.5. Proponent Estimates of Direct Air Emissions of the Kearl Project During Operations¹

Pollutant	Emissions per Day (tonnes)	Emissions per Year (tonnes)	% Incremental Contribution	% Contribution Given Potential Development ²
SO ₂	0.7	245	0.3	0.2
NO _x	43	15,578	11	8
PM _{2.5}	2	719	7	6
VOCs	74	27,014	24	16

Source: Imperial Oil (2005 Volume 5, p2-42, 2-43, 2-80). Notes: 1. All figures rounded up unless less than one. 2. Potential development is the project's contribution divided by the contribution of the project plus existing and planned future development.

impacts, and (4) monetizing these impacts (Rabl 2005, Kerr 2004, Hanley and Spash 1993). Completing this 'dose-response' method of damage costing is challenging and involves gathering data on factors such as population distribution, local air movement patterns, and health impact costs. To date little of this research has been completed with respect to bitumen air pollution.

The only damage costing study that has been completed of bitumen development is by Kerr (2004) who assessed damage costs of SO₂ and NO_x. Kerr used conservative unit damage costs from relevant studies to account for the small population of the Regional Municipality of Wood Buffalo. For my analysis I use her unit damage costs for SO₂ and NO_x and conservative factors from other studies for PM_{2.5} and VOCs (Table 6.6).

Table 6.6. Unit Damage Costs by Air Pollutant

Pollutant	Damage Cost Factor (\$ / tonne)	Reference
SO ₂	979	Kerr (2004)
NO _x	1,097	Kerr (2004)
PM _{2.5} ¹	6,719	Matthews and Lave (2000)
VOCs	1,213	Rabl and Spadoro (2000)

Note: 1. I use a damage cost factor for particulate matter of 10 microns or smaller (PM₁₀) in place of a damage cost specifically derived for PM_{2.5} as the former wasn't available, but doing so may underestimate damages due to the ability of small particles to get deeper into the lungs.

To estimate air emissions during each stage of the project I follow several steps. In their 2005 application the proponents estimated average annual SO₂ and NO_x emissions during operations of 245 tonnes per year (t/yr) and 15,578 t/yr, respectively. I adjust these estimates proportionate to production for the early years of the project, but also, given increases in planned total production capacity from 300,000 bpd to 345,000 bpd, I scale up emissions accordingly. As the proponents did not provide SO₂ and NO_x emission estimates for the construction years of the project, I estimate SO₂ and NO_x emissions assuming that emissions during construction will be the same proportion of operational SO₂ and NO_x emissions as GHG emissions during construction are to GHG emissions during operations. The proponents estimated that annual GHG construction emissions would be 3.5% of annual operations emissions, and so I estimate SO₂ and NO_x construction emissions as 3.5% of SO₂ and NO_x operations emissions. The proponents also did not estimate annual SO₂ and NO_x emissions during final reclamation emitted from heavy equipment and tailings ponds. I assume that annual construction emissions are a good approximation for emissions during each year of final reclamation. I follow the same procedures for estimating PM_{2.5} and VOC emissions.

I estimate damage costs from air pollution by multiplying my emission forecasts by the unit damage costs in Table 6.6. I estimate that the project will cause about \$79 million in air pollution costs per year once the project is in full operations, or \$0.71/bbl of production.

My air pollution damage costs are likely underestimated. Though human health impacts are the dominant component of air pollution damages, there may also be damages to agriculture, forestry, ecosystems, and other receptors. Second, I do not include damages from total reduced sulphur, arsenic, and other pollutants of the project due to a lack of information on unit damage costs. Third, I do not include emissions from pipeline transport, refining, or from consumption of the refined petroleum products (RPPs) made from Kearn's bitumen, the last two of which may be relatively large.

6.5.11. Greenhouse Gas Emissions

Bitumen development is heavily criticized for its GHG emissions due to its high emissions relative to other sources of crude oil and because total emissions from

bitumen development are forecast to grow markedly with the growth in production in the coming decades (Woynillowicz, Severson-Baker, and Reynolds 2005, IHS CERA 2010, EC 2011a, McCulloch, Raynolds, and Wong 2006). To help address these criticisms, Alberta prices carbon through its *Climate Change and Emissions Management Act (CCEMA)*.

Under the *CCEMA*, facilities emitting more than 100,000 tonnes of GHGs per year are required to reduce their emissions intensity – defined as emissions per unit of physical output – 2% a year starting from their fourth year of commercial operations until a 12% reduction in intensity is reached. Emissions intensity is measured from a baseline established in the fourth year of a facility’s commercial operations based upon its third year of operations. If facilities are not automatically going to meet their reduction target they have three ways to reach it: (1) improvements to their own operations, (2) purchasing Alberta-based offset credits, or (3) paying \$15 a tonne into the Climate Change and Emissions Management Fund (CCEMF). Each of these options has been taken in recent years by large emitters (Table 6.7). Emitters such as Kearn are likely to use the least expensive of these three options to comply with the *CCEMA*.

Table 6.7. Large Emitters’ Use of the CCEMA’s Three GHG Abatement Mechanisms

Mechanism	2007	2008	2009	2010	Average
internal improvements	42%	32%	28%	23%	31%
Alberta offsets	16%	23%	34%	35%	27%
CCEMF payments	42%	46%	38%	42%	42%

Source: CCC and Alberta (2011).

There is insufficient information available on bitumen developers’ marginal GHG abatement costs to enable modelling the effect of the *CCEMA* on the Kearn project in detail. The Pembina Institute has identified the costs of some GHG abatement options, including carbon capture and storage and offsets (McCulloch, Raynolds, and Wong 2006), and more recent, detailed studies of the marginal abatement cost curves of bitumen projects have been conducted for the Alberta government, but they are not

public.⁷⁸ Suncor (Undated-a) has pursued 'energy management' as a means of reducing its emissions intensity, and I assume that these internal improvements are less expensive than paying into the CCEMF. One abatement option not yet pursued on a facility level is carbon capture and storage. Estimates of carbon capture and storage range from \$34 to 100/t (McColl et al. 2009, McCulloch, Reynolds, and Wong 2006).

Given the lack of data on abatement costs I assume that Kearn's *CCEMA* compliance costs are \$15/t for all emissions overages, i.e., emissions subject to abatement through one of the three mechanisms provided by the *CCEMA*. I assume that all emission overages are abated and thus are not associated with GHG damage costs. In a sensitivity analysis I assume compliance costs of \$10/t for internal improvements and \$12.50/t for offsets (and \$15 for CCEMF payments) to examine the effect of lower costs for these mechanisms.

The Alberta government plans to invest \$1.96 billion investment in carbon capture and storage in 2010 through 2024 (s.6.5.5 above). I assume that the CCEMF payment portion of Kearn's *CCEMA* compliance costs over this time period (\$14 million) will help finance the carbon capture and storage investment. This accounts for Kearn's portion of the cost of the carbon capture and storage investment made by the Alberta government left unaddressed in s.6.5.5 above. Kearn's payments into the CCEMF of \$14 million will contribute 0.7% of the total cost of the \$1.96 billion investment, and as such I count 0.7% of the 5 million tonnes of GHG abatement that Alberta expects from carbon capture and storage annually as the amount of Kearn's GHGs that are abated every year after 2024, the year that the carbon capture and storage projects are expected to be completed (Alberta 2010a).

I estimate that the *CCEMA* and Kearn's investment in carbon capture and storage will marginally reduce Kearn's lifecycle GHG emissions. In 2024, for example, the year that carbon capture and storage is planned to come on-line, the *CCEMA* and carbon capture and storage will reduce Kearn lifecycle emissions by 0.7% (see below for emissions data). Over the lifecycle of the project and its bitumen I estimate that the

⁷⁸ Jotham Peters, Navius Research, email message to author, August 31, 2011.

CCEMA and Kearl's investment in carbon capture and storage only abate a total of about 13 Mt of GHGs.

To assess the damage costs of unabated emissions I assume for my base case that development of Kearl will result, at least over the long term, in fossil fuel production that wouldn't otherwise occur, and consequently Kearl will result in incrementally greater global consumption of RPPs. Under this assumption, all of the lifecycle emissions of Kearl bitumen – emissions from production (construction, operations, and reclamation), refining, consumption, and transportation between these steps – are incremental. Further, and consistent with known conventions in CBA, in the base case scenario I account for the global externalities of bitumen production and thus extend standing for GHG damages to the globe.⁷⁹ If these non-Canadian externalities are not counted in project evaluations then the vast majority of GHG damages will never be counted as with all projects the vast majority of damages will occur outside the jurisdiction in question.

To estimate construction emissions for the base case I use the proponents' estimates of emissions for construction from their 2005 application (130 kt/year) but scaled up 15% to reflect the recent expansion of the project to 345,000 bpd capacity from 300,000 bpd. To estimate emissions from production through consumption I apply IHS CERA's (2010, Table 6.8) 'mining-dilbit' emission factors for each of these stages to 87% of the bitumen produced by Kearl, the volume of RPPs that would be produced from bitumen at an average Alberta refinery.^{80, 81, 82} I assume that annual reclamation

⁷⁹ Marvin Shaffer, Economist, email message to author, June 22, 2010.

⁸⁰ I use the mining – dilbit emission factors given that no upgrader is currently planned (CAPP 2011a 5).

⁸¹ The conversion of bitumen to RPPs results in a reduction in volume to 87% because of the combined effect of two processes in Alberta refining: there is a gain in volume of about 6% through refining, but only about 83% of refinery outputs become combustible fuels (STC 2011b). While Alberta refineries may not reflect volume changes and output mixes of US refineries – IHS CERA, for example, notes that almost 100% of the outputs at some US refineries are combustible fuels – I use average Alberta refinery numbers as these are the only concrete data that I have. If the IHS CERA numbers are more reflective of the refineries that will receive Kearl bitumen, my model will underestimate GHG emissions and overestimate the project's NPV.

⁸² My methods might underestimate total incremental emissions as IHS CERA's emission factors don't include indirect emissions (e.g., emissions from the production of diesel fuel consumed by Kearl trucks) which may also be incremental with this project.

emissions will be approximately equal to annual construction emissions, as final reclamation entails a variety of construction-like activities. Emissions abated through the CCEMA and carbon capture and storage are not counted.

Table 6.8. GHG Emission Factors in the Mining-dilbit Production Chain

	Crude Production	Crude Transport	Crude Refining	Distribution of RPPs	Fuel Combustion ¹	Total
GHG emission factor (kg CO ₂ e per bbl refined petroleum product)	26	5.5	70	2.1	384	487.6

Data: IHS CERA (2010). Note: 1. The emission factor for combustion excludes emissions from combustion of petroleum coke, a by-product of refining that is typically used for electricity generation. If the emissions from petroleum coke are included the combustion emission factor is 432 kg CO₂e per bbl refined petroleum product.

The next step in damage costing is multiplying unabated emissions by a damage cost factor. There is a very wide range of estimates for unit damage costs in the literature (IPCC 2007, Tol 2011). In his most recent meta-analysis of unit damage costs, Tol (2011) finds a mean estimate across studies of \$87.48/t CO₂e (2010 CDN).^{83, 84} Accordingly, I find GHG damages of \$4.2 billion a year once the project is in full operations, or about \$37/bbl.

Tol's mean estimate implicitly accounts for the wide uncertainty in unit damage costs across the literature, including the upper side of the probability distribution pertaining to how high unit damage costs may be. However, this mean value still may not capture the potential for very large damage costs associated with the risks of catastrophic climate change (e.g., Weitzman 2008, 2010), including the expectation that damage costs will rise over the Kearl project's lifespan as global GHG concentrations grow relative to climatic tipping points (Stern 2006, IPCC 2007). Therefore, Tol's mean damage cost estimate applied to Kearl emissions may underestimate the actual damage costs of Kearl's GHG pollution.

⁸³ The damage cost from Tol was converted to \$ 2010 CDN from \$ 1995 USD.

⁸⁴ In a study that received widespread attention but also serious criticism from some climate change economists, Stern (2006) used a damage cost of \$85/t (USD, year unstated).

In sensitivity analysis I examine the effect of restricting standing for GHG damage costs to Canadians. The Canadian population in 2010 was 34 million, which was about 0.5% of the global population (AFE 2011b, World Bank 2011). I use this ratio to adjust base case GHG damages. This scenario is consistent with how standing is applied for all other impacts in this CBA (i.e., limited to Canada) but signifies externalization of GHG damages to the globe and thus is an incomplete accounting of Kearn impacts.

In a third scenario ('Within Canada GHGs') I account for only those emissions of the project emitted from Canada under the assumption that Kearn bitumen will be exported via pipeline for upgrading, refining, and consumption in the US. In this scenario only emissions from construction, production, half of transportation, and reclamation are counted. Counting half of transportation emissions reflects the approximate share of pipeline transportation of Kearn bitumen between the mine site and refineries. This third scenario may be useful to policy debates regarding the Canadian lifecycle emissions of Kearn, but also may be used if readers feel that refining- and consumption-related emissions shouldn't be treated as incremental.

Table 6.9 shows the emissions of the project over the lifecycle of the project and its bitumen. The vast majority of lifecycle emissions are associated with final consumption of RPPs, followed by refining. Almost 95% of emissions will occur downstream of the Kearn plant gate.

Table 6.9. Lifecycle GHG Emissions of the Kearn Project

Stage in Project / RPP Lifecycle	Lifecycle emissions (Mt)	Proportion of Lifecycle Emissions
Construction	1.80	0.09%
Production	104.27	5.33%
Transportation to Refinery	22.06	1.13%
Refining	280.72	14.34%
Distribution	8.42	0.43%
Consumption	1,539.95	78.65%
Final Reclamation	0.75	0.04%
Total	1,957.97	100%

6.5.12. Landscape Damages

The project site occupies 23,000 hectares. About 46% of the landscape is uplands, and 52% is wetlands including Kearl Lake. The mine site will be cleared of vegetation and soil, mined, and then reclaimed. By the project's end the landscape will be transformed – there will be an increase in uplands (+26%), a decrease in wetlands (-35%), several end pit lakes will be created, and Kearl Lake will also be expanded. During the life of the project the ecological services provided by the project site will be substantially impeded, compounding existing impacts on wildlife and vegetation (e.g., ABMI 2009, Schneider et al. 2010, Sorensen et al. 2008, CEMA 2008). The project will also interfere with the site's ability to provide cultural, recreational, and other services.

Kearl's proponents specified a variety of plans in their 2005 application for reclamation, but I made several simplifying assumptions to enable estimation of landscape damage costs:

- equal parts of forests and wetlands are damaged during each year of Kearl's development,
- landscape impacts rise linearly over the initial years of the project to a maximum compromised landscape of 50% of the project area within ten years, and
- reclamation efforts remediate the landscape at a linear rate over the final five years of the project.

I use landscape unit damage costs estimated by Anielski and Wilson (2005) pertaining to the ecosystem, cultural, and other services provided by boreal forest and wetlands in Canada of \$59.77 and \$1,089.51 per hectare per year, respectively.

Under these base case assumptions, I estimate that annual landscape damage costs rise to \$7 million in 2017 and remain at this level until the year that final reclamation begins. I assume that after the project is completed the landscape will provide the same ecological, cultural, and other services that it did prior to the project, even though the landscape will have been altered from its original physiographical character.

Three alternative scenarios in which reclamation 'fails' to some extent are possible: (1) higher reclamation costs, (2) unsuccessful reclamation, and (3) higher

reclamation costs and unsuccessful reclamation. The probability of one of the above scenarios is high for several reasons including:

- a lack of information on reclamation costs in the Kearl application suggesting that these costs – and thus the challenges of reclamation – are highly uncertain;
- the young and unproven science of reclamation in the bitumen region (Gosselin et al. 2010);
- Alberta government reclamation policy does not require that reclaimed lands provide the exact same ecological, aesthetic, and other services as before disturbance (Woynillowicz, Severson-Baker, and Reynolds 2005);
- the poor history of reclamation in mining in Canada (CESD 2002);
- the additional time it will take for the landscape to fully recover beyond the official project end date;
- the history of cost over-runs and performance shortfalls in large-scale projects (e.g., Merrow, Phillips, and Myers 1981, Flyvbjerg, Bruzelius, and Rothengatter 2003); and
- the poor financial incentive for reclamation in the Alberta government's security deposit program (Gosselin et al. 2010).

New technologies such as Suncor's Tailings Reduction Operations method may enable successful reclamation, but as yet these are unproven.

Accurately assessing the risk of the above 'reclamation failure' scenarios in the CBA requires quantitative information on both the probability and cost of each. Probability is undetermined. However, the cost of each can be estimated as permanent loss of the ecosystem services provided by the impacted landscape. I consider this scenario in sensitivity analysis.

6.5.13. Water Consumption

According to the proponents' 2005 application (Imperial Oil 2005 Volume 6), the project will be a net draw on local water resources during normal operations. The effect of the project's water consumption is most appropriately examined in terms of whether or not impact thresholds are surpassed and the degree to which those given standing in the CBA are affected. Furthermore, the project's effects must be considered alongside the water withdrawals of all other downstream and upstream water users in the watershed: the project's water consumption may pose an opportunity cost if other water users are

forced to restrict their consumption. At the same time, ecological and other services provided by the region's water resources may be impeded if impact thresholds are surpassed (Sheffer and Carpenter 2003).

The relevant threshold is referred to as instream flow needs. In 2007 the Alberta and federal governments released an interim instream flow needs framework (AENV and DFO 2007), and while recommendations for a final framework have been tabled (Ohlson, Long, and Hatfield 2010), no final instream flow needs framework has yet been established. While there are at present many sizeable scientific gaps impeding understanding of the region's water resources (Gosselin et al. 2010, Schindler, Donahue, and Thompson 2007) and there is evidence that water quality may be more of an issue with bitumen development than quantity (NRTEE 2010), the Alberta government has in recent years called on industry to limit water consumption during low flow winter months (Water Matters 2009), suggesting that thresholds are already being passed (at least in winter). With Kearn and other projects coming on-stream added to the effect of climate change, there may be more restrictions on water consumption in the future. I assume that Kearn's OPEX includes the cost of water use permits, but nonetheless the fact that restrictions are being imposed suggests that there will be an additional cost of Kearn's water consumption in terms of how other industrial users are affected and in ecological terms. Lacking data on the degree to which Kearn might contribute to future restrictions and the impact thresholds of the relevant ecosystem, I am not able to estimate water consumption-related costs and therefore water consumption costs are omitted from the NPV calculation. This omission may result in an overestimate of Kearn's NPV.

6.5.14. Water Pollution

The proponents concluded that the project will breach several government-issued water quality guidelines (Imperial Oil 2005 Volume 6). The proponents predicted that guidelines will be breached in the Muskeg River for aluminium, cadmium, chromium, copper, iron, selenium, total nitrogen, total phosphorus, and molybdenum; in the Central Firebag Tributary Wetlands for molybdenum; and in Kearn Lake for cadmium and iron. Assuming that these guidelines reflect health impact thresholds, the breaches signify possible damage costs arising from the project.

In recent years additional evidence has surfaced indicating that bitumen-related water pollution is causing human health thresholds to be surpassed. In 2006, Dr. John O'Connor, a physician working in Fort Chipewyan, concluded that the community had atypically high disease rates. Subsequent studies by Timoney (2007), Timoney and Lee (2009), and Kelly et al. (2010) identified health risks associated with water quality downstream of bitumen mining areas. A recent Royal Society of Canada review (Gosselin et al. 2010) questioned the conclusions of these studies, but it did not dispute that bitumen development is polluting the region's water.

To estimate damage costs of the Kearl project it is necessary to have pollutant unit damage costs. My review of the international Environmental Valuation Reference Inventory (EC 1999) database in the fall of 2011 did not uncover any studies of the monetary value of water quality losses that I could use. It is reasonable to assume that the project's water pollution will have a damage cost, but this cost is unquantifiable without further valuation research on the damage costs of bitumen-related water pollution. By failing to monetize this damage cost my CBA will underestimate environmental costs.

6.5.15. Discount Rate

The next steps in CBA entail calculating the project's net social benefits on an annual basis by summing benefits and costs for each year of the project, and then discounting to arrive at a NPV. I use 2009 as the base year for discounting, the year that construction started. I carry forward all costs incurred prior to 2009, and discount all costs and benefits from 2010 and future years. The choice of the discount rate to use in CBA is subject to considerable debate, with recommendations ranging from close to 0 to 12% or higher, depending on the nature of the project and CBA. Most argue that discount rates should reflect people's investment behaviour and not be set 'normatively', however others argue that this rule should not apply when there are serious sustainability concerns, such as catastrophic climate change, and therefore alternative discounting procedures should be applied. One option is time-declining (often called hyperbolic) rates (Atkinson and Mourato 2008), and another is differential discounting (e.g., Hasselmann et al. 1997) where externalities such as climate change impacts, for example, would be discounted at a low rate while private market impacts at a 'normal'

rate. The Treasury Board of Canada Secretariat (TBCS 2007) concludes that there is inadequate agreement in the literature for doing anything but using a constant rate. Given the lack of consensus, I use a range of discount rates. For my base case I use a social discount rate of 8% as recommended by the TBCS in its most recent CBA guide (TBCS 2007) – and I conduct sensitivity analyses using alternative rates of 3.5% and 12%. The 3.5% rate is consistent with recommendations of Boardman et al. (2010) and reflects many analysts sustainability concerns, and the 12% rate is recommended by the TBCS in their 1998 guidelines (TBCS 1998) and is more reflective of typical private discount rates.⁸⁵

6.5.16. Results (Base Case and Sensitivity Analyses)

The key parameters for the base case CBA and sensitivity analyses are shown in Table 6.9 and disaggregated results for the base case are presented in Table 6.10. I estimate the base case NPV of the Kearl project to be a net social cost of \$10.8 billion and the range of NPVs based on the sensitivity analyses to be between -\$27 and +\$22 billion (Table 6.11). Note that my numbers ignore several costs that I could not monetize and therefore overstate social value.

Table 6.10. Key Parameters Used in the Kearl CBA

Parameter	Unit	Base Case Value	Alternative Values Tested Under Sensitivity Analyses ¹
Years of construction	Years	12	
Years of production	Years	41	
Years of final reclamation	Years	5	
Maximum production capacity	bpd	345,000	
Production capacity utilization factor	%	89	75.7, 95
WTI price	\$ 2010 CDN	91.35 in 2012 and rising	68.90 in 2012 and rising; 116.40 in 2012 and rising

⁸⁵ The TBCS did not offer alternative rates for sensitivity analysis in their 2007 CBA guidelines.

Parameter	Unit	Base Case Value	Alternative Values Tested Under Sensitivity Analyses ¹
Bitumen price	\$ 2010 CDN	54.81 in 2012 and rising	41.34 in 2012 and rising; 81.31 in 2012 and rising
Bitumen price differential	%, \$	60%	54%, \$20
CAPEX	Million \$ 2010 CDN	29,126 (undiscounted)	+10%
Annual OPEX at full operations	Million \$ 2010 CDN / year	1,253 and rising	+10%
Annual reclamation costs starting in 2012	Million \$ 2010 CDN / year	102	
Lease rentals	\$ CDN nominal	3.50 since 1997	3.50 since 1955 ²
Exploration costs	Million \$ 2010 CDN	0	10 in each of 1955, 1998, 2003, and 2005
User cost	Million \$ 2010 CDN / year	60	0
SO ₂ damage cost factor	\$ 2010 CDN / t	979	
NO _x damage cost factor	\$ 2010 CDN / t	1,097	
PM _{2.5} damage cost factor	\$ 2010 CDN / t	6,719	
VOC damage cost factor	\$ 2010 CDN / t	1,213	
GHG damage cost factor	\$ 2010 CDN / t of CO ₂ e	87.48	
Cost of <i>CCEMA</i> compliance	\$ 2010 CDN / t abated	15 (all mechanisms)	15 (CCEMF), 12.50 (offsets), 10 (internal improvements)
GHG emissions scope	-	lifecycle (construction through to consumption)	standing limited to Canadians, limited to emissions from sources within Canada
Project area – forestlands	ha	10,580	
Project area – wetlands	ha	11,960	
Forestland damage cost factor	\$ 2010 CDN / ha	59.77	

Parameter	Unit	Base Case Value	Alternative Values Tested Under Sensitivity Analyses ¹
Wetland damage cost factor	\$ 2010 CDN / ha	1,089.51	
Reclamation failure	n/a	Unquantified	permanent 100% landscape damage costs
Discount rate	%	8	3.5, 12

Notes: 1.A blank indicates that no sensitivity analysis was conducted of a given parameter. 2. This parameter change is only examined in the distributional part of the analysis (s.6.5.17).

Table 6.11. Project Benefits and Costs in the Base Case

Category	Item	NPV (\$ million 2010 CDN) ²
Monetized	Revenue	59,116
	Project costs	-33,816
	Government costs	-351
	User cost	-298
	Environmental costs	-34,966
	GHG internalization costs ¹	-30
	Net Benefits	-10,841
Non-monetized	Pre-2003 project review costs	-
	Unmonetized air pollution	-
	Water consumption	-
	Water pollution	-
	Risk of reclamation failure	-

Note: 1. GHG internalization costs are costs associated with CCEMA compliance. 2. The "-" signs in the column are negative signs indicating negative, but non-monetized, impacts.

Changes in bitumen price forecasts have the most significant effect on the CBA results. High prices increase the project's NPV to \$10.8 billion, and low prices decrease it to -\$27.3 billion, the lowest of all scenarios. The average bitumen price over the project's operational life in which the project's NPV equals zero (i.e., the social break-even price) is \$85 (or \$142 WTI with a 60% differential). This compares to an average

Table 6.12. Net Present Values of Monetized Impacts Under Base Case and Sensitivity Analysis Scenarios (million \$ 2010 CDN)

Scenario	NPV
GHG standing limited to Canadians	21,978
Within Canada GHGs	20,255
High price	10,836
\$20 differential	10,186
3.5% discount rate	-1,349
high utilization 95%	-9,688
100% carbon capture and storage at \$55/t	-10,130
No user costs	-10,543
CCEMA compliance costs (\$15/\$12.50/\$10)	-10,831
Base case	-10,841
Reclamation failure	-10,872
Exploration costs	-11,582
CAPEX 10% increase	-11,932
OPEX 10% increase	-11,979
low utilization 75.7%	-13,778
12% discount rate	-13,483
54% differential	-16,516
Low price	-27,259

price for the base price forecast of \$71 (\$119 WTI). Changes in the differential also have a major influence: NPV rises to +\$10.2 billion with a \$20 differential, and drops to -\$16.5 billion with a 54% differential.

The way in which GHG emissions are modeled is also critical to the results. GHG damage costs of the project in the base case are highly significant: GHG costs are \$34.2 billion, which is 49% of total project costs in the base case. These damage costs stem in significant part from the limited effect of the CCEMA and carbon capture and storage (which combined I estimate reduce lifecycle emissions of the project over its whole life only 0.7%), as well as the inclusion of consumption-related emissions in the base case (about 79% of lifecycle emissions). When only GHG damages incurred by

Canadians are included the project's NPV becomes +\$22 billion because most of the GHG damage costs of the project are incurred by non-Canadians. Similarly, if only emissions emitted from within Canada are counted, then the project's NPV is +\$20.3 billion. These changes in assumptions regarding the proportion of GHG emissions to include in the damage cost estimate cause dramatic shifts in the final results. However, both of these two scenarios exclude a large proportion of damage costs and are therefore questionable. The 'GHG standing limited to Canadians' scenario ignores the vast damages that occur to the rest of the globe that stem from the project's production of fossil fuels that, at least over the long term, wouldn't otherwise be consumed. Likewise, the 'within Canada GHGs' scenario ignores emissions that will occur outside of Canada.

If Kearn upstream GHG emissions (i.e., from construction, operations, reclamation, and transportation to refineries) are captured and sequestered at a cost of \$55/t, a recent cost estimate of carbon capture and storage provided by Gosselin et al. (2010), the project's NPV rises slightly to -\$10.1 billion, still giving a private internal rate of return of 10.8%.⁸⁶ This scenario demonstrates that carbon capture and storage can have a positive, if limited, welfare-improving effect on the project, and will not undermine the economic viability of the project. The reason for the limited effect on NPV is that carbon capture and storage, in this scenario, only addresses the small proportion of GHG emissions from production and excludes the large volume of lifecycle emissions emitted downstream of the project.

The discount rate is another important parameter. At 3.5% the project's NPV rises to -\$1.3 billion; at 12% NPV drops to -\$13.5 billion. The internal rate of return of the project is 11.4% in the base case (private NPV of \$8.2 billion).

My results compare with other recent cost estimates (Table 6.12). The comparison is based on private sector impacts because the other studies do not include social costs. The comparison shows that my estimated private sector supply costs are

⁸⁶ Note that not all GHG upstream emissions are readily captured (McCulloch, Reynolds, and Wong 2006) – emissions from non-point sources, such as from mining trucks, are much more difficult to address. Accordingly, the carbon capture and storage scenario modeled should be considered illustrative.

similar to the CERI plant gate estimate. My WTI supply costs, however, are higher than the other estimates due to different assumptions regarding bitumen differential, capacity utilization, and CAPEX. When I adopt CERI's assumptions of a 10% discount rate and \$20 differential, for example, my private supply costs (WTI, Cushing) are \$85.13, which is close to the CERI estimate of \$81.51.

Table 6.13. Comparison of Supply Costs and Associated Parameters (\$ 2010 CDN)^{1, 2}

Parameter	This Study (Base Case)	CERI	ERCB ³	National Energy Board
discount rate	8%	10%	10%	10, 15%
private supply cost/bbl bitumen produced (plant gate)	\$53.36	\$61.43	-	-
private supply cost/bbl bitumen produced (WTI, Cushing)	\$88.94 ⁴ (\$85 to 99) ⁵	\$81.51	\$63 to 81 ⁶	\$65 to 75
CAPEX/bbl	\$80,259	\$72,938	\$50 to 75,000	\$60 to 75,000
bitumen:WTI differential	60%	\$20	-	-
Production capacity factor	89%	89%	-	-

Sources: CERI (2012), ERCB (2011a), and NEB (2011). Notes: 1. Dashes indicate no data provided by source. 2. The "-" signs in the column signify no data or parameter supplied in source. 3. It is unclear what year of dollars the ERCB uses. 4. Base case, estimated using the 60% bitumen:WTI differential. 5. Sensitivity analysis cases using the \$20 differential (\$85) and the 54% bitumen:WTI (\$99) differential. 6. US dollars (year unknown).

6.5.17. Distributional Analysis

The Treasury Board of Canada Secretariat (TBCS 2007) recommends that all CBAs include a presentation of the distribution of benefits and costs on major stakeholder groups. This advice fits with good practices in project review (s.3.3.2.3).

There are numerous ways in which impacts can be disaggregated by stakeholder, from qualitative methods to quantitative disaggregation including sophisticated weighting of impacts by stakeholder group (e.g., Boardman et al. 2011, TBCS 2007, Biçak, Jenkins, and Özdemirag 2002, Chambers, Saxena, and Shah 1989). For this study I report impacts by key stakeholder group for the base case assumptions

(Table 6.13). The impacts attributed to each stakeholder group are mutually exclusive and mutually exhaustive, and all sum to the NPV of the project.

I estimate that proponents – the owners of the two companies developing Kearn, as well as investors – will earn \$8.2 billion at an 8% discount rate. The internal private sector rate of return is 11.4%. It is interesting to note that, as is common in megaproject investments (s.2.6.6), investors were overly-optimistic with their CAPEX estimates: actual CAPEX has exceeded the original forecasts by a wide margin. Note that, as mentioned in s.6.5.3, it may be that labour is capturing a flow of the rent in the form of a wage premium that more than compensates for demand, a phenomenon as has been documented in other natural resource industries in Canada (Copithorne 1979, Gunton and Richards 1987). Consequently, proponents might be earning less than they otherwise might.

Assessing the fiscal impacts of projects on government is complex. Many studies include all tax revenue from the project while excluding costs to government, resulting in a significant overestimation of net revenue impacts. My approach is to assume that all normal taxes from a project (e.g., sales tax, fuel tax) are offset by normal government costs to provide services to the project and its employees (such as health care and policing). To estimate net revenue impacts I include only revenue and costs that are unique to the project compared to a more typical investment generating a normal return. In the case of bitumen development, the revenue that is unique is the revenue generated by royalties, leases and property tax payments, and corporate income taxes on rent generated by the natural resource, and the costs are special infrastructure and service costs incurred to facilitate bitumen development. Based on this analysis, I estimate that the Government of Alberta will earn \$12.2 billion – the largest net gain of any party – in the base case scenario. Numerous benefits and costs have not been monetized and are omitted from this estimate. Some lease payments, for example, are omitted due to lack of data. If one assumes that the current tenure system was in place back through to the 1950s when the proponents first took out the leases then the Alberta government's take grows an additional \$44 million and the investors take declines accordingly. The Government of Alberta could also incur future liabilities associated with the risk of reclamation failure.

Table 6.14. Distribution of Monetized and Non-monetized Benefits and Costs of the Kearn Project¹

Stakeholder	Impact(s)	NPV (\$ million 2010 CDN) ²
Proponents	Return on investment (net of revenue, project costs, corporate income tax, property tax, GHG internalization costs, royalties, rentals)	8,193
	Pre-2003 environmental assessment costs	-
	Exploration costs	-
	Historical lease payments	-
	Payments of federal withholding tax	-
	Potential reclamation failure costs	-
Government of Alberta	Net of: Alberta corporative income tax, royalties, rentals, property taxes to Regional Municipality of Wood Buffalo, Alberta government costs, user costs	12,235
	Historical lease payment receipts	+
	Potential future liabilities from reclamation failure	-
Government of Canada	Federal corporate income tax	3,696
	Incremental federal tax revenue associated with foreign investment	+
	Incremental foreign investment benefits to Canada	+
	Federal withholding tax	+
	Rent leakage out of Canada	-
	Potential future liabilities to non-Alberta taxpayers from reclamation failure	-
Externalities - Alberta	Net of GHG damages, air pollution, land damages	-747
	Unmonetized air pollution	-
	Lost services from reclamation failure	-
	Water consumption	-
	Water pollution	-

Stakeholder	Impact(s)	NPV (\$ million 2010 CDN) ²
Externalities - Rest of Canada	GHG damages	-151
Externalities - Rest of world	GHG damages	-34,068
World	Net of all of above impacts (project NPV)	-10,841

Note: 1. I estimate zero labour benefits. 2. The "-" signs in the column are negative signs indicating negative, but non-monetized, impacts. The "+" signs indicate positive impacts.

I estimate that the Government of Canada will experience a net gain from the project. The federal government will earn about \$3.7 billion in corporate income tax on rent in the base case. The federal government will also earn withholding tax on foreign earnings at a rate of between 5 and 15% depending upon which country rent is leaked to, as well as gain from incremental attraction of foreign capital. At the same time, due to the project's foreign financing, the project will also leak rent out of the country. The Canadian government may also suffer some future liabilities associated with reclamation failure if the federal government provides financial support to address reclamation failure as it has in the past with other abandoned industrial sites.

Externalities of the project flow to people all over the world but some essentially only to those living in Alberta. Albertans, particularly those in the bitumen development region including Aboriginals, will suffer many of the environmental impacts of the project. I estimate that Albertans will suffer \$747 million in GHG, air pollution, and landscape damages in the base case scenario. Albertans will also bear costs in terms of unmonetized air pollution, water consumption and water pollution, and potential lost services from reclamation failure. However, to the extent that households are taxed and receive benefits from the Government of Alberta (and the Regional Municipality of Wood Buffalo), Albertans will share in the net benefits accruing to the Alberta government in the form of lower taxes and/or increased services. Further, some Albertans may also gain to the extent that they are investors in the project.

Some people outside of Alberta may experience some of the air pollution and water impacts of the project, but the major impact on people across the rest of Canada will be GHG damages from the project of an estimated \$151 million in the base case.

Canadians outside of Alberta will also share in the net benefits that accrue to the Canadian government. Further, some Canadians outside of Alberta may also gain to the extent that they are investors in the project.

People outside of Canada will suffer an estimated \$34 billion in GHG damage costs in the base case. Despite the benefits that many of these people outside of Canada will receive from the oil from the project, these people are still net losers from the project due to the very large climate change externalities of the project.

6.6. Discussion

The CBA presented in this chapter provides new insight into the value of the bitumen development to society. The CBA provides a very different perspective on the economic impacts of Kearl than the EconIA findings prepared by Kearl's proponents. The CBA interprets many of the impacts very differently (e.g., employment, GHGs), identifies a range of impacts not considered in EconIA or in the whole review of Kearl (e.g., user costs, depletion of natural capital, government costs) and shines the light on who would seem to benefit overall, and who would seem to lose.

Sensitivity analyses played an important role in the CBA by demonstrating how the project's social value can swing markedly through changes in assumptions. With such a demonstration of variability in results it is surprising to see so little sensitivity analysis in other studies, most notably EconIAs completed by proponents in support of their project review applications, and research bodies such as CERI assessing the impacts of bitumen development across Canada for their industry and government clients.

The distributional analysis is also important because it highlights the potential for government bias towards project approval given the earning potential at stake. Any use of EconIA without a paired discussion of the NPV of a project estimated through CBA presents a very incomplete description of the impacts of a project.

Overall, the CBA results challenge many of the conclusions in the Kearl application and of the JRP itself that the project is in the public interest. While the CBA

results are highly dependent upon several uncertain parameters, notably bitumen price, project development costs, and GHG damages, the analysis nonetheless highlights the risk of this project, consistent with the megaproject experience the world over (s.2.6.8). CBA results on their own should not be the basis of decision-making, but this case study clearly demonstrates that CBA can provide critical perspective that should, at the least, be used to reflect upon the results of other methods of impact assessment.

The Kearl CBA complements the existing literature on the economic impacts of bitumen development. Like Brandie et al.'s (1982) study, I found that the Kearl project's economic viability was heavily linked to the price of oil. Like Kerr (2004), I determined that there are substantial health costs from air pollution caused by the bitumen industry, and like Shiell and Loney (2007), I found that GHG costs of Kearl are very important. Shiell and Loney concluded that their "results call into question the wisdom of planning major investments in the oil sands," and that "at the global level, exploitation of the oil sands may in fact reduce aggregate welfare rather than increase it" (2007 434). My CBA corroborates this conclusion, though it highlights how other factors, such as bitumen price, are also very influential.

Much work can still be done in this field; this study should still be considered an early application of CBA in the bitumen development context. I was not able to monetize or even quantify some of the project's impacts, such as water pollution, the potential price effects of Kearl's expanded supply to the North American oil market, and the benefits of incremental foreign investment. These omissions may balance each other out, but only through further detailed analysis can one determine more conclusively the influence of each of these impacts on the overall results. One might argue that the non-monetization (or even quantification) of some impacts in these CBAs makes the results less credible because they are incomplete. However, the opposite argument can be made: leaving the 'overly-uncertain' impacts out of the monetary tally means that greater faith can be placed in the monetary results that were generated, and it speaks to the cautious nature of the analyses. As relayed in Chapter 7, there are many weighty critiques of environmental valuation in particular, and so choosing not to value particular impacts monetarily indicates attention to these critiques and should place the monetary results that were generated in more favourable light. Non-monetized environmental impacts can still be considered in such CBAs through critical value comparisons, i.e.,

whether the monetary values of these non-monetized impacts would be large enough to reduce the NPV of the project to zero.

Future research could also make the analysis more complete. Future analyses could examine community impacts, cultural impacts, or other impacts that were not considered in this CBA. In addition, I did not examine potential energy security benefits of bitumen production, or potential geopolitical impacts of Canada having the third largest proven reserves of oil in the world and the largest reserves available for private investment. While some of these items could be argued to already be included in the analyses through consumers' willingness to pay for bitumen, it remains true that many impacts are left out of the analysis, and these omissions mean that there is room for future analysts to improve upon the CBA presented here.

Future research could also look explicitly at the question of rate of development. Research could look at how the Hotelling and Hartwick rules (e.g., Hartwick 1977) and related ideas in resource economics might be applied in bitumen development in order to maximize net benefits, and thus to build upon work such as that by Fuller and Vickerson (1987) who examined the question of the optimal rate of bitumen development.

Another important weakness of my CBA is that I relied heavily on the proponents' application for information. This information may be inaccurate due to proponent and consultant bias associated with their position as promoters of the project. Ideally information should come from independent third parties. Similarly, I relied on government water quality standards to gauge whether or not human health impacts would occur due to the project's water pollution. Ideally one would do a detailed review of these guidelines to determine if they are appropriate for this purpose, or government would provide guidance on how to properly address these types of impacts in CBAs for project reviews.

Another weakness of the CBA is that it provides limited perspective on the value of the project relative to other investment possibilities. As recommended by Berger in the quotation at the beginning of this chapter, consideration should be given to the effects of different project designs and technologies on the Kearn project's NPV, how the

imposition of stronger environmental standards would affect its NPV, and how different schedules for project construction and rate of extraction might affect its NPV (i.e., bringing in phases 2 and 3 earlier/later, or changing the capacity scales of the different phases). The latter is important also in terms of exploring how the project meshes with external economic conditions such as labour shortages and oil prices. Ideally any CBA of a bitumen project would be complemented with CBAs of other possible investments such as other bitumen projects, other energy projects (e.g., wind farms), and non-energy investments to get a sense of the relative value of each. Only through such exercises can one put the NPVs estimated in the CBA in this chapter into proper perspective and provide perspective on how valuable the Kearl project is to Canada. Such comparisons make the most sense, though, when CBA is applied to planning exercises beyond the level of individual projects (see s.7.4.2).

Despite the above limitations, the CBA presented in this chapter would seem to provide constructive input into the broader debate over bitumen development and it highlights the gaps that exist when project review omits CBA as is currently practiced (ss.5.2.5 and 5.2.10). In the next chapter I explore in more detail the strengths and weaknesses of CBA in the project review context and provide guidance on its proper role in project review.

7. Evaluation of Cost-Benefit Analysis in the Bitumen Project Review Context

7.1. Introduction

In Chapter 5 I noted that CBA is not used in reviews of bitumen project proposals despite the evidence that it is a good practice method of impact assessment, despite it being requested by the ERCB in its *Directive 023*, and despite the fact that it provides a means – as demonstrated in the Kearsley CBA case study in Chapter 6 – to directly address the project review process' two prime decision criteria: the significance of a project's effects and a project's public interest value. With this level of support and these benefits, why isn't CBA used in bitumen project review? In this chapter I evaluate CBA relative to what I describe in s.3.3.3.3 to be a sound method of impact assessment to try to help explain the absence of CBA in current bitumen project review practice and to examine the method's usefulness in megaproject review. As part of this evaluation I examine several hypotheses in the literature that attempt to explain the relative low use of CBA.

The outcome of the evaluation presented in this chapter is a better understanding of *where* and *how* CBA and its techniques and variants should fit in the project review process. There is a huge literature critiquing CBA, but little of this literature examines CBA in the context of project review, or in the context of the challenges posed by megaprojects specifically. This chapter thus adds to the existing literature by looking at CBA from the megaproject review angle specifically.

In the next section I describe the methods that I use to evaluate CBA. Following that I present the evaluation results. In the discussion following I examine the appropriate role of CBA in bitumen project review, I provide some advice on how the method should be employed. In the final section of this chapter I relate my findings to literature that attempts to explain why CBA is used relatively little.

7.2. Methods

My evaluation of CBA uses the characteristics of a sound method of impact assessment developed in s.3.3.3.3 (reproduced here in Table 7.1) as evaluative criteria. Furthermore, the evaluation is conducted with the challenges of megaproject review in mind, in line with the rest of this thesis. I evaluate CBA based upon my experience with the method in the Kearl CBA, as well as relevant arguments from the literature. My evaluation does not cover every critique of CBA but focuses on the major critiques relevant to the use of CBA in megaproject review. Similarly, my evaluation of CBA does not cover every single topic in Table 7.1 but focuses on the main issues.

Table 7.1. Criteria Defining a Sound Method of Impact Assessment

Criterion	Description
Suited to context	Method is matched to the tasks at hand and as such is appropriate to the role, types of information sought, impact types under review, types and quality of data, and any other characteristics of the analytical context.
Flexible	Method can perform well under changing circumstances.
Scientifically robust	Method's steps are sensible, and the method is logical, sensitive to inputs, produces consistent results, exhibits convergent validity, is not internally biased, and produces results that are consistent with theory.
Minimal subjectivity	Method requires few subjective inputs to be used. Any judgments required of analysts are based upon explicit criteria.
Easy to understand	Method is easily evaluated in terms of its applicability for a given review situation. Method's underlying theory, key assumptions, and results are easy to understand and communicate. Method is easy to use. Easy to see how method works and results are constructed.
Useful outputs	Outputs address the questions being asked in project review. Outputs facilitate understanding of the meaning of the project's impacts and are expressed or expressible in terms that are known and understood by users and stakeholders. Outputs are communicated in verifiable terms.
Validity	Method is viewed by all involved as an appropriate way to assess the impacts in question in the analytical context in question. Method is compatible with external conditions and existing institutions.
Inexpensive	Method is inexpensive financially, in terms of time, data, and personnel requirements.
Participative	Method is designed for participatory analysis or can easily be adapted for stakeholder participation. Method is democratic, not technocratic, in nature.

7.3. Evaluation of CBA

7.3.1. *Suited to Context*

It's likely that no method can do everything well. CBA is certainly not capable of supporting every aspect of project review, but the method is capable of providing perspective on many of the issues that arise in project review.

Suitability to Project Review

CBA is highly suited as a method of impact assessment for several reasons. First, impacts are tracked in monetary terms in CBA, and this means that impacts on different valued ecosystem components can be compared in magnitude (Arrow et al. 1996), something that few methods can do directly. A related advantage is that most people are familiar with the money metric, whereas few people are familiar with the native metrics of impacts (such as kg per unit time of air pollution, or changes in Shannon's biodiversity index). Many methods of impact assessment provide means of quantifying impacts, but only CBA (and other economic impact assessment methods) tracks impacts in monetary terms.

CBA's proficiency at impact assessment also stems from its interest in all types of impacts (Pearce, Atkinson, and Mourato 2006), a feature that EconIA and many other methods do not hold (Table 7.2). Furthermore, CBA is concerned with impacts accruing to *all* individuals (Boardman et al. 2011). EconIA, in contrast, is only concerned with its standard set of impact indicators – GDP, jobs, labour income, and tax revenue – and how people, labour and government are affected by these effects: EconIA is not interested in the many other economic impacts that projects also often cause, or how people are affected by the project in ways other than through changes in GDP, jobs, labour income, or tax revenue (s.6.2.1). Finally, CBA's proficiency at impact assessment stems from its focus on the net, or incremental, effects of a project. Net effects are a fundamental concern of impact assessment, and at least in the field of economic impact assessment, only CBA can estimate them.

It should be noted, though, that monetizing environmental impacts is often very challenging, and this weakens CBA's ability to assess impacts. While market goods are

Table 7.2. Economic Values Examined by CBA and EconIA

Economic Value	Definition	Example	CBA	EconIA
market use value	Values associated with the use of goods and services traded in markets	capital costs	✓	✓
non-market use value	Values associated with the use of something that is not normally traded in markets	atmosphere as garbage dump	✓	X
non-use values, e.g., altruistic, bequest, existence	Benefits from giving something to someone else, from being able to pass something on to future generations, from knowing that something exists, or from having the option to use something in the future	endangered boreal species	✓	X

valued in CBA based upon their market prices, non-market impacts, such as damages to the water purification services provided by marshlands cleared for surface mining, require that valuation techniques like contingent valuation are used. There is substantial literature examining the technical, practical, and moral challenges of environmental valuation (e.g., Vatn and Bromley 1994, Hanley 1992, Anonymous 1992, Boardman et al. 2011, Nelson 2006, Sagoff 1988, Gowdy 2004, Chichilnisky 1997, Kelman 1981, Hanley 2001, Gunton 1992, 2003a, Boscolo, Vincent, and Panayotou 1998, Lind 1995, Atkinson and Mourato 2008, Shaffer 2000). These challenges translate into the concern held by many critics that CBA results underrepresent environmental impacts, with the consequence that any use of CBA in project review may skew decision-making towards development at the expense of the environment.

A related limitation of CBA is its inability to deal with non-utilitarian impacts, such as project impacts that affect the rights of individuals. This was a problem in the Kearl CBA – while the monetary value of water pollution is expected to be relatively small given the small population that would be affected, water pollution may be one of the largest issues with bitumen development from an Aboriginal rights perspective given their rights as affirmed in s.35 of the *Constitution Act, 1982*. There is no means in CBA to compare or otherwise reconcile impacts on rights with monetary impacts grounded in the willingness to pay measure of impacts. It is important to recognize, though, that this critique is not solely one for CBA but for all impact assessment methods that don't explicitly address the issue of rights. CBA should not be used as a sole method of

impact assessment but complemented with other methods to provide decision-makers with multiple perspectives on a project's impacts.

It is critical to remember, though, that while environmental valuation may have hurdles to overcome, at least CBA gives voice to many project impacts by directly drawing attention to them. As Pearce and Nash (1981) write

CBA at least forces the process of evaluation to list all gains and losses and to weigh their relative values. This may seem a small future. But in a world where decisions are made more often than not on irrational assessment, it could remain the single most important attribute of any calculus designed to assist the decision-making process (4).

Even the process of attempting to value environmental impacts is beneficial in itself as it helps make explicit the linkage between projects and all of their effects. The Kearl CBA, for example, draws attention to the huge scale of GHG impacts of the project in a way profoundly different to how GHGs were addressed in the Kearl review. CBA may have many challenges in valuing environmental impacts such as GHG impacts, but at least it attempts to do this, unlike EconIA, for example, which completely ignores environmental impacts. Sound project review will use a variety of methods of impact assessment to gather information on environmental impacts, and CBA can play an important role in drawing attention to these impacts by discussing them in terms that people pay attention to and are familiar with, i.e., monetary terms.

CBA fits well with the nature and role of federal EA under the *CEAA 2012* and is well-suited to gather the types of information necessary. CBA fits with the purposes of the *CEAA 2012* regarding informing decision-making and sustainability, allows government to test a proponent's stated purposes and rationale for a project, provides a means to compare alternatives (such as alternative production capacities), can also be used in quantitative risk assessment and cumulative effects assessment, both of which are aspects of sound federal EA, and CBA's outputs relate directly to the *CEAA 2012*'s significance and justification tests (Hundloe et al. 1990). Environmental valuation can be used to help impact assessors and decision-makers interpret the significance of particular adverse effects, and NPV results of the whole project can be used to help decision-makers examine the justification of projects. The most recent guidance to

significance determination in federal EA (FEARO 1994) notes that CBA can't be used in significance determinations

because [CBA] compares the estimated environmental costs and benefits of a project, whereas the Act clearly states that only **adverse** environmental effects are to be considered (bold in original; 192)

but this conception of CBA misses the opportunity to use CBA techniques of environmental valuation to estimate the value of an adverse effect alone, i.e., without consideration of any project benefits. Further, given that neither the *CEAA 2012* nor any *CEAA 2012* policy documents provide any guidance to its significance criteria (magnitude, duration, etc.) in terms of what is too great an impact, CBA's ability to put impacts into perspective (in relation to other impacts by way of the monetary values of each) is especially helpful. The Kearl CBA in Chapter 6, for example, is helpful in identifying the relatively small scale of impacts related to the project's demands on government budgets, depletion of natural capital, and land degradation compared to the huge scale of impacts of the project's GHG emissions.

CBA may conflict, though, with the precautionary principle identified in s.4 of the *CEAA 2012*. While the *CEAA 2012* doesn't define the precautionary principle, the precautionary principle is defined in the preamble to the *Canadian Environmental Protection Act* [S.C. 1999, c.33] to mean that

where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

Therefore, while positive NPV results from CBAs (which could be used, for example, in justification decisions) imply that projects should go ahead despite any risks of negative impacts they might pose, the precautionary principle at least as it is defined in the *Canadian Environmental Protection Act* indicates that strong efforts at mitigation should regardless be prescribed in the EA process to address those risks if they pose the threat of irreversible change. In other words, positive CBA results based upon findings of expected net benefits should not be used to justify a lack of mitigation of serious risks.

CBA is useful for the ERCB's public interest test because its chief output, a project's NPV, directly refers to a project's effect on the aggregate of the values individuals hold for gains and losses associated with a project. Presumably because of this the ERCB requests in its *Directive 023* that proponents to use CBA. The analysis in Chapter 6, for example, suggests that there are more losses than gains from Kearl under the base case assumptions, and thus the project is a net loss from the point of view of the values that society holds. EconIA, in contrast, is not capable of this: EconIA informs of some economic effects of projects but cannot inform of the value of these effects to society (s.6.2.1). CBA is the only quantitative means of assessing a project's public interest value; other methods such as expert opinion, literature review, and stakeholder involvement provide qualitative means of inferring a project's public interest value.

CBA fits well with Alberta's EIA process. CBA can be used to help ensure that the EIA process fulfils its mandates of environmental protection and sustainable development, integrating environment and economic considerations into decision-making, and predicting impacts (s.4.4.3). CBA can gather information that EIA requires, such as how alternatives perform, the justifications of projects, and socio-economic impact data, and can help with health risk assessment (a role that AESRD sees for EIA).

Suitability to Megaproject Challenges

The highly controversial nature of megaprojects as reviewed in s.2.6.1 may not be alleviated if CBA is used, because CBA itself is very controversial (see s.7.3.4 below). Much of the controversy relates to environmental valuation, but even more standard components of CBA, such as discounting, are major sources of controversy.

The breadth of issues of megaprojects is theoretically not a problem for CBA to deal with. A wide variety of monetization techniques have been developed over the last several decades providing analysts with the possibility of estimating all of a project's impacts in monetary terms. However, even if not all impacts are monetized analysts can still assess them in CBA through techniques such as calculating 'critical values' to identify what monetary value the non-monetized impacts would have to be to affect the results (Shaffer 2010). Chapter 6 demonstrated that some impacts can sometimes be too difficult to monetize, but this shortfall is minor when CBA is compared to other methods: no other methods of impact assessment (aside from variants of CBA such as

multiple account analysis) provide the capacity to systematically assess such a wide range of impact types. CBA does have limitations, though, with respect to its use in assessing some types of impacts of megaprojects.

CBA is a method of partial equilibrium analysis, meaning that it is only suitable for use when the projects being studied do not affect prices in an economy, i.e., do not cause 'general equilibrium' effects. Given the tendencies of megaprojects to affect whole economies (s.2.4.2), this problem may arise often in megaproject reviews, especially if a megaprogram is underway. Certainly with the Kearn CBA this was a problem. As such, a good practices megaproject review process will use methods (such as computable general equilibrium modelling) to account for general equilibrium effects (Layman Undated, Vickerman 2007). In the megaproject and especially megaprogram contexts this limitation of CBA must be kept in mind.

CBA is vulnerable to injection of bias (such as optimism bias), political interference (e.g., by a government that wishes to manipulate results by restricting standing), and strategic manipulation by proponents (Flyvbjerg 2009), but CBA is likely no more vulnerable to this interference than EconIA or any other method of impact assessment. All methods can be manipulated to make projects look more or less favourable and thus all applications of all methods of impact assessment in megaproject reviews must be carefully scrutinized.

Techniques exist within CBA to address megaproject risks – such as expected value analysis, sensitivity analysis, and Monte Carlo analysis – though these techniques are data intensive. These techniques are not unique to CBA – they can be applied with many methods of impact assessment – and thus their data requirements are not unique to CBA applications.

Lastly, like many methods, CBA is flexible to changing impact assessment data, assumptions, or other conditions (see s.7.3.3 below), and CBA helps decision-makers 'understand the big picture' (see s.7.3.7 below).

7.3.2. Flexible

Like most methods of impact assessment that involve modelling, CBA can handle changes in data, key parameters, and assumptions. CBA is also flexible in that various forms of the method exist to enable analysts to use it under varying circumstances. For example, multiple accounts analysis (Shaffer 2010) can be used when government or stakeholders reject monetization of certain impacts, cost-effectiveness analysis (Boardman et al. 2011) can be used when benefits of projects are hard or controversial to monetize, and techniques of environmental valuation can be used to assess the scope of particular effects. CBA can be used completely or in part and to an extent that balances its benefits with its limitations in a given circumstance.

7.3.3. Scientifically Robust

CBA follows a series of logical steps that sensibly move from one to the next, and these steps fit well with the rational model of decision-making and project review. The internal logic of CBA rests perhaps on the strongest theoretical foundation of any method of impact assessment, perhaps even greater than what the field of environmental assessment itself rests upon (Pearce, Atkinson, and Mourato 2006, McAllister 1982). CBA's origins as a means of comparing economic and environmental impacts date back to the early 1800s. CBA theory was being developed by the early part of the 1900s (Hanley and Spash 1993), and over the past four or five decades CBA has been an extremely popular topic in the economic but also philosophy, environmental management, and legal literatures. Those involved in project review should take some comfort in the degree to which CBA has been examined (Gunton 1992). Nonetheless, the many aspects of CBA's internal logic that continue to be hotly debated must not be ignored when considering the usefulness of the method in megaproject review.

Many critiques of CBA concern its reliance on individuals' willingness to pay as a measure of value. A first problem gets at the heart of CBA as a method of social choice and is ethical in nature. As most famously pointed out by Arrow (1963) in his Impossibility Theorem, the aggregation of individual's preferences for some set of items will not necessarily lead to a logical, transitive ordering unless certain restrictive assumptions are made (Boardman et al. 2011). The practical issue is how to aggregate

individuals' preferences fairly and make interpersonal comparisons of utility, such as that one dollar held by one person is worth as much as one dollar held by another person. As Boardman et al. (2011) note, CBA analysts are generally content to make the assumptions necessary to allow for aggregation, and proceed accordingly, despite the ethical ramifications. Second, as Brown (1984) points out, orienting policy decisions towards willingness to pay is not necessarily consistent with maximizing welfare – people may be willing to spend a lot of money on something, indicating in CBA terms that that thing is valuable, but production and/or consumption of that same thing may be highly toxic or polluting or damaging to a community. Therefore, from a sustainability perspective, willingness to pay is a poor basis for policymaking unless it is paired with equal consideration for negative impacts and the compensation that people demand for these impacts (which, if the impact is a loss, is more appropriately measured in CBA in terms of willingness to accept (Knetsch 2007)). A third reason why willingness to pay (and its associated measure willingness to accept) is a poor basis for policy is that individuals often have little understanding of the nature of environmental goods and services, such as the value of peat lands in Northern Alberta, and so their ability to value them may be poor (McAllister 1982, Hanley 2001). For this reason, the small damage costs of Kearn's landscape impacts (s.6.5.12) might underweight this aspect of the project from an ecological sustainability perspective. Fourth, willingness to pay (or accept) also requires individuals to frame impacts monetarily, yet individuals tend to have narrow, myopic, and 'consumer' perspectives when doing so (Brown 1984, Sagoff 1988, Jacobs 1997). These individualistic perspectives may be appropriate for consumer goods like oil, but not for climate change damages which demand 'citizen' perspectives related to the broader interests of society (Sagoff 1988, Kelman 1981, Jacobs 1997, Vatn 2009). A fifth critique of willingness to pay is that it is a function of wealth, which means that CBA might be co-opted by the preferences of the wealthy (Boardman et al. 2011, Hanley 2001, Gowdy 2004, Hanley 1992, McAllister 1982). This issue is highly relevant in the oil development context as it is the world's wealthy that drive up the price of oil through their high demands for it, and as s.6.5.16 indicates, the price of oil is a key parameter affecting the CBA results.

A different problem with the internal logic of CBA has to do with discounting. Discounting allows cost-benefit analysts to aggregate future impacts with today's

impacts, even though time preference and the opportunity cost of capital mean that future impacts are worth less than today's impacts. This capability is an important benefit that CBA brings to project review, but the problem is that the logic of discounting can mean that the preferences of future generations can be discounted to such a low value in analyses of long projects that these preferences are not taken into account in current decision-making (e.g., Chichilnisky 1997). This has obvious problems in a sustainability context given that a key tenet of sustainability is that future generations should be left no worse off than present generations.

A final problem with the internal logic of CBA relevant to megaproject review regards how CBA deals with impact distribution. While CBA can provide information on the distribution of impacts (s.6.5.17), the main output – NPV – suggests that net benefits alone are sufficient to justify a project's approval. CBA relies on the Kaldor-Hicks criterion which states that a project is worthwhile if some people can be made better off even while compensating those made worse off. This criterion does not mandate that the compensation takes place, only that it is theoretically possible. The consequence is that CBA can find a project to be net socially beneficial and recommend it while ignoring the fact that no one made better off is required to compensate those left worse off, and that often it would be difficult or even impossible to do so, such as in scenarios in which a project causes global impacts.

However, despite all of the above problems with the internal logic of CBA, few other methods provide such a concrete means of actually *evaluating* a project's impacts, i.e., valuing impacts. Additionally, CBA has the rare capacity to explicitly account for the time value of impacts, something that no other method is capable of doing quantitatively (the time value of impacts could be addressed qualitatively in qualitative methods of impact assessment). The critiques in this section about CBA's scientific robustness are thus strongly tied to the fact that CBA can do things that most other methods cannot do or are not conventionally used for.

A final issue with the scientific robustness of CBA is with respect to a bias it has against qualitative and non-economic impact data. CBA demands quantitative data on impacts in order to monetize impacts. Any impacts not quantified in CBA, such as the Kearl mine's water consumption, inevitably garner less attention. With respect to non-

economic impacts, such as the effect of Kearl's air pollution, many argue that the challenges of environmental valuation mean that such impacts inevitably get diminished in analysis, meaning that they get underweighted (e.g., Sinden, Kysar, and Driesen 2009). In such cases it is clearly important to complement CBA with other forms of impact assessment that give these types of impacts adequate attention.

7.3.4. *Minimal Subjectivity*

A weakness of CBA is that many subjective judgements must be made such as who gets standing, what a project's alternative scenarios are, which techniques should be used to address issues that arise in a particular case study (e.g., should expected value analysis or Monte Carlo analysis or other techniques be used to address uncertainty?), what discount rate is appropriate, and how a project's future impacts are likely to unfold (e.g., Stirling 1997a, Broome 2008). Certainly these types of judgements had to be made in the Kearl CBA. When subjective judgements are made, they reflect the cognitive and interest biases of those making the judgements, which are themselves the product of megaproject characteristics (Chapter 2) but also the training, experience, world views, politics, and career and personal interests of those making the judgements (Nelson 2006, Kammen and Pacca 2004). CBA guidelines (e.g., TBCS 2007, US EPA 2010, Boardman et al. 2011) can help with these judgements, make them more transparent, and keep them in line with convention, but they do not provide guidance on all subjective matters that arise in CBAs, and the people that write guidelines can themselves inject their biases into the guidelines.

However, again bias in analysis is not just a problem of CBA but part of all methods of impact assessment (Matthews 1975, Otway and von Winterfeldt 1992, Anex and Focht 2002, Hollick 1981, McAllister 1982, Hanley 2001). EconIA, for example, rests on numerous subjective judgements on appropriate multipliers, appropriate methods to estimate multipliers, and cost and price scenarios. Undoubtedly numerous subjective judgements were made in the Kearl EconIA, and as Chapter 2 suggests, it is likely that these judgements were biased towards making the Kearl project look favourable. Consequently, all impact assessments should be subjected to close scrutiny, no matter what methods of impact assessment are used (s.3.3.2.4).

7.3.5. *Easy to Understand*

Some aspects of CBA are easy to understand, and others are not, though CBA may not be any more difficult to understand than other impact assessment methods. The essence of CBA is easily understood – add up the benefits and subtract the costs – and CBA’s reliance on the common metric of money helps. Beyond the basics, though, CBA, like other quantitative methods, is not simple.

Fundamental concepts in CBA like how benefits and costs are measured (willingness to pay and opportunity costs, respectively) are not normally understood by people who have not studied economics (McAllister 1982). It’s also likely difficult for many people to understand how one could generate a single final number – a project’s NPV – by examining such disparate topics as employment and land degradation. Pearce et al. (2006) suggest that there are relatively few CBA manuals because putting CBA in practice is complicated and requires experience and extensive theoretical knowledge. Gowdy (2004) contends that most economists don’t even understand CBA, and explains the continuing debates on aspects of CBA as a function of differing understandings among those involved.

Many people argue that CBA is a ‘black box’ process (Hanley 2001). This was a comment raised by a provincial government respondent in the expert survey (s.3.3.3.3). CBA is not really different in this sense from many impact assessment methods, though. The Kearn EconIA, for example, relies upon Statistic Canada’s input-output model, and this may be as difficult to understand as the data structures underlying the Kearn CBA. All sophisticated methods of impact assessment – especially quantitative methods – have a degree of opaqueness that impedes the layperson from readily understanding how results are generated. Impact assessment is a complicated affair and neither CBA nor any other sophisticated method is going to be simple to understand.

7.3.6. *Useful Outputs*

CBA is unique among impact assessment methods in terms of its ability to help impact assessors and decision-makers interpret the significance of a diverse array of impacts in a common metric and then to convert this all into a composite result that then becomes a decision recommendation (in the *CEAA 2012* context, this composite result

relates to the justification test). When CBA isn't used, project review tends to entail examining impacts one by one using different methods of impact assessment for each impact, and then decision-makers make some sort of judgement of what it all means. For example, in the Kearl EA, individual impact assessments were performed for air pollution, wildlife impacts, effects on water resources, impacts on Aboriginal groups, and on other types of impacts. For each impact type the Kearl JRP examined mitigation measures and made conclusions with respect to each impact's significance. The JRP then looked at all of this disparate information and concluded through some unspecified and opaque manner of internal computation that altogether the project was in the public interest. What CBA brings to project review is a method of measuring the extent of economic and other types of impacts in a common metric which itself communicates significance about the relative scale of each impact, and then sums all of these impacts in a systematic fashion to give a single interpretation of the net social value of a project, which is then translated into a recommendation to approve (positive NPV) or deny (negative NPV) the proposal. Of course decision-makers should use the NPV output with the limitations of CBA in mind, but regardless CBA provides what decision-makers are presumably looking for: a summary indication of the meaning of all of a project's many different types of impacts with respect to public values, and a lens from which to base approval decision-making on.

In the bitumen review context, this advantage of CBA is even more potent because the two key decision criteria of the process – the *CEAA 2012* 'likelihood of significant adverse effects' criterion and the *OSCA* 'public interest' criterion – are directly related to NPV. The NPV of individual impacts – such as the massive NPV of Kearl's GHG impacts – provides one interpretation of significance, and the NPV of the whole project provides one interpretation of the project's public interest value. Few other methods of impact assessment provide the capacity to assess impact significance in ratio data terms, and few other methods provide a systematic means of evaluating the many disparate impacts of projects and making sense of it all in terms of public preferences (i.e., values).

Despite the above arguments, many people question the usefulness of aggregating all impact information into a single measure (NPV) in CBA. Several survey

respondents questioned this approach (s.3.3.3.3), as do a number of authors. McAllister (1982), for example, writes:

[f]irst, our knowledge of what determines the welfare of society is entirely too weak to reduce it to a mathematical equation, which all grand index methods imply can be done. Thus all mathematical rating formulas must be seen for what they are: simplified approximations that yield highly questionable results. If it were otherwise, we could pursue the solution of all public issues with dogmatic certainty, which clearly we cannot. No amount of sophisticated mathematics or statistics can alter this fact. Although the extensive use of numbers and equations can make an effort appear very scientific and precise, if the end result is a grand index, it is neither (263).

Price (2000), presents a counter point, and argues that while there are issues with aggregating 'apples and oranges' this must be done regardless, whether through some other method or opaquely through some internal exercise in decision-makers' minds. Price reminds us that CBA at least forces people to be explicit about valuation and decision-making.

When not all impacts are monetized, such as with water pollution and reclamation liabilities in the Kearsley CBA, decision-makers are forced to weigh the monetized impacts with the non-monetized impacts, and in doing so they make explicit how much they value the non-monetized impacts. For example, if a CBA monetized all impacts except water pollution and found a NPV of \$1 billion, then an approval decision implies that decision-makers believe that water pollution impacts of the project amount to less than \$1 billion. CBA also puts decision-makers into a position where they can be forced to be explicit about their decisions when their decisions run counter to the findings of CBAs (Shaffer 2000). If a CBA recommends approval, but decision-makers reject a project, then the question is why. Few other methods of impact assessment put decision-makers in this position so tightly.

A second useful output of CBA is information on the distribution of impacts. Though CBA does not require distributional analysis, it can be done and is recommended (e.g., TBCS 2007, Pearce, Atkinson, and Mourato 2006, Arrow et al. 1996). As demonstrated in Chapter 6, CBA can provide concrete and interesting

information on who gains and who loses. CBA's capability to inform of the distribution of impacts may be one of its most important contribution to project review.

A third useful output of CBA is the information it provides on the economic efficiency of projects. CBA's chief output, NPV, measures economic efficiency, and efficiency matters because resources are limited – many of the political debates in most countries revolve around what taxpayers get for their tax contributions. Taxpayers especially should be interested in economic efficiency of bitumen development given the investment that taxpayers make by way of tax and royalty subsidies, research subsidies, and provision of infrastructure. Neither EconIA nor any other method of impact assessment assesses projects in terms of efficiency (Hanley 1992).

This logic advocating a method of impact assessment that looks directly at economic efficiency is not without its critics, though. Indeed a key criticism of CBA is that it does not actually tell decision-makers the things that they are most interested in (e.g., Gunton 1992, Boardman et al. 2011). Government decision-makers are typically concerned about how projects affect local employment, equity, regional development, key interest groups, and government budgets (Nelson 2006, Vining and Boardman 2007). Decision-makers are concerned about politically important factors, and CBA typically only informs of some of these topics indirectly. For example, the Kearl CBA provides information on employment, but only in vague terms. In contrast, EconIA's outputs are written directly in the language that government decision-makers are interested in – estimates of jobs, government revenue, and GDP estimates (Kinnaman 2011) – even if EconIA's estimates are often inaccurate or provide only part of the story for the reasons outlined in s.6.2.1 and s.7.3.1. As demonstrated in Chapter 6, though, CBA can be used to provide perspective on many of these things – the Kearl CBA provided clear information on government net revenues and how different stakeholder groups may be affected, and as Lee (2012) demonstrates in his review of the potential economic impacts of the Enbridge Northern Gateway pipeline proposal, CBA can be applied to come up with fairly concrete estimates of megaproject employment impacts. If CBA is to be more widely appreciated it may need to be performed with these issues in mind and results may need to be presented more clearly in the language of jobs, government revenue, stakeholder impacts, and economic output.

Another issue with CBA – but equally relevant to any method in which analysts conduct extensive sensitivity analyses – is the range of results that can be generated when uncertainties are probed through sensitivity analyses. The range of NPV results presented in Table 6.11 highlights the range of results that came out of the Kearl CBA. This wide range of results may confuse users of CBA outputs and may be seen as a weakness of the method, but the opposite case can also be seen. Impact assessment is filled with uncertainty, and all applications of impact assessment methods that don't conduct extensive sensitivity analysis do a disservice to decision-makers and stakeholders by hiding or diminishing uncertainty and impeding decision-makers and stakeholders from understanding the range of possible outcomes of project development. In the case of the Kearl CBA, the base case result is based upon notions of the most likely values of parameters, and the consistency of results showing the project will be a net social cost communicates robustness of the model. Consequently, the extensive use of sensitivity analysis in CBA means that the method produces outputs that are more useful, not less, because of the method's contribution to risk communication (s.3.3.3.12).

7.3.7. *Inexpensive*

CBA can be an expensive method of impact assessment because it is not often easy to do (Boardman et al. 2011, Hanley 2001, Sagoff 1988, Sinden, Kysar, and Driesen 2009, Vining 2009, Pearce, Atkinson, and Mourato 2006). According to Nelson (2006), the US Bureau of Land Management does little CBA because it is felt to be too expensive to justify doing most of the time. The costs of CBA can be reduced by employing the technique of 'benefits transfer' in which valuations from other studies are used instead of conducting original valuation studies (this was done for the air pollution, landscape, and GHG damage costing of the Kearl CBA). A large body of valuation studies have been completed (see Environment Canada's (EC 1999) EVRI database, for example) from which analysts can transfer environmental valuation data. Even with benefits transfer, though, CBA is still an involved process, as Chapter 6 attests.

However, the value of a method lies in consideration of the value of the results alongside the costs to get the results. Indeed when one factors in the information that

CBA can provide it may turn out to be a more efficient expenditure of research funds than that on other methods of impact assessment.

7.3.8. *Validity with Stakeholders*

The megaproject review literature is quite supportive of CBA, and so are respondents surveyed for this thesis (s.3.3.3.3), but other data suggest that CBA's validity among the broader environmental management community is less strong. CBA is widely accepted among academics (particularly economists) as a tool for project evaluation (Gunton 2003a, Kinnaman 2011, Shaffer 2010, Adamowicz 2004). Some see CBA as an essential tool but debate how it should be used (e.g., Chichilnisky 1997, Gunton 2003a). Outside of policy analysis communities the view of CBA is much less favourable, though. Planners and philosophers such as McAllister (1982) and Sagoff (1988) feel that CBA is too flawed for use in its traditional form and requires major modifications to make it useable. In contrast, EconIA receives relatively little attention in the academic literature – this may be because few academics take the method seriously, or because EconIA attempts to do far less than CBA and consequently receives less attention.

The evidence suggests that government decision-makers have mixed views of CBA. Decision-makers in the US, Canada, Australia, and elsewhere support CBA enough to require it be used to examine the costs and benefits of regulatory proposals (Rodrigo 2005, Boardman et al. 2011), and CBA is used in many countries for various environmental and other public policy initiatives (Hanley 2001), but despite all of this the method is little used overall (Atkinson and Mourato 2008, Adamowicz 2004). In s.7.4.3 below I examine various hypotheses attempting to explain method usage patterns.

7.3.9. *Participative*

CBA is traditionally a technocratic exercise, and its complexity creates an obstacle for stakeholder participation, but this doesn't mean that CBA is participation-less nor incapable of being used with the direct participation of stakeholders. An undeniable strength of CBA is that it is grounded in individuals' valuations (Pearce, Atkinson, and Mourato 2006, Hanley 2001). Prices are the basis for impact assessment

in CBA, and prices come from individuals' actions in the marketplace, or in the case of non-market valuation, are inferred from individuals' behaviour such as how much they value real estate near industrial facilities. In the Kearl CBA, for example, oil prices are in large part a function of global demand, and the value of landscape damages are based upon surveys that asked people how much they are willing to pay to preserve boreal forest and other studies that infer a monetary value of boreal forest. CBA rests on the notion that each individual is best able to judge what contributes to their own welfare (McAllister 1982). This is an important foundation of CBA, and this sets CBA apart from most methods of impact assessment in which stakeholders have no direct involvement whatsoever in shaping statements of the significance of impacts. Most methods rely on analysts to make judgements of significance. Secondly, CBA's reliance on individuals' valuations means that its outputs are the product not just of the valuations of those who tend to be involved in public policymaking but also those that tend not to be involved. Interest groups, like oil industry lobby groups and environmental groups, play prominent roles in public policy formation while the poor, less-educated, and marginalized tend not to play prominent roles. Through CBA – at least those analyses that extend standing across all groups in a jurisdiction – all stakeholders are involved by way of their market and non-market valuations (Boardman et al. 2011).

Beyond being involved through pricing, though, stakeholders are not typically involved in any direct way in CBA unless it is adapted into a more participative manner. As with the fields of planning, risk analysis, and lifecycle analysis, CBA theorists are increasingly calling for and experimenting with greater stakeholder involvement in CBA (Jacobs 1997, Stirling 1997a, Sagoff 1998, O'Neill 1997, Stirling 1997b, Campen 1986, Soderholm and Sundqvist 2003, Vatn 2009, Aslaksen and Myhr 2007, Niemeyer and Spash 2001, Atkinson and Mourato 2008). Kenyon et al. (2001), for example, have experimented with citizens' juries – gatherings of small groups of citizens – to overcome problems of environmental illiteracy and citizen vs. consumer perspectives in non-market valuation. These 'deliberative monetary valuation' techniques seem to address some of the problems of CBA, though they do have some challenges of their own (Niemeyer and Spash 2001, Sagoff 1998, Vatn 2009, Spash 2007, Hanley 2001, Price 2000, Anderson 1993). Further exploration of deliberative CBA methods is needed.

7.3.10. Summary

As the above evaluation material and the Kearl CBA case study makes clear, CBA has several important shortcomings but is nonetheless a very important method of impact assessment. One key lesson is that CBA has rare and in some cases unique capabilities that other methods do not have. An inevitable consequence of this is that CBA draws criticism in forms that other methods do not. The second key lesson is that many of the critiques that people level at CBA are applicable to alternative methods of impact assessment. Other methods of impact assessment tend to have many of the same problems as CBA, and may have other problems too. A third key lesson is that any use of CBA must be done with its limitations in mind. CBA is not meant to replace decision-making, nor is it meant to be used in isolation. Table 7.3 summarizes the evaluation in this chapter.

Table 7.3. Summary of CBA Evaluation

Criterion	Key Evaluation Points with CBA
Suited to context	<ul style="list-style-type: none"> • impacts tracked in a metric (money) that people are familiar with, unlike many other impact assessment methods • CBA measures incremental effects (<i>net</i> impacts) due to its focus on all types of impacts, opportunity costs, and what would likely happen otherwise • monetization of non-market impacts is challenging, especially non-use impacts, but CBA gives voice to wide variety of impact types and makes trade-offs explicit • fits well with purposes and information requests of the <i>CEAA 2012</i>, Alberta EIA, and ERCB public interest review • unlike many other methods, CBA provides a means of assessing significance and the public interest value of projects • suitable for comparing alternatives, quantitative risk analysis, health risk assessments, cumulative effects assessment • most suited to economic impact assessment, but useable for assessing environmental and other types of impacts • has the unique ability to assess all types of impacts together to give information on a project's 'total value' • is capable in the megaproject review context (techniques to address uncertainty, ability to assess breadth of impact types, flexible, and provides perspective on the 'big picture') unlike many other methods, but CBA may make review more controversial
Flexible	<ul style="list-style-type: none"> • multiple forms of CBA exist to address multiple analytical contexts
Scientifically robust	<ul style="list-style-type: none"> • strongest theoretical background of any method • rational in essence, but internal logic heavily criticized • many critiques of willingness to pay basis of value (e.g., maximizing willingness to pay

Criterion	Key Evaluation Points with CBA
	<p>not necessarily consistent with maximizing welfare, relies on poor understandings, consumer vs. citizen preferences, income disparities)</p> <ul style="list-style-type: none"> • problems in discounting, but the only method that exists to address the time-value of impacts • logic founded on Kaldor-Hicks criterion: ignores compensation issue • like all quantitative modeling methods, CBA is biased towards quantitative data in that qualitative data more difficult to assess and presented in less prominent way • CBA results are biased towards economic impacts – it's more difficult to assess non-economic impacts
Minimal subjectivity	<ul style="list-style-type: none"> • like all methods, many subjective judgments required
Easy to understand	<ul style="list-style-type: none"> • easy to understand on surface, but only on the surface • likely as much a 'black box' as other quantitative modeling methods
Useful outputs	<ul style="list-style-type: none"> • rare ability to aggregate all impact data into a 'grand index' result, though this is criticized by some despite the fact that aggregation happens regardless • rare ability to evaluate a project and offer a decision recommendation • forces decision-makers to be explicit in their decision-making • provides information on distribution of impacts • unique ability to inform of the economic efficiency of projects • unlike EconIA which uses indicators popular with decision-makers (e.g., jobs), standard CBA outputs are not very useful to decision-makers, though CBA can be conducted in a way that relates to decision-maker interests
Inexpensive	<ul style="list-style-type: none"> • expensive because very difficult to do, but may not be any more expensive than other methods considering inputs necessary for other methods and the scope of CBA outputs
Validity	<ul style="list-style-type: none"> • CBA viewed as essential by some academics, rejected by others • governments mandate it in some contexts, ignore it in others
Participative	<ul style="list-style-type: none"> • based upon preference data from all individuals that are given standing, but is typically carried out technocratically divorced from stakeholders • participative CBA is emerging but still immature – many impact assessment methods including EconIA are not participative at all

7.4. Discussion

7.4.1. A Role for CBA in Bitumen Project Review

Should CBA be used in bitumen project reviews? It should be apparent from the material reviewed in this chapter that the answer is yes, albeit a qualified yes. The evaluation establishes that CBA offers project review many things that other methods

cannot offer. CBA has shortcomings, but all methods have shortcomings. CBA can be used as an input into project review decision-making, as the relevant question is not 'should CBA replace other methods such as EconIA', but 'should CBA be used as one of the methods of impact assessment'?

Furthermore, even though the NPV result from a CBA implies a decision recommendation, CBA is not meant to be a replacement for the current decision-making process. CBA should not be treated as a final arbiter of decisions. CBA should simply be a part of the impact assessment process so that the information that it produces can be considered alongside the information that other impact assessment methods produce. If the CBA presented in Chapter 6 was conducted to inform Kearl project review decision-making, the appropriate response to the CBA results would be that the results should be considered alongside studies of impacts not covered well in the CBA – such as water pollution – and studies of impacts not covered at all in the CBA, such as those of how Fort McMurray will be affected by the project. As Campen (1986) argues, CBA should be used as a tool, not a rule. From this standpoint, the many critiques of CBA are diminished in importance, as the shortcomings of CBA can be addressed in part by the information produced through other methodological means.

EconIA should be one of these other means, but importantly, without CBA a void gets filled by EconIA, with all of the shortcomings of that method, to the detriment of project review which is supposed to identify sound proposals, help manage project impacts, and filter out wholly bad proposals. As the discussions in this chapter and Chapter 6 show, EconIA has many serious limitations, especially when it is marketed and received as a means of *evaluation*. Without CBA, impact assessment that is reliant solely on EconIA presents gross exaggerations of economic impacts, not simply because EconIA assesses gross impacts not net impacts, but in the other sense of the word. EconIA results are typically marketed to decision-makers and stakeholders without reference to opportunity costs, the economic ramifications of all of a project's impacts, considerations of what would've happened anyway, and uncertainties. CBA has problems, but if project review does not mandate CBA alongside EconIA, decision-makers and stakeholders are easily misled by EconIA results. EconIA can't replace CBA, but without the use of CBA, EconIA results are left to fill the void.

Consequently, picking up from the methods good practices in Chapter 3 (s.3.3.3.3), it is clear that CBA is a component of a good practice bitumen project review process as it is, overall, a sound method of impact assessment. The reservations expressed by survey respondents reported in s.3.3.3.3 may reflect misunderstandings of CBA's capabilities, the role that it is intended to play in project review, and a lack of awareness of the consequences of a lack of use of CBA.

Project review is necessary because megaprojects have a history of failing and introduce risks for society that should be analyzed prior to project approvals being considered, and CBA can play a critical role by providing a unique perspective on the impacts of projects, and a perspective that can be used, at least, as the basis for critically examining the results of other methods of impact assessment. Biophysical, cultural, and social impact assessment methods are needed to provide specific insight into a project's biophysical, cultural, and social impact potential. On the economic side, EconIAs provide only a portion of the information that is needed for sound decision-making focused on the public interest, and the private cash flow analyses that proponents conduct to help them decide whether or not to pursue a project are not provided publicly and examine only private costs and benefits and thus do not help decision-makers (and stakeholders) understand a project's social economics.

7.4.2. *How CBA Should be Used in Bitumen Project Review*

The underlying message of the above discussion is that the 'baby should not be thrown out with the bathwater'. CBA is rejected on various grounds by many people and organizations, and many of these arguments against CBA have validity, but the proper course of action is not outright rejection of CBA but use of CBA in a manner that respects the shortcomings of the method. Four paths can be taken.

One path is to use CBA in its traditional and complete form in project reviews in the assessment of a project's impacts in a way that is transparent and mindful of its limitations. Impacts can be monetized using all of the valuation techniques that CBA theorists and practitioners have developed, and these can be combined into a NPV of benefits and costs, and as long as analysts are transparent on assumptions and

limitations of these techniques, decision-makers and stakeholders can take the information output from the CBA for what it's worth.

A second path is to use CBA in project reviews but to do so in a modified way that makes sense to government and other stakeholders. There are many ways in which CBA can be adapted to address the elements of the method that are contested. For example, to address concerns about environmental valuation, one could use a 'critical value approach', i.e., what would these impacts have to be to change the NPV result from positive (or negative) to zero? The same approach can be used if there is extreme uncertainty in valuations of particular impacts (e.g., Kotchen and Burger 2007). A second and related way to deal with complaints about monetization is to conduct 'multiple accounts analysis' in which readily-monetized impacts are monetized and problematic impacts are examined in separate non-monetary accounts (e.g., Shaffer 2010). As Shaffer explains, if the goal is to inform decision-making, then there is no need to translate all impacts into a single unit (such as money) and instead impacts should be captured in the analysis in the most meaningful and empirically sound way possible. In a multiple account CBA impacts that are naturally conceived of in monetary terms are tracked in these terms, while other impacts, such as environmental and social impacts, are tracked in their native metrics. Alternatives are then compared in terms of their performance across accounts, and trade-offs can be identified in terms of their critical values, i.e., what an impact would have to be worth for a particular alternative to be favoured. A third way to deal with monetization issues is to conduct valuation using participative techniques, such as 'deliberative monetary valuation' (see s.7.3.10). Vatn (2009) advocates such techniques because they allow for discussion, learning, and the forming of preferences yet result in monetary values that can be compared with market impacts. In a similar fashion stakeholders could be brought together to deliberate on and negotiate key parameters like discount rates, or at least acceptable ranges for these parameters. Government could convene stakeholders for each project review, or more efficiently, could convene stakeholders from time to time to ensure that CBA guidelines (such as those provided by the Treasury Board of Canada Secretariat) are consistent with stakeholder interests. A fourth way to deal with monetization issues would be to use CBA strictly for the assessment of market economic impacts and to use other methods that are considered to be more capable of assessing other impact types. A fifth

way to use CBA would be to solely use methods of environmental valuation and to abstain from summing these with benefits into a summary of net impacts. In this way, CBA is used solely to assess the 'significance' of particular impacts. Using CBA in one of these modified ways to address concerns over aspects of CBA would be consistent with many CBA advocates' views of the proper role of CBA, and would address the concerns of expert survey respondents who argued, for example, that CBA "science is not robust enough to account for all potential environmental/social and economic benefits and costs" (s.3.3.3.3).

A third path is to use CBA techniques in focused studies of key project review issues, such as the social value of a project's environmental impacts, or of particular mitigation strategies. This approach reduces the tasks of the analyst to just those revolving around the impact or mitigation strategy in question and thus allows the analyst (and the review process) to reduce the workload, though this strategy may not eliminate some of the large challenges in CBA, such as those of non-market valuation.

A fourth path is to use CBA not in project reviews but in support of strategic EAs, regional EAs, or in class EAs to get at the broader issue of the social value of a particular type of development without getting into the idiosyncrasies of specific projects. Such an approach would mean that the onerous tasks in CBA are undertaken only once in these broader studies of the value of development and thus avoided at the level of project review. Used in such a manner, limited resources are focused on doing good CBA in more limited applications instead of potentially being spread thin in repeated applications of the method. One way that CBA could be used in these broader studies is by applying it to generic projects to assess their social value. Another way that CBA could be used is as a guiding framework for general equilibrium modelling to examine the social value of the industry as a whole.

Regardless of how CBA is adapted for use in or with project review, all CBAs conducted for bitumen project reviews should follow good practice conventions listed in CBA guidance materials. As such CBAs should:

- be transparent on techniques, assumptions, logic, and rationales;
- identify most likely parameter values and explore uncertainties through sensitivity analyses;

- be subject to independent oversight, particularly regarding key parameters such as discount rates and oil price forecasts;
- compare key parameters and data with other similar projects to provide a reference class forecasting orientation to the analysis; and
- provide a detailed comparison and discussion of CBA results with those of other methods of impact assessment (especially EconIA) to put all methods' outputs in perspective.

CBAs and cost-benefit analysts should also be subjected to the good practices of project review, particularly good practices pertaining to scoping, scrutiny of applications, final decision-making, legal backing, communication, stakeholder involvement, and expert involvement. As examples, in concert with final decision-making good practices, if decision-makers decide to go against CBA results they should be required to indicate why they have rejected the CBA results (Hanley 2001), and in concert with the legal foundation good practices, cost-benefit analysts should be subject to penalties for manipulation (Van Wee and Tavasszy 2008).

7.4.3. *Why So Little CBA?*

This chapter provides numerous ideas as to why CBA is not used in bitumen project review. Those in charge of project review policy, and those making day-to-day decisions on how impact assessment is conducted, may be concerned about one or more of the shortcomings of CBA identified in this chapter.

Indeed one hypothesis to explain specifically why CBA is used relatively little around the world is simply that CBA is not actually useful (Atkinson and Mourato 2008, Adamowicz 2004, Navrud and Pruckner 1997, Crookes and de Wit 2002, Boardman, Vining, and Waters 1993, Pearce, Atkinson, and Mourato 2006, Canter 1998). As discussed in s.7.3.7, CBA provides information on a project's economic efficiency, but decision-makers are often more concerned about such things as employment and economic output, despite their connection with the economic efficiency of new development. A related explanation is that CBA may not be considered necessary as the decision to approve a project (i.e., the decision to develop) may have already been made. Recall from s.5.2.14 that only 48% of survey respondents believed that bitumen project review was primarily intended to help decision-makers decide if they should

approve a project or not. If decision-makers generally feel that CBA is not useful, then they might be reminded of how economic efficiency matters but also how CBA can be performed so that it more directly informs of a project's employment impacts, tax revenue, economic output, or other topics of interest.

A second hypothesis attempting to explain the low level of use of CBA revolves around domain biases, i.e., the notion that method usage patterns reflect organizational routines, approaches, and perspectives (Howlett and Lindquist 2007, Allison 1971). The ERCB and other review bodies may have a tradition of relying upon EconIA, despite sound reasons for doing otherwise. Or, these bodies may simply not have many staff trained in economics and economic impact assessment methods, and thus CBA may be overlooked in these organizations in favour of other methods that fit with the educational backgrounds of their staff (Adamowicz 2004, Navrud and Pruckner 1997, Crookes and de Wit 2002). Navrud and Pruckner (1997) suggest that the relatively favourable view of CBA in the US relative to Europe and elsewhere is due to the long tradition of its use, but also government familiarity as there are legal requirements for CBA when regulatory changes are being considered. Boardman et al. (1993) argue that bureaucrats favour methods that support their orientation, i.e., the mandate of their agency. From this latter perspective, given the orientation of the ERCB towards development, CBA's much more reserved results compared to EconIA may have led the ERCB to favour EconIA over CBA. If this hypothesis explains low CBA usage in bitumen project reviews then there should be policy reviews within the regulating bodies on the appropriateness of their approaches, their staff's skills and expertise, as well as an audit of how these bodies influence the integrity of the review process.

A third hypothesis is that lack of awareness in government of the benefits of CBA (and/or the problems with EconIA) has led government to direct impact assessors away from using CBA (Adamowicz 2004). Navrud and Pruckner (1997) suggest that people may be unaware of the economic benefits and costs of environmental decisions. This hypothesis suggests a lack of awareness in the ERCB, government, proponents, and other stakeholders involved in bitumen project review of the pros and cons of CBA and EconIA. Again, this situation could be remedied through training of bureaucrats, ERCB staff, and JRP members.

A fourth hypothesis is that CBA is little used because it is considered to be too difficult and expensive to use, particularly in terms of time and data (Crookes and de Wit 2002, Canter 1998). Barget and Gouget (2010) suggest that EconIA is used so much compared to CBA because it is relatively easy to understand, and an OECD study concluded that low use of CBA is linked to the difficulty of valuing non-economic benefits and costs (Atkinson and Mourato 2008). If this hypothesis is accurate, then consideration might be given to the costs of poor project review, including time and money spent in hearings and addressing stakeholder concerns of projects. While the costs of employing CBA may not be justifiable when the project under review is a conventional project, the data reviewed in this thesis suggests that there are net benefits to the use of CBA in megaproject review due to megaprojects' risks.

Related to the above, a fifth hypothesis is that there has been a relative lack of guidance on how to do CBA and that this has translated into little use of the method (Navrud and Pruckner 1997, Crookes and de Wit 2002, Vining and Boardman 2007). CBA is complex, both theoretically and in practice. The ERCB's *Directive 023* provides only minimal guidance on parameters; no specific instructions are provided on how CBA (nor EconIA) should be used in project reviews. The only official guidance in Canada is provided by the Treasury Board of Canada Secretariat (TBCS 2007), and this is for how to use CBA in the regulatory impact review context, not the project review context. Many texts are available to guide CBA, such as Boardman et al. (2011) and US EPA (2010), but none of these are specifically focused on project review applications of the method. If this hypothesis explains the lack of CBA usage in bitumen project reviews, then good guidance materials need to be developed specifically describing how to conduct CBA in reviews.

A sixth hypothesis attempting to explain the low level of CBA usage is that the methodological issues of CBA translate into a lack of interest in, or a lack of trust with, the method (Adamowicz 2004, Navrud and Pruckner 1997, Crookes and de Wit 2002, Atkinson and Mourato 2008, Canter 1998). Negative opinions for CBA may be traced to experiences in the US with CBA as the method of regulatory impact analysis – CBA has come to be criticized as an “antiregulation weapon” used by those opposed to new health and environmental regulations (Revesz and Livermore 2008, DeMuth and Ginsburg 2010 878, Sinden, Kysar, and Driesen 2009), even though it may also be a

useful tool for pro-regulatory interests (DeMuth and Ginsburg 2010). While all methods have issues, this hypothesis suggests that CBA's issues are so large that the method is avoided despite the issues of other methods. An assumption of this hypothesis is that those in charge of directing which methods are used feel that the 'cost-benefit ratio' of not using CBA is positive, i.e., that the gains of non-use are greater than the losses of non-use. The evidence presented in this thesis suggests that the opposite is the case – that there are sizeable net gains to project review if CBA is used alongside other methods of impact assessment. If this hypothesis is valid then education of involved parties is needed to address this perception of a negative cost-benefit ratio to the use of CBA in project review.

A final hypothesis is that there are strategic reasons for method choice (Navrud and Pruckner 1997, Green 1997, Boardman, Vining, and Waters 1993, Hahn and Dudley 2007, Barget and Gouguet 2010). As discussed in Chapter 6, EconIA conducted for Kearsley presents rosy estimates of GDP, employment, and tax revenue effects, while CBA forecasts a much less exuberant picture of the project's impacts. Proponents of development would obviously prefer EconIA outputs over those of CBA. As well, CBA may also be in disfavour because it can show the distribution of benefits and costs – proponents may wish to keep quiet the scale of potential private returns from the exploitation of a public resource. This hypothesis makes sense when there are great gains to be made and governments and regulators are in favour of development, both of which appear to be the case. If this hypothesis is accurate then political action is necessary to force government to act in the broader public interest.

Several respondents in the expert survey commented on method choice specifically, and these respondents were in most cases cynical. One provincial government respondent argued that method choice was not about illumination but obfuscation: "how much fog will it take to get an approval." A federal government respondent wrote that

it seems to me the proponent and contractors determine the methods to be used in doing the assessment and that government simply agrees with the appropriateness of the methods.

One industry respondent wrote that methods are chosen based upon what others have used in the past “regardless of quality.” A regulator wrote that the “personal experience of senior government individuals involved can sometimes influence choice [but] not always wisely” and a consultant respondent felt that in-house government impact assessment

method choice is determined on a top-down and politicized basis, according to costs... and minimizing the chance that proposed plans... will be able to be viewed in a negative light.

A lawyer respondent observed that impact assessment is a highly manipulated affair:

[i]f a certain methodology shows significant adverse effect, then a different method is used. One common example is government guidelines like the ambient air quality guidelines. If the model shows less than the guidelines, the proponent says this equates to no adverse effects. If the model shows exceedances, then this does not equate to adverse effects - the proponent says there must be empirical evidence of adverse effects which are assumed not to exist and if no one has studied the effects then the absence of evidence is equated with evidence of absence.

While the above commentary is not conclusive evidence, it suggests that the failure to use CBA in bitumen project reviews is explained at least in part by the ‘strategic choice’ hypothesis.

The existing literature on CBA usage patterns is small and there has been little empirical testing of hypotheses. Future researchers could test these hypotheses and generate resolutions to these matters targeted to whichever factors explain sub-optimal method usage patterns. Such an exercise is outside of the scope of this thesis but is an ideal next step in order to address the CBA gap in project review. Certainly government acting in the public interest could take these steps.

8. Conclusion

8.1. Key Lessons

The objectives of this thesis were threefold: (1) to identify good practices for the review of bitumen megaproject proposals, (2) to evaluate the current process for the review of bitumen megaproject proposals, and (3) to identify means to improve the bitumen megaproject review process. Each of these three objectives has been met.

In Chapter 2 I explored the context underlying bitumen project review. I identified the defining characteristics of megaprojects and then examined bitumen development against each of these characteristics. It became clear through this process that bitumen development, like some other developments described in the literature as 'megaprojects', is of a scale greater than the typical megaproject. Bitumen development is composed of a dynamic body of conventional projects and megaprojects and it is more appropriately called a megaprogram. The most important finding in Chapter 2, though, is the identification of the challenges that megaprojects and megaprograms pose to those conducting, managing, and participating in project review. Megaprojects pose eight key challenges to project review, and when megaprojects are being developed within a megaprogram, these challenges become heightened. Consequently, megaprojects within megaprograms demand an exceptionally robust project review process if government is to ensure that only good projects are approved and projects' adverse effects are mitigated.

In Chapter 3 I synthesized three bodies of literature and the results of an expert survey to generate an improved, if more complex, list of good practices of megaproject review for the megaprogram context than what previously existed in the literature. The list of good practices includes 22 sets of practices that can be categorized into three types: practices pertaining to where project review sits within the larger system for managing the land and resources, practices pertaining to standard steps in project

review, and practices relevant to multiple steps of the review process. The good practices are based upon the EA and megaproject literatures and the feedback of 117 experts including representatives of government agencies, regulatory bodies, industry, environmental groups, and Aboriginal groups, and citizen interveners. While the practices are designed with bitumen development in mind, the practices are applicable to other megaproject review contexts. Like most 'best practices' research, this thesis did not directly examine practices in terms of their effect on outcomes, but the consistency in the results gives confidence in the validity of the good practices identified.

Chapter 5 presents a detailed evaluation of the current process for the review of bitumen megaproject proposals. The evaluation covers a wide range of topics, much wider than any previous evaluation, and thus complements existing literature that evaluates specific aspects of the current process. The results of the evaluation are multi-faceted but can be summed up as very concerning. Bitumen development is one of the most influential forces shaping Canadian society today, and this development has ramifications for Canadian (and global) energy, military, and economic security, yet the federal and Alberta processes for reviewing the merits of proposals for new bitumen projects has serious shortcomings. Most prominently there are weaknesses that seriously undermine the generation of good information from which decisions are supposed to be made, a situation I refer to as a 'foundation of unfounded faith'. The process is also poorly resourced, which contributes to a key weakness: lack of effective cumulative effects management. Other key weaknesses of the process are that its structure exacerbates conflict among proponents and opponents of development, is complex (to the extent that even some of those running the process don't know how it works), and creates massive documents that fail to identify key issues. The federal and Alberta processes are similar in many respects, but when project proposals don't trigger federal EA, the process is even weaker. A final major finding in the evaluation is that the methods of impact assessment used in reviews are lacking, particularly with respect to the central foci of review: whether or not a project is likely to cause significant adverse effects that are not justifiable in the circumstances, and the public interest value of the project. CBA is a method that can help address these issues, but is not used in bitumen project reviews, or in regional EAs or strategic EAs of bitumen development. It is for this

reason that I conduct a case study application of CBA of the Kearl mine, a megaproject currently under construction.

Chapter 6 presents the CBA case study of Kearl, and identifies a range of findings that question the current wisdom of relying on the method of EconIA to assess projects' economic impacts. EconIA is a method for assessing the *gross* impacts of a project, not *net* impacts, as it doesn't consider many costs of projects such as their environmental impacts and the opportunity costs of resources. CBA addresses these issues and therefore provides a more comprehensive evaluation of projects. The Kearl CBA concludes that the project could be a net gain to investors, and that the Alberta and federal governments could earn large tax and royalty revenues. The big losers from the project are likely to be global households given GHG impacts. Effects of the project on North American oil prices may also have a substantial negative effect across the Canadian economy. The CBA identifies costs of the project, and presents more accurate tallies of the project's net employment, tax, and royalty benefits than what is provided by EconIA. The CBA examines environmental impacts in a way that no previous impact assessment conducted for the Kearl project had done – in monetary terms – and also examines several impacts that had not been considered in the review of Kearl, such as depletion of natural capital and general equilibrium effects. In short, the CBA case study provides critical information that did not previously exist.

In Chapter 7 I evaluate CBA as a method of impact assessment using criteria developed in Chapter 3 which define a sound method of impact assessment. This chapter builds upon the literature examining the advantages and disadvantages of CBA by evaluating the method specifically in the megaproject review context. The evaluation finds that CBA has numerous shortcomings but that CBA contributes critical information to project review that is not generated by other methods. An important point raised in chapters 6 and 7 is that although EconIA is complementary to CBA and is not intended to perform the same function, EconIA is in effect a 'competitor' to CBA in terms of providing decision-makers with economic impact information. If CBA is not performed, EconIA ends up being the sole source of economic impact information on a project, which is a great problem for those interested in understanding a project's net impacts and social value. Another key finding is that CBA has the capacity to directly inform decision-making in bitumen project review. CBA can provide one interpretation of the

significance of a project's impacts, a key output of EA as required under the *CEAA 2012*, and CBA can help decision-makers with their justification decision under the *CEAA 2012* by providing perspective on the net benefits of the project despite its negative effects. Likewise, CBA can be used to distil a project's many impacts into a summary assessment of its public interest value as required under the *OSCA*. In Chapter 7 I conclude that CBA should be used in megaproject review, though as I point out in that chapter, CBA might best be used in a modified form (such as multiple account analysis) and in strategic, regional, or class EAs and not in every single project review.

All of the above lessons address the first two objectives of this thesis – identifying good practices, and evaluating the current bitumen project review process. The next and final step in this thesis is to identify ways in which the current process can be improved to shift the process to be more in alignment with good practices, and more importantly, to make it more capable of facilitating sound development in the public interest. In the next section I present recommendations to the federal and Alberta governments to guide them in converting the current project review process into a good practice process. These recommendations satisfy the third objective of this thesis and form the sixth contribution of this thesis.

8.2. Recommendations

Table 8.1 lists 83 recommendations stemming from the evaluation of the project review process presented in Chapter 5 and the evaluation of CBA in Chapter 7. All recommendations are directed at the federal and Alberta government. Note that some of these recommendations are only starting points for improvements to the current project review process – further work may be necessary to refine the recommendations to make them workable and effective.

Note that nowhere in this thesis do I advocate total suspension of bitumen development, but also nowhere do I advocate further development. The good practices presented in this thesis are intended to facilitate sound development in the public interest, and the recommendations presented in Table 8.1 are intended to transform the current review process such that it is better equipped to ensure that only sound

Table 8.1. Summary of Key Weaknesses in Current Process and Recommendations

Good Practice Set	Key Weaknesses	Recommendations
Integration with Broader Management System	<ul style="list-style-type: none"> • important gaps in high level policy that have yet to be filled (e.g., cumulative effect thresholds) • relative lack of use of regional EA, SEA, and planning • insufficient stakeholder and Aboriginal involvement in high-level policy development • lack of federal leadership in bitumen planning 	<ol style="list-style-type: none"> 1. Canada should lead the development of a national energy plan and/or a national bitumen development plan through sound stakeholder participation and Aboriginal consultation. 2. Alberta and Canada should focus on filling in gaps left by the Lower Athabasca Regional Plan immediately. To do so, Alberta and Canada should implement a process of collaborative planning involving Aboriginal and other stakeholder representatives to come to agreement on outstanding gaps in the cumulative effects management system. Alberta and Canada should commit to implementing the outcomes of these collaborative planning exercises. 3. Canada and Alberta should together conduct SEA of bitumen development policy to better understand the cumulative effects of the megaprogram. 4. Canada should publicly state a commitment to active, regular involvement in bitumen development planning and management within its jurisdictional limitations specified in the constitution.
Initial Review	<ul style="list-style-type: none"> • poor government feedback following initial review 	<ol style="list-style-type: none"> 5. Canada and Alberta should consult with proponents and other stakeholders on how to improve feedback following initial review.
Scoping	<ul style="list-style-type: none"> • no requirements to examine distribution of impacts or project success potential • projects scoped poorly, paying inadequate attention to some types of impacts including socio-economics and cumulative effects • lack of guidance from federal government and AESRD on appropriate methods of impact assessment 	<ol style="list-style-type: none"> 6. Canada and Alberta should amend project review law to require review of impact distribution and project success potential. 7. Canada and Alberta should require the CEA Agency and AESRD to examine policy pertaining to the content of terms of references, particularly with respect to ensuring that cumulative effects, socio-economic impacts, and other impacts are sufficiently assessed. 8. Canada should require the CEA Agency to identify acceptable methods of impact

Good Practice Set	Key Weaknesses	Recommendations
		<p>assessment and principles of sound impact assessment methodology, and issue more detailed guidance on significance and justification determinations.</p> <p>9. Alberta should require AESRD to identify acceptable methods of impact assessment and issue guidance to proponents on how to translate EIA results into a summary useful for decision-makers.</p> <p>Also recommendations (R)#39, 41, 42</p>
Application Preparation	<ul style="list-style-type: none"> • insufficient mechanisms to prevent biased impact assessment by proponents in their self-assessments 	<p>10. Canada and Alberta should amend project review laws to mandate that project applications clearly link those who conducted impact assessment with sections or components of applications so as to enable reviewers to identify who did what.</p> <p>11. Canada and Alberta should amend project review laws to mandate that impact assessors' qualifications are included and presented alongside sections or components of applications that these people worked on.</p> <p>12. Canada and Alberta should establish a publicly accessible database of impact assessors who contribute to bitumen impact assessment, their qualifications, and the projects and specific impact assessment components of project applications that they have contributed to.</p> <p>13. Alberta should amend the law(s) governing ERCB project review to prohibit and penalize conscious acts of misinformation and professional misconduct. Both Canada and Alberta should amend project review law to penalize negligence in impact assessment.</p>

Good Practice Set	Key Weaknesses	Recommendations
Scrutiny of Application	<ul style="list-style-type: none"> • application inadequately scrutinized for quality and bias, especially EIA content and content regarding socio-economic impacts, cumulative effects, mitigation plans, project alternatives, and project success potential • methods of impact assessment inadequately scrutinized • federal reviewers and ERCB make no commitments to review impact assessment methods • <i>Directive 023</i> requirement for CBA ignored • information and analysis gaps don't always get filled 	<ol style="list-style-type: none"> 14. Alberta should amend <i>EPEA</i> and update the 1996 MOU between AESRD and ERCB to require AESRD to scrutinize the quality of EIA report content and publicly report on this review prior to releasing the EIA report to the ERCB. 15. Canada, Alberta, and the ERCB should train review staff to enhance their capacity to scrutinize application content (including methods of impact assessment used) regarding socio-economic impacts, cumulative effects, mitigation measures, alternatives, and project success potential. 16. Canada and Alberta should issue policy directing proponents and review staff (including review panels) that requires and specifies how to ensure that project alternatives are more thoroughly examined, including justifications for chosen project designs in regards to existing problems, opportunities, and high-level policy. 17. Canada and Alberta should amend project review laws to require proponents to include information in their applications on the effectiveness of mitigation measures that they propose. 18. Alberta should require the ERCB to issue a new, final <i>Directive 023</i> within six months. The directive should require that proponents use CBA as well as EconIA to assess the economic impacts of projects, and to require that proponents discuss the limitations of CBA and EconIA in terms of informing the review process. 19. Alberta should amend the <i>OSCA</i> to elevate <i>Directive 023</i> to legal status. <p>Also: R#38, 39</p>

Good Practice Set	Key Weaknesses	Recommendations
Final Decision-making	<ul style="list-style-type: none"> • Alberta law does not require provincial final decision-makers to link their decisions to review findings and does not require the ERCB to explain its decision recommendations, contributing to poor explanations of approval decisions • no time buffer for appeals to approval decisions • non-elected officials play a strong role influencing final decision-making but there are few effective means to hold them to account for their decisions • few defences against bias towards approval due to previous tenure decision-making • terms and conditions rarely specify required outcomes and are typically expressed in non-binding recommendations and commitments to address impacts, weakening effectiveness monitoring and accountability • non-environmental impacts, such as social impacts, receive little attention in terms and conditions • no guidance for minimum content of terms and conditions of approval in law 	<ol style="list-style-type: none"> 20. Alberta should amend the <i>OSCA</i> to require the ERCB to explain its decision recommendation including how it determined that a project serves (or does not serve) the 'public interest'. 21. Alberta should amend the <i>OSCA</i> to require the Alberta cabinet to take project review findings into consideration in final decision-making and to explain how project review findings contributed to their final decision. 22. Canada should state a commitment to enforce the <i>CEAA 2012</i> requirement that JRPs provide substantive explanations for their conclusions regarding whether or not projects are likely to cause significant effects. 23. Canada and Alberta should amend the <i>CEAA 2012</i> and <i>OSCA</i> to mandate a deferral between approval decisions and when proponents are allowed to begin development. 24. Canada and Alberta should amend the <i>CEAA 2012</i> and <i>OSCA</i> to establish a legal framework for conditions of approval that specifies required content (including purposes and allowable outcomes) and enforceability provisions.
Monitoring and Enforcement	<ul style="list-style-type: none"> • few requirements for proponents to take remedial action to address poor mitigation effectiveness • widespread reliance on industry self-monitoring 	<ol style="list-style-type: none"> 25. Canada and Alberta should amend environmental management laws to require prompt remedial action by government and proponents to address poor effectiveness in mitigation measures stemming from project review decision-making.

Good Practice Set	Key Weaknesses	Recommendations
	<ul style="list-style-type: none"> • persistent problems with existing effectiveness monitoring programs 	<p>26. Canada and Alberta should disband RAMP and establish a new collaborative, multi-stakeholder effectiveness monitoring program. This program should be mandated through amendments to federal and Alberta law and should be required to monitor the breadth of economic, environmental, and social impacts of bitumen development, and be required to regularly report on findings publicly and store reports on a publicly-accessible internet database. The legal amendments should establish that the two prime revenue earners of development (industry and government) should fund the program, but the legal amendments should clarify how funders are not given special powers with respect to shaping the monitoring program – the law should establish independence of the monitoring program from the interests it is monitoring.</p> <p>27. Canada and Alberta should amend project review legislation to require a clear identification of all commitments made by proponents in applications and decision documents of the ERCB and JRPs.</p> <p>28. Canada and Alberta should amend project review law to elevate all commitments made by proponents to the legal status of conditions of approval in terms of enforceability.</p>
Process Management	<ul style="list-style-type: none"> • no Alberta staff training program • no external audit of Alberta process • internal auditing programs are weak • no auditing of process with respect to international best standards • lessons from monitoring not being passed on to future project reviews 	<p>29. Alberta should establish training programs for Alberta (including ERCB) government staff to improve their project review skills.</p> <p>30. Alberta should initiate a study to identify appropriate indicators of success for Alberta Energy's annual audit of the ERCB, report on the results of the study publicly, and implement the findings in the next year's audit.</p> <p>31. Canada should address the Auditor General's (OAGC 2009b) critiques of the CEA Agency's quality assurance program.</p>

Good Practice Set	Key Weaknesses	Recommendations
		<p>32. Alberta should amend its project review law to legally mandate a program of regular external audit of the EIA and ERCB public interest review programs.</p> <p>33. Canada and Alberta should amend project review law to require regular comparisons of the project review process with international good practices.</p> <p>34. Canada and Alberta should initiate a study of the ways in which monitoring results can be better transmitted to future project reviews and publicly report on the results.</p>
Resources	<ul style="list-style-type: none"> • inadequate resourcing by government in terms of funding, staffing, expertise • non-industry stakeholders not supported well enough 	<p>35. Canada and Alberta should increase the budgets of project review programs and hire additional review staff with expertise in economic and social impact assessment in particular.</p> <p>36. Canada and Alberta should direct additional resources towards understanding the cumulative effects of bitumen development.</p> <p>37. Canada and Alberta should increase the budgets and/or proponent funding requirements for federal and ERCB participant funding programs.</p> <p>Also: R#29, 45</p>
Methods of Impact Assessment	<ul style="list-style-type: none"> • methods of impact assessment often inappropriate • neither CBA nor reference class forecasting methods are used, despite both being 'good practice' methods of impact assessment 	<p>38. Canada and Alberta should initiate an independent evaluation of current methods of impact assessment and report publicly on results.</p> <p>39. Canada and Alberta should amend the <i>CEAA 2012</i> and <i>EPEA</i> to require reference class forecasting be used to justify impact predictions.</p> <p>40. Alberta should investigate CBA usage pattern hypotheses (s.7.4.3) in bitumen project review and take appropriate responses depending upon findings in order to enhance CBA usage.</p> <p>41. Canada and Alberta should require the CEA Agency and AESRD to identify CBA as an acceptable method of impact assessment and to articulate how it should be used in project review.</p>

Good Practice Set	Key Weaknesses	Recommendations
		<p>42. Alberta should develop a technical guide and a companion layperson's guide on CBA in bitumen project review fitting with good practice advice in the literature and the guidelines presented in s.7.4.2. The guide should be developed through consultation with a range of experts and stakeholders and be scrutinized for bias that might affect results of forthcoming CBA studies. The guide should specify acceptable discount rates and provide guidance on acceptable damage costing and sensitivity analysis techniques.</p> <p>Also: R#6, 7-9, 14-18</p>
<p>Consolidated Review Process Managed by Independent Review Body</p>	<ul style="list-style-type: none"> • process is not well consolidated, and parties involved are not well integrated • no IRB, and few government review staff are dedicated to project review tasks • government actors and the ERCB bring their biases to project review • lack of accountability of ERCB and JRP members • questionable that ERCB and JRPs have sufficient authority as they routinely approve projects despite obvious and persistent mitigation failure 	<p>43. Canada should conduct an audit the usefulness of the MPMO and report publicly on results.</p> <p>44. Canada and Alberta should initiate an independent study examining how an IRB for energy megaproject review in Canada should be implemented, including federal-Alberta jurisdictional issues and how to reshape review management given existing roles of MPMO, CEA Agency, and ERCB.</p> <p>45. Alberta should amend s.5 of the <i>ERCA</i> to mandate ERCB board membership with expertise in all of the matters arising in applications (e.g., petroleum geology and resource conservation but also environmental impact assessment, cumulative effects assessment, etc.)</p> <p>46. Canada and Alberta should amend the <i>CEAA 2012</i> and <i>OSCA</i> to prohibit the ERCB and JRPs from approving projects that will exacerbate megaprogram impacts until management frameworks, such as the objectives and thresholds legally codified in the <i>Lower Athabasca Regional Plan</i>, are developed.</p> <p>47. Canada and Alberta should initiate an independent study examining how to improve the accountability of ERCB and JRP members and publicly report on and implement results.</p>

Good Practice Set	Key Weaknesses	Recommendations
Mitigation and Maximizing Net Benefits	<ul style="list-style-type: none"> • no strong requirements for projects to substantially mitigate impacts or achieve gains in non-economic indicators • only a small subset of negative impacts must be fully mitigated; most impacts must only be mitigated to point of 'acceptability' yet no guidance on what this point is • poor mitigation success 	<p>Also R#35</p> <p>48. Canada should amend the <i>CEAA 2012</i> to clearly emphasize that federal EA is concerned not only with "adverse effects" but also benefits of projects, and that projects and their alternatives are to be assessed based upon their net benefit contributions.</p> <p>49. Canada and Alberta should initiate an independent study to examine the technical and legal procedures pertaining to how to require proponents to mitigate all substantial adverse effects. Findings should be reported publicly.</p> <p>50. Canada and Alberta should amend the <i>CEAA 2012</i> and <i>OSCA</i> to require proponents to demonstrate that their projects will result in a net improvement to society across sustainability indicators.</p> <p>51. Canada and Alberta should develop policy guiding the design of mitigation schemes, including priorities and good practices.</p>
Process Description	<ul style="list-style-type: none"> • roles, responsibilities, and authorities of involved actors not clear • ERCB has internally conflicting mandates • ambiguities in roles of AESRD, ERCB, and JRP • unclear stakeholder involvement requirements in <i>Directive 056</i> • unclear <i>in situ</i> EIA requirements • <i>Directive 023</i> is out of date • documentation explaining how the project review process is spread wide 	<p>52. Canada and Alberta should re-issue policy that clarifies roles, responsibilities, and authorities of all involved actors in the existing 1996 MOU between AESRD and ERCB and the <i>Canada-Alberta Agreement</i>.</p> <p>53. Alberta should amend laws governing the ERCB to clarify ambiguities in the board's mandate.</p> <p>54. Alberta should require AESRD to clarify EIA requirements for <i>in situ</i> project proposals.</p> <p>55. Canada and Alberta should collaboratively develop technical and laypersons' guides to the complete bitumen project review process including federal and Alberta components.</p> <p>Also: R#8, 9, 18</p>

Good Practice Set	Key Weaknesses	Recommendations
Legal Foundation	<ul style="list-style-type: none"> • too much discretion built into the <i>CEAA 2012</i> • no legal test of <i>CEAA 2012</i>'s 'significantly adverse effect' and justification criteria • no legal test for ERCB public interest criterion • purpose of project review to inform decision-making not listed in Alberta law • evidence that project review may not be genuinely intended to assist decision-makers in informing approval decisions • high levels of discretion in Alberta legal framework • legal status of ERCB directives unclear • Alberta process not legally protected when harmonized with federal EA 	<p>56. Canada and Alberta should amend project review laws to reduce discretion through the use of mandatory language. Canada and Alberta should expand legal codification of the federal and Alberta project review process to convert existing policy (such as with respect to federal SEA) into law.</p> <p>57. Canada and Alberta should amend the <i>CEAA 2012</i> and <i>OSCA</i> to specify legal tests of the 'significant adverse effect', justification, and 'public interest' criteria.</p> <p>58. Alberta should amend the <i>EPEA</i> and <i>OSCA</i> to specify the purpose of EIA and public interest review is to inform decision-making.</p> <p>59. Alberta should clarify the legal status of ERCB directives by ensuring that all directives are referred to in Alberta project review law.</p> <p>60. Alberta should amend the <i>EPEA</i> and <i>OSCA</i> to indicate minimum requirements of a federal-Alberta harmonized review process.</p> <p>Also: R#19, 53 and 54</p>
Structured Decision Procedures	<ul style="list-style-type: none"> • key decision criteria related to project approval decisions are poorly defined 	<p>R#8, 57</p>
Communication	<ul style="list-style-type: none"> • poor communication of monitoring results • confidentiality restrictions in the <i>CEAA 2012</i> • stakeholder dissatisfaction with government and industry communication 	<p>61. Canada should amend the <i>CEAA 2012</i> to mimic Alberta's laws with respect to confidentiality and stakeholder access to confidential information.</p> <p>62. Canada and Alberta should create a single communication portal for bitumen project review documentation, notices, monitoring results, etc., including a single web registry of documentation.</p> <p>Also: R#26, 27</p>

Good Practice Set	Key Weaknesses	Recommendations
Stakeholder Participation	<ul style="list-style-type: none"> • no commitment to stakeholder involvement in laws governing the ERCB • ERCB limits standing to those potentially 'directly and adversely' affected • no obvious mechanisms for stakeholder learning • no involvement opportunities in terms of monitoring • ERCB heavily restricts who can receive funding support • process is relatively unsuccessful at resolving conflict between involved parties • involvement constitutes 'placation' at best 	<p>63. Canada and Alberta should initiate an independent study of options and means for implementing shared decision-making in the project review context and publicly report on results.</p> <p>64. Alberta should amend the <i>OSCA</i> to unambiguously establish stakeholder interests as a component of the public interest.</p> <p>65. Canada and Alberta should amend the <i>CEAA 2012</i> and <i>OSCA</i> to widen standing in hearings beyond 'direct material interests' so that public members without direct material interests have an opportunity to represent the broader public interest.</p> <p>66. Canada and Alberta should amend environmental management law to mandate stakeholder involvement in compliance and effectiveness monitoring.</p> <p>Also: R#57</p>
Expert Involvement	<ul style="list-style-type: none"> • institutional laxity regarding quality of expert input • little concern for peer-reviewed input • undue faith in the quality of application content • qualifications of experts are often checked in confrontational environment of 'duelling experts' • hearings not focused on constructing shared, high-quality knowledge • experts not used in a manner that checks their bias 	<p>67. Canada and Alberta should alter the structure of hearing processes such that experts are not hired by proponents or interveners but are hired by review panels (but paid for by proponents and government reflective of expected rent earnings from project) to provide independent, unbiased opinions on contentious issues.</p> <p>Also: R#10-13</p>
Precautionary Process	<ul style="list-style-type: none"> • quality of risk assessment low • passive adaptive management, not active adaptive management • no specific mechanisms to address risks associated with 	<p>68. Alberta should amend project review law to state that Alberta decision-makers must use the precautionary approach in their decision-making, and Alberta should articulate this approach in a policy statement.</p> <p>69. Canada and Alberta should initiate a joint</p>

Good Practice Set	Key Weaknesses	Recommendations
	<p>new technology</p> <ul style="list-style-type: none"> • poor risk communication to decision-makers and stakeholders • project review laws pay little explicit attention to risk 	<p>and independent research program targeting key scientific uncertainties of impacts of bitumen development such as pollution of the Athabasca River. This program should be directed by government, industry and other stakeholders and be funded by government and industry.</p> <p>70. Canada and Alberta should both develop policy directing that impact assessment of projects proposing new technologies is conducted with caution, including that new technologies are tested in limited fashions.</p> <p>71. Canada and Alberta should amend the <i>CEAA 2012</i> and <i>EPEA</i> to require proponents to submit a statement of the key uncertainties and risks posed by the project within their applications.</p> <p>Also: R#25, 26</p>
Appeal Mechanisms	<ul style="list-style-type: none"> • standing rules are limiting when appeals go to the ERCB • appeals to the courts expensive • appeals on matters of substance go to the ERCB, therefore no independent appellate body 	<p>72. Alberta should amend the <i>ERCA</i> to extend appeals of ERCB decisions to a broader range of stakeholders in concert with extensions to the ERCB's 'directly and adversely affected' standing criterion (R#65).</p> <p>73. Alberta should establish an independent appellate body for the purposes of receiving appeals over the substance of ERCB decisions <i>or</i> expand jurisdiction and skill set of Alberta Environmental Appeals Board to enable hearing of appeals over the substance of ERCB decisions <i>or</i> amend <i>ERCA</i> to provide statutory rights to appeal the substance of ERCB decisions to the courts.</p> <p>74. Canada should amend the <i>CEAA 2012</i> to provide statutory rights of appeal to an independent appellate body over procedure and substance in <i>CEAA 2012</i> decisions.</p>

Good Practice Set	Key Weaknesses	Recommendations
Obligations to Indigenous Peoples Met	<ul style="list-style-type: none"> • Aboriginals strongly dissatisfied • delegation of consultation to proponents • consultation policy rejected by Alberta First Nations • lack of Alberta Métis consultation strategy • lack of criteria structuring decisions over the sufficiency of accommodation • Alberta has unilaterally curtailed scope of issues and obligations • lack of engagement of Aboriginals in strategic decision-making 	<p>75. Alberta should rewrite its policy with respect to Aboriginal consultation such that it requires itself, not proponents, conduct consultation.</p> <p>76. Alberta should initiate a reworking of First Nations consultation policy and guidelines through a collaborative process involving First Nations.</p> <p>77. Alberta should develop a Métis consultation policy and guidelines through a collaborative process involving Métis.</p> <p>78. Canada, in collaboration with Aboriginal groups, should develop and publish criteria to structure decision-making over the sufficiency of consultation and accommodation.</p> <p>79. Canada and Alberta should amend the <i>CEAA 2012</i>'s and ERCB's 'direct adversely affected' tests to expand standing to Aboriginals whose rights, traditional uses, and interests are affected by proposed projects.</p> <p>80. Canada and Alberta should initiate Aboriginal consultation on bitumen high-level policy.</p> <p>Also: R#1-4</p>
Minimal Public Investment in Project	<ul style="list-style-type: none"> • government indirectly invests more than necessary • Alberta government provides incentives for uneconomic development 	<p>81. Alberta should convene a new royalty review panel with terms of reference oriented towards revisiting whether Albertans 'get their fair share', including consideration of Plourde's (2009, 2010) findings that the new system retains favourable terms for industry.</p> <p>82. Canada and Alberta should continue to reduce federal and Alberta subsidies to the bitumen industry.</p> <p>83. Canada and Alberta should develop policy requiring industry to bear a greater portion of infrastructure and environmental externalities associated with bitumen development. Canada and Alberta should direct project reviewers to use this policy in prescribing approval conditions (e.g., proponent X will contribute to the costs of program Y).</p>

development is allowed to go ahead. However, given the many problems with bitumen development today (Chapter 2) and the many problems in the project review process identified in this thesis, it does seem appropriate that the Alberta and federal governments halt new approvals until the recommendations in Table 8.1 are substantially addressed.

Perhaps the most important set of recommendations are those related to the need to strengthen the broader management system and with respect to cumulative effects management. Bitumen development is a megaprogram with huge economic, social, and environmental impacts on Alberta and Canada. Alberta in particular is making efforts to improve its management of the cumulative effects of bitumen development, but continues to do so while development proceeds rapidly, a situation seemingly not unlike 'trying to fix a car while it is moving'. The research reported in this thesis has identified numerous gaps in the foundation upon which project review rests, such as a lack of land use and national energy development plans, an absence of cumulative effects information, and persistent unresolved Aboriginal complaints. All of these gaps directly or indirectly relate to the management of the cumulative effects of the megaprogram. Going forward, it would seem reasonable, and most appropriate if the goal is sustainable economic development, to ensure the foundation for project review decision-making is solid by filling in these gaps. By doing so, impact assessment at the level of individual projects will be much improved, but more importantly, management of the cumulative effects of bitumen development – what really matters in impact assessment (Duinker and Greig 2006) – will be improved.

Planning with Albertans, but also Canadians, should be at the heart of this process. Bitumen development is shaping the whole country as well as Alberta, and if development is to be done sustainably but also with any sense of democracy, planning must involve both Albertans and Canadians, albeit respective of the split in interests specified in our constitution.

The magnitude of impacts of bitumen development is also of global significance. Canada may very well now be an energy superpower, as Prime Minister Harper has taken to labelling our country, but what must be remembered is that with power comes responsibility. In a globalized world in which humans are shaping the planet's climate

and other biogeophysical systems to such an extent that we have entered a new, unprecedented era of planetary history – the anthropocene (Vitousek et al. 1997, Crutzen and Steffen 2003) – it is critical that development of one of the world's remaining major deposits of fossil fuels is done with extreme care and consideration. If this resource is developed by Alberta and Canada, it must be developed responsibly.

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Appendices

Appendix A.

Survey Methods and Participation

The expert survey was intended to gather insider perspective on project review best practices and to help resolve topics that lacked consensus in the literature. While it would have been ideal to test the validity of all best practice ideas in the literature with expert opinion from the bitumen development context, it was not possible to conduct such a large survey and so I focused on items that I judged lacked strong consensus in the literature.

The survey was conducted through an on-line questionnaire hosted by Fluid Surveys (<http://fluidsurveys.com/>) except for one hard-copy version which was mailed to a person who did not have access to a computer. I designed the survey during 2009 based largely upon advice provided by Dillman (2000, 1999). I continued working on the design until the spring of 2010 at which point the survey was deployed. The survey is presented in Appendix B.

A critical step in survey development is testing, often called pre-testing. An early version of the questionnaire was tested by several colleagues in the School of Resource and Environmental Management, Simon Fraser University (SFU) and three people from the target population. The latter three included a representative of an Alberta government body, a federal government representative, and a representative of an NGO. Testers provided feedback on questionnaire content, ease of use, and time commitment. In the end the survey underwent numerous changes through its development over almost a year. I amalgamated data collected from testers from questions that remained in the final version of the survey with the rest of the data.

The survey required ethics approval as it involved members of the public and asked them questions under an expectation of confidentiality. SFU has a variety of policies in place to ensure that any research conducted does not compromise the rights and wishes of public participants. SFU's Office of Research Ethics granted approval to the survey on October 29, 2009 and then, following changes made to the survey design over the fall and winter of 2009 and 2010, they granted reapproval on March 10, 2010.

The survey was conducted confidentially to attempt to generate the most honest and insightful data possible. Confidentiality is protected through several means. First, the survey was hosted by a Canadian-based survey company that uses computer servers located in Canada. Second, no questions were asked that would definitively identify the respondent. In cases where respondents answered in ways that could potentially identify them (i.e., in open-ended questions) I either did not publish this information or modified it (in some cases based upon the advice of the respondent) to prevent identification. Third, I present the results of the questionnaire in a consolidated manner, such as average responses across respondents, to prevent identification. Fourth, respondents are not identified in this thesis or elsewhere other than generally in the acknowledgements. Respondents played an invaluable role in the research presented in this thesis, but to preserve their anonymity I do not name them. Fifth, in accordance with SFU policy, the data are being stored on a burned compact disc and kept in a secure location for a period of two years following the completion of the survey after which it will be destroyed.

The population of interest in the survey was those individuals in government, industry, Aboriginal groups, environmental groups, consultancies, and elsewhere that have intimate experience with the bitumen project review process. This expertise might stem from many years working on the process in government or as industry or NGO representatives, or it may stem from being personally involved as a citizen intervener in a particular project's review. Potential respondents were identified through an iterative process which began with contacting the key agencies involved, e.g., the ERCB, AENV, and the CEA Agency. I asked for names of people who fit the description of 'experts' as defined above, and when contacts were made I asked these people for further suggestions. I also identified people from published documentation of project reviews,

notably several recent ERCB regulatory hearing decision statements (e.g., AEUB and Canada 2007). In many cases I had to track people down using government directories, on-line telephone directories, and/or internet searches. In cases where I was forced to contact individuals to confirm complete contact information I provided a basic explanation of the study and simply requested contact information so that I could send them an invitation to participate (see below). After almost a year of gathering names I had a list of 277 potential respondents for the survey.

Potential respondents were contacted several times using different media leading up to the start of the survey. The first official contact was through an introductory letter explaining the survey and the study as a whole. Most people received this letter in both paper and electronic form through mail and email. This first 'mail-out' occurred at the end of April, 2010. Those people that I added to the potential respondent list after this first mail-out only received the email version. A short time following the initial letter(s) I sent an email through Fluid Survey's system with further information and a weblink to the questionnaire. In most cases people did not complete the questionnaire quickly and so I sent up to three reminder emails over the ensuing three months. In some cases, I made phone calls as a final reminder. When respondents completed their questionnaires the Fluid Survey automatically showed a thank you letter. The survey was stopped on August 1st, 2010 and the questionnaire was taken offline at this time. In a few cases individuals emailed me additional comments which I added to their responses from the survey, and in a few cases I emailed respondents for clarification of their responses. In total, the survey ran for a three month period, though not all participants had this amount of time to respond as some were added to the respondent list after the survey had already begun. The respondents were told that they will be sent a copy of any publications that come out of the survey research, this thesis included.

Of the 277 potential respondents, 88 actively declined during the process of introducing people to the survey, leaving 189. Of these 189, 117 respondents completed at least a portion of the questionnaire, 42% of the initial 277. In the end, 75 (27% of 277) respondents fully completed the questionnaire.

The final respondent population, i.e., those who actually completed a portion or all of the questionnaire, was fairly evenly split across groups (Figure A1). Those who categorized themselves as 'other' identified themselves as lawyers, interested citizens unaffiliated with any particular group, or municipal government. The ratio of government to non-government respondents was 28% to 72%. The ratio of industry to non-industry, the former including consultants and lawyers who worked for industry, was 29% to 71%.

It should be made clear that the sample population was not randomly selected and thus the results cannot be taken to be statistically representative. Though the survey was intended to gather expert opinion, the definition of 'expert' was fairly broad. Respondents had an average of 10.3 years' experience with bitumen project review or other types of review processes, ranging from one year to 50. The sample population contained some of the most expert people possible, but also several people who were new to the field but were included because they work directly on the topic. Figure A2 shows the frequency distribution of respondents by years of experience. While 40 respondents had five years of experience or less with the review process, this group was only 39% of the total number that partially or fully completed the questionnaire; 61% had more than five years of experience. A second issue is that two important sub-groups were barely represented. The Chair of the ERCB decided that no one from the organization would participate, and a decision was also made in the CEA Agency that their staff would not participate. One ERCB staff member did participate prior to the ERCB Chair's decision. In addition to the overall lack of participation from these two key organizations, Parks Canada staff also decided that they would not participate, the reason given was that staff participation would contravene their role as servants of the government, and employees at one First Nations organization declined to participate over concerns about the nature of the study and how the results would be used. In sum, the survey sampled from an overall experienced group of people across the range of sectors involved but two key organizations were underrepresented.

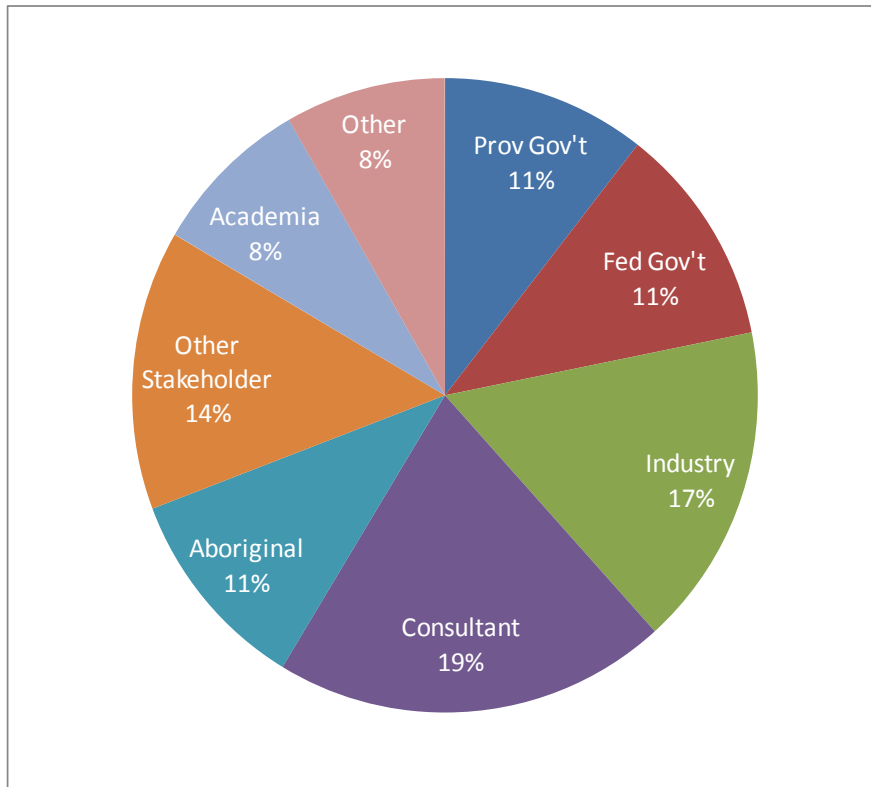


Figure A1. Respondent Population as Categorized by Respondents Themselves

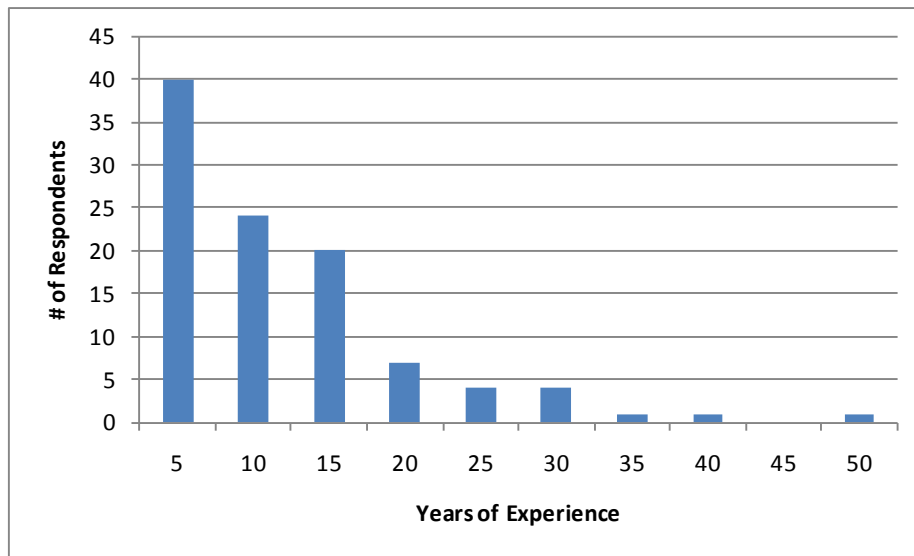


Figure A2. Frequency Distribution of Years of Experience of Respondents with Project Review¹

Note. 1. Years of experience signifies 'up to' the year label, i.e., five years of experience signifies up to five years of experience, ten signifies more than five but no more than ten, etc.

The questionnaire was composed of several parts so that the survey would address different aspects of this research. Part A defined the project review process for respondents to help ensure consistency. Part B asked a short series of questions to gather information on place of work and years of experience with the process to help confirm if respondents fit the description of 'experts'. (In the end no one was rejected from the study.) Part C asked questions regarding good practices of project review, the topic matter of Chapter 3. Part D of the questionnaire asked respondents to evaluate the degree to which best practices are employed in the current tar sands review process, and Part E asked several questions regarding the performance of the current process for bitumen review. The results of Parts D and E are discussed in Chapter 5.

The questionnaire contained several types of questions. Many questions used Likert-type scales to structure responses. A second type of question was multiple choice, and where appropriate the possible responses were randomly ordered to minimize ordering bias. A third type of question requested that respondents rank a series of options, such as a preferred model. A fourth group of questions was open-ended and either asked for perspective on a topic or simply provided respondents with the opportunity to add comments on whatever they wished.

The questionnaire had a total of 162 questions. As the questionnaire was voluntary, all questions were technically optional.

It is not possible to calculate the average time it took for people to do the survey as they could save their responses and return to the questionnaire many times. It would appear, though, that the minimum time to completely finish the questionnaire was approximately 30 minutes but many people took 1-3 hours to complete the questionnaire. Of those that completed the whole questionnaire most took the time to answer the optional open-ended questions.

The data collected through the survey were quantitative and qualitative. Quantitative analyses of data entailed counting and averaging responses, calculating percentages, and to test for statistically significant differences between the responses of industry and non-industry respondents, and government and non-government respondents, I used the Kolmogorov-Smirnov (K-S) test for two independent samples. The assumptions of this test are 1) that observations should be independent events measured at ordinal scale or higher, and 2) there must be at least two mutually exclusive categories into which the observations are placed. I conducted all data analysis using Microsoft Excel 2007. For qualitative data I reviewed responses for patterns among respondents' comments and identified material that arose repeatedly and/or was particularly interesting.

Note that I used the term 'oil sands' throughout the survey as this term is generally accepted as less controversial than the term 'tar sands' which I assumed might have a negative effect on participation. In retrospect, it may have been better to use the more neutral term 'bitumen'.

Appendix B.

Survey

In the following pages of this appendix I present a paper copy of the electronic questionnaire presented on-line through Fluid Survey. This paper copy is not an exact replica of the on-line version but is faithful to the content and order of the original on-line version. Once respondents completed the survey they were directed to a 'thank you' webpage.

Best Practices and Evaluation of the Oil Sands Project Review Process

Welcome to our questionnaire!

This questionnaire is quite easy to complete. In the web pages that follow we:

- define the "project review process"
- ask a few questions about your background
- ask about your perspective on best practices for the review of large-scale projects
- ask about your perspective on the quality of the current process for the review of large-scale oil sands projects, and lastly
- ask some final questions on how you think oil sands development is proceeding as a whole.

As this questionnaire covers a broad range of topics, and as you may be less familiar with some topics than others, feel free to respond "don't know" or "not sure."

Thank you very much for taking the time to offer your perspective - it's critical that our research has an "insider view" into the process.

Part A: Defining the Project Review Process

Speaking generically, the project review process is the government's process of receiving applications for new projects, reviewing the applications, and making a decision over whether or not to approve the project. In many jurisdictions the project review process is the environmental assessment process.

In the case of oil sands development the project review process is the combination of environmental impact assessment under Alberta's *Environmental Protection and Enhancement Act*, federal environmental assessment under the *Canadian Environmental Assessment Act* when applicable, and the Energy Resources Conservation Board's public interest project evaluation process.

Of course, oil sands projects would not get to project review without proponents first gaining subsurface and surface tenure, and projects also often require a variety of permits under legislation such as the *Alberta Water Act*. While the decision-making processes associated with these other steps are not part of the project review process per se, we do address them in parts of this questionnaire.

We acknowledge proposed changes to the federal component of the project review process as introduced in the recent federal budget bill, but as these are not yet in place we ask that you please consider the process to be as it is currently.

Part B: Your Background

1. First, please tell us with which of the following groups are you associated. Please check the appropriate box by clicking on it, and check all those that apply.

- provincial government
- federal government
- industry
- consultant
- aboriginal group
- other stakeholder group
- academia
- if other, please specify: _____

2. When you gained your experience with project review and/or oil sand project review, what is or was your work title (or titles if you held multiple positions)?

3. Can you please provide a brief description of the position or positions that you identify above?

4. How many years of experience do you have with the oil sands project review process and/or project review in other development contexts?

Part C: Importance of Practices in the Review of Applications for New Large-scale Projects

Please respond to the following series of questions pertaining to specific practices and how important they are to conducting an effective review of applications for new large-scale energy projects. Focus on what would be an ideal situation. Note that we are not asking about all practices here that might be considered “best practice” but solely a subset in need of testing.

Roles in the Review Process

1. What is the most appropriate model for the lead body in large-scale project review?

Please rank each option with 1 as most appropriate and 3 as least appropriate. Rank only one option with 1, one with 2, etc. If you are not sure, then leave the question blank. If you have a different model in mind, then please describe below.

	1	2	3
A government department or agency having some association with the project such as the energy or economic development department.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A temporary government body established expressly for the purpose of leading reviews, and staffed by a team of employees pulled from government departments and agencies relevant to the project application at hand.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
An independent arm’s length body established by government expressly for the purpose of leading reviews of large-scale project proposals, and staffed by a permanent workforce with expertise in project review.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you think another model is most appropriate then please explain here:

2. What is the most appropriate model for who conducts impact assessment of proposed large-scale projects, i.e., performs impact studies and prepares regulatory documentation for decision-makers?

Please rank each option with 1 as most appropriate and 5 as least appropriate. Rank only one option with 1, one with 2, etc. If you are not sure, then leave the question blank. If you have a different model in mind, then please describe below.

	1	2	3	4	5
Government civil service and/or their consultants (proponent pays).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The proponent and/or their consultants (proponent pays).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
An independent arm's length agency established by government (government pays).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
An independent arm's length agency established by government (proponent pays).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Government civil service and/or their consultants (government pays).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you think another model is most appropriate then please explain here:

Do you have any further comments on the ideal organizational structure for large-scale project reviews?

Methods of Impact Assessment

3. How important is it that the method of cost-benefit analysis is used to assess project impacts?

Cost-benefit analysis involves identifying all economic, environmental, social, and other impacts incurred by all actors in society, converting them into a common metric – traditionally dollars – and “summing” them to provide an estimate of the net benefit of development to society as a whole and a recommendation for a decision.

- Very important
- Important
- Somewhat important
- Not important
- Don't know

4. And how important is it that the method of reference class forecasting is used to assess projects' impacts?

Reference class forecasting entails comparing, or benchmarking, forecasts of the positive and negative impacts of the project in question to the realized average impacts of a class of similar projects.

- Very important
- Important
- Somewhat important
- Not important
- Don't know

Do you have any comments on what contributes to ideal impact assessment methodology in the large-scale project review context?

Stakeholder Involvement

5. There are many ways in which government can involve stakeholders in the review of applications for new large-scale projects. Which of the following models of involvement most closely matches what you think is appropriate?

Please rank each option with 1 as most appropriate and 4 as least appropriate. Rank only one option with 1, one with 2, etc. If you are not sure, then leave the question blank. If you have a different model in mind, then please describe below.

	1	2	3	4
Involvement entails providing stakeholders with notification and/or information on the project.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Involvement entails asking stakeholders for their input prior to taking action.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Involvement is managed through a quasi-judicial process in which stakeholders are provided with the opportunity to formally assess all aspects of the project, submit evidence on project impacts, and to cross examine experts, government, and proponents.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Involvement is managed through a shared decision-making process in which government, stakeholders, and proponents participate in formal negotiations to reach a decision on the application.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

If you think another model is most appropriate then please explain here:

Do you have any further comments on what provides for ideal stakeholder involvement in the large-scale oil sands project review context?

Uncertainty and Risk

6. Which of the following practices should be employed in the review process to address the uncertainties and risks of large-scale project development?

	Very important	Important	Somewhat important	Not important	Don't know
Proponent is required to demonstrate beyond a reasonable doubt that uncertainties are benign, meaning that despite imperfect knowledge there will be no serious consequences from the project.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Assessment of uncertainty and risk in impact assessment by identifying uncertainties, quantifying the probabilities of undesirable events and the magnitude of harm, and conducting sensitivity analyses in impact forecast models.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Extra caution when new technology is proposed by allowing only smaller projects at first until technology is proven and requiring redundancy in systems so that proven technology exists to back up new technologies.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Active adaptive management to deal with uncertainty through active experimentation and incorporating what is learned into future management decisions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Specification, at time of approval, of who is liable for unforeseen consequences, required mitigation measures, and timelines for mitigation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you have any further comments on how uncertainty and risk should be addressed in project review?

Decision-making

7. How much discretion should the law underlying the review process offer elected government officials making decisions in the project review process?

Discretion in decision-making is when decision-makers are not required to make decisions with respect to specified decision rules, procedures, or criteria but instead are given the freedom to decide based upon their own judgement.

- maximum – elected decision-makers should be able to exercise wide discretion in making decisions on large-scale project applications
- minimum – elected decision-makers’ discretion should be heavily constrained by explicit and legally-binding decision making rules, procedures, and criteria
- not sure

8. How much discretion should the law underlying the review process offer non-elected government officials making decisions in the project review process?

- maximum – non-elected decision-makers should be able to exercise wide discretion in making decisions on large-scale project applications
- minimum – non-elected decision-makers’ discretion should be heavily constrained by explicit and legally-binding decision making rules, procedures, and criteria
- not sure

9. What is the most appropriate model for who makes final decisions on large-scale project approvals?

Please rank each option with 1 as most preferred and 4 as least preferred. Rank only one option with 1, one with 2, etc. If you are not sure, then leave the question blank. If you have a different model in mind, then please describe below.

	1	2	3	4
Elected officials in the governing party based upon recommendations of a stakeholder table.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
An independent review board appointed by government.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A stakeholder table in which representatives of the project proponent(s) and all impacted parties come to consensus or near-consensus agreement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Elected officials in the governing party based upon recommendations of an independent review body.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you another model is most appropriate then please explain here:

Do you have any comments on what contributes to sound decision-making in the context of large-scale project reviews?

Mitigation

Mitigation of negative impacts associated with a large-scale oil sands project can take many forms including prevention, minimization, repair, to compensation in-kind and financial compensation.

10. How important is it that there is a legal requirement for proponents to mitigate negative impacts of their projects?

- Very important
- Important
- Somewhat important
- Not important
- Don't know

11. How important is it that stakeholder groups are compensated for any negative impacts they incur as a result of the project?

Consider that if a project involved draining a lake, the proponent could preserve another lake somewhere else in order to mitigate the overall ecological effect of the project, but this would still leave a local group without a lake for fishing, and thus simple mitigation does not necessarily address all groups that are affected by a project.

- Very important
- Important
- Somewhat important
- Not important
- Don't know

Do you have any comments on ideal mitigation practices in the context of large-scale project development?

Time Limits

12. How important is it that time limits for the review of a single application are set in law?

- Very important
- Important
- Somewhat important
- Not important
- Don't know

Do you have any further comments on how the time commitments of project review should be addressed?

Project Review in the Broader Decision-making Framework

13. Which of the following roles should project review play in the broader governmental decision-making framework regarding large-scale project development?

Recall that in most jurisdictions project review is typically the environmental assessment process, and that decision-making on tenure, permits, and potentially other items also occurs.

- Project review should serve as the decision-making point in which it is determined whether or not a project goes ahead, and secondarily to address technical and mitigation issues.
- Project review should serve primarily as a mechanism to address technical and mitigation issues of project proposals to ensure that projects are appropriate.
- Other, please specify: _____

14. With respect to all of the government decision-making required for large-scale projects – for example with regard to tenure, environmental assessment, permitting, etc. – which of the following models most closely matches your preference for how these decisions should be made?

- All decisions made together in a single process.
- Multiple decision-making processes to deal with different aspects separately.
- Not sure.

Do you have any further comments on the proper role of project review within the broader governmental decision-making framework?

Larger Program of Development

Oil sands development exemplifies a case where individual large-scale projects are developed alongside multiple other projects that together constitute a larger program of development.

15. When a larger program of development is occurring, how important is it that

	Very important	Important	Somewhat important	Not important	Don't know
applications for individual projects are reviewed on a case-by-case basis?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
reviews are conducted on classes or types of projects that compare in some way such as location or technology?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
reviews are conducted of the regional effects of development?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
reviews are conducted on the nation-wide effects of development when the development spans nations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
reviews are conducted of government policy that relates to the larger program of development?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you have any further comments on how government should review or plan larger programs of development?

Other Ideas on Best Practices?

16. We have not asked about all practices that are important in the review of large-scale projects. If there are practices that you would like to highlight and/or describe as important then please do so here:



Part D: Quality of the Current Process for the Review of Applications for New Large-Scale Oil Sands Projects

In the questions that follow please either rank the performance of the current process or indicate your level of agreement with the statement given.

Initial Review

Initial review occurs when government first receives a proposal and has to decide whether or not detailed review is necessary (such as environmental assessment) and if so what type of detailed review should occur.

1. Which choice below most closely matches your view of how well the current process distinguishes oil sands project proposals in terms of whether or not they require detailed review?

- Too strict – the process requires detailed review of projects that do not need it.
- Appropriate – the process requires detailed review of only those projects that need it.
- Not strict enough – the process exempts some projects from detailed review that should be reviewed.
- Not sure.

2. The types of detailed review available in the current project review process are sufficient to address the variety of types of oil sands projects that are proposed.

Each of the ERCB, Alberta Environment, and the Canadian Environmental Assessment Agency has a variety of types of review to address different types of projects. Under Alberta environmental impact assessment, projects may simply be screened or required to undergo 'full' assessment. If federal environmental assessment is required, there are four types of review: screening, comprehensive assessment, mediation, and panel review. The ERCB either conducts 'routine' reviews in which there is no hearing, or 'non-routine' reviews which are more involved and include a hearing. Large-scale projects such as the recently approved Imperial Oil Kearsy mine are often subjected to Joint Panel Reviews involving a formal hearing as per federal and Alberta environmental assessment law and the responsibilities of the Energy Resources Conservation Board.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

3. Following initial review, proponents receive adequate feedback and direction from government.

Feedback might include information on the acceptability of their proposals, how proposals might be improved, and next steps in the regulatory process.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

Do you have any further comments or ideas for improvement with respect to how initial review is conducted when new proposals for large-scale oil sands projects arise?

Organizational Structure of the Review Process

4. Which choice below matches your perception about the appropriateness of the current level of consolidation of the oil sands project review process?

Consolidation refers to whether or not all of government's concerns are addressed through one single review process or through multiple separate reviews. The current project review process consolidates provincial and federal environmental impact assessment processes, the ERCB's evaluation of a project in terms of its ability to meet the public interest, and decision-making regarding permitting. In the current system tenure decision-making is not consolidated with project review.

- Too consolidated - existing processes should be more separated out
- Appropriate
- Not consolidated enough - existing processes should be brought together more
- Not sure

5. Which choice below matches your perception about the level of government staff integration in the oil sands project review process?

Staff integration refers to how closely government staff across departments, agencies, and levels of government work together through the process.

- Too integrated - staff work too closely together
- Appropriate
- Not integrated enough - staff are too separated
- Not sure

6. Which choice below matches your perception about the appropriateness of the number of government bodies involved in the oil sands project review process?

In project review there are numerous government bodies involved such as Alberta Environment, the Energy Resources Conservation Board, the Canadian Environmental Assessment Agency, and the Major Projects Management Office.

- Too many
- Appropriate
- Not enough
- Not sure

7. The government bodies currently involved in oil sands decision-making exhibit no bias for or against development.

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree
- Don't Know

Do you have any further comments or ideas for improvement with regards to the organizational structure of the current oil sands project review process?

Scoping

Scoping is the process of deciding what aspects of projects need to be examined if detailed reviews of applications are necessary. Typically, these requirements are established in terms of reference for detailed review.

8. Typical terms of reference correctly focus detailed reviews on the important issues associated with proposed large-scale oil sands projects.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

Do you have any further comments on the current process or ideas for improvement with regards to scoping?

Range of Issues Assessed in Oil Sands Project Review

9. Prior to decisions on whether or not to approve applications for new large-scale oil sands projects

	Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree	Not applicable/not important
the justifications for development are adequately assessed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
economic impacts are adequately assessed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
environmental impacts are adequately assessed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
social impacts, such as effects on communities and aboriginal traditions, are adequately assessed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
cumulative effects are adequately assessed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
mitigation opportunities and strategies are adequately examined.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
impact assessments are adequately scrutinized for accuracy and quality.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
alternative designs, including the option of no development, are adequately examined.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
proponents are adequately assessed in terms of their capacity to successfully develop their proposed projects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
all major information and analytical gaps in applications are adequately filled.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you have any further comments or ideas for improvement with respect to the content of applications for new large-scale oil sands projects and how they are currently reviewed?

Methods of Impact Assessment in Oil Sands Project Reviews

10. Methods of impact assessment used to assess the impacts of proposed large-scale oil sands projects are appropriate.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

11. Which of the following factors influence which methods of impact assessment are used in reviews of applications for new oil sands projects?

	Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree
the level of understanding of methods in government	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
government's trust in methods' abilities to inform the process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
which methods were used in previous reviews of similar projects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
the kind of information that government is looking for	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
political or strategic factors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
trends in other jurisdictions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
government requirements or recommendations established in law or policy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
methods' ease of use and cost in terms of money, staff, and / or time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
professional standards or trends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If there are other factors influencing method choice, please explain here:

Do you have any further comments or ideas for improvement with regards to the methods currently used for assessing the impacts of large-scale oil sands projects?

Stakeholder Involvement

12. All parties potentially affected by oil sands projects are provided with adequate opportunity to participate in the oil sands project review process.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

13. Stakeholders are given sufficient opportunities to learn and become informed of the issues raised by project applications.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

Do you have any further comments or ideas for improvement in terms of how stakeholders are currently involved in the review of large-scale oil sands applications?

Expert Involvement

14. Studies, expert testimony and other 'expert inputs' are sufficiently evaluated in terms of scientific quality prior to their use.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

Do you have any further comments or ideas for improvement with respect to how experts are currently involved in the review of applications for new large-scale oil sands projects?

Uncertainty and Risk Associated with Oil Sands Projects

15. Uncertainty and risk associated with applications for new large-scale oil sands projects are adequately analyzed in the project review process.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

16. The uncertainty of impact predictions is adequately communicated to decision-makers and stakeholders.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

Do you have any further comments or ideas for improvement with regards to how uncertainty and risk are currently addressed in the review of large-scale oil sands applications?

Discretion in Decision-making

17. Elected officials making final decisions regarding whether or not to approve large-scale oil sands projects are guided by clear criteria.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

18. Which of the following statements most closely matches your perspective on the level of discretion that elected decision-makers have in the current review process when making decisions.

Discretion in decision-making is when decision-makers are not required to make decisions with respect to specified decision rules, procedures, or criteria but instead are given the freedom to decide based upon their own judgement. Decision-making criteria are factors that decision-makers are obliged to use when making decisions.

- Too strict – elected decision-makers have insufficient discretion and are too restricted by rules, procedures, and decision criteria.
- About right – the level of discretion that elected decision-makers have is appropriate.
- Not strict enough – elected decision-makers have too much discretion in decision-making.
- Not sure.

19. Which of the following statements most closely matches your perspective on the level of discretion that non-elected decision-makers have in the current review process when making decisions.

- Too strict – non-elected decision-makers have insufficient discretion and are too restricted by rules, procedures, and decision criteria.
- About right – the level of discretion that non-elected decision-makers have is appropriate.
- Not strict enough – non-elected decision-makers have too much discretion in decision-making.
- Not sure.

Do you have any further comments on discretion in the current oil sands project review process?

Final Decision-making

20. The current allocation of final decision making authority for approvals of large-scale oil sands project applications is appropriate.

Final decision-making regarding approval of applications for new large-scale oil sands projects is currently made by the Alberta cabinet based upon the advice of the Energy Resources Conservation Board.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

21. Decision-making processes that occur prior to project review have no effect on the outcome of project review decision-making.

In the current system, proponents first gain tenure over mineral deposits and overlying surface lands via decision-making processes run by Alberta Sustainable Resource Development, Alberta Energy, and the Crown Mineral Disposition Review Committee. If proponents decide to develop the resource they then enter the project review process.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

Do you have any further comments or ideas for improvement in terms of how decision-making occurs in oil sands project reviews?

Terms and Conditions of Approvals

22. The terms and conditions attached to approvals of new oil sands projects provide a clear indication of what is expected of proponents.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

Do you have any comments or ideas for improvement with respect to current terms and conditions of approvals of large-scale oil sands projects?

Mitigation of Negative Impacts of Large-Scale Oil Sands Projects

23. The review process adequately ensures that when oil sands projects are approved all serious negative impacts of projects are mitigated.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

Do you have any comments or ideas for improvement with regards to how mitigation is currently addressed in reviews of applications for new large-scale oil sands projects?

Appeal Mechanisms in Oil Sands Project Review

Appeals may be made with respect to environmental assessment and Energy Resources Conservation Board decisions. Appeals are defined as requests for decisions to be revisited based upon some argument stating that a decision is faulty or was arrived at through error.

Only one mode of appeal is expressly provided by the Alberta Environmental Protection and Enhancement Act (EPEA) for stakeholders during the environmental impact assessment (EIA) process. Under section 44(6), any person directly affected by a proposed activity that is determined to warrant EIA may file a statement of concern to the Environmental Assessment Director regarding the person's concerns over the Director's decision over whether or not to require a proposal to undergo EIA. However, if an EIA report is not required by the director or if the proposed activity is exempt by regulation, parties may still request the Minister of Environmental to use their discretionary power under section 47 of the EPEA to require an EIA report for the activity.

The Canadian Environmental Assessment Act (CEAA) does not provide any specific avenues for appeal.

However, both EIA under the EPEA and environmental assessment under the CEAA may be appealed through the legal courts over both matters of procedure and substance.

ERCB decisions may be appealed on matters of procedure and substance. As explained in section 25 of the Energy Resources Conservation Act (ERCA), decisions of the ERCB are "final" except for two avenues of appeal provided in the ERCA in sections 40 and 41. As explained in section 48 of Alberta Regulation 252/2007 ("the ERCB Rules of Practice"), the ERCB has the authority to review its decisions on its own initiative or at the request of affected parties. Such appeals for review can be made on grounds of error of law, jurisdiction, or fact, or when new facts are raised or circumstances have changed. Section 41 of the ERCA indicates that appeals to ERCB decisions may also be made to the Alberta Court of Appeal on questions of jurisdiction and law, and appeals to decisions of the Court of Appeal may be granted to the Supreme Court of Canada.

24. The current appeal system provides stakeholders with an effective means to address their concerns.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

Do you have any further comments or ideas for improvement in terms of the current appeals system associated with large-scale oil sands project reviews?

25

Monitoring and Enforcement

25. There is adequate monitoring of proponents' activities in terms of compliance with terms and conditions of oil sands project approvals.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

26. Terms and conditions of oil sands project approvals are adequately enforced.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

27. There is adequate monitoring of oil sands projects' impacts.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

28. Appropriate remedial measures are taken when monitoring finds undesirable impacts during oil sands project construction or operations.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

29. Monitoring results are adequately transmitted into future project review decision-making.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

Do you have any further comments or ideas for improvement in terms of how monitoring and enforcement is currently carried out in the case of large-scale oil sands projects?

High-level Policy Support for Project Review

High-level policy is broad strategic policy that is intended to guide government in their day-to-day decision-making, including how decisions are made in reviews of applications for new large-scale oil sand projects and how cumulative effects are assessed. Examples of current high-level policy include the Fort McMurray Mineable Oil Sands Integrated Resource Management Plan, the Land Use Framework, the Provincial Energy Strategy, and federal climate change policy.

30. Existing high-level policy provides decision-makers with a strong foundation and clear direction from which to make decisions in reviews of applications for new large-scale oil sands projects.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

Do you have any comments or ideas for improvement with respect to the current state of high-level policy and its relationship to large-scale oil sands reviews?

Resources for Project Review

31. The current process for the review of applications for new large-scale oil sands projects

- proceeds too rapidly.
- takes too much time.
- takes an appropriate amount of time.
- not sure.

32. Government bodies and staff involved in project review have adequate funding and expertise to participate effectively.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

33. The costs of participating in the review process are reasonable for proponents.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

34. Non-industry stakeholders such as aboriginal, environmental, and community groups have adequate resources to participate effectively in the project review process.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

Do you have any comments or ideas for improvement with respect to resources in the current oil sands project review process?

Public Description of the Oil Sands Project Review Process

35. Existing, publicly-available documentation on the oil sands project review process provides all parties with a clear description of the process and clear instructions on how to participate.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

Do you have any further comments or ideas for improvement with respect to the current description of the process of oil sands project review?

Legal Basis of the Oil Sands Project Review Process

The legal basis of a review process is the degree to which and the way in which it is established in law, i.e., what and how. Those aspects of a process not established in law may be documented in policy statements but carry less or no force of law.

36. The oil sands project review process is adequately established in law.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

37. The Energy Resources Conservation Board, being the chief government actor in the review of applications for new oil sands projects, has adequate authority to conduct an effective review process.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

Do you have any further comments or ideas for improvement with regards to the current oil sands review process' legal basis?

Communication in the Oil Sands Project Review Process

38. Government communicates well with proponents and stakeholders during the oil sands review process.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

Do you have any further comments or ideas for improvement in terms of the current state of communication in oil sands project review?

Purpose and Role of Oil Sands Project Review

According to current law and policy, the project review process is intended to provide government with information on oil sands project proposals so that government is in a better position to decide whether or not to approve them.

39. Which of the following statements most closely matches your perception of the function that project review plays in decision-making in practice?

- In practice, the primary function of review is to determine whether or not oil sands projects should be approved or rejected and the secondary function is to identify ways of mitigating negative impacts.
- In practice, the primary function of review is to identify ways to mitigate negative impacts of oil sands projects so that development proceeds in the most beneficial manner.
- Not sure.

40. In fact, the vast majority of applications for new oil sands projects are approved. Why do you think this is the case?

Please check all that apply.

- Government is unwilling to reject projects.
- Proponents only submit proposals for projects that are in the public interest.
- The review process identifies mitigation measures that ensure that the project is in the public interest.
- The decision to develop has already been made when subsurface and/or surface tenure is awarded to a proponent and thus project review is used to address technical and mitigation issues.
- Not sure.
- Other, please specify: _____

Do you have any further comments on the purpose of project review or how it can be improved?

Larger Program of Bitumen Development

Individual oil sands projects are a part of a larger program of bitumen development occurring across North America. This larger program of development involves multiple production facilities, upgraders, refinery expansions, pipelines, and other types of development.

41. There is adequate review and examination of issues beyond the scale of the individual oil sands project.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

42. Government policy with respect to oil sands development is subject to adequate review and examination.

- Strongly Agree
- Agree
- Don't Know
- Disagree
- Strongly Disagree

43. Is there anything unique about oil sands development compared to other types of development that demands special attention in government planning or decision-making?

Do you have any further comments or ideas for improvement with respect to how the larger program of bitumen development is currently addressed?

Strengths, Weaknesses, and Other Reforms

44. What are the main strengths of the current process for the review of applications for new large-scale oil sands projects?

Please consider any of the topics we have raised in this questionnaire, as well as any other strengths that come to mind.

45. What are the main weaknesses of the current process for the review of applications for new large-scale oil sands projects?

Please consider any of the topics we have raised in this questionnaire, as well as any other weaknesses that come to mind.

46. Do you have any other ideas on how the current process should be reformed?

Part E: Evaluating the Outcomes

In this set of questions, please consider how well you think the current process for the review of applications for new large-scale oil sands projects performs.

1. Overall, how successful do you think the review process is in terms of:

	Very successful	Somewhat successful	Don't Know	Somewhat unsuccessful	Very unsuccessful
improving relationships and reducing conflict?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
integrating Aboriginal perspectives into decision-making?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
being cost-effective?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
helping society move toward sustainability?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
integrating public perspectives into decision-making?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
improving decisions on project development?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
addressing issues associated with the larger program of bitumen development?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
serving the public interest?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. On a scale of 1 to 10, with 10 being excellent and 1 being very poor, how would you rate the current process overall?

1	2	3	4	5	6	7	8	9	10
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. If you would like to make any other comments regarding the success of the process, please do so here:

Part F: Your Perspective on the Current State of Oil Sands Development

1. Which of the following statements most closely describes your view with respect to the pace of development?

- The current rate and nature of oil sands development is about right.
- Oil sands development is not fast enough.
- Oil sands development should be slowed down.
- Oil sands development should be stopped.

2. If you would like to make any comments regarding the your perspective on development, please do so here:

End of questionnaire – please return by mail in the envelope provided.

Thank you very much for your time. We sincerely appreciate it and we will mail you a copy of the report when it is completed.

Appendix C.

Survey Results – Evaluation

This appendix presents the detailed numerical results for the evaluation part of the questionnaire (part D). Note that for some tables below the full wording of answer options is different than presented in the column headings. See the survey (Appendix B) for full wording of questions and answer options. The following tables do not present open-ended questions and associated responses.

Question #	Question	too strict	appropriate	not strict enough	not sure	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
1	Which choice below most closely matches your view of how well the current process distinguishes oil sands project proposals in terms of whether or not they require detailed review?	15%	34%	41%	11%	no	yes

Question #	Question	strongly agree	agree	don't know	disagree	strongly disagree	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
2	The types of detailed review available in the current project review process are sufficient to address the variety of types of oil sands projects that are proposed.	12%	41%	13%	25%	9%	no	yes

Question #	Question	strongly agree	agree	don't know	disagree	strongly disagree	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
3	Following initial review, proponents receive adequate feedback and direction from government.	15%	33%	19%	27%	5%	no	yes

Question #	Question	too consolidated	appropriate	not consolidated enough	not sure	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
4	Which choice below matches your perception about the appropriateness of the current level of consolidation of the oil sands project review process?	12%	30%	45%	12%	no	yes

Question #	Question	too integrated	appropriate	not integrated enough	not sure	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
5	Which choice below matches your perception about the level of government staff integration in the oil sands project review process?	5%	22%	56%	16%	yes	no

Question #	Question	too many	appropriate	not enough	not sure	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
6	Which choice below matches your perception about the appropriateness of the number of government bodies involved in the oil sands project review process?	25%	49%	11%	15%	no	no

Question #	Question	strongly agree	agree	neither agree nor disagree	disagree	strongly disagree	don't know	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
7	The government bodies currently involved in oil sands decision-making exhibit no bias for or against development.	3%	22%	14%	35%	22%	5%	no	yes

Question #	Question	strongly agree	agree	don't know	disagree	strongly disagree	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
8	Typical terms of reference correctly focus detailed reviews on the important issues associated with proposed large-scale oil sands projects.	7%	33%	35%	15%	11%	yes	yes

Question #	Question	strongly agree	agree	neither agree nor disagree	disagree	strongly disagree	don't know	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
9	Prior to decisions on whether or not to approve applications for new large-scale oil sands projects the justifications for development are adequately assessed.	12%	42%	1%	19%	16%	9%	no	yes
	... economic impacts are adequately assessed.	18%	38%	3%	23%	8%	10%	no	yes
	... environmental impacts are adequately assessed.	23%	27%	1%	23%	22%	4%	no	yes
	... social impacts, such as effects on communities and aboriginal traditions, are adequately assessed.	8%	29%	1%	25%	29%	8%	no	yes
	... cumulative effects are adequately assessed.	15%	22%	0%	19%	41%	3%	no	yes
	... mitigation opportunities and strategies are adequately examined.	14%	31%	0%	27%	18%	11%	no	yes
	... impact assessments are adequately scrutinized for accuracy and quality.	19%	37%	0%	19%	15%	10%	no	yes
	... alternative designs, including the option of no development, are adequately examined.	6%	25%	0%	25%	30%	14%	no	yes

Question #	Question	strongly agree	agree	neither agree nor disagree	disagree	strongly disagree	don't know	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
	... proponents are adequately assessed in terms of their capacity to successfully develop their proposed projects.	10%	31%	0%	21%	11%	27%	no	yes
	... all major information and analytical gaps in applications are adequately filled.	15%	29%	1%	23%	16%	15%	no	yes
10	Methods of impact assessment used to assess the impacts of proposed large-scale oil sands projects are appropriate.	8%	31%	0%	35%	18%	7%	no	yes
11	Which of the following factors influence which methods of impact assessment are used in reviews of applications for new oil sands projects? government requirements or recommendations established in law or policy	28%	51%	0%	6%	3%	13%	no	no
	... methods' ease of use and cost in terms of money, staff, and / or time	15%	39%	0%	19%	3%	24%	no	no
	... trends in other jurisdictions	4%	42%	1%	21%	3%	29%	no	yes
	...professional standards or trends	17%	53%	0%	15%	3%	13%	no	no

Question #	Question	strongly agree	agree	neither agree nor disagree	disagree	strongly disagree	don't know	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
	... which methods were used in previous reviews of similar projects	36%	51%	0%	1%	0%	11%	no	no
	... the level of understanding of methods in government	8%	54%	0%	11%	1%	25%	no	no
	... government's trust in methods' abilities to inform the process	10%	57%	0%	10%	0%	24%	no	no
	... the kind of information that government is looking for	23%	52%	0%	4%	1%	20%	no	no
	... political or strategic factors	21%	43%	0%	13%	0%	24%	no	no

Question #	Question	strongly agree	agree	don't know	disagree	strongly disagree	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
12	All parties potentially affected by oil sands projects are provided with adequate opportunity to participate in the oil sands project review process.	18%	38%	4%	19%	21%	no	yes

Question #	Question	strongly agree	agree	don't know	disagree	strongly disagree	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
13	Stakeholders are given sufficient opportunities to learn and become informed of the issues raised by project applications.	19%	43%	7%	20%	11%	no	yes
14	Studies, expert testimony and other 'expert inputs' are sufficiently evaluated in terms of scientific quality prior to their use.	14%	35%	15%	24%	11%	no	yes
15	Uncertainty and risk associated with applications for new large-scale oil sands projects are adequately analyzed in the project review process.	14%	28%	10%	28%	21%	no	yes
16	The uncertainty of impact predictions is adequately communicated to decision-makers and stakeholders.	11%	22%	14%	32%	21%	no	yes
17	Elected officials making final decisions regarding whether or not to approve large-scale oil sands projects are guided by clear criteria.	4%	19%	30%	30%	16%	no	yes

Question #	Question	too strict	about right	not strict enough	not sure	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
18	Which of the following statements most closely matches your perspective on the level of discretion that elected decision-makers have in the current review process when making decisions.	1%	44%	36%	19%	no	yes
19	Which of the following statements most closely matches your perspective on the level of discretion that non-elected decision-makers have in the current review process when making decisions.	11%	41%	32%	16%	no	yes

Question #	Question	strongly agree	agree	don't know	disagree	strongly disagree	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
20	The current allocation of final decision making authority for approvals of large-scale oil sands project applications is appropriate.	20%	29%	11%	29%	11%	no	yes
21	Decision-making processes that occur prior to project review have no effect on the outcome of project review decision-making.	12%	28%	26%	17%	17%	no	yes

Question #	Question	strongly agree	agree	don't know	disagree	strongly disagree	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
22	The terms and conditions attached to approvals of new oil sands projects provide a clear indication of what is expected of proponents.	12%	57%	15%	9%	7%	no	yes
23	The review process adequately ensures that when oil sands projects are approved all serious negative impacts of projects are mitigated.	9%	28%	10%	26%	28%	no	yes
24	The current appeal system provides stakeholders with an effective means to address their concerns.	15%	30%	19%	24%	12%	no	yes
25	There is adequate monitoring of proponents' activities in terms of compliance with terms and conditions of oil sands project approvals.	10%	30%	13%	25%	22%	no	yes
26	Terms and conditions of oil sands project approvals are adequately enforced.	9%	29%	23%	22%	17%	no	yes

Question #	Question	strongly agree	agree	don't know	disagree	strongly disagree	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
27	There is adequate monitoring of oil sands projects' impacts.	13%	24%	16%	24%	22%	no	yes
28	Appropriate remedial measures are taken when monitoring finds undesirable impacts during oil sands project construction or operations.	10%	29%	21%	26%	13%	no	yes
29	Monitoring results are adequately transmitted into future project review decision-making.	10%	22%	28%	22%	16%	no	yes
30	Existing high-level policy provides decision-makers with a strong foundation and clear direction from which to make decisions in reviews of applications for new large-scale oil sands projects.	4%	26%	17%	36%	17%	no	yes

Question #	Question	proceeds too rapidly	takes too much time	takes an appropriate amount of time	not sure	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
31	The current process for the review of applications for new large-scale oil sands projects	19%	35%	29%	17%	no	no

Question #	Question	strongly agree	agree	don't know	disagree	strongly disagree	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
32	Government bodies and staff involved in project review have adequate funding and expertise to participate effectively.	0%	10%	23%	44%	23%	no	yes
33	The costs of participating in the review process are reasonable for proponents.	3%	38%	35%	17%	8%	no	no
34	Non-industry stakeholders such as aboriginal, environmental, and community groups have adequate resources to participate effectively in the project review process.	9%	24%	11%	24%	31%	no	yes

Question #	Question	strongly agree	agree	don't know	disagree	strongly disagree	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
35	Existing, publicly-available documentation on the oil sands project review process provides all parties with a clear description of the process and clear instructions on how to participate.	11%	50%	10%	24%	4%	no	yes
36	The oil sands project review process is adequately established in law.	12%	38%	34%	12%	4%	no	yes
37	The Energy Resources Conservation Board, being the chief government actor in the review of applications for new oil sands projects, has adequate authority to conduct an effective review process.	24%	35%	15%	13%	13%	no	yes
38	Government communicates well with proponents and stakeholders during the oil sands review process.	6%	33%	16%	37%	7%	no	yes

Question #	Question	primary function to determine whether or not should be approved	primary function to identify ways to mitigate	not sure	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
39	Which of the following statements most closely matches your perception of the function that project review plays in decision-making in practice?	48%	40%	12%	no	yes

Question #	Question	government unwilling to reject	proponents only submit proposals in the public interest	review process identifies mitigation measures that ensure project in the public interest	decision to develop already been made	not sure	other please specify
40 ⁸⁷	In fact, the vast majority of applications for new oil sands projects are approved. Why do you think this is the case?	49%	15%	35%	44%	6%	24%

⁸⁷ Question 40 was a non-mutually exclusive question; this is why the total is greater than 100%.

Question #	Question	strongly agree	agree	don't know	disagree	strongly disagree	sign diff: gov't vs. non-gov't	sign diff: industry vs. non-industry
41	There is adequate review and examination of issues beyond the scale of the individual oil sands project.	11%	17%	13%	27%	31%	no	yes
42	Government policy with respect to oil sands development is subject to adequate review and examination.	9%	24%	11%	29%	27%	no	yes