Final Report

Framework for Sustainability-based Assessment for the Keeyask Hydro Project

prepared by
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for the Consumers Association of Canada (Manitoba Branch)

submitted to
the Manitoba Clean Environment Commission review and hearings
on the proposed Keeyask Hydropower Project
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Executive Summary

The purpose of this report is to

- describe a framework for sustainability-based decision making;
- establish the public interest and legislative basis for undertaking sustainability-based assessments, or their substantive equivalents, in Manitoba; and
- assess whether there are grounds for confidence that the proposed Keeyask project, as described in the Response to the EIS Guidelines, will promote progress towards sustainability while avoiding significant adverse effects.

Sustainability assessment is an integrated approach to decision making that centres upon clearly establishing a need (in this case for the services provided by electricity) through an open and democratic process, providing a fair and full assessment of alternatives, and assessing the alternatives against an explicit set of sustainability criteria that have been specified for the particular case and context.

In the context of the proposed Keeyask hydro dam, applying a sustainability assessment framework is necessary to ensure long-term improvement in human and natural welfare. Whether, it is climate change, biodiversity, declining resources, or threats to traditional ways of living, the proposed dam touches upon many critical issues of the 21st century. Furthermore, the significance of the near term and legacy effects of the proposed dam makes it imperative to fairly share impacts and benefits both within and between generations.

Within the province of Manitoba, the combination of the Manitoba *Sustainable Development Act* (Manitoba 1998), key sections of the Manitoba *Environment Act* (Manitoba 2012a) and the Canadian *Environmental Assessment Act* (CEAA 2012a) provide a strong legislative basis for applying sustainability assessment, or its substantive equivalent.

In order to ensure that the proposed Keeyask dam will promote progress towards sustainability, this report assesses the extent to which the project, as described in the Response to the EIS Guidelines, meets the standards of sustainability-based assessment.

The results of the assessment indicate five key deficiencies in the KHLP's Response to the EIS Guidelines that make it impossible for the Clean Environment Commission to make an informed decision on the acceptability of the proposed undertaking, notably:

1. The EIS approach is unsatisfactory as a means of assessing progress towards sustainability;
2. Need for the project has not been established;
3. No comparative assessment of alternatives is provided to demonstrate that the proposed project is the best option;

4. No explicit set of sustainability decision criteria seems to have been applied; and
5. There are important instances of contested and potentially adverse effects, including impacts on Lake Sturgeon, Boreal Woodland Caribou, and boom and bust dynamics.

Based upon the above, we recommend the following to the Clean Environment Commission:

1. that the CEC suspend or defer its decision about the acceptability of the proposed Keeyask project until these deficiencies and those noted by other experts have been addressed and the overall analysis revisited.

2. that for future assessments the CEC require proponents to adopt from the outset an integrated sustainability assessment framework that includes a full justification of need, a full and fair analysis of alternatives, and application of an explicit set of sustainability criteria specified for the case and context.

3. that the CEC apply an explicit sustainability criteria set in its assessment of the Keeyask proposal as a first step would be beneficial, although it cannot provide a basis for concluding that the project is acceptable, because the review does not include comparative evaluation of alternatives. A full criteria set included in Appendix 5 of this report is provided as an option for this purpose, with a summary of the set provided at the end of the Executive Summary.

Given that Manitoba Hydro has been required to justify the need for and alternatives to the proposed Keeyask dam (as well as the proposed power systems plan of which the Keeyask project is a component), it is reasonable to expect that this information could be included within the CEC hearings. These arguments are the foundation upon which the EIS rests.

We hope the insights contained in this report, as well as the final recommendations, will serve to inform the particulars of the proposed Keeyask dam, as well as contribute to the broader debate about environmental and strategic decision making in Manitoba.

Table 1 – Summary of proposed set of evaluative and decision criteria for the Keeyask case

Improving the ecological basis of our livelihoods and wealth
Goal Build human-ecological relations to establish and maintain the long-term integrity of socio-biophysical systems and protect the irreplaceable life support functions upon which human as well as ecological wellbeing depends.
Themes • Maintenance of ecological services and regulation • Improvement of habitats and habitat intactness

- The ecological basis of traditional livelihoods
- Climate change mitigation
- Appropriate immediate and long-term adaptive planning
- Management of adverse effects

Fostering desirable and durable livelihoods

Goal
The cumulative effects will expand the range and availability of desirable and durable livelihood opportunities while helping to ensure sufficiency for all.

Themes
- Ensuring livelihood foundations
- Protecting the most vulnerable
- Fostering local economic development and self-determination
- Prevention of boom and bust
- Shared responsibility for livelihood maintenance

Enhancing First Nations wellbeing and self-determination

Goal
Ensure the project effects will enhance First Nations community wellbeing and respect traditional livelihoods, while allowing First Nations communities to benefit from development projects as appropriate.

Themes
- First Nations ways of living and self-determination
- Enhanced determinants of health
- First Nations infrastructure
- Furthering Askiy
- Fostering community wellbeing

Ensuring fairness in process and outcomes

Goal
The cumulative effects will ensure that sufficiency and effective choices for all are pursued in ways that reduce dangerous gaps in sufficiency and opportunity (and health, security, social recognition, political influence, etc.) between the rich and the poor.

Themes
- Fair distribution of benefits and risk
- Fair access to resources and opportunities
- Mitigation of unavoidable losses
- Accounting for the past
- Shared responsibility for promoting equity

Leaving a positive legacy

Goal
Favour present options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainably.

Themes
- Securing long-term availability of energy and resources
- Securing future opportunities

- Saving for the future
- Ensuring lasting benefit
- Shared responsibility for a positive legacy
- Developing energy bridges

Promoting resource maintenance, conservation and efficiency

Goal
Provide a larger base for ensuring sustainable livelihoods for all while reducing threats to the long term integrity of socio-ecological systems by reducing extractive damage, avoiding waste and cutting overall material and energy use per unit of benefit.

Themes
- Reducing overall energy and resource consumption
- Fostering responsible use of energy
- Developing resilient energy supplies
- Avoidance of resource conflicts
- Mitigating perverse effects

Prioritizing precautionary and adaptive management

Goal
Favour the selection, design and implementation of the undertaking (including provisions for monitoring and adjustment) that reflect the application of precautionary approaches that respect uncertainty and avoid both well and poorly understood risks of serious or irreversible damage to the foundations of sustainability, and a willingness to act on incomplete but suggestive information where there may be risks to social and/or ecological systems that are crucial for sustainability.

Themes
- Responsive monitoring and adaptive management
- Developing baseline data
- Dealing with uncertainty
- Managing for climate change
- Avoiding lock-in

Ensuring due process and an informed citizenry

Goal
Build the capacity, motivation and habitual inclination of individuals, communities and other collective decision making bodies to apply sustainability requirements through more open and better informed deliberations, greater attention to fostering reciprocal awareness and collective responsibility, and more integrated use of administrative, market, customary and personal decision making practices.

Themes
- Maintenance of traditional ways of knowing and deciding
- Promoting good governance
- Fostering informed and responsible citizenry
- Full cost accounting
- Promoting open and informed decision making
- Ensuring proper problem formulation

Integrating immediate and long-term planning objectives

Goal

Apply all principles of sustainability at once, seeking mutually supportive benefits and multiple gains so as to ensure the overall cumulative effects of the chosen alternative will make the strongest feasible contribution to sustainability while avoiding trade-offs.

Themes

- Promoting integrated assessment to seek the best alternative
- Seeking mutually reinforcing positive gains
- Avoiding trade-offs

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List of Abbreviations

CAC Manitoba – Consumers' Association of Canada, Manitoba Branch
CEC – Manitoba Clean Environment Commission
COSEWIC – Committee On the Status of Endangered Wildlife In Canada
EIS – Environmental Impact Statement
MPILC – Manitoba Public Interest Law Centre
NFAT – Need For and Alternatives To assessment
PUB – Manitoba Public Utilities Board
SARA – Species At Risk Act

EIS Supporting Documentation and Other Reports

This study drew primarily from the following documents:

- The Environmental Impact Statement (Response to EIS Guidelines)
- The CEC Terms of Reference
- The CEAA Terms of Reference
- The World Commission on Dams Final Report
- Foundations for a Sustainable Northern Future - Report of the Joint Review Panel for the Mackenzie Gas Project
- Sustainability-based assessment criteria and associated frameworks for evaluations and decisions: theory, practice and implications for the Mackenzie Gas Project Review
- Report of the Joint Review Panel on the Lower Churchill Hydroelectric Generation Project

Author bios

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Kyrke Gaudreau is the Sustainability Manager at the University of Northern Brisith Columbia. Kyrke recently completed his PhD in social and ecological sustainability at the University of Waterloo where his research focused on the sustainability assessment of energy systems. Kyrke has consulted on various strategic and environmental assessments of energy systems in Canada, and has researched energy systems sustainability in several different countries. Kyrke serves on the editorial board of Alternatives Journal, where he writes for a popular audience on a variety of environmental, social and technical issues.

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Robert B. Gibson is a professor in the Department of Environment and Resource Studies at the University of Waterloo, Ontario, Canada, where he has taught since 1981. He mostly works on environmental policy issues and broader sustainability imperatives. His involvement with environmental assessment law, policy and process issues dates back to the mid 1970s and includes work in most provinces and all three territories. Over the past decade, he has focused on integrating sustainability considerations in land use decision making in urban growth management, corporate greening initiatives, and special area governance, as well as environmental assessments at the project and strategic levels. Most recent projects focus on application of the principles set out in his book on *Sustainability Assessment,* published by Earthscan in 2005.

1 Introduction

1.1 Purpose

This report sets out to achieve three interrelated goals:

1. describe a framework for sustainability-based decision making;
2. establish the public interest and legislative basis for undertaking sustainability-based assessments, or their substantive equivalents, in Manitoba; and
3. assess whether there are grounds for confidence that the proposed Keeyask dam, as described in the Response to the EIS Guidelines, will promote progress towards sustainability while avoiding significant adverse effects.

In doing so, this report aims to inform the broader debate about environmental and strategic decision making in Manitoba.

Sustainability assessment is an integrated approach to decision-making that attempts to improve the decision-making processes such that it moves beyond narrowly defined considerations to address as much as possible the full suite of requirements for sustainability, as well as the interconnections, feedbacks and uncertainties that typify the social and ecological systems to which we contribute and upon which we depend (Gibson et al. 2005).

For the planning and assessment of major undertakings, and associated decision making, sustainability assessment provides a framework for identifying, evaluating and comparing the potential impacts of undertakings and their best alternatives for progress towards sustainability. Furthermore, within the province of Manitoba, where concerns have already been expressed about the state of environmental assessment practice (e.g. CEC 2013, p.VII), sustainability assessment may provide an important means of improving upon current practice.

1.2 Rationale

In the context of the proposed Keeyask hydro dam, applying a sustainability assessment framework is necessary to ensure long-term improvement in human and natural welfare. Whether it is climate change, biodiversity, declining resources, or threats to traditional ways of living, the proposed dam touches upon many critical issues of the 21st century. Furthermore, the significance of the near term and legacy effects of the proposed dam makes it imperative to fairly share impacts and benefits both within and between generations.

Unfortunately, the Response to the EIS Guidelines fails to meet the standards of sustainability-based assessment, and consequently does not provide firm grounds for confidence that implementing the project would be the best option in the public interest, that it would make a positive overall contribution to sustainability, maximize potential benefits and avoid unnecessary negative impacts and associated costs for mitigation, adaptation and management.

The results of our review indicate five key deficiencies in the KHLP's Response to the EIS Guidelines that make it impossible for the Clean Environment Commission to make an adequately informed decision:

1. The EIS approach to assessing progress towards sustainability lacks coherence, and makes it difficult, if not impossible, to develop a clear understanding of the anticipated benefits and impacts.
2. The EIS provides no satisfactory justification of need for the project, leaving unanswered whether the generating station is truly necessary for the time being;
3. The EIS provides no assessment of alternatives to the dam, leaving unanswered whether there are better alternatives to answering whether this is the preferred way to serve the basic purposes involved;
4. The EIS provides no explicit set of sustainability decision criteria; and
5. There are important instances of contested and potentially adverse effects, including, but not limited to, impacts on Lake Sturgeon, Boreal Woodland Caribou, and boom and bust dynamics.

Fortunately, it is not too late to improve the decision making context of the proposed Keeyask dam (e.g. WCD 2000, p.276). We hope the insights contained in this report, as well as the final recommendations, serve to inform the broader the particulars of the proposed Keeyask dam, as well as add to the broader understanding of means to enhance environmental and strategic decision making in Manitoba.

1.3 Outline

The outline of this report is as follows:

The first part of this report, beginning in section 2, describes Gibson's generic framework for sustainability-based decision making. The discussion centres on providing a working definition of progress towards sustainability, describing the importance of clearly establishing a 'need' for electricity and defining a full suite of alternatives and assessing the alternatives against an explicit set of sustainability criteria that have been specified for the particular case and context. Finally, a preliminary set of sustainability criteria appropriate for the proposed Keeyask dam case is provided in Appendix 5 with a description of the criteria specification process provided in Appendix 6.

The second part of this report establishes the legislative basis for undertaking sustainability-based assessments, or their substantive equivalents, in Manitoba. This work is summarized in section 2.5, with the analysis provided in Appendix 1.

Finally, the third part of this report assesses the extent to which the proposed Keeyask dam, as described in the Response to the EIS Guidelines, meets the standards of sustainability assessment best practice. This discussion is provided in section 3, which indicates that for present purposes it is impossible for the CEC to

make an informed decision about whether the proposed Keeyask dam promotes progress towards sustainability.

2 The fundamentals of sustainability assessments

This section introduces sustainability assessment as a framework for decision-making. It provides:

1. a brief history of sustainability assessment practice in Canada and beyond;
2. a basic definition of requirements for *progress towards sustainability;*
3. a general approach for undertaking sustainability assessment;
4. a set of basic guidelines for sustainability assessment practice; and
5. the legislative basis for applying sustainability assessment in Manitoba.

2.1 A brief history of sustainability assessment practice

In order for humanity to address the interrelated challenges and opportunities facing us we must improve our decision making processes such that they move beyond narrowly defined considerations towards addressing, as much as possible, the full suite of requirements for sustainability, as well as the interconnections, feedbacks and uncertainties that typify complex socio-ecological systems at multiple scales (Gibson et al. 2005). For the planning and assessment of major undertakings and associated decision making, sustainability assessment provides a framework for identifying, evaluating and comparing the potential impacts of options and selecting preferred alternatives as desirable and feasible means of moving towards sustainability.

Integrated sustainability-based approaches provide a more efficient and effective means of guiding decision making. These approaches

- attempt to avoid the overlap of scattered, fragmented, and narrowly defined assessments, which better ensures that both the assessment process and the long-term outcomes are positive;
- seek to provide a better venue for public engagement and public deliberation about overall objectives and the relative merits of options; and
- are forward-looking, and therefore more likely to serve the lasting public interest.

The undertakings that may benefit from sustainability assessment can be at both project and strategic levels, and can be for proposals as well as on-going initiatives (Devuyst 1999; Pope et al. 2004; Gibson et al. 2005). Sustainability assessment tries to take into account the full range of significant factors and their interrelations, and looks well ahead – aiming for long term progress towards futures that are more desirable and more secure, for humans and the natural world.

Various approaches to sustainability assessment have been applied in Canadian contexts in recent years in many different venues (growth management planning, resource management, review of institutional practice, and major project

assessment, etc.) and under several different names including integrated assessment, comprehensive planning, sustainability appraisal, and triple-bottom-line evaluation (Gibson 2006b).

As noted by Gibson (2006b), several formal environmental assessment reviews undertaken by joint review panels under provincial, federal and/or Aboriginal authority have adopted sustainability-based decision making. These reviews draw legitimacy from the *Canadian Environmental Assessment Act,* which promotes sustainable development as one of its statutory purposes:

> *s.4 (1)(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 (CEAA 2012a, s.4(1)(b))*
>
> *s.4(1)(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 (CEAA 2012a, s.4(1)(h))*

The first high profile Canadian example of an environmental assessment process explicitly applying a "contribution to sustainability" test was the panel review of the Voisey's Bay nickel mine and mill project, located in northern Labrador (Gibson 2002; Gibson et al. 2005). Subsequent Canadian cases have included reviews by joint review panels of the proposed Kemess North copper-gold mine (Kemess JRP 2007), Whites Point quarry and marine terminal (Whites Point JRP 2007), Mackenzie Gas Project (Mackenzie Gas JRP 2009) and Lower Churchill hydroelectric generation project (Lower Churchill JRP 2011).

Even project proponents have begun adopting sustainability-based frameworks, although with varying degrees of success. Sustainability assessment processes have also been applied internationally, such as in Hong Kong, Belgium, Namibia, Western Australia, South Africa, and the European Union (Devuyst 1999; Pope and Grace 2006).

2.2 Defining progress towards sustainability

One question that often arises in sustainability assessment (or in discussions about sustainable development) is what sustainability and sustainable development in fact entail. Many different definitions have been proposed, with the most common being the Brundtland definition, which defines sustainable development as (Brundtland and al. 1987):

> *Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.*

While this definition is a helpful beginning, its broad generally has been open to diverse interpretations including some that do not reflect serious attempts to understand what a commitment to more sustainable practices means for us as individuals, as members of a society, and as humans sharing this world (e.g. Robinson 2004). Furthermore, the language of sustainable development generally leads to a desire to define particular undertakings as being sustainable or not. Over the long run, nothing is sustainable: climates change, infrastructure turns over, and empires grow and decline. What matters is not the sustainability of particular undertakings but the extend to which they contribute more broadly to progress towards sustainability.

We define *progress* towards sustainability as

> *a process of building towards futures that are desirable and viable on a single, limited planet where the possibilities for human wellbeing, social justice, and ecological stewardship are deeply entwined and where complexity and surprise are unavoidable. (Gibson 2012, pers. comm.)*

Using this definition, we strive to outline how an undertaking may be selected and structured to help society move in a positive direction. This is a journey with no *a priori* defined end goal.

The definition of progress towards sustainability embodies certain characteristics, summarized in Table 2 below.

Table 2 – Characteristics of progress towards sustainability

Progress towards sustainability is:

- a challenge to conventional thinking and practice
- about long as well as short term wellbeing
- comprehensive, covering all the core issues of decision making
- a recognition of links and interdependencies, especially between humans and the biophysical foundations for life
- embedded in a world of complexity and surprise, in which precautionary approaches are necessary
- a recognition of both inviolable limits and endless opportunities for creative innovation
- about an open-ended process, not a state
- about intertwined means and ends – culture and governance as well as ecology, society and economy
- both universal and context dependent.

Source: adapted from (Gibson et al. 2005, Box 3.2 p. 62)

Ultimately, however, the definition of progress towards sustainability provided in this section is insufficient for assessing the proposed Keeyask project because it has not been elaborated on for the particular case and context. Appendix 5 of this

report proposes a preliminary set of sustainability criteria that attempt to define what progress towards sustainability entails in the Keeyask case.

Before reaching that point, however, this report describes what sustainability assessment is and how it is undertaken, why sustainability assessment is required in the Keeyask case, and how the EIS submitted by the KHLP is insufficient for determining whether or not the Keeyask project (as proposed) is the best option for progress towards sustainability.

2.3 A basic framework for sustainability assessment

This section introduces a basic approach for sustainability assessment based on Gibson's (2006b) generic framework for sustainability assessment. The description provided here is complementary to what is found in other documents (Gibson et al. 2005; Gibson 2006b; a); the reader is encouraged to consult these other sources as needed.

The basic approach underpinning Gibson's framework is the development of an evaluative framework for assessing and determining the need for and desirability of the proposed project (in this case the Keeyask dam) in comparison with its alternatives. This evaluative framework is centred on the sustainability criteria set that must be specified to address the needs and realities of the particular cases and contexts

This section is divided into three parts:

- Part 1 establishes the need that the proposed project is designed to meet;
- Part 2 describes the importance of developing and assessing a full suite of potentially reasonable alternatives (in this case alternative technologies/approaches as well as alternative power system plans) so as to ensure that the best option is chosen; and
- Part 3 describes the relevance of a comprehensive sustainability criteria set against which both the need and alternatives can be assessed.

This section does not include a discussion of trade-offs, which are also important considerations in sustainability assessment. The interested reader is encouraged to read Gibson et al. (2005, ch. 6 and 7).

2.3.1 Establishing a need

> *"Dams are a means to an end, not an end in themselves. What is that end? How central are the challenges that large dams set out to meet? And how well can dams meet them?" – (WCD 2000, p.1)*

A crucial step in sustainability assessment, as well as most planning processes, is determining the fundamental purpose or need. In the case of the proposed Keeyask dam, the question of need relates to how much electricity must be produced in the

short, medium, and long-term, so as to maintain and improve the welfare of Manitobans.

In order to determine this need it is important to recognize that electricity is simply a means to social ends. People generally do not want electricity, or even energy, but rather the services they provide, including comfortable homes, personal transportation, entertainment, and light (Lovins 1976; 1977; Science Council of Canada 1977; Bott et al. 1983; Brooks and Newman 2004).

In Manitoba, Manitoba Hydro was created for the purpose of meeting the needs of the province, as noted in Section 2 of the Manitoba Hydro Act (Manitoba 2012c, s.2 p.4):

> *"The purposes and objects of this Act are to provide for the continuance of a supply of power adequate for the needs of the province, and to engage in and to promote economy and efficiency in the development, generation, transmission, distribution, supply and end-use of power"*

As the quote above makes clear, Manitoba Hydro was created to meet the needs of the province. In order to do so, Manitoba Hydro must have a clearly defined set of needs to be met.

A key question is how are these needs determined? It is fair to say that determining energy needs is not an easy task; discussions surrounding the topic can ultimately require questioning the basic character of human needs (e.g. Maslow 1943), and definitions of the good life (e.g. Higgs et al. 2000; Hall and Klitgaard 2012). Certainly many considerations must be taken into account.

First, at a technological level, responding to needs appropriately may involve matching the quality of the energy to the quality of the end-use. For example, the Manitoba Clean Energy Strategy notes that (Manitoba 2012b, p. 30):

> *"[U]sing electricity – a high value energy form – to raise air or water temperatures by only a few degrees is considered a wasteful way to create heat. It is often termed, "using a chainsaw to cut butter." As a result, the conversion of buildings heated all-electrically (many of which are in rural areas) to use geothermal heat pumps, biomass or solar sources of renewable energy can produce multiple benefits (ex: lower energy costs, new local jobs, freeing up more electricity for Manitoba hydro exports)."*

In this instance, we can see that there are needs, such as for low-level ambient heat, currently being met by using high quality electrical energy, when a low quality electricity source might be well enough suited.

Second, oftentimes what appears as a need may in fact be a reflection of cultural norms, which can and do change. For example, as Lovins (1976) notes:

> *In addition, or instead, we can make and use a smaller quantity or a different mix of the outputs themselves, thus to some degree changing (or reflecting ulterior changes in) our life-styles. We might do this because of changes in personal values, rationing by price or otherwise, mandatory curtailments, or gentler inducements. Such "social changes" include car-pooling, smaller cars, mass transit, bicycles, walking, opening windows, dressing to suit the weather, and extensively recycling materials.*

Third, as noted above, the discussion of needs can easily turn towards important, abstract and often difficult reflections on the relationship between consumption (and 'needs') and what it means to live a good life. It may help to provide an example to illustrate this point. In a report prepared by EnerNOC Utility Solutions regarding future electricity demand in Manitoba, the category of residential 'miscellaneous' electricity consumption is projected to increase by 233 percent from the year 2010 to 2031. As noted by Enernoc (2013, p. 68-69)

> *Growth in miscellaneous use is also substantial. This use includes various plug loads not elsewhere classified (e.g., hair dryers, power tools, coffee makers, etc.). This end use has grown consistently in the past and we incorporate future growth assumptions that are consistent with historical trends.*

One must question whether it makes logical sense to assume continued growth, rather than expect that people may reach a saturation point in electronics or that device efficiency improvements may keep pace with any rise in demand for more devices. Furthermore, we must consider whether or not we *wish* to continue expanding our consumption of electronics and electric devices in light of the balance of attractions and disadvantages involved. Ultimately, we must ask two important questions regarding the growth in electricity usage:

1. Is this growth desirable (do we want more electronics)?
2. Is this growth inevitable (are we stuck on this development path)?

Fortunately, there are approaches available to help define the long terms needs (energy and otherwise) of a dynamic and vibrant society. For example, various energy researchers promote the use of backcasting, whereby positive visions of the future are developed and then steps required to more towards these more desirable futures are determined (Robinson 1982; Robinson 2003; Loorbach 2007, ch. 4; Kern and Smith 2008).

By undertaking backcasting exercises in a participatory and transparent manner, the legitimacy and representativeness of backcasting for may be improved. To this end we note that the World Commission on Dams proposes a participatory approach to needs assessment when it calls for (WCD 2000, p. 264):

> *An assessment based on participatory methods appropriate to the local context resulting in a clear set of development objectives that guide the subsequent assessment of options.*

Compared to forecasting techniques, backcasting provides two important benefits for sustainability assessment. First, backcasting helps avoid issues of overstated demand, which have been a traditional concern for energy planners. As noted by the World Commission on Dams (2000, p.179):

> *The needs for power, food and water are typically identified through sectoral demand forecasts, which have frequently overstated sectoral needs.*

On the same page, the WCD notes:

> *Overstating future demand has led to a perceived need for a large incremental response to meet rapidly growing needs. In many circumstances this has militated against a gradual approach of adopting smaller, non-structural options and has pushed decision-makers into adopting large-scale dam projects because they seem to be the only adequate response to the large gap between existing supply and forecast demand.*

Secondly, because backcasting is an explicitly normative exercise (Robinson 2003), it promotes reflection and deliberation upon unattractive characteristics of present arrangements and trends, such as the currently inequitable use of resources by modern societies (WCD 2000, p. 149) and allows pursuit of futures we want, rather than acceptance of projections from what we have now..

Proper backcasting requires an explicit set of sustainability criteria, by which the various desirable futures can be compared and assessed. In section 2.3.3 and Appendix 5 of this report we outline and propose a set of sustainability criteria for assessing the proposed Keeyask project. This criteria set may serve as a starting point for a backcasting approach as well, although it would require updating for the different context of a backcasting exercise.

Finally, the extent to which Manitoba Hydro is responsible for a full deconstruction of societal needs, or depiction of desirable futures, is an open question. It is unclear where Manitoba Hydro's duties end and where other stakeholders' (governmental or otherwise) duties begin. However, it should be evident that determining desirable futures is properly part of the task of determining energy needs, which is in turn a fundamental component of establishing good energy strategy.

Likewise, in a situation such as the proposed Keeyask dam where it ultimately comes down to a decision of whether or not to flood land – and expend tremendous resources addressing and mitigating the ensuing social-ecological impacts – we believe beginning with a well formulated and mutually agreed upon set of needs is the first and perhaps most important step that should be undertaken.

2.3.2 Developing alternatives

> *"The World Commission on Dams considers that the end of any dam project must be the sustainable improvement of human welfare… If a large dam is the*

best way to achieve this goal it deserves our support. Where other options offer better solutions we should favour them over large dams." – (WCD 2000, p.2)

Once a need has been defined and agreed upon, the next step in a sustainability-based assessment process should be to identify the potentially reasonable alternative approaches to meeting that need. The identification and comparative evaluation of alternatives is crucial to promoting progress towards sustainability.

The assessment of alternatives matters because it helps to overcome our inability to define and measure adequately the thresholds of acceptability. While there are obvious cases where a proposed project is unacceptable, and it is possible to be reasonably well informed about important parameters, there is no possibility of a clear overall delineation of the assumed line between acceptability and unacceptability.

Many of the fundamental limitations and critiques of narrowly conceived environmental assessment result from the application of an acceptability threshold, which leads to processes and outcomes that are typically ill-defined, not well equipped to address cumulative and synergistic effects, and focuses on harm minimization as opposed to promoting positive steps (Duinker and Greig 2006).

In order to avoid the perils of trying to define a threshold of acceptability, sustainability assessment should be applied primarily in the comparison of alternatives. The premise is that as societies move along choosing the best alternatives, they will progress towards sustainability. A hydro dam is not sustainable or unsustainable; rather it is a possible means of helping Manitoba progress towards or away from greater sustainability. O'Brien (2001) notes,

> *the assessment of the benefits and drawbacks of a full range of alternatives, not assessment of the acceptable level of a hazardous activity, is not only the heart of an environmental impact statement, it is the heart of wise decision-making in a democracy.*

In its final report, the WCD devotes significant time and energy to stressing the importance of defining a full suite of alternatives to meet the agreed upon needs. For example, one criterion proposed by the WCD is the following (WCD 2000, p.223):

> *The range of options being examined at the outset will be broad and go beyond technical alternatives to consider relevant policy, programme and project alternatives. It should also consider: institutional changes and management reforms that could influence consumption patterns, reduce demand, and affect the viability of other supply options; the river basin context, cumulative impacts and interactive effects, including the interaction between surface and groundwater resources; multipurpose functions of alternatives; secondary local and regional development effects of alternatives; subsidies that can distort*

comparison of alternatives; life cycle analysis to compare electricity generation alternatives; and the gestation period required before benefits are delivered.

The WCD also notes that, historically, dam builders have not been particularly successful in their assessment of alternatives. For example, in WCD (2000, p. 178), the report notes:

The range, scale and type of options considered in development plans in the past were limited by the boundaries of the planning and decision-making approaches of the day. Many sectoral planning studies from which projects emerged were narrow technical and economic studies, aimed at least-cost supply solutions for providing a single service such as irrigation water or electric power. When dams were contrasted with alternatives, they were typically only compared to other potential dam projects or, in the case of hydropower, with alternative large-scale thermal power generation options.

For the purpose of this report, there are two key issues that must be considered with regard to the assessment of alternatives. First, conservation and demand side management (collectively called DSM) opportunities must be given first priority. Before developing new supplies, it is important to ensure that current supplies are being efficiently and effectively used. As noted by the WCD (2000, p.224)

Planning must give priority to making existing water, irrigation, and energy systems more effective and sustainable before taking a decision on a new project. The potential is highly location specific, therefore assessment will require detailed in-country reviews that cut across sectoral boundaries and go beyond technical responses to include consideration of policy options.

Promoting DSM opportunities is both a technical and a social question. As noted above in section 2.3.1 with regard to defining the need, there are often many technical and associated policy and management opportunities for ensuring that the quality of energy supply is properly matched to the end-use.

In Manitoba, heating is an example of an end-use that may be better served by biomass or geothermal options, both of which either eliminate or greatly reduce electricity requirements. A list of possible DSM opportunities proposed in the Manitoba Clean Energy Strategy is outlined in Table 3, and highlights Manitoba's goal to be "[l]eading Canada in Energy Efficiency" (Manitoba 2012b, p.3). At the same time, there are often many changes to societal norms (such as dressing appropriately for the weather) that can lead to significant energy savings.

Table 3 - Sample DSM Opportunities in the Manitoba Clean Energy Strategy

• "Through Manitoba Hydro, implement a new on-Meter financing program that overcomes the high upfront costs that prevent households from implementing energy saving retrofit measures.

- Enhance Manitoba's successful Low Income energy efficiency programming, in partnership with social enterprises, to help build community capacity, create jobs and maximize economic benefits.
- Expand The Green Building Policy so that more government funded building construction, renovation and operations are subject to energy efficiency requirements.
- Expedite adoption of National Building Code energy efficiency updates to ensure Manitoba homes and businesses achieve the lowest lifetime costs for energy.
- Advance vehicle-related efficiency through green fleet purchasing policies, support for higher vehicle fuel efficiency standards and promotion of active transportation.
- Support the expansion of voluntary programs to benchmark, rate and label building energy performance. Manitoba will explore and pilot programs that disclose the energy performance of buildings offered for sale or lease.
- Pursue minimum energy efficiency standards for high-energy consuming products where federal standards are deemed inadequate.
- Develop and publish an annual energy efficiency plan that establishes stronger efficiency targets; identifies an expanded range of programming options; sets out costs and benefits; and reports on performance."

Source: Adapted from (Manitoba 2012b, p.3):

The second key issue relating to the assessment of alternatives is the extent to which the various alternatives are compatible with, or exclude, one another. This is an important issue that has significant implications for longer-term energy strategy, and one whose importance is recognized by the WCD. For example, as noted by the WCD (WCD 2000, p. 23):

> *The degree of even-handedness applied in considering alternatives to large dams is, perhaps, one of the most contested issues. It raises the question of whether dams are selected over other options that may meet the water development or energy objectives at lower cost, or that may offer more sustainable and equitable development benefits. This aspect of the debate extends to whether, and on what basis, dams should be considered complementary to, or mutually exclusive of other options of different scales and types. ….*
>
> *The options debate connects with the political economy of decision-making, and therefore to the distribution of power and influence within societies. This includes how choices are made between available options, and the extent to which market or other institutional factors create barriers and incentives for different options that provide the same service.*

Large incremental additions to energy supply have the potential to harm other means of meeting needs such as DSM or biomass heating. For example, as noted by Mahapatra et al. (2007), in Sweden between 1973-1986, an abundance of electricity resulting from an expansion of nuclear power led to the promotion of electricity-based heating systems over biomass heating. As a result few housing units in this period were build to accommodate biomass heat and unfortunately, it is far more

costly to retrofit a house for biomass heating than it is to design for biomass in the first place, which ultimately leads to an exclusion of biomass options for heating.

There are other means by which dams may exclude alternatives. For example, as noted by the WCD (2000, p.221):

> *Often dams take a long time to come on stream, delaying the delivery of benefits. Because they are high cost investments they divert resources and can exclude other options that may be able to deliver benefits more quickly. These options include demand side management, alternative supply side technologies and improving and expanding the performance of existing systems.*

Building dams does not necessarily harm alternative forms of generation. To the contrary, in certain instances dams may actually benefit other renewable forms of electricity, such as wind power, by providing a means of overcoming intermittencies (Manitoba 2012b). However, without a full and fair analysis of alternatives, the potential for such positive synergy is likely to be lost and a development path chosen that precludes or disadvantages viable alternatives both now and in the future.

The assessment of alternatives requires an explicit set of sustainability criteria by which the various desirable power system configurations can be compared and assessed. In Appendix 5 of this report we outline and propose a set of sustainability criteria for assessing the proposed Keeyask project. This criteria set may serve as a starting point for such an assessment.

It should be clear at this point that properly determining and assessing alternatives is a fundamental component of good energy strategy, and serves to avoid the limitations of attempting to define an acceptability threshold. There may be alternatives to the dam (e.g. a mix of conservation, demand management, solar PV, wind, biomass heating, etc.) that do not require actions that are as irreversible as the flooding of land and that consequently facilitate a more flexible and adaptable approach to ensuring adequate, appropriate and affordable energy services. Likewise, these other forms of electricity supply and conservation may provide an opportunity for incremental increases in supply that do not lead to the risk of oversupply and overconsumption of electricity.

Ultimately, we contend that the CEC cannot make a fully informed decision on the relative merits of the proposed Keeyask dam without the full and fair comparison of alternatives.

2.3.3 Developing a set of sustainability-based evaluation and decision criteria

The desired end result of sustainability assessment is the achievement of net gains that are mutually reinforcing, fairly distributed and lasting, and that avoid all potentially significant adverse effects. This begs questions, however, about what are

the key benefits to be sought, and what adverse effects are especially to be avoided. Addressing these questions requires the development of suitably specified sustainability criteria.

As was previously noted, every important decision we make is based on some set of criteria for evaluation and decision-making. The criteria are not always explicitly stated or applied in a consistent manner. They may not even be mutually compatible. But they are always present.

For the purpose of sustainability assessment and proper decision making, the goal is to have a coherent set of explicitly identified and consistently applied criteria. These criteria clarify how to pursue the general goal of contributing to sustainability in a given case and context, and to do this they must integrate (Gibson 2006b):

- considerations that are linked across the usual social, economic and ecological categories;
- universally-applicable imperatives and concerns specific to the case and context;
- issues and priorities interacting from local to global levels, and over time from present to future generations; and
- attention to best options as well as improvements over base conditions.

The basic set of generic decision-making criteria used in this document are Gibson's sustainability criteria (Gibson et al. 2005, ch. 5), which are shown in Table 4 below. Gibson's criteria represent a synthesis of the main requirements for progress towards sustainability presented in the literature and tested in practice in sustainability implementation initiatives (including early sustainability assessments) over the past few decades (Gibson et al. 2005, ch. 5).

These criteria can be phrased and categorized in various ways, and in every application they should be specified for the particulars of the case and context, but they should provide an adequate working foundation.

Table 4 - Gibson's eight evaluative and decision criteria for sustainability

Socio-ecological system integrity Build human-ecological relations to establish and maintain the long-term integrity of socio-biophysical systems and protect the irreplaceable life support functions upon which human as well as ecological wellbeing depends.
Livelihood sufficiency and opportunity Ensure that everyone and every community has enough for a decent life and that everyone has opportunities to seek improvements in ways that do not compromise future generations' possibilities for sufficiency and opportunity.
Intragenerational equity Ensure that sufficiency and effective choices for all are pursued in ways that reduce dangerous gaps in sufficiency and opportunity (and health, security, social recognition, political influence, etc.) between the rich and the poor.
Intergenerational equity

Favour present options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainably.

Resource maintenance and efficiency
Provide a larger base for ensuring sustainable livelihoods for all while reducing threats to the long term integrity of socio-ecological systems by reducing extractive damage, avoiding waste and cutting overall material and energy use per unit of benefit.

Socio-ecological civility and democratic governance
Build the capacity, motivation and habitual inclination of individuals, communities and other collective decision making bodies to apply sustainability requirements through more open and better informed deliberations, greater attention to fostering reciprocal awareness and collective responsibility, and more integrated use of administrative, market, customary and personal decision making practices.

Precaution and adaptation
Respect uncertainty, avoid even poorly understood risks of serious or irreversible damage to the foundations for sustainability, plan to learn, design for surprise, and manage for adaptation.

Immediate and long term integration
Apply all principles of sustainability at once, seeking mutually supportive benefits and multiple gains.

The generic criteria above provide a basic framework that covers the key sustainability issues and their interconnections. As a basic framework, these criteria should ensure that no big common issues are neglected. At the same time, the criteria are clearly both general in nature and broad in scope, and it is important that they be specified and elaborated for the case and its particular context.

The process of criteria specification is described in Appendix 5 following the presentation of the proposed sustainability criteria set for the Keeyask case. A similar sample set of criteria relating to the Mackenzie Gas Project is provided in chapter 19 of the final report by the Joint Review Panel (Mackenzie Gas JRP 2009, ch. 19). A description of the criteria specification process is provided in Appendix 6

2.4 General guidelines for sustainability assessment processes

The sections above describe the basic approach to sustainability assessment, and in doing so they implicitly hint at a set of guidelines for undertaking proper sustainability assessment practice. This section briefly makes those guidelines explicit. Five guidelines for the design and application of sustainability assessment processes are provided in Table 5 and are elaborated upon below.

Table 5 - Basic procedural guidelines for sustainability assessment

Prioritize contribution to sustainability and apply it in all processes
Establish contribution to sustainability as the main test of proposed purposes, options, designs and practices, and must put application of this test at the centre of decision making, not as one advisory contribution among many.

Base decisions on an explicit set of evaluation and decision criteria and trade-off rules
Adopt evaluation and decision criteria and trade-off rules that reflect the full set of core requirements for progress towards sustainability, recognize interdependencies and seek multiple

reinforcing gains on all fronts.

Be open and participatory
Provide means of specifying the sustainability decision criteria and trade-off rules for specific contexts, through informed choices by the relevant parties (stakeholders).

Promote transparency and accountability
Ensure that the deliberations and decisions are sufficiently open to scrutiny and participation, and sufficiently accountable in law, that an informed public can push effectively for proper application.

Promote the process of sustainability assessment as much as the substantive outcome
The process of undertaking a sustainability assessment provides an opportunity to foster social learning, build good will, and allow stakeholders to take ownership and responsibility of the lives and decision. The process of sustainability assessment can be improved by incorporating open participative approaches, respecting different interests, and integrating different kinds of knowledge.

Source: adapted from (Gibson 2006a)

Prioritize contribution to sustainability and apply it in all processes

Ensuring progress towards sustainability must be an integral component of decision making, as opposed to something considered separately and/or after the fact. By centring decisions around their resulting contribution to sustainability, one can help ensure that projects, plans and programs and other undertakings are designed to help society meet the needs that have been identified in the best manner.

Bringing sustainability to the centre of decision making requires recognizing that dams and other projects are a means to an end, not an end in themselves. Recognizing this, it becomes sensible to acknowledge that proper decision making should be centred on how best to move towards those desired ends.

Notably, the World Commission on Dams proposes a that set of sustainability criteria should be applied at all important decision points, including the needs assessment, the selection of alternatives, preliminary studies, project preparation, project implementation, and finally project operation (WCD 2000).

As was mentioned in section 2.2, above, sustainability assessment does not seek to define whether or not a proposed undertaking is sustainable, but rather whether or not it is the best option for helping society progress towards sustainability. This point is equally valid here insofar as all decisions should be centred on promoting progress towards sustainability.

Base decisions on an explicit set of evaluative and decision-making criteria and trade-off rules

All decisions are based upon criteria. For clarity and accountability in sustainability assessment, it is important to specify the relevant criteria explicitly.

By their very nature, sustainability criteria serve to define what is considered important, both universally and within a particular case and context. Appendix 5 provides an initial set of sustainability criteria set that has been developed for the

proposed Keeyask dam. It draws from sustainability criteria sets for dams prepared by other bodies – such as the World Commission on Dams (WCD 2000) – as well as attention to the conditions and concerns, opportunities and aspirations surrounding the Keeyask proposal, alternatives and context.

Be open and participatory

It is becoming increasingly evident that citizens and stakeholders want to be involved in decision-making processes (Martinez-Alier et al. 1998; Munda 2004; Hirsch Hadorn et al. 2006; Funtowicz and Ravetz 2008; Gasparatos et al. 2008; Waltner-Toews and Kay 2008). Funtowicz and Ravetz (1993) provide a cogent argument for public participation:

> *When problems lack neat solutions, when environmental and ethical aspects of the issues are prominent, when the phenomena themselves are ambiguous, and when all research techniques are open to methodological criticism, then the debates on quality are not enhanced by the exclusion of all but the specialist researchers and official experts. The extension of the peer community is then not merely an ethical or political act; it can positively enrich the processes of scientific investigation.*

Participation is considered to foster public engagement and local ownership (Reason and Bradbury 2001; Waltner-Toews and Kay 2008; Giampietro and Mayumi 2009, ch. 10), improve accountability (Kidd and Fischer 2007), help manage uncertainty and unpredictability, foster learning (Lister 2008, p. 99), and increase the legitimacy of decisions (Lovins 1977; Franklin 1990).

In light of the successes and failures of large-scale dam building projects across the world, the World Commission on Dams is firm and explicit in its call for increasing public participation, stating (WCD 2000, p. 215):

> *Decision-making processes and mechanisms are used that enable informed participation by all groups of people, and result in the demonstrable acceptance of key decisions. Where projects affect indigenous and tribal peoples, such processes are guided by their free, prior and informed consent.*

In order to achieve this, the World Commission on Dams notes that effective and open participation requires (WCD 2000, p. 215):

> *1 – Recognition of rights and assessment of risks are the basis for the identification and inclusion of stakeholders in decision-making on energy and water resources development.*
>
> *2 – Access to information, legal and other support is available to all stakeholders, particularly indigenous and tribal peoples, women and other vulnerable groups, to enable their informed participation in decision-making processes.*

3 – Demonstrable public acceptance of all key decisions is achieved through agreements negotiated in an open and transparent process conducted in good faith and with the informed participation of all stakeholders.

4 – Decisions on projects affecting indigenous and tribal peoples are guided by their free, prior and informed consent achieved through formal and informal representative bodies.

Promote transparency and accountability

The guidelines above all serve to ensure that the decision-making process is both transparent and accountable. Promoting transparency and accountability helps improve the decision-making process by facilitating scrutiny by all stakeholders and empowering them to act effectively to ensure that decisions are made in the proper manner, for the right reasons and with the proper goals in mind. This is essence fundamental requirement of democracy.

A sustainability assessment approach, with its focus on developing and defining a set of mutually agreed upon sustainability criteria, provides one possible means of moving towards more transparent and justified decision making.

Promote the process of sustainability assessment as much as the outcome

Sustainability assessment is generally promoted as a means of improving the substance of decision-making, ultimately leading to better outcomes. While this is no doubt the central thrust of the approach, particularly with regard to potential developments such as the proposed Keeyask project, it is important to recognize that sustainability assessment also has value as an approach to ongoing learning.

The process of undertaking a sustainability assessment – including critical examination of needs and purposes, careful identification of potentially reasonable alternatives and specifying the sustainability criteria – provides an opportunity for those involved to reflect on what matters in society, what future we want and what rights and responsibilities we have towards one another.

The proposed Keeyask project provides an ideal opportunity to apply a sustainability assessment framework and obtain maximum benefits from the process itself. It is clear that a wide range of challenges and opportunities face Manitoba and the world more broadly. Whether it is climate change, biodiversity, declining resources, or threats to traditional ways of living, this proposed dam touches upon many critical issues of the 21st century.

There are substantial benefits in choosing an approach that promotes informed discussion and critical self-reflection in the broader population. It is noteworthy that the federal EIS Guidelines for the proposed Keeyask project speak to this very opportunity, where they require the proponent to describe "how Canadians benefit from the information gathering process undertaken by the proponent as part of the environmental assessment" (CEAA 2012b, p. 26). The guidelines mention the following factor to consider (CEAA 2012b, p. 26):

contribution of the EA to support sustainable development: Describe how the EA process for the Project contributed to the concept of sustainable development for a healthy environment and economy.

The process of applying a sustainability assessment framework would help the proponent – and future proponents – meet these requirements within the existing legislative frameworks.

2.5 The legislative basis for sustainability assessment in Manitoba

Thus far in this report the basics of sustainability assessment have been described and an argument for applying sustainability assessment in the proposed Keeyask case has been presented. What has not been discussed yet is whether there exists any legislative basis for incorporating a sustainability assessment in EA processes in Manitoba.

We understand that the notion of sustainability assessment has been discussed at some length in Manitoba through forums such as the Consultation on Sustainable Development Implementation (Sinclair 2002; Sinclair and Quinn 2012) but that there is no official Manitoba government document stating that decisions must be made using a sustainability assessment framework.

In order to address this gap, Appendix 1 provides an analysis of the legislative basis for sustainability assessment in Manitoba through a review of the Manitoba *Sustainable Development Act* (the SD Act) (Manitoba 1998), key sections of the Manitoba *Environment Act* (the ENV Act) (Manitoba 2012a) and the Canadian *Environmental Assessment Act* (CEAA 2012) (CEAA 2012a). It does so by synthesizing and reorganizing sections of the three Acts and comparing them to Gibson's sustainability framework.

The objective here is not to establish that sustainability-based assessment in this case is mandatory in law, but rather to demonstrate the extent to which the key elements of a sustainability-based approach are already recognized in applicable public policy and legislated commitment as set forth in the three Acts and that the approach is clearly appropriate for application in decision making on a proposed undertaking that, ultimately, is to be judged on whether it best serves the public interest.

The review of the positions taken in the three Acts applies Gibson's generic sustainability assessment framework because it is a synthesis of global experience, is widely recognized and has been applied worldwide as a relevant approach to sustainability assessment (e.g. Pope et al. 2004). Moreover, it has been heavily informed by Canadian environmental assessment practice, and has been applied previously by proponents, experts, and joint review panels in a Canadian context

(e.g. for the Mackenzie Valley Gas Project Review) (Gibson 2006b; OPA 2006; Gibson et al. 2008).

Ultimately, if the Acts incorporate the key components of Gibson's framework for sustainability assessment, concerning both substance and process, then it is reasonable to argue that the Acts demand a sustainability assessment approach to planning and decision-making on major undertakings.

The results of the analysis lead to three conclusions. First, it is clear that effectively, there is comprehensive overlap in the substantive requirements for sustainable development between Gibson's evaluation and decision-making criteria and the three Acts. For this reason, it is fair to say that the Acts effectively support and necessitate application of the full suite of requirements for progress towards sustainability. Taken as a package, the Acts are demanding and rigorous with regard to sustainable development.

Second, the three Acts are in good agreement with the guidelines for sustainability assessment practice proposed in Table 5, with some notable differences. Unlike the guidelines proposed in Table 5, the legislation reviewed includes no direct requirement for application of specified evaluative and decision-making criteria and trade-off rules. Nor do the three Acts explicitly state that contribution to sustainability should be the overarching goal at all stages of decision making and planning.

Arguably, however, application of the "contribution to sustainability" test is implicitly required to satisfy the intent of the Manitoba *Sustainable Development Act* and *Environment Act* to ensure long-term sustainability for Manitoba and its citizens and to serve the stated purpose of CEAA 2012 to promote sustainable development (CEAA 2012a, 4(1)h).

In any event, since both the substantive and procedural requirements of sustainability assessment are already consistent with what is established in the Acts, adoption of a more explicit and more fully elaborated framework for sustainability assessment would be a useful next step in clarifying expectations and facilitating implementation.

2.6 Summary

This section introduced sustainability assessment as a framework for decision-making. It began by providing a brief history of sustainability assessment practice in Canada and beyond, and then provided a basic definition of *progress towards sustainability.* Second, a general approach for undertaking sustainability assessment was described. Third, a set of basic guidelines for sustainability assessment practice was proposed. Finally, the legislative basis for applying sustainability assessment in Manitoba was confirmed, with supporting material provided in Appendix 1.

Now that a basic framework for sustainability assessment has been provided and shown to be compatible with the Manitoba *Sustainable Development Act* and *Environment Act,* as well as the *Canadian Environmental Assessment Act*, it is now possible to turn to the proposed Keeyask dam and the Response to the EIS Guidelines submitted by the KHLP. This task is undertaken in the following section.

3 Sustainability-based decision making and the Keeyask project

This section considers the essential public interest question in the Keeyask case: whether there are grounds for a confident decision that approving and building the proposed dam, as described and supported in the Response to the EIS Guidelines would be the best means of promoting progress towards sustainability while avoiding significant adverse effects.

It is important to note this section does not attempt to evaluate the proposed project's potential effects or to reach conclusions about the extent to which these effects may contribute to or constrain sustainable development. Instead, we adopt a contribution to sustainability perspective in examining the adequacy of the proponent's approach to assessing and justifying the proposal. There are several reasons for this.

First, as will be argued in this section, there are serious inadequacies in the EIS that render it impossible to make an informed decision regarding how the proposed Keeyask dam may help promote progress towards sustainability. Second, other experts in this process have identified areas where important project outcomes are contested and/or potentially adverse, and such uncertainties must be addressed before an informed decision can be made.

This section begins by describing how the federal and CEC guidelines include requirements for sustainability. Following that, the proponent's approach to justifying the proposed Keeyask dam in light of sustainable development – which is provided in Chapter 9 of the Response to the EIS Guidelines – is critiqued. Finally, other gaps and deficiencies are discussed.

3.1 Requirements for sustainability as included in the Guidelines

This section outlines the requirements for sustainability-related matters included in the two guidelines documents that set out expectations for the proponent's EIS: the federal EIS Guidelines (CEAA 2012b) and the Terms of Reference for the Clean Environment Commission review (Mackintosh 2012).

3.1.1 Federal EIS Guidelines - requirements related to sustainability

The federal EIS guidelines include several categories of sustainability-related concerns. These will be described briefly below.

General contribution to sustainable development
As noted above, there is a general requirement that the assessment process contribute to sustainable development. The guidelines mention the following factor to consider (CEAA 2012b, p. 26):

> *contribution of the EA to support sustainable development*
>
> *- Describe how the EA process for the Project contributed to the concept of sustainable development for a healthy environment and economy.*

Assessment of the need for and alternatives to
The federal Guidelines require a description of the need for and alternatives to the project, both of which are important for sustainability assessment. As noted in the guidelines (CEAA 2012b, p. 6-7):

> *For the purpose of the comprehensive study, the proponent must clearly describe the need for the proposed project. The "need for" the project can be described by an answer to the question: What is the problem or opportunity the project is intended to solve or satisfy? The "need for" will establish the fundamental rationale of the project; and*
>
> *The EIS must include an analysis of alternatives to the Project which describe functionally different ways to meet the project need and achieve the project purpose from the perspective of the proponent. Analysis of "alternatives to" a project should validate that the preferred alternative is a reasonable approach to meeting need and purpose. (CEAA 2012b, p. 6).*

While the Terms of Reference for the CEC review (as will be discussed below) exclude the Need For and Alternatives To (NFAT) assessment, it is noteworthy that the CEAA guidelines stipulate that the EIS itself must include an analysis of alternatives, which it does not (see Keeyask HLP 2012s. 4.6).

Precaution, adaptive management and minimization of adverse effects
The guidelines require consideration of precaution, assessment of cumulative effects, and mitigation of significant adverse effects. With regard to precaution, the guidelines include the following (CEAA 2012b, p. 20-21):

> *The EIS will demonstrate that the Project has been examined in a careful and precautionary manner. In determining whether the Project is likely to cause significant adverse environmental effects, the proponent shall:*
>
> *demonstrate that all aspects of the Project have been examined and planned in a careful and precautionary manner in order to ensure that they would not cause serious or irreversible damage to the environment, especially with respect to environmental functions and integrity, considering system tolerance and resilience, and/or the human health of current or future generations;*
>
> *outline and justify the assumptions made about the effects of all aspects of the Project and the approaches to minimize these effects;*

evaluate alternative means of carrying out the Project and compare them in light of risk avoidance and adaptive management capacity;

ensure that in designing and operating the Project, priority has been and would be given to strategies that avoid the creation of adverse environmental effects;

develop contingency plans that explicitly address accidents and malfunctions;

identify any proposed follow-up and monitoring activities, particularly in areas where scientific uncertainty exists in the prediction of effects; and,

present public views on the acceptability of all of the above.

With regard to cumulative effects, the guidelines state the following (CEAA 2012b, p. 25):

The proponent shall identify and assess the Project's cumulative effects. Cumulative effects are defined as changes to the environment due to the project when considered combination with the effects of other works or other past, present and reasonably foreseeable future projects. Cumulative effects may result if:

- implementation of the Project being studied caused direct residual negative effects on the environmental components, taking into account the application of technically and economically feasible mitigation measures; and/or the same environmental components are affected by other past, present or reasonably foreseeable future actions (projects or activities).

With regard to the mitigation of significant adverse environmental effects, the guidelines state the following (CEAA 2012b, p. 22):

The EIS must consider measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the Project. As a first step, the proponent is encouraged to use an approach based on the avoidance and reduction of the effects at the source. Such an approach may include modification of the design of the Project or relocation of project components.

The requirements for considering precaution, assessing cumulative effects, and mitigating significant adverse environmental effects are all compatible with the aims of sustainability assessment.

Maintaining capacity of renewable resources

Finally, with regard to sustainable development, the guidelines include a special requirement to assess impacts on renewable resources (CEAA 2012b, p. 25):

The EIS must describe the effects of the Project on the capacity of renewable resources to meet the needs of the present and those of the future. The EIS must identify those resources likely to be significantly affected by the Project, and

describe how the Project could affect their sustainable use. The EIS must also identify and describe any criteria used in considering sustainable use. Sustainable use may be based on ecological considerations such as integrity, productivity, and carrying capacity.

While this guideline most obviously requires attention to the direct effects on renewable resources (e.g. the impacts on Lake Sturgeon), it also demands consideration of larger, indirect effects, such as effects on Manitoba's electrical power system and more broadly. For example, the proposed project is likely to affect the development of other renewable resources (e.g. wind and solar power) insofar as the proposed project may promote positive synergy with these resources, delay the development of the resources, or contribute to some other effect(s). This was discussed in section 2.3.2 with regard to assessing alternatives.

In summary, under the federal Guidelines contribution to sustainable development is a general expectation of the assessment process and several basic requirements for sustainability-based decision making are included explicitly. Where the federal Guidelines go furthest is in requiring that the environmental assessment process itself contribute to the concept of sustainable development, thereby opening the door to sustainability-based decision making and assessment.

3.1.2 Clean Environment Commission - Terms of Reference

The Terms of Reference for the Manitoba Clean Environment Commission also include provisions for sustainability-based assessment. In particular, the CEC's Terms of Reference note that (Mackintosh 2012, p. 3):

the Commission's recommendation shall incorporate, where appropriate, the Principles of Sustainable Development and Guidelines for Sustainable Development as contained in Sustainable Development Strategy for Manitoba.

This statement in the Terms of Reference is important because, as is discussed in Appendix 1, there is a substantive overlap between a comprehensive sustainability assessment framework and the provisions of the Manitoba S*ustainable Development Act* (Manitoba 1998), the Manitoba *Environment Act* (Manitoba 2012a), and the Canadian *Environmental Assessment Act* (CEAA 2012a). The result is full justification for the argument that the Clean Environment Commission should be adopting sustainability-based decision making, or something equivalent, in its assessment of the proposed Keeyask dam.

3.1.3 Summary of the requirements in the Terms of Reference

The Guidelines and Terms of Reference described above provide a basic set of direct requirements for sustainability assessment. The CEC ToR's explicit reference to the Principles of Sustainable Development and Guidelines for Sustainable Development in the Manitoba *Sustainable Development Act*, provides especially strong grounds for applying a sustainability assessment framework.

Based upon the requirements provided above, the following section critiques the KHLP's approach to sustainability assessment.

3.2 Gaps in the EIS relating to sustainability

This section provides a basic critique of the KHLP's justification for how the proposed Keeyask dam contributes to sustainability. This critique centres on five fundamental concerns with the EIS relating to sustainability:

1. The EIS approach is unsatisfactory as a means of assessing progress towards sustainability;
2. Need for the project has not been established;
3. No comparative assessment of alternatives is provided to demonstrate that the proposed project is the best option;
4. No explicit set of sustainability decision criteria seems to have been applied; and
5. There are important instances of contested and potentially adverse effects, including impacts on Lake Sturgeon, Boreal Woodland Caribou, and boom and bust dynamics.

Without addressing these concerns, we argue that it is impossible for the CEC to make an informed decision about whether the proposed Keeyask dam would contribute to progress towards sustainability.

3.2.1 An approach to assessing progress towards sustainability lacking coherence

The first gap with the EIS regarding assessing progress towards sustainability is that the proponent provides an approach that lacks coherence. This is exemplified in "Chapter 9 – Sustainable Development" of the Response to the EIS Guidelines.

In Chapter 9 of the EIS, the project proponent describes how the proposed project will contribute to sustainable development (Keeyask HLP 2012, ch.9). While one of the shorter chapters in the document, the chapter outlines a wide variety of goals, guidelines, policies and principles that provide the legislative and regulatory framework for the project with regard to sustainable development. The goals, guidelines, policies and principles include:

- The Government of Manitoba's Principles of and Guidelines for Sustainable Development (Manitoba 1998; Manitoba Conservation n.d.) listed in Appendix 2;
- The Government of Canada's Federal Sustainable Development Strategy Goals (Environment Canada 2010), listed in Appendix 3; and
- Manitoba Hydro's Policies/Principles of Sustainable Development (Manitoba Hydro n.d.), listed in Appendix 4.

The approach taken by the project proponent in Chapter 9 is to address each policy, principle, goal, and guideline individually. An illustrative example is provided in Table 6 below, which contains the EIS's response to the Principles of Sustainable Development as set forth in the Manitoba *Sustainable Development Act.* Table 6

contains the entire response by the proponent to those Principles. In certain responses a comment is provided by us.

Table 6 – Comparing the EIS with selected Manitoba Principles of Sustainable Development

Principle: Integration of Environmental and Economic Decisions "Economic decisions should adequately reflect environmental, human health and social effects. Environmental and health initiatives should adequately take into account economic, human health and social consequences." **Response in EIS** "The Project has been designed to provide long term electricity benefits to Manitoba and export customers and to enhance quality of life through the provision of clean affordable energy. Hydroelectric energy is a much cleaner, healthier option than coal and gas, the main alternatives for generating electricity in the mid-continent market area. "The Project is being designed and will be constructed using methods to minimize effects on the environment and the local KCNs communities, and to maximize economic and social benefits for the communities, northern Manitoba, and the whole province. Job training, increased employment, and the associated improvement in the standard of living are positive, long lasting social outcomes. As an example of the attention given to human and social consequences, programs under the AEAs provide the KCNs with programs to address cultural objectives and access to a healthy food supply consistent with their traditional lifestyle" (Keeyask HLP 2012, 9.6). **Comment by report authors** This response in no way describes how the proponent applied integrated decision-making. The intent of integration is not simply to look at the cost of mitigating an adverse effect, but rather to consider the full suite of requirements for progress towards sustainability. Likewise, the impacts of the project – both good and bad, on the natural environment, First Nation communities, the people of Manitoba, etc. both and now and in the future – cannot be depicted or evaluated adequately without attention to the interactions among social, ecological, and economic components. Given the scale of this proposed project, and the potential it shows to provide long-term lasting benefits, if properly undertaken, it is important to ensure that the decision-making framework is appropriated integrated. This was not shown in this response.
Principle: Stewardship "The economy, the environment, human health and social well-being should be managed for the equal benefit of present and future generations. Manitobans are caretakers of the economy, the environment, human health and social well-being for the benefit of present and future generations. Today's decisions are to be balanced with tomorrow's effects." **Response in EIS** "The Project, by design, will provide hydroelectric energy benefits, including reduced greenhouse gas emission benefits, for many generations into the future. From a regional perspective, the KCNs have been very involved in planning the Project and in the environmental assessment and they will continue to have a direct role in the monitoring and follow-up programs. Intergenerational benefits are a mainstay of the KCNs' decision to

participate in the Partnership.

At the same time, the KCNs are equally attentive to applying their worldview to avoid and reduce environmental effects and demonstrate respect to Askiy. Partnership income will be beneficial to generations of KCNs community Members, and will provide sustained revenues to the broader Manitoba economy. Stewardship of the environment will continue through ongoing monitoring and follow-up programs involving KCNs communities and Manitoba Hydro, and AEA programs will enhance the cultural identity and connection to the land of present and future generations which in turn will contribute to social well being." (Keeyask HLP 2012, 9.6)

Principle: Shared Responsibility and Understanding

"Manitobans should acknowledge responsibility for sustaining the economy, the environment, human health and social well-being, with each being accountable for decisions and actions in a spirit of partnership and open cooperation. Manitobans share a common economic, physical and social environment. Manitobans should understand and respect differing economic and social views, values, traditions and aspirations. Manitobans should consider the aspirations, needs and views of the people of the various geographical regions and ethnic groups in Manitoba, including Aboriginal peoples, to facilitate equitable management of Manitoba's common resources."

Response in EIS

"The processes for developing the Project have included the development of a partnership that is intended, in part, to meet the societal, cultural, economic and employment aspirations of the local KCNs communities, which include the continuation of traditional and cultural practices, as well as a deeper integration into the regional and provincial economy. Discussions leading to the formation of the Partnership and the planning and environmental assessment activities have led to a growing understanding and respect for the different values, and worldviews of Manitoba Hydro and the KCNs." (Keeyask HLP 2012, 9.7)

Principle: Prevention

"Manitobans should anticipate, and prevent or mitigate, significant adverse economic, environmental, human health and social effects of decisions and actions, having particular careful regard to decisions whose impacts are not entirely certain but which, on reasonable and well-informed grounds, appear to pose serious threats to the economy, the environment, human health and social well-being."

Response in EIS

"Early discussions with TCN, followed by discussion with all KCNs, resulted in Project design parameters aimed at minimizing environmental disruption. Adverse effects agreements entered into with each of the KCNs established mechanisms to avoid, offset and mitigate Project effects on the communities. As a result, each community endorsed its agreement. The AEA offsetting programs, direct costs and residual compensation in each agreement addresses and resolves all past, present and known or anticipated Project effects on the collective rights and interests of the respective Cree Nation and its Members and on the exercise of Aboriginal and Treaty rights by the Cree Nation and its Members.

"As well, extensive technical and ATK studies have been undertaken to predict potential environmental effects of the Project and to develop plans to mitigate those effects. Monitoring and other follow-up programs will continue as required to test predictions and make

adjustments as necessary" (Keeyask HLP 2012, 9.7).

Comment by report authors

This response ignores that the best preventative measure for some parameters may be to not build a dam in the first place, thereby avoiding the adverse consequences of building a dam as well as the substantial costs that may be required to address these consequences. This provides an example of how, without a proper assessment of the need for and alternatives to the dam, unnecessary harm may occur.

Principle: Conservation and Enhancement

"Manitobans should: Maintain the ecological processes, biological diversity and life-support systems of the environment; harvest renewable resources on a sustainable yield basis; make wise and efficient use of renewable and non-renewable resources; and enhance the long-term productive capability, quality and capacity of natural ecosystems."

Response in EIS

"These concepts have been a primary focus of the Project planning and design. Implementation measures have emerged through the environmental assessment and the Partnership's consultation processes. Examples for maintaining biological diversity and life-support systems include wetland development, rehabilitation of important habitat types, and avoiding effects on fire regimes. As well, CNP is developing sustainable harvesting plans for fish and moose in the Split Lake Resource Management Area, where the Project is located. The Project uses water, a renewable resource, in a sustainable manner, while providing the province and others with electricity that minimizes environmental effects and is cost effective relative to other options." (Keeyask HLP 2012, 9.7)

Principle: Rehabilitation and Reclamation

Manitobans should: Endeavour to repair damage to or degradation of the environment; and consider the need for rehabilitation and reclamation in future decisions and actions.

Response in EIS

"Once the Project is constructed, areas no longer required for operations will be decommissioned and rehabilitated. A hydroelectric generating station may operate almost in perpetuity. If decommissioning is required at some future date, it will be undertaken according to the legislative requirements, existing agreements and industry standards prevalent at the time. KCNs Principles Regarding Respect for the Land, set out in Section 9.2.1, also speak to rehabilitation and reclamation." (Keeyask HLP 2012, 9.8)

Principle: Global Responsibility

"Manitobans should think globally when acting locally, recognizing that there is economic, ecological and social interdependence among provinces and nations, and working cooperatively, within Canada and internationally, to integrate economic, environmental, human health and social factors in decision making while developing comprehensive and equitable solutions to problems."

Response in EIS

"The Project will contribute to substantial reductions in greenhouse gases (GHG) by displacing fossil fuel electricity generation.

"A detailed Life Cycle Assessment was conducted by the Pembina Institute in order to estimate the GHG emissions resulting from the construction, land use change, operation, and

decommissioning of the Project. The resulting emissions are extremely low relative to other forms of generation. An equivalent amount of electricity, produced by a combined cycle natural gas generating station during one year of operation would result in more than double the entire life cycle emissions estimated associated with the Keeyask Project over a 100 year period. Since the Project will displace gas and coal generation, primarily in the U.S. Midwest, it will contribute to substantial GHG reductions. The Project is estimated to displace 30 million tonnes carbon dioxide equivalent during the first 10 years of operation" (Keeyask HLP 2012, 9.8).

Comment by report authors

The reduction in GHG emissions is important and commendable. However, the Government of Manitoba's Guidelines note the economic, ecological and social interdependence among provinces and nations, and this interdependence requires extending considerations of equity well beyond GHG emissions.

Given the potential for the proposed dam to have significant environmental, economic, social, and cultural impacts, it is imperative that the benefits and risks of the project be equitably shared. Some relevant concerns may include fair distribution of benefits and risks; fair access to resources and opportunities; accounting of impacts from previous developments; shared responsibility amongst all partners to seek equitable outcomes and processes; and promotion of equity both between and within generations.

The responses by the proponent to the other requirements for sustainable development are of a comparable nature to what is found in Table 6. Several problems with these responses, both at the individual and aggregate level, are worth exploring.

First, at the individual level, there are several instances where the responses provided by the proponent do not address the stated policy, goal, principle, or guideline. For three of the seven responses provided in Table 6 above, our comment describes how the response fails to address the stated policy.

A second concern with the individual responses is that in several instances the proponent's argument relies on contested knowledge and outcomes. For example, with regard to Lake Sturgeon the proponent notes (Keeyask HLP 2012, s.9-13):

> *"As another example, a combination of habitat enhancement measures and a fish stocking program that includes a fish hatchery will enhance the population of lake sturgeon in the Project area."*

As has been described elsewhere, serious concerns have been raised about the anticipated success of the habitat stocking program. For this reason it is not evident at this point that the KHLP's remediation efforts will "improve the species' population" (Keeyask HLP 2012, s.9-18). Insofar as these contested outcomes are the basis for the KHLP's case for positive sustainability effects, their approach is questionable.

Beyond contested conclusions, some important concerns regarding the proposed dam are overlooked. Notably, the KHLP tends to only highlight the anticipated positive benefits of the dam, and underplays potentially significant adverse impacts. For example,

- Mercury contamination of water is only mentioned in Table 9A-1 in the appendix to Chapter 9, and only with regard to noting that "[m]edium-term elevated mercury levels to be offset by other sources of domestic fish via programs in most AEAs."
- The impacts on Caribou are only mentioned in three instances, all of which simply say they will be monitored.
- Economic boom and bust concerns are not mentioned in Chapter 9.
- The potential for increased drug and alcohol abuse in KCM communities is not mentioned.

While many of these issues are addressed in other areas of the EIS, , the under-reporting of negative outcomes in chapter 9 undermines the credibility of the chapter's assertions about sustainability effects related to the individual principles..

Beyond the deficiencies of the individual responses, the approach taken in Chapter 9 lacks coherence insofar it includes is no explicit attempt to integrate the piecemeal responses into a complete whole. For example, after reading the responses provided in Table 6 it is difficult, if not impossible, to develop a meaningful understanding of why the proposed Keeyask dam should be built, and what it will mean for future generations in Manitoba.

3.2.2 Inadequate justification of the need for the project

A second fundamental concern with the Response to the EIS Guidelines submitted by the KHLP is that it does not contain an adequate justification for the project based on need for the electricity.

As noted in section 2.3.1, "dams are a means to an end, not an end in themselves" (WCD 2000, p.1). In the case of the proposed Keeyask dam, the question of need relates to how much electricity must be produced in the short, medium and long-term, so as to maintain and improve the welfare of Manitobans. Without a clearly justified and agreed upon need, a hydro dam can easily become a solution to a problem that didn't exist.

The need must be defined and determined in an inclusive and participatory manner (WCD 2000, p. 264), as otherwise there is a risk that the demand may be overstated, which the World Commission on Dams notes has historically been a problem with dam proponents (WCD 2000, p.179).

In the federal EIS guidelines, the KHLP is tasked with justifying the need(CEAA 2012b, p.6):

The "purpose of" and "need for" the project should be established from the perspective of the project proponent and in the context provided for consideration of alternatives to the project.

The project will be designed to achieve specific objectives established by the proponent. These objectives should be described. The "purpose of" the project can be described by an answer to the question: What is to be achieved by carrying out the project?

For the purpose of the comprehensive study, the proponent must clearly describe the need for the proposed project. The "need for" the project can be described by an answer to the question: What is the problem or opportunity the project is intended to solve or satisfy? The "need for" will establish the fundamental rationale of the project.

In response to the EIS guidelines, the KHLP attempts to justify the need in a few short paragraphs (Keeyask HLP 2012, p.4-5 and 4-6):

Manitoba domestic load is growing, resulting in the need for new power resources around 2020 considering just load growth from Manitoba customers and not including any new export contracts. In addition, consistent with its mandate, Manitoba Hydro has entered into new firm export contracts with Minnesota Power starting 2020, Wisconsin Public Service starting 2021 and Xcel Energy. These export contracts would also involve development of additional export interconnections that will support Manitoba's electricity supply in terms of energy security, reliability and economy.

Manitoba Hydro supports the Project because it meets the requirements of both its domestic and export customers while providing an opportunity to work collaboratively with the local Cree Nations in a manner that provides mutual benefits. No other project could achieve this entire set of objectives.

This justification is entirely inadequate insofar as it amounts to a set of unsubstantiated claims. The KHLP does note that they are required to justify the need for the dam as part of the Need For and Alternatives To (NFAT) assessment, which is taking place before the Public Utilities Board. If it is the case that this justification has already been developed, there is no reason why it should not be provided in the EIS response, particularly given that it is the foundational argument upon which the entire EIS rests. The fact that Manitoba Hydro will be subject to an NFAT assessment does not establish that the need has been justified. All that it indicates is Manitoba Hydro's NFAT assertions will be assessed.

For the purposes of CEC review of the proposed Keeyask dam, the current absence of an adequate review for the asserted need means that a properly informed conclusion about the acceptability of the proposed project is not possible.

3.2.3 No assessment of alternatives

The third important deficiency in the EIS with regard to sustainability is that it does not provide an assessment of alternatives to the dam. Such an assessment is an expectation clearly set out in the federal EIS guidelines (CEAA 2012b, p. 10):

> *The EIS must include an analysis of alternatives to the Project which describe functionally different ways to meet the project need and achieve the project purpose from the perspective of the proponent. Analysis of "alternatives to" a project should validate that the preferred alternative is a reasonable approach to meeting need and purpose*
>
> *Analysis of alternatives to the Project should describe the process the proponent used to determine that the Project is viable (technically, economically and environmentally). The level of assessment should reflect the more conceptual nature of the alternatives to the Project at this stage of the process (CEAA 2012b, p. 10).*

As noted in section 2.3.2, the assessment of alternatives matters because of the common absence of justifiably defined threshold of acceptability for individual projects. While there are cases where a proposed project is clearly unacceptable, there is rarely if ever a firm line between what is and what is not acceptable.

Many of the fundamental limitations and critiques of narrowly conceived environmental assessment result from the implicit assumption that there is an overall acceptability threshold, even though that threshold is typically not defined, is insensitive to cumulative and synergistic effects, and prioritizes harm minimization as opposed to promoting positive steps (Duinker and Greig 2006).

As O'Brien (2001) notes, "the assessment of the benefits and drawbacks of a full range of alternatives, not assessment of the acceptable level of a hazardous activity, is not only the heart of an environmental impact statement, it is the heart of wise decision-making in a democracy."

Similarly, the World Commission on Dams emphasizes the importance of assessing alternatives (WCD 2000, p.223):

> *The range of options being examined at the outset will be broad and go beyond technical alternatives to consider relevant policy, programme and project alternatives. It should also consider: institutional changes and management reforms that could influence consumption patterns, reduce demand, and affect the viability of other supply options; the river basin context, cumulative impacts and interactive effects, including the interaction between surface and groundwater resources; multipurpose functions of alternatives; secondary local and regional development effects of alternatives; subsidies that can distort comparison of alternatives; life cycle analysis to compare electricity generation alternatives; and the gestation period required before benefits are delivered.*

Despite the requirements that the EIS include an analysis of alternatives to the project, the EIS submitted by the KHLP provides no analysis of alternatives. The KHLP attempts to justify this omission by noting:

> *The Partnership, as proponent for the Project, has no alternative available to develop other than Keeyask; and Manitoba Hydro as purchaser of the production has no alternative available to meet the qualitative, quantitative or temporal requirements referred to above. Manitoba Hydro will be required to fully explain its decision to contract for Keeyask production before an independent panel to be appointed by the Minister responsible for Manitoba Hydro to review the need for and alternatives to (NFAT) major new hydroelectric projects, including the Keeyask Generation Project (Keeyask HLP 2012, 4.6).*

The KHLP does recognize that they are required to provide an assessment of alternatives to the dam as part of the Need For and Alternatives To (NFAT) assessment, which is taking place before the Public Utilities Board. If it is the case that this justification has already been developed, there is no reason why it should not be provided in the EIS response, particularly given that it is a foundation upon which the entire EIS rests. However, we note that the fact that Manitoba Hydro will submit an NFAT assessment does not indicate that alternatives have been adequately identified and assessed.

As is that case with the failure to establish need, absence of a careful and comprehensive assessment of potentially reasonable alternatives means that the CEC review cannot reach an informed conclusion about the acceptability of the proposed project.

3.2.4 No explicit set of sustainability criteria

The fourth deficiency in the Response to the EIS Guidelines is that the proponent has provided no set of criteria for assessing the need, alternatives, or impacts of the project on renewable resources. The federal Guidelines note with regard to alternatives (CEAA 2012b, p.10):

> *The EIS must include an analysis of alternatives to the Project which describe functionally different ways to meet the project need and achieve the project purpose from the perspective of the proponent. Analysis of "alternatives to" a project should validate that the preferred alternative is a reasonable approach to meeting need and purpose.*
>
> *The proponent will…*
>
> *develop criteria to identify the major environmental, economic and technical costs and benefits of the alternatives; and*
>
> *identify the preferred alternatives to the Project based on the relative consideration of the environmental, economic and technical costs and benefits.*

Likewise, with regard to the impacts of the project on renewable resources, the federal Guidelines state (CEAA 2012b, p.25):

> *"The EIS must describe the effects of the Project on the capacity of renewable resources to meet the needs of the present and those of the future. The EIS must identify those resources likely to be significantly affected by the Project, and describe how the Project could affect their sustainable use.* ***The EIS must also identify and describe any criteria used in considering sustainable use."*** *[emphasis added]*

The only criteria that appear to be provided in the EIS relate to those used to establish significance of project effects and significance of cumulative effects. While these criteria are no doubt important for their intended use, they are inadequate for broader decision making purposes, such as choosing why one alternative means is preferable to another. [1]

We do not wish to imply that no criteria were used in the decision making process. It is evident that the EIS presents various design decisions that have been made and these decisions are at least implicitly based upon criteria. However, without an explicit set of overall criteria for evaluations and decisions it is difficult, if not impossible, to ensure that the assessment has been undertaken in an appropriate manner and that the conclusions are defensible.

In Appendix 5 of this document, a set of sustainability criteria is proposed for the Keeyask dam. This criteria set may be applied by the CEC for the purpose of ensuring a proper need, a fair assessment of alternatives, and finally an ultimate assessment of the preferred alternative. The set is continually being improved and we invite suggestions from concerned stakeholders.

3.2.5 Contested and potentially adverse effects

The fifth deficiency in the EIS Response with regard to sustainability is that the potential for adverse effects in several important area remains contested and uncertain. These potential adverse effects concerns are important as particular issues to be addressed in the CEC review, but until they are resolved the associated uncertainties undermine the confidence in positive sustainability effects presented in Chapter 9 of the EIS.

The authors of this report do not purport to be experts in the various domains relating to the EIS. Fortunately, it is possible to draw from a summary of preliminary comments developed by experts retained by the Consumers' Association of Canada, Manitoba Branch (MPILC 2013).

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[1] We understand that in the hearings the proponents have also reported particular criteria for the treatment of indigenous wisdom.

Concerning cumulative effects, the experts conclude:

> *given that the region has already been substantially altered by hydroelectric development, and that it is agreed past alterations have been cumulatively significant, one could also argue that any further development must be also considered cumulatively significant and should not proceed unless net positive contributions to the sustainability of the sub-watershed, including its processes and people, can be demonstrated.*

Second, with regard to the Lake Sturgeon stocking program, the noted challenges include, but are not limited to, the following:

> *Failure to identify the availability of young of the year (YOY) habitat as a key limiting factor to rehabilitation of lake sturgeon in the area, and an overestimation of the probability of success associated with creating suitable YOY habitat that is used effectively by the fish.*

The expert on Lake Sturgeon ultimately concludes :

> *It should be noted that the goal of re-establishing a self-sustaining population in the Project area will require a successful stocking program **and** a successful habitat remediation program. Given the uncertainty associated with creating YOY habitat, the assertion that the probability of an increased lake sturgeon population is moderate to high seems optimistic (emphasis in original).*

Third, with regard to Caribou, the expert notes that:

> *As noted in the EIS, the proposed Keeyask dam may cause substantial effects on caribou. Furthermore, given available evidence it appears that Boreal Woodland Caribou occupy the project area, and this is important because they are listed as threatened under SARA. Habitat loss is recognized as a primary driver of the decline of forest-dwelling caribou. The EIS approach to understanding habitat may be overly restrictive and inappropriate for the context.*

Furthermore, with regard to whether or not the Caribou in the region may include the SARA threatened Woodland Caribou, the expert concludes:

> *On balance, the available information implies that, more likely than not, boreal woodland caribou occupy the project area.*

Finally, for our purposes here, with regard to the anticipated socio-economic benefits of KCN communities, the experts note the following concerns. In terms of community trauma:

> *Certain social problems may arise following the development of large-scale projects such as the Keeyask. These problems are especially traumatic for First*

Nations communities because of the interrelated nature of culture, the economy and social relations on the resource base.

In terms of the strength of the partnership:

Although Keeyask is presented as a common interest for Manitoba Hydro and the First Nations partners, there is a large asymmetry of power between Hydro and indigenous communities.

In terms of economic development and compensation:

Given the scarcity of economic opportunities in many communities surrounding Keeyask, the development is portrayed as a rare economic opportunity for the KCN communities. Much of the employment resulting from Keeyask would appear to be short-term in comparison to some of the potential social and economic problems which are long-term.

There are other concerns, as well as positive comments, contained in the preliminary reports submitted by the Consumers' Association of Canada. However, for present purposes the above comments establish that there are contested and potentially adverse effects relating to the proposed Keeyask dam, and these effects are potentially significant enough to affect prospects for positive contributions to sustainability. Furthermore, these impacts are not independent of one another; they involve r different but linked parts of a broader social and ecological system that includes First Nations' livelihoods and culture, as well as the interests of other stakeholders in Manitoba.

In other words, these impacts are interrelated and need to be considered in an integrated manner. As was argued in section 3.2.1 above, the EIS does not provide such an integrated assessment. In this report we have proposed sustainability assessment as one means of meeting this evident need.

3.3 Summary

This section provided a basic critique of the KHLP's justification for how the proposed Keeyask dam contributes to sustainability. The critique is centred on five fundamental concerns with the EIS relating to sustainability:

1. The EIS approach is unsatisfactory as a means of assessing progress towards sustainability;
2. Need for the project has not been established;
3. No comparative assessment of alternatives is provided to demonstrate that the proposed project is the best option;
4. No explicit set of sustainability decision criteria seems to have been applied; and
5. There are important instances of contested and potentially adverse effects, including impacts on Lake Sturgeon, Boreal Woodland Caribou, and boom and bust dynamics.

Without addressing these concerns, we argue that it is impossible for the CEC to make an informed decision about whether the proposed Keeyask dam promotes

progress towards sustainability and whether approval of the project would be in the public interest. We believe a more comprehensive and integrated approach is necessary, one that includes a clear justification of need, a fair assessment of the full suite of alternatives, and application of a clear and explicit set of sustainability-based criteria against which decisions may be made.

In this report, we have proposed Gibson's sustainability assessment framework as one possible framework (including a possible criteria set in Appendix 5). Other frameworks may be equally valid, so long as they meet the legislative requirements set forth in the Manitoba *Environment Act*, the Manitoba *Sustainable Development Act*, and the Canadian *Environmental Assessment Act* and cover the full suite of requirements for progress towards sustainability. Appendix 1 provides a synthesis of these legislative requirements.

4 Conclusion

This report set out to achieve three interrelated goals. The first goal was to describe a framework for sustainability-based decision making. This goal was addressed in section 2, where Gibson's framework for sustainability assessment was introduced.

The discussions around Gibson's framework began by providing a working definition of the core meaning of and requirements for progress towards sustainability and describing the importance of clearly establishing need for a new electricity undertaking through an open and democratic process.

Following that the discussion turned to the process of determining and defining a full suite of alternatives and assessing the alternatives against an explicit set of sustainability criteria that have been specified for the particular case and context.

The second goal of this report was to establish the legislative basis for undertaking sustainability-based assessments, or their substantive equivalents, in Manitoba. In order to develop this argument, Appendix 1 compares Gibson's framework for sustainability assessment against the Manitoba *Sustainable Development Act* (Manitoba 1998), key sections of the Manitoba *Environment Act* (Manitoba 2012a) and the Canadian *Environmental Assessment Act* (CEAA 2012a).

Effectively there is complete overlap in the substantive requirements for sustainable development between Gibson's sustainability-based criteria for evaluations and decision-making and the expectations set out in the three Acts and there is general agreement between the three Acts and the guidelines for the introduction of the sustainability assessment practice proposed in Table 5. Section 2.5 concludes that Manitoba should adopt an explicit framework for sustainability assessment, with Gibson's framework as one possibility.

In addition to being appropriate for use in the Keeyask case, explicit adoption of a sustainability assessment framework may help the Clean Environment Commission

address its concerns about the state of environmental assessment practice, as noted in the *Report on Public Hearing* for the Bipole III project (CEC 2013, p.VII).

Finally, the third goal of this report was to assess the extent to which the proposed Keeyask dam, as described in the Response to the EIS Guidelines, meets the requirements of sustainability-based assessment. The results of the assessment indicated that for present purposes it is impossible for the CEC to make an informed decision about whether the proposed Keeyask dam promotes progress towards sustainability and meets the proper expectations for acceptability in the public interest. Five key deficiencies in Manitoba Hydro's Response to the EIS Guidelines were noted:

1. The EIS approach is unsatisfactory as a means of assessing progress towards sustainability;
2. Need for the project has not been established;
3. No comparative assessment of alternatives is provided to demonstrate that the proposed project is the best option;
4. No explicit set of sustainability decision criteria seems to have been applied; and
5. There are important instances of contested and potentially adverse effects, including impacts on Lake Sturgeon, Boreal Woodland Caribou, and boom and bust dynamics.
6. .

Based upon the above, we recommend the following:

- First – that the CEC make no decision on the proposed Keeyask project until these deficiencies and those noted by other experts have been addressed and the overall analysis revisited. Given that Manitoba Hydro has been required to justify the need for and alternatives to the proposed Keeyask dam (as well as the proposed power systems plan), it is reasonable to expect that this information could be included within the CEC hearings.

- Second – that for future assessments the CEC adopt from the outset an integrated sustainability assessment framework that includes a full justification of need, a full and fair analysis of alternatives, in light of an explicit set of sustainability criteria specified for the case and context.

It is never too late to improve the decision making context (WCD 2000, p.276), particularly for a project as long-lived as the proposed Keeyask dam. At a minimum the CEC could apply an explicit sustainability criteria set to its review of the Keeyask proposal.

While such an application would be beneficial, it cannot provide a basis for concluding that the project is acceptable unless the review includes a comparative evaluation of alternatives. Ultimately, sustainability assessment and the public

interest both demand choice of the option that will deliver the greatest mutually supporting, fairly distributed and lasting benefits while avoiding adverse effects and risks.

We hope the insights contained within this report, as well as the final recommendations, assist the review of the proposed Keeyask dam, and contribute usefully to the broader debate about environmental and strategic decision making in Manitoba.

Kyrke Gaudreau and Robert B. Gibson

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Appendix 1 – The legislative basis for sustainability assessment in Manitoba

This appendix provides an analysis of the legislative basis for sustainability assessment in Manitoba, by analyzing the Manitoba *Sustainable Development Act* ('the SD Act') (Manitoba 1998), key sections of the Manitoba *Environment Act* ('the ENV Act') (Manitoba 2012a) and the Canadian *Environmental Assessment Act* ('CEAA 2012') (CEAA 2012a). It does so by synthesizing and reorganizing sections of the three Acts and comparing them to Gibson's sustainability framework.

There are several benefits to using Gibson's framework for such a comparison. First, Gibson's framework is recognized and applied worldwide as a relevant approach to sustainability assessment (e.g. Pope et al. 2004).

Second, Gibson's framework has been heavily informed by Canadian environmental assessment practice, and has been applied previously by proponents, experts, and joint review panels in a Canadian context (e.g. for the Mackenzie Valley Gas Project Review) (Gibson 2006b; OPA 2006; Gibson et al. 2008).

Ultimately, if the Acts are in agreement with Gibson's framework for sustainability assessment, then it is reasonable to argue that the Acts demand a sustainability assessment approach to planning and decision making on major undertakings, insofar as all the basic characteristics of sustainability assessment – both in terms of substance and process – are required.

There is one word of note before beginning the discussion. We understand that the notion of sustainability assessment has been discussed at some length in Manitoba through forums such as COSDI, (Sinclair 2002; Sinclair and Quinn 2012) but that there is no official Manitoba government document stating that decisions must be made using a sustainability assessment framework, be it Gibson's framework or otherwise. What we are looking for instead is to show how sustainability assessment is a logical way to implement the existing EA process while addressing the requirements for sustainable development as set forth in the three Acts.

The following section compares the substantive components of Gibson's framework – namely the eight evaluative and decision-making criteria – with the three Acts. This represents the bulk of the discussion. Following that, the guidelines for sustainability assessment practice are briefly compared with the three Acts.

Substantive comparison of Gibson's framework to the acts

This section compares the requirements for sustainable development, as found in the Manitoba *Sustainable Development Act* (Manitoba 1998), the Manitoba *Environment Act* (Manitoba 2012a) and the Canadian *Environmental Assessment Act* (CEAA 2012a), with Gibson's evaluative and decision-making criteria. This comparison is shown in Table 7 below. The approach taken was to determine how

each individual of Gibson's individual criteria is compatible with the requirements set forth in the three acts.

Table 7 – Gibson's evaluation and decision criteria with the Act

Socio-ecological system integrity

Build human-ecological relations to establish and maintain the long-term integrity of socio-biophysical systems and protect the irreplaceable life support functions upon which human as well as ecological wellbeing depends.

Manitoba Sustainable Development Act

Principle – Conservation and Enhancement (selected parts)
Manitobans should

- "maintain the ecological processes, biological diversity and life-support systems of the environment"
- "enhance the long-term productive capability, quality and capacity of natural ecosystems."

Principle – Rehabilitation and Reclamation (entire principle)
"Manitobans should

- endeavour to repair damage to or degradation of the environment; and
- consider the need for rehabilitation and reclamation in future decisions and actions."

Manitoba Environment Act

Intent and Purposes of Act (Manitoba 2012a, 1(1))
"The intent of this Act is to develop and maintain an environmental protection and management system in Manitoba which will ensure that the environment is protected and maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for this and future generations, and in this regard, this Act…

(e) prohibits the unauthorized release of pollutants having a significant adverse effect on the environment."

Canadian Environmental Assessment Act

Purposes of Act (CEAA 2012a, 4(1))
"The purposes of this Act 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;…
(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."

Interpretation
"environment" means the components of the Earth, and includes

(a) land, water and air, including all layers of the atmosphere;
(b) all organic and inorganic matter and living organisms; and
(c) the interacting natural systems that include components referred to in paragraphs (a) and (b) (CEAA 2012a, p. 2)

Mandate of Act (CEAA 2012a, 4(2))
"The Government of Canada, the Minister, the Agency, federal authorities and responsible authorities, in the administration of this Act, must exercise their powers in a manner that

protects the environment and human health and applies the precautionary principle."

Comment

There is full overlap between the criterion and the SD Act. Even the terminology is similar (e.g. life support functions and life-support systems). Furthermore, the language of the SD Act – in using the preface "Manitobans should" – indicates the relationship between Manitobans and their natural environment, which is consistent with Gibson's use of the term "human-ecological relations".

In terms of the ENV Act, there is once again considerable overlap, including the recognition of the relationship between social and ecological systems and the importance of maintaining both (*i.e.* social-ecological systems integrity).

Finally, with regard to CEAA 2012, there is once again considerable overlap. CEAA 2012 adopts a reasonably integrated understanding of the biophysical environment, and recognizes links between biophysical and socio-economic effects, though it does not automatically cover direct socio-economic effects.

Livelihood sufficiency and opportunity

Ensure that everyone and every community has enough for a decent life and that everyone has opportunities to seek improvements in ways that do not compromise future generations' possibilities for sufficiency and opportunity.

Manitoba Sustainable Development Act

Principle - Shared Responsibility and Understanding (selected parts)

- "Manitobans should acknowledge responsibility for sustaining the economy, the environment, human health and social well-being, with each being accountable for decisions and actions in a spirit of partnership and open cooperation."
- "Manitobans should consider the aspirations, needs and views of the people of the various geographical regions and ethnic groups in Manitoba, including Aboriginal peoples, to facilitate equitable management of Manitoba's common resources."

Principle – Stewardship (selected parts)

- "The economy, the environment, human health and social well-being should be managed for the equal benefit of present and future generations."

Manitoba Environment Act

Intent and Purposes of Act (Manitoba 2012a, 1(1))

"The intent of this Act is to develop and maintain an environmental protection and management system in Manitoba which will ensure that the environment is protected and maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for this and future generations…"

Canadian Environmental Assessment Act

Purposes of Act (CEAA 2012a, 4(1))

"The purposes of this Act are…

(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"

Comment

There is basic overlap between the criterion and the SD Act, the ENV Act and CEAA 2012. Gibson's criterion calls more explicitly for individual livelihood opportunities than do the Acts, which tend to focus on the broader 'economy' (e.g. 'healthy economy in CEAA 2012).

However, the ENV Act recognizes the importance of sustaining a high quality of life, which lends more towards the individual. Other Acts may be more explicit about ensuring individual livelihood sufficiency and opportunity.

Intragenerational equity

Ensure that sufficiency and effective choices for all are pursued in ways that reduce dangerous gaps in sufficiency and opportunity (and health, security, social recognition, political influence, etc.) between the rich and the poor.

Manitoba Sustainable Development Act

Principle – Stewardship (selected parts)

- "The economy, the environment, human health and social well-being should be managed for the equal benefit of present and future generations."
- "Manitobans are caretakers of the economy, the environment, human health and social well-being for the benefit of present and future generations."

Principle – Shared Responsibility and Understanding (selected parts)

- "Manitobans should acknowledge responsibility for sustaining the economy, the environment, human health and social well-being, with each being accountable for decisions and actions in a spirit of partnership and open cooperation."
- "Manitobans share a common economic, physical and social environment."
- "Manitobans should consider the aspirations, needs and views of the people of the various geographical regions and ethnic groups in Manitoba, including Aboriginal peoples, to facilitate equitable management of Manitoba's common resources."

Principle – Global Responsibility (entire principle)

- "Manitobans should think globally when acting locally, recognizing that there is economic, ecological and social interdependence among provinces and nations, and working cooperatively, within Canada and internationally, to integrate economic, environmental, human health and social factors in decision making while developing comprehensive and equitable solutions to problems."

Manitoba Environment Act

Intent and Purposes of Act (Manitoba 2012a, 1(1))

"The intent of this Act is to develop and maintain an environmental protection and management system in Manitoba which will ensure that the environment is protected and maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for this and future generations…"

Canadian Environmental Assessment Act

Interpretation

"sustainable development" means development that meets the needs of the present, without compromising the ability of future generations to meet their own needs. (CEAA 2012a, p. 5)

Comment

There is basic overlap between Gibson's criterion of intragenerational equity and the three Acts. Gibson's criterion is more explicit about the gaps between the rich and the poor in terms of access to resources and opportunities. However, the SD Act explicitly recognizes that the economy, the environment and society are shared by all Manitobans, as well as globally.

The SD Act also mentions equity explicitly (e.g. "equitable management of Manitoba's common resources"), which overlaps well with Gibson's criterion. Likewise, CEAA 2012 adopts the Brundtland definition of sustainable development, which has a strong focus on

equity considerations, both within and between generations (Brundtland and al. 1987). In terms of the ENV Act, the focus on sustaining a high quality of life is closely tied in with equality, as recognized by the World Bank (Soubbotina and Sheram 2000).

Intergenerational equity

Intergenerational equity

Favour present options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainably.

Manitoba Sustainable Development Act

Principle – Stewardship (entire principle)

- "The economy, the environment, human health and social well-being should be managed for the equal benefit of present and future generations."
- "Manitobans are caretakers of the economy, the environment, human health and social well-being for the benefit of present and future generations."
- "Today's decisions are to be balanced with tomorrow's effects."

Principle - Global Responsibility (entire principle)

- "Manitobans should think globally when acting locally, recognizing that there is economic, ecological and social interdependence among provinces and nations, and working cooperatively, within Canada and internationally, to integrate economic, environmental, human health and social factors in decision making while developing comprehensive and equitable solutions to problems."

Guideline - Integrated Decision Making and Planning (entire guideline)

- "Encouraging and facilitating decision making and planning processes that are efficient, timely, accountable and cross-sectoral and which incorporate an inter- generational perspective of future needs and consequences."

Manitoba Environment Act

Intent and Purposes of Act (Manitoba 2012a, 1(1))

"The intent of this Act is to develop and maintain an environmental protection and management system in Manitoba which will ensure that the environment is protected and maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for this and future generations…"

Canadian Environmental Assessment Act

Interpretation

"sustainable development" means development that meets the needs of the present, without compromising the ability of future generations to meet their own needs. (CEAA 2012a, p. 5)

Comment

There is substantive overlap between Gibson's criterion and the three Acts. This should come as no surprise given the oft-cited Brundtland definition of sustainable development as focusing on meeting the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland and al. 1987).

Resource maintenance and efficiency

Provide a larger base for ensuring sustainable livelihoods for all while reducing threats to the long term integrity of socio-ecological systems by reducing extractive damage, avoiding waste and cutting overall material and energy use per unit of benefit.

Manitoba Sustainable Development Act

Principle – Conservation and Enhancement (entire principle)
Manitobans should:

(d) "maintain the ecological processes, biological diversity and life-support systems of the environment"
(e) "harvest renewable resources on a sustainable yield basis; make wise and efficient use of renewable and non-renewable resources"
(f) "enhance the long-term productive capability, quality and capacity of natural ecosystems."

Guideline – Efficient Use of Resources (selected parts)

(g) "Encouraging and facilitating development and application of systems for proper resource pricing, demand management and resource allocation together with incentives to encourage efficient use of resources"

Guideline – Waste Minimization and Substitution (entire guideline)

(h) "Encouraging and promoting the development and use of substitutes for scarce resources where such substitutes are both environmentally sound and economically viable"
(i) "Reducing, reusing, recycling and recovering the products of society."

Manitoba Environment Act

Miscellaneous provisions respecting proposals (Manitoba 2012a, 12.0.2)

(j) "When considering a proposal, the director or minister must take into account — in addition to other potential environmental impacts of the proposed development — the amount of greenhouse gases to be generated by the proposed development and the energy efficiency of the proposed development."

Canadian Environmental Assessment Act

Factors to be considered (CEAA 2012a, 19(1))
"The environmental assessment of a designated project must take into account the following factors:

(d) mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the designated project;
(g) alternative means of carrying out the designated project that are technically and economically feasible and the environmental effects of any such alternative means"

Comment

There is substantive overlap between Gibson's criterion and the SD Act. Both focus on reducing waste, increasing productivity, transitioning to renewable resources, recycling, reusing, etc. The principles and guidelines of the SD Act even help to elaborate what a commitment to resource maintenance and efficiency may entail.

With regard to the ENV Act, there is basic overlap with Gibson's criterion, particularly with regard to energy efficiency and greenhouse gases, which are an important component of Gibson's criterion.

Finally, there is basic overlap with CEAA 2012, insofar as CEAA 2012 recognizes the importance of developing mitigation measures to reduce extractive damage of the proposed project and its alternative means.

Socio-ecological civility and democratic governance

Build the capacity, motivation and habitual inclination of individuals, communities and other collective decision making bodies to apply sustainability requirements through more open and

better informed deliberations, greater attention to fostering reciprocal awareness and collective responsibility, and more integrated use of administrative, market, customary and personal decision making practices.

Manitoba Sustainable Development Act

Integration of Environmental and Economic Decisions (entire principle)

- "Economic decisions should adequately reflect environmental, human health and social effects."
- "Environmental and health initiatives should adequately take into account economic, human health and social consequences."

Principle – Shared Responsibility and Understanding (selected parts)

- "Manitobans should acknowledge responsibility for sustaining the economy, the environment, human health and social well-being, with each being accountable for decisions and actions in a spirit of partnership and open cooperation."
- "Manitobans should understand and respect differing economic and social views, values, traditions and aspirations."
- "Manitobans should consider the aspirations, needs and views of the people of the various geographical regions and ethnic groups in Manitoba, including Aboriginal peoples, to facilitate equitable management of Manitoba's common resources."

Guideline – Efficient Use of Resources (selected parts)

- "Employing full-cost accounting to provide better information for decision makers."

Guideline – Public Participation (entire guideline)

- "Establishing forums which encourage and provide opportunity for consultation and meaningful participation in decision making processes by Manitobans"
- "Endeavouring to provide due process, prior notification and appropriate and timely redress for those adversely affected by decisions and actions"
- "Striving to achieve consensus amongst citizens with regard to decisions affecting them."

Guideline – Access to Information (entire guideline)

- "Encouraging and facilitating the improvement and refinement of economic, environmental, human health and social information"
- "Promoting the opportunity for equal and timely access to information by all Manitobans."

Manitoba Environment Act

Intent and Purposes (Manitoba 2012a, 1(1))

- "The intent of this Act is to develop and maintain an environmental protection and management system in Manitoba which will ensure that the environment is protected and maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for this and future generations, and in this regard, this Act…

  (a) is complementary to, and support for, existing and future provincial planning and policy mechanisms;

  (c) provides for the recognition and utilization of existing effective review processes that adequately address environmental issues;

  (d) provides for public consultation in environmental decision making while recognizing the responsibility of elected government including municipal governments as decision makers"

Environmental awareness programs (Manitoba 2012a, 2(3))

" For the purposes of increasing environmental awareness in Manitoba, the minister may

- cause the preparation and production of informational material respecting the environment

of the province and make the material available to the public;
- undertake, or by means of grants or other assistance, support and encourage the development of educational programs or courses in the public education system, or educational programs for the public at large, respecting environmental management."

Canadian Environmental Assessment Act 2012

Purposes of Act (CEAA 2012a, 4(1))
"The purposes of this Act are
- to promote cooperation and coordinated action between federal and provincial governments with respect to environmental assessments;
- to promote communication and cooperation with aboriginal peoples with respect to environmental assessments;
- to ensure that opportunities are provided for meaningful public participation during an environmental assessment;
- to ensure that an environmental assessment is completed in a timely manner;
- to encourage federal authorities to take actions that promote sustainable development in order to achieve or maintain a healthy environment and a healthy economy"

Comment

There is substantive overlap between Gibson's criterion and the three Acts. All three highlight the need for open and participatory decision-making, and indicate the importance of individuals taking responsibility for decision and actions.

It is noteworthy that the SD Act calls for full-cost accounting to aid decision-making. Likewise, the ENV Act recognizes the importance of raising environmental awareness as part of the mandate of the minister.

Finally, CEAA 2012 and the ENV Act recognize the importance of proper coordination between and integration of existing mechanisms for decision-making. In many regards, the Acts help to elaborate what socio-ecological civility and democratic governance may mean in the Manitoba context.

Precaution and adaptation

Respect uncertainty, avoid even poorly understood risks of serious or irreversible damage to the foundations for sustainability, plan to learn, design for surprise, and manage for adaptation.

Manitoba Sustainable Development Act

Principle – Prevention (entire principle)
- "Manitobans should anticipate, and prevent or mitigate, significant adverse economic, environmental, human health and social effects of decisions and actions, having particular careful regard to decisions whose impacts are not entirely certain but which, on reasonable and well-informed grounds, appear to pose serious threats to the economy, the environment, human health and social well-being."

Canadian Environmental Assessment Act 2012

Purposes of Act (CEAA 2012a, 4(1))
"The purposes of this Act are
(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;

(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;
(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."

Factors to be considered (CEAA 2012a, 19(1))

"The environmental assessment of a designated project must take into account the following factors:

(a) the environmental effects of the designated project, including the environmental effects of malfunctions or accidents that may occur in connection with the designated project and any cumulative environmental effects that are likely to result from the designated project in combination with other physical activities that have been or will be carried out;
(b) the significance of the effects referred to in paragraph (*a*);
(d) mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the designated project;
(e) the requirements of the follow-up program in respect of the designated project;
(f) any change to the designated project that may be caused by the environment;

Comment

There is substantive overlap between Gibson's criterion and the Acts. The ENV Act and CEAA 2012 both recognize the importance of precaution and prevention, including concerns such as malfunctions and accidents, as well as impacts of the environment on the project.

The only difference is that Gibson's criterion is a little broader, favouring design for adaptive management, which is not directly referenced in the Acts, although, CEAA 2012 includes indirect mention of adaptive management through references to follow-up programs. However, adaptive management is an increasingly well-recognized concept in areas including resource management and environmental assessment practice, and therefore it is not unreasonable to assume adaptive management, when appropriate, would be promoted.

Immediate and long term integration

Apply all principles of sustainability at once, seeking mutually supportive benefits and multiple gains.

Manitoba Sustainable Development Act

Principle - Integration of Environmental and Economic Decisions (entire principle)

- "Economic decisions should adequately reflect environmental, human health and social effects."
- "Environmental and health initiatives should adequately take into account economic, human health and social consequences."

Principle - Global Responsibility (selected parts)

- "Manitobans should think globally when acting locally, recognizing that there is economic, ecological and social interdependence among provinces and nations, and working cooperatively, within Canada and internationally, to integrate economic, environmental, human health and social factors in decision making while developing comprehensive and equitable solutions to problems."

Guideline - Integrated Decision Making and Planning (entire guideline)

- "Encouraging and facilitating decision making and planning processes that are efficient,

timely, accountable and cross-sectoral and which incorporate an inter-generational perspective of future needs and consequences."

Guideline - Research and Innovation (entire guideline)

- "Encouraging and assisting the researching, development, application and sharing of knowledge and technologies which further our economic, environmental, human health and social well-being."

Manitoba Environment Act

Intent and Purposes of Act (Manitoba 2012a, 1(1))

"The intent of this Act is to develop and maintain an environmental protection and management system in Manitoba which will ensure that the environment is protected and maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for this and future generations, and in this regard, this Act

(a) is complementary to, and support for, existing and future provincial planning and policy mechanisms;

(d) provides for the recognition and utilization of existing effective review processes that adequately address environmental issues;

Canadian Environmental Assessment Act 2012

Purposes of Act (CEAA 2012a, 4(1))

The purposes of this Act are

(c) to promote cooperation and coordinated action between federal and provincial governments with respect to environmental assessments;

Comment

There is substantive overlap between Gibson's criterion and the SD Act. The principles and guidelines of the SD Act even provide some elaboration on how the principles of sustainable development may be integrated both now and in the future, such as through promoting innovation and cross-sectoral decision making, as well as cooperation both in Canada and beyond.

With regard to the ENV Act and CEAA 2012, both refer to the importance of coordination between different governing bodies, as well as the utilization of existing effective processes, both of which are important characteristics of immediate and long-term integration.

As can be seen from Table 7 above, there is generally a substantive overlap between Gibson's evaluation and decision-making criteria for sustainability assessment and the Manitoba S*ustainable Development Act* (Manitoba 1998), the Manitoba *Environment Act* (Manitoba 2012a), and the Canadian *Environmental Assessment Act* (CEAA 2012a). Furthermore, in many instances, the three Acts serve to elaborate on what Gibson's criteria may mean in a Manitoba context, and in a manner that is complementary with and in the spirit of Gibson's criteria.

The only discrepancy that may be found is in the criterion category of "Livelihood sufficiency and opportunity", in which Gibson makes note of the importance of individual livelihood opportunities, whereas the three Acts tend to discuss the economy as a whole. This does not represent a conflict, however, but rather a different scale of focus.

In summary, when taken as a package, the three Acts effectively call for the full suite of requirements for progress towards sustainability when compared with a rigorous and comprehensive approach to sustainability assessment (*i.e.* Gibson's framework for sustainability assessment).

Procedural comparison of Gibson's framework to the Sustainable Development Act

It is now possible to compare the Act with the general guidelines for sustainability assessment processes, which were described in Table 5. The only guideline not included in this discussion is the fifth ("Promote the process of sustainability assessment as much as the outcome"). The comparison is shown in the tables below.

Table 8 – Comparing the Act with Gibson's procedural guidelines for sustainability assessment

Prioritize contribution to sustainability and apply it in all processes Establish contribution to sustainability as the main test of proposed purposes, options, designs and practices, and must put application of this test at the centre of decision making, not as one advisory contribution among many
Manitoba Sustainable Development Act **Main Body - Purpose of Act (p. 4)** • "The purpose of this Act is to create a framework through which sustainable development will be implemented in the provincial public sector and promoted in private industry and in society generally." **Principle - Integration of Environmental and Economic Decisions (entire principle)** • "Economic decisions should adequately reflect environmental, human health and social effects." • "Environmental and health initiatives should adequately take into account economic, human health and social consequences."
Manitoba Environment Act **Intent and Purposes of Act (Manitoba 2012a, 1(1))** "The intent of this Act is to develop and maintain an environmental protection and management system in Manitoba which will ensure that the environment is protected and maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for this and future generations…"
Canadian Environmental Assessment Act 2012 **Purposes of Act (CEAA 2012a, 4(1))** "The purposes of this Act are (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" **Mandate of Act (CEAA 2012a, 4(2))** "The Government of Canada, the Minister, the Agency, federal authorities and responsible authorities, in the administration of this Act, must exercise their powers in a manner that protects the environment and human health and applies the precautionary principle."
Comment

There is basic overlap between Gibson's requirement and the three Acts. As noted, the purpose of the SD Act is to create a framework for implementing sustainability development in the public sector and beyond. The full suite of principles and guidelines indicate the relevance of sustainable development in all facets of decision making and the expectations for integration in planning and decision making imply a commitment to serving social, economic and biophysical objectives together, rather than trading off between or among them.

The three Acts taken as a whole also represent adoption of sustainable development (or contribution to sustainability) as the higher test for all decisions. Although the Acts could have included more explicit language on these matters, the intent seems clear enough.

Base decisions on an explicit set of evaluation and decision criteria and trade-off rules

Adopt evaluation and decision criteria and trade-off rules that reflect the full set of core requirements for progress towards sustainability, recognize interdependencies and seek multiple reinforcing gains on all fronts.

Manitoba Sustainable Development Act

Main Body – Provincial sustainability indicators established 9(1) (p. 11)

- "The minister shall cause sustainability indicators to be established within three years after the coming into force of this Act."

Principle – Integration of Environmental and Economic Decisions (entire principle)

- "Economic decisions should adequately reflect environmental, human health and social effects."
- "Environmental and health initiatives should adequately take into account economic, human health and social consequences."

Guideline – Integrated Decision Making and Planning (entire guideline)

- "Encouraging and facilitating decision making and planning processes that are efficient, timely, accountable and cross-sectoral and which incorporate an inter- generational perspective of future needs and consequences."

Guideline – Efficient Use of Resources (selected parts)

- "employing full-cost accounting to provide better information for decision makers."

Comment

There is basic overlap between Gibson's requirement and the SD Act. Gibson's requirement explicitly calls for a set of evaluative and decision-making criteria (such as those presented in Table 4 above). The guidelines, principles and main body implicitly demand such criteria, such as through requirements for full-cost accounting. Particularly, the use of indicators as required in the Act presupposes a set of criteria for which the indicators are representing.

More explicit requirements for comprehensive criteria would have strengthened the SD Act, but at least implicitly, the Act supports the application of Gibson's requirement.

In terms of the ENV Act and CEAA 2012, there are no direct references to evaluative and decision-making criteria and trade-off rules, although they are clearly implicit in both Acts. For example, CEAA 2012 requires consideration of "mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the designated project," and this clearly requires a set of criteria for determining feasibility, as well as trade-off rules for comparing various mitigation options.

CEAA 2012 also provides for approval of undertakings that may have significant adverse

effects if these are "justified in the circumstances." Some authorities have taken this to imply a need for explicit, sustainability-based evaluation of the trade-offs involved. See especially Lower Churchill JRP (2011, appendix 8).

Be open and participatory

Provide means of specifying the sustainability decision criteria and trade-off rules for specific contexts, through informed choices by the relevant parties (stakeholders).

Manitoba Sustainable Development Act

Principle – Shared Responsibility and Understanding (selected parts)

- "Manitobans should acknowledge responsibility for sustaining the economy, the environment, human health and social well-being, with each being accountable for decisions and actions in a spirit of partnership and open cooperation."

Guideline – Public Participation (entire guideline)

- "Establishing forums which encourage and provide opportunity for consultation and meaningful participation in decision making processes by Manitobans"
- "Endeavouring to provide due process, prior notification and appropriate and timely redress for those adversely affected by decisions and actions"
- "Striving to achieve consensus amongst citizens with regard to decisions affecting them."

Guideline – Access to Information (entire guideline)

- "Encouraging and facilitating the improvement and refinement of economic, environmental, human health and social information"
- "Promoting the opportunity for equal and timely access to information by all Manitobans."

Manitoba Environment Act

Intent and Purposes of Act (Manitoba 2012a, 1(1))

"The intent of this Act is to develop and maintain an environmental protection and management system in Manitoba which will ensure that the environment is protected and maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for this and future generations, and in this regard, this Act…

(d) provides for public consultation in environmental decision making while recognizing the responsibility of elected government including municipal governments as decision makers"

Canadian Environmental Assessment Act 2012

"The purposes of this Act are

(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;

Comment

There is substantive overlap between Gibson's requirement and the three Acts. The SD Act calls for informed choices and open and participatory decision-making, while the ENV Act recognizes the importance of public consultation, and CEAA 2012 requires meaningful public participation.

Once again, Gibson's requirement is more explicit about the specification and use of decision-making criteria and trade-off rules, which is something a future revision of the Act might usefully address. However, the use of specified criteria and trade-off rules is implicit the substance of the three Acts.

Be transparent and accountable

Ensure that the deliberations and decisions are sufficiently open to scrutiny and participation, and sufficiently accountable in law, that an informed public can push effectively for proper application.

Manitoba Sustainable Development Act

Guideline - Public Participation (entire guideline)

- "Establishing forums which encourage and provide opportunity for consultation and meaningful participation in decision making processes by Manitobans"
- "Endeavouring to provide due process, prior notification and appropriate and timely redress for those adversely affected by decisions and actions"
- "Striving to achieve consensus amongst citizens with regard to decisions affecting them."

Guideline - Access to Information (entire guideline)

- "Encouraging and facilitating the improvement and refinement of economic, environmental, human health and social information"
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- "Encouraging and facilitating decision making and planning processes that are efficient, timely, accountable and cross-sectoral and which incorporate an inter-generational perspective of future needs and consequences."

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(d) provides for public consultation in environmental decision making while recognizing the responsibility of elected government including municipal governments as decision makers"

Canadian Environmental Assessment Act 2012

"The purposes of this Act are

(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"

Mandate of Act (CEAA 2012a, 4(2))

"The Government of Canada, the Minister, the Agency, federal authorities and responsible authorities, in the administration of this Act, must exercise their powers in a manner that protects the environment and human health and applies the precautionary principle."

Comment

There is substantive overlap between Gibson's requirement and the SD Act. The SD Act calls for public participation and accountability. The principles, guidelines and body of the SD Act even serve to elaborate on Gibson's requirement in the Manitoba context.

In terms of the ENV Act and CEAA 2012, both recognize accountability and transparency in their calls for meaningful public participation and consultation. Likewise, transparency and accountability is grounded more generally at the government level, such as the Federal

Accountability Act (Canada 2006).

In general there is strong overlap between the guidelines for sustainability assessment processes and the Manitoba S*ustainable Development Act* (Manitoba 1998), the Manitoba *Environment Act* (Manitoba 2012a), and the Canadian *Environmental Assessment Act* (CEAA 2012a).

Where the guidelines differ is in the explicit call for a clear set of evaluative and decision-making criteria and trade-off rules that are specified for the context. While such criteria and rules are not explicitly mentioned in the Acts, it is reasonable to argue that they are implicitly required for various reasons. For example, as noted in Table 8, the *Sustainable Development Act* requires a set of sustainability indicators, and indicators must be matched with criteria insofar as indicators help measure progress towards desirable outcomes (or away from undesirable outcomes) and the specification and application of properly comprehensive criteria are effectively needed to move towards the desirable outcomes (and away from the undesirable ones).

With regard to specified trade-off rules, while such a requirement may not be explicitly called for in the acts, the commitments to integration and full-cost accounting in the SD Act, for example, implicitly includes attention to trade-offs. Similarly, as was mentioned in Table 8, CEAA 2012 requires consideration of "mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the designated project," this clearly requires a set of criteria for determining feasibility, as well as trade-off rules for comparing amongst various mitigation options.

On the relationship between the Acts and sustainability assessment

This section set out to compare the Manitoba S*ustainable Development Act* (Manitoba 1998), the Manitoba *Environment Act* (Manitoba 2012a), and the Canadian *Environmental Assessment Act* (CEAA 2012a) with the application of a sustainability assessment framework. Based upon the comparison provided above, a number of closing remarks can be made.

First, it is clear that there is substantial and significant overlap in the substantive requirements for sustainable development between Gibson's evaluative and decision-making criteria and the three Acts. For this reason, it is fair to say that the Acts effectively support the application of the full suite of requirements for progress towards sustainability. When understood as a package, the Acts are demanding and rigorous with regard to sustainable development.

Second, it is clear there is strong overlap in the procedural elements of Gibson's framework for sustainability assessment and the three Acts. Gibson's framework is more explicit in its demands for specified evaluative and decision-making criteria and trade-off rules. Likewise, Gibson's framework explicitly states that contribution

to sustainability should be prioritized as the overarching goal, and applied at all stages of decision making and planning.

The Acts are less explicit in this regard, although they implicitly require a higher test, and it is clear that sustainable development is becoming increasingly recognized at the government level. Likewise, the intent of the ENV and SD Acts to ensure the long-term sustainability of Manitoba and its citizens is evidence that sustainability is a long-term and overarching goal (as it should be). Similarly, as has been previously mentioned, one of the stated purposes of CEAA 2012 is sustainable development (CEAA 2012a, 4(1)h).

Finally, implicit in this commentary is the proposal that Manitoba should adopt an explicit framework for sustainability assessment, be it Gibson's or otherwise. Since both the substantive and procedural requirements of sustainability assessment are already consistent with what is established in the Acts, adoption of a more explicit and more fully elaborated framework for sustainability assessment would be a useful next step in clarifying expectations and facilitating implementation.

Even if no framework is adopted, it is clear that the requirements set forth in the Act are consistent with those of a sustainability framework, and therefore the end result in terms of substance and process should be the same.

Appendix 2 - Principles and guidelines from the Manitoba *Sustainable Development Act*

Principles of sustainable development

The following are principles of sustainable development emerging from the *Sustainable Development Act* set out by the Province of Manitoba in 1998 (Manitoba 1998).

Integration of Environmental and Economic Decisions:

- Economic decisions should adequately reflect environmental, human health and social effects.
- Environmental and health initiatives should adequately take into account economic, human health and social consequences.

Stewardship:

- The economy, the environment, human health and social well-being should be managed for the equal benefit of present and future generations.
- Manitobans are caretakers of the economy, the environment, human health and social well-being for the benefit of present and future generations.
- Today's decisions are to be balanced with tomorrow's effects.

Shared Responsibility and Understanding:

- Manitobans should acknowledge responsibility for sustaining the economy, the environment, human health and social well-being, with each being accountable for decisions and actions in a spirit of partnership and open cooperation.
- Manitobans share a common economic, physical and social environment.
- Manitobans should understand and respect differing economic and social views, values, traditions and aspirations.
- Manitobans should consider the aspirations, needs and views of the people of the various geographical regions and ethnic groups in Manitoba, including Aboriginal peoples, to facilitate equitable management of Manitoba's common resources.

Prevention:

- Manitobans should anticipate, and prevent or mitigate, significant adverse economic, environmental, human health and social effects of decisions and actions, having particular careful regard to decisions whose impacts are not entirely certain but which, on reasonable and well-informed grounds, appear to pose serious threats to the economy, the environment, human health and social well-being.

Conservation and Enhancement:

- Manitobans should:
    - Maintain the ecological processes, biological diversity and life-support systems of the environment;
    - harvest renewable resources on a sustainable yield basis; make wise and efficient use of renewable and non-renewable resources; and
    - enhance the long-term productive capability, quality and capacity of natural ecosystems.

Rehabilitation and Reclamation:

- Manitobans should:
    - Endeavour to repair damage to or degradation of the environment; and

- consider the need for rehabilitation and reclamation in future decisions and actions.

Global Responsibility:

- Manitobans should think globally when acting locally, recognizing that there is economic, ecological and social interdependence among provinces and nations, and working cooperatively, within Canada and internationally, to integrate economic, environmental, human health and social factors in decision making while developing comprehensive and equitable solutions to problems.

Guidelines for sustainable development

The following are guidelines for sustainable development emerging from the Government of Manitoba's principles and guidelines of sustainable development (Manitoba Conservation n.d.).

Efficient Use of Resources:

- Encouraging and facilitating development and application of systems for proper resource pricing, demand management and resource allocation together with incentives to encourage efficient use of resources; and
- employing full-cost accounting to provide better information for decision makers.

Public Participation:

- Establishing forums which encourage and provide opportunity for consultation and meaningful participation in decision making processes by Manitobans;
- Endeavouring to provide due process, prior notification and appropriate and timely redress for those adversely affected by decisions and actions; and
- Striving to achieve consensus amongst citizens with regard to decisions affecting them.

Access to Information:

- Encouraging and facilitating the improvement and refinement of economic, environmental, human health and social information; and
- Promoting the opportunity for equal and timely access to information by all Manitobans.

Integrated Decision Making and Planning:

- Encouraging and facilitating decision making and planning processes that are efficient, timely, accountable and cross-sectoral and which incorporate an inter- generational perspective of future needs and consequences.

Waste Minimization and Substitution:

- Encouraging and promoting the development and use of substitutes for scarce resources where such substitutes are both environmentally sound and economically viable; and
- Reducing, reusing, recycling and recovering the products of society.

Research and Innovation:

- Encouraging and assisting the researching, development, application and sharing of knowledge and technologies which further our economic, environmental, human health and social well-being.

Appendix 3 – Federal Sustainable Development Strategy – Goals

Coming from the 2010 "Planning for a sustainable future: A Federal Sustainable Development Strategy for Canada"(Environment Canada 2010) and discussed in the Keeyask proposal to show how the project addresses each goal (Keeyask HLP 2012, 9-3).

Table 9 - Eight goals of the Canadian Federal Sustainable Development Strategy

Climate Change Reduce greenhouse gas emission levels to mitigate the severity and unavoidable impacts of climate change.
Air Pollution Minimize the threats to air quality so that the air Canadians breathe is clean and supports healthy ecosystems.
Water Quality Protect and enhance the quality of water so that it is clean, safe and secure for all Canadians and supports healthy ecosystems.
Water Availability Enhance information to ensure that Canadians can manage and use water resources in a manner consistent with the sustainability of the resource.
Wildlife Conservation Maintain or restore populations of wildlife to healthy levels
Ecosystem / Habitat Conservation and Protection Maintain productive and resilient ecosystems with the capacity to recover and adapt; and protect areas in ways that leave them unimpaired for present and future generations.
Biological Resources Sustainable production and consumption of biological resources are within ecosystem limits.
Greening Government Operations Minimize the environmental footprint of government operations.

Appendix 4 – Sustainability requirements of Manitoba Hydro

As a Crown corporation, Manitoba Hydro is subject to the Government of Manitoba's *Sustainable Development Act C.C.S.M. c. S270*. Second, Part 6 Guideline 13 of C.C.S.M. c. S270 states:

> *"Each Crown Corporation shall, within two years after the establishment of the code of practice, prepare and adopt a corporate sustainable development code of practice."*

Manitoba Hydro has developed a set of thirteen policies and principles for sustainable development, and these are shown in Table 10 below.

Table 10 - Manitoba Hydro Sustainable Development Policy/Principles

MH 1 - Stewardship of the Economy and the Environment
Recognize its responsibility as a caretaker of the economy and the environment for the benefit of present and future generations of Manitobans. Meet the electricity needs of present and future Manitobans in a manner that ensures the long-term integrity and productivity of our economy, our environment, our natural resources and safeguards our human health.

MH 2 – Shared Responsibility
Ensure that Manitoba Hydro's employees, contractors, and agents are aware of our sustainable development policies and guiding principles and encourage them to act accordingly. Encourage the Corporation's employees to share their knowledge of the concepts and practical application of sustainable development.

MH 3 - Integration of Environmental and Economic Decisions
Treat technical, economic and environmental factors on the same basis in all corporate decisions, from initial planning to construction to operations to decommissioning and disposal. To the extent practical, include environmental costs in economic and financial analysis.

MH 4 - Economic Enhancement
Enhance the productive capability and quality of Manitoba's economy and the well-being of Manitobans by providing reliable electrical services at competitive rates.

MH 5 - Efficient Use of Resources
Encourage the development and application of programs and pricing mechanisms for efficient and economic use of electricity by our customers. As well, efficient and economic use of energy and materials will be encouraged throughout all our operations.

MH 6 - Prevention and Remedy
To the extent practical, anticipate and prevent adverse environmental and economic effects that may be caused by Corporate policies, programs, projects and decisions rather than reacting to and remedying such effects after they have occurred. Purchase, where practical, environmentally sound products taking into account the life cycle of the products. Address adverse environmental effects of Corporate activities that cannot be prevented by:

- endeavouring, wherever feasible, to restore the environment to pre-development conditions or developing other beneficial uses through rehabilitation and reclamation;
- striving to replace the loss with substitutes that would enhance the environment and/or associated resource uses while offsetting the type of damage experienced;
- making monetary payments for compensable damages on a fair, equitable and timely basis.

Give preference, where practical, to projects and operating decisions that use renewable resources or that extend the life of supplies of non-renewable resources.

MH 7 - Conservation
To the extent practical, plan, design, build, operate, maintain and decommission Corporate facilities in a manner that protects essential ecological processes and biological diversity. Give preference, where practical, to projects and operating decisions that use renewable resources or that extend the life of supplies of non-renewable resources.

MH 8 - Waste Minimization
Manage all wastes arising from Corporate activities by: first, endeavouring to eliminate or reduce the amount generated; second, striving to fully utilise reuse and recycling opportunities; third, disposing of remaining waste in an environmentally sound manner.

MH 9 - Access to Adequate Information
Share relevant information on a timely basis with employees, interested people and governments to promote a greater understanding of Manitoba Hydro's current and planned business activities and to identify impacts associated with the Corporation's plans and operations.

MH 10 - Public Participation
Provide opportunities for input by potentially affected and interested parties when evaluating development and program alternatives and before deciding on a final course of action.

MH 11 - Understanding and Respect
Strive to understand and respect differing social and economic views, values, traditions and aspirations when deciding upon or taking action.

MH 12 - Scientific and Technological Innovation
Research, develop, test and implement technologies, practices and institutions that will make electrical supply and services more efficient, economic and environmentally sound.

MH 13 - Global Responsibility
Recognize there are no political and jurisdictional boundaries to our environment, and that there is ecological interdependence among provinces and nations. Consider environmental effects that occur outside of Manitoba when planning and deciding on new developments and major modifications to facilities and to methods of operation.

Source: (Manitoba Hydro n.d.)

Manitoba Hydro Act

Purposes and objects of Act (Manitoba 2012c, s.2):

> *2. The purposes and objects of this Act are to provide for the continuance of a supply of power adequate for the needs of the province, and to engage in and to promote economy and efficiency in the development, generation, transmission, distribution, supply and end-use of power and, in addition, are*
>
> *(a) to provide and market products, services and expertise related to the development, generation, transmission, distribution, supply and end-use of power, within and outside the province; and*
>
> *(b) to market and supply power to persons outside the province on terms and conditions acceptable to the board.*

Appendix 5 – A proposed set of evaluative and decision criteria for the Keeyask case

This section proposes a set of evaluative and decision-making criteria for application in the Keeyask case. In comparison with the fragmentary approach to assessment provided in Environmental Impact Statement developed by the project proponent, this framework attempts to be more consistent and integrated. It is clear there are important issues needing to be addressed to ensure the proposed Keeyask project delivers constructive, equitable and lasting gains for the citizens of Manitoba, while avoiding significant adverse effects, both now and in the future.

The points below identify the main categories of sustainability-related considerations to be addressed in the evaluations and decisions in this case as required by existing law and regulation. Each category includes a set of themes (shown in *italics*) that are then elaborated upon in the relevant criteria. In certain instances, the categories overlap and the particular considerations interact, and this is a reflection of the interrelated and integrated nature of the proposed project.

When considered as an integrated set, the categories, themes and criteria provide the basis for evaluations and decisions in planning, assessments and approvals. Their application should ensure proper attention is given to the full interacting set of key determinants of net gains while avoiding significant adverse effects and trade-offs.

The factors discussed in this section are assessed at a coarser level of detail than what is provided in the environmental reviews of proposed individual projects (e.g. the Environmental Impact Statement for the Keeyask Project). Instead, the focus is generally on the most significant impacts and on providing the necessary summary information to inform decision-making. This is similar to the approach taken in other sustainability assessments of large proposed developments (e.g. Mackenzie Gas JRP 2009; Lower Churchill JRP 2011).

The framework is designed to recognize the purposes of the federal and provincial environmental assessment legislation, the particular requirements of the *Environmental Impact Statement Guidelines* issued in February 2012, the Manitoba *Environment Act*, the Manitoba *Sustainability Act*, and the Aboriginal and/or treaty rights that may be affected.

The framework and application illustrated in this document are limited by time and resource constraints. This is an assessment guided primarily by an in-principle perspective rather than a perspectives based on the benefit of multiple consultations, more time and available personnel. Despite these limitations there is a lot of traction that can be gained from such an analysis, even one of such modest

means. Furthermore, the illustrated application to the Keeyask project ideally highlights the potential benefits of a much more powerful analysis undertaken in an early manner by proponents and decision makers guided by the requirements of progress towards sustainability.

Following the proposed set of criteria, a sample process of criteria specification is described in Appendix 6.

Table 11 – A proposed set of evaluative and decision criteria for the Keeyask case

Improving the ecological basis of our livelihoods and wellbeing

Goal

Build human-ecological relations to establish and maintain the long-term integrity of socio-biophysical systems and protect the irreplaceable life support functions upon which human as well as ecological wellbeing depends.

Criteria

Maintenance of ecological services and regulation

- Will the effects of the project allow for the maintenance of necessary ecological process (e.g. nutrient dispersal and cycling, seed dispersal, primary productivity, fire regimes)?
- Will the effects of the project allow for the maintenance of necessary ecological regulation (e.g. control of populations, pests, and diseases)?
- Will the project effects allow for the maintenance of necessary ecotypes and their functions (e.g. ensuring offset wetlands provide same functions as destroyed ones)?
- Will the project effects promote or improve water quality in local and regional areas (both short-term and long-term)?

Improvement of habitats and habitat intactness

- Will the project effects allow for the maintenance of keystone and/or endangered species (esp., caribou, moose and sturgeon) and culturally important species and ecotypes?
- Will the project effects allow for the maintenance of the necessary context for species to thrive and prosper (e.g. spawning and young of the year habitats for sturgeon, calving areas for caribou)?
- Will the project effects allow for sufficient intactness to maintain and promote sensitive or endangered species (e.g. caribou are especially sensitive to fragmentation)?

The ecological basis of traditional livelihoods

- Will the project effects allow for the maintenance of traditional livelihoods that depend on habitats and ecological services (e.g. hunting and trapping, medicinal plants)?
- Are the offsetting programs for hunting, fishing and trapping designed in a way to ensure success (e.g. ensuring food security and sovereignty, ensuring the new areas are not unduly impacted by increased resource extraction), and are sufficient measures in place to address any failed offsetting program?

Climate change mitigation

- Will the project effects in combination with other programs and infrastructure at Manitoba Hydro reduce greenhouse gas emissions, including upfront emissions (e.g. land clearing, flooding, and peat disintegration) in comparison with alternatives?

Appropriate immediate and long-term adaptive planning

- Will the project effects assist present and future land use planning, conservation initiatives and land and wildlife management plans?
- Is the Environmental Protection Program and its subsidiary plans (e.g. the EnvPPs)

sufficiently able to address both anticipated and unanticipated cumulative and synergistic effects and environmental changes (e.g. faster than predicted climate change)?
- Are the synergistic and cumulative impacts of cascading dams sufficiently addressed in the adaptation and monitoring plan?
- Are relevant ecological thresholds anticipated and planned for, within a sufficient margin of safety?

Management of adverse effects
- Are sufficient measures in place to mitigate the deposition and spread of contaminants (e.g. mercury) and avoid bioaccumulation of contaminants in the broader food chain (e.g. birds, humans)?
- Are synergistic effects of peat disintegration, sedimentation and shoreline erosion on water quality sufficiently understood with appropriate measures in place to address these effects?
- What is the level of certainty regarding reversibility of the anticipated effects both in the short term (e.g. elimination of mercury levels in Stephen's Lake) as well as after decommissioning?
- Are appropriate measures in place to find constructive uses for wastes generated in the project (e.g. overburden from land clearing)?

Fostering desirable and durable livelihoods

Goal
The cumulative effects will expand the range and availability of desirable and durable livelihood opportunities while helping to ensure sufficiency for all.

Criteria
Ensuring livelihood foundations
- Will the proposed project enhance livelihood foundations (e.g., available housing, applicable skills and education, financial and social capital, knowledge of the land, electricity and other services) and opportunities?
- Are the livelihood opportunities to be gained from the proposed project more desirable (numerous, diverse, lasting, culturally attractive, etc.) than the livelihood opportunities to be sacrificed?
- Will the proposed project provide respectful and fulfilling employment opportunities and foster self-determination?
- Will the proposed project address historical impediments to livelihood development (e.g. incidence of diabetes on reserves), particularly those directly or indirectly related to the impact of past developments in the area?

Protecting the most vulnerable
- Will the proposed project deliver net benefits to the people in the most affected communities, in the region, in the province, in Canada, and where the electricity is to be consumed?
- Are the anticipated opportunities directed to and likely to be practically accessible by those now most in need of livelihood improvement, including people in the most affected communities and region (e.g. improving energy efficiency in homes on reserves)?

Fostering local economic development and self-determination
- Will the proposed project ensure that local and regional residents have legitimate access to opportunities potentially available?
- Are the estimates of financial remuneration and short and long-term job creation credible when accounting for the history of previous large-scale and short-term resource projects?
- Are any measures in place to ensure short and long-term employment projections, or to provide alternative opportunities if projections are short?
- Will the project help First Nations and other affected communities transition to renewable

energy sources?

Prevention of boom and bust

- Are sufficient measures in place to ensure local areas have the necessary infrastructure and capacity to accommodate the anticipated population increases (e.g. schools, water supply, conflict resolution)?
- Are appropriate and credible measures in place to mitigate adverse local and regional boom-bust effects (e.g. by building longer term, broadly useful capacities)
- Are sufficient measures in place to provide retraining for workers whose jobs will be displaced at the end of the construction period?
- Will the proposed project help ensure that First Nations' established businesses maintain long-term sustainability?

Shared responsibility for livelihood maintenance

- Are appropriate measures in place to ensure local communities (First Nations and otherwise) will use their economic gains in a constructive manner and that the jobs will be designed in a manner that leads to positive legacy?

Enhancing First Nations wellbeing and self-determination

Goal

Ensure the project effects will enhance First Nations community wellbeing and respect traditional livelihoods, while allowing First Nations communities to benefit from development projects as appropriate.

Criteria

First Nations ways of living and self-determination

- Are employment opportunities structured in a manner that allows for and fosters traditional ways of living?
- Are employment opportunities structured in a manner that reduces First Nations dependence upon external economic support and avoids brain drain from the reserves?
- Will the proposed project allow First Nations sufficient use of their territories for economic and other purposes (e.g. ensuring a wilderness experience for ecological tourism)?
- Will the proposed project foster First Nations self-governance and self-determination?
- Does the proposed project ensure First Nations communities are empowered to decide upon future proposed developments?

Enhanced determinants of health

- Will the project effects enhance community cohesion and commitment, inter-community relationships, and traditions of mutual respect and assistance through all phases of the undertaking?
- Will the project effects enhance community positive intergenerational relations and household and family solidarity?
- Will the project effects promote livelihood security, community self-reliance, and diversity of opportunities through all phases of the undertaking?
- Will the project effects promote cultural preservation and evolution, and pride of place through all phases of the undertaking?
- Will the project effects help to mitigate and reverse currently negative social, economic and cultural trends (e.g., diabetes, feelings of mistrust and anxiety towards development)?

First Nations infrastructure

- Will the project effects improve community and regional public infrastructure and programs (e.g. affordable and accessible good quality housing, social programs and services, accessible transportation)?
- Are appropriate measures in place to ensure that the anticipated economic expansion does not

overwhelm local the First Nations' capacity for management (e.g. increase in temporary workers, social delinquency)?
- Are sufficient measures in place to ensure the income earned is used wisely and constructively (e.g. not for drugs or gambling)?
- Does the proposed project provide a credible approach for overcoming the constraints to education (e.g. teacher retention, culture shock of being educated elsewhere)?

Furthering Askiy
- Will the cumulative effects help to maintain or undermine valued traditional ways, cultural norms and supports, and social relationships (e.g., respect for Elders)?
- Will the cumulative effects of the project as well as anticipated future projects foster positive progress towards Askiy, as opposed to minimizing significant harm?

Fostering community wellbeing
- Will the cumulative effects ensure and foster the maintenance of First Nations' heritage for current and future generations?
- Will the proposed project promote personal and community wellbeing on reserves (e.g. improving feelings of trust, reducing anxiety)?
- Will the cumulative effects and management plans allow for and foster spontaneous activities (e.g., as opposed to the planned activities through the AEA offsetting programs)?

Ensuring fairness in process and outcomes

Goal

The cumulative effects will ensure that sufficiency and effective choices for all are pursued in ways that reduce dangerous gaps in sufficiency and opportunity (and health, security, social recognition, political influence, etc.) between the rich and the poor.

Criteria

Fair distribution of benefits and risk
- Are sufficient mechanisms in place to ensure fair distribution of benefits and risks between partnering and non-partnering First Nation communities?
- Will the cumulative effects reduce or exacerbate inequities in the distribution of opportunities and other benefits, burdens and damages, risks and uncertainties among potentially affected individuals, communities, regions and other interests?
- Is the undertaking designed to direct the benefits chiefly to those who are less economically-advantaged (e.g. by providing affordable access to electricity)?
- Will the geographical distribution of benefits (e.g. employment opportunities, revenue flows, access to resources and services, opportunities for effective participation in crucial decision making) match the distribution of burdens and damages, risks and uncertainties (e.g. loss of opportunities and resources, increase in ecological constraints, addition of responsibilities to deal with undesired changes and emerging problems, strains on existing community and institutional capacities)?

Fair access to resources and opportunities
- Will the cumulative effects encourage less materially and energy intensive approaches amongst the advantaged to open space for ensuring material and energy sufficiency for all?
- Will the cumulative effects expand gaps in sufficiency and opportunity (including desirable employment, health, security, income, social recognition, political influence, and vulnerability to risks) between the rich and the poor, women and men, and Aboriginal and non-Aboriginal people?
- Will the cumulative effects reduce the differences in opportunities and perceived status between urban/peri-urban and rural/remote communities?
- Will the undertaking ensure fair and full-cost pricing of electricity while ensuring this does

not unduly harm the marginalized and vulnerable?

Mitigation of unavoidable losses

- Where the undertaking involves unavoidable losses (e.g. loss of lands flooded or otherwise removed from full use), have measures been proposed to avoid or fully mitigate the adverse effects on individuals and communities?

Accounting for the past

- Given the historical impact of hydropower on First Nations communities in Manitoba, what mechanisms are in place to ensure future development projects address historical actions?
- Does the proposed project and the EIS develop a baseline that accounts for past harm against First Nations communities due to hydro and other development?

Shared responsibility for promoting equity

- Where informed attention to cumulative equity effects and effective delivery of actions to enhance equity depend on governance capacities (e.g. of provincial government agencies) have those capacities been demonstrated and/or are there reliable grounds for expecting them to be in place?
- Have proponents and relevant government agencies ensured that no single community or group is affected in a manner that would be considered unacceptable in other communities or groups (*i.e.* avoidance of environmental racism)?

Leaving a positive legacy

Goal

Favour present options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainably.

Criteria

Securing long-term availability of energy and resources

- Will the project effects assist in returning current resource exploitation and other pressures on ecological systems and their functions to levels that are safely within the perpetual capacity of those systems to provide resources and services likely to be needed by future generations?
- Insofar as the undertaking involves sacrifice of current continuing or renewable resources, which will not be available to future generations, have justifications been provided to establish that all other options would have entailed more adverse effects on future generations?
- Are sufficient steps in place to avoid long-term legacy costs from the project (e.g. potential removal of the dam)?

Securing future opportunities

- Will the project effects favour options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainably?
- Will the project effects include measures to build for future generations a lasting basis for viable socio-ecological systems, desirable and viable livelihoods and community wellbeing, and firm grounds for confidence that these measures will be successful?

Saving for the future

- Given that large dams/reservoirs have a limited life expectancy, and increasing maintenance costs over time, will proposed plans and other arrangements ensure that sufficient resources are reserved for and available to the future generations that will need to address maintenance, decommissioning and rehabilitation needs?
- At the end of its anticipated life, will the undertaking leave the local communities, region and province with resources and opportunities at least as great and desirable as those available today?
- What mechanisms are in place to ensure resource-based revenue is used to build better future

opportunities, both by local Aboriginal communities and for Manitoba as a whole?
- Are sufficient funds being held aside in trust to respond to both anticipated and unanticipated issues that arise from the monitoring?
- Are sufficient funds and resources being set aside by the proponents to address potential eventualities (e.g. a future decision or need to decommission the dam, ongoing adaptive environmental management)?

Ensuring lasting benefit
- Are sufficient measures in place to ensure revenues lead to lasting benefits and account for the value of the natural and social capital lost due to the project?
- Do the Adverse Effects Agreements sufficiently account for long-term impacts and benefits?

Shared responsibility for a positive legacy
- Where informed attention to cumulative effects on future generation and effective protection of the interests of future generations depend on governance capacities (e.g. of provincial government agencies) have those capacities been demonstrated and/or are there reliable grounds for expecting them to be in place?

Developing energy bridges
- Will the proposed project in combination with other programs and infrastructure at Manitoba Hydro help Manitoba transition to sustainable energy and resource consumption?
- Will the proposed project in combination with other programs and infrastructure at Manitoba Hydro allow resource communities currently relying on fossil-based electricity generation to transition to renewable sources of energy (e.g. solar PV, wind, biomass)?

Promoting resource maintenance, conservation and efficiency

Goal

Provide a larger base for ensuring sustainable livelihoods for all while reducing threats to the long term integrity of socio-ecological systems by reducing extractive damage, avoiding waste and cutting overall material and energy use per unit of benefit.

Criteria

Reducing overall energy and resource consumption
- Will the cumulative effects reduce overall material and energy use, resource depletion (including agricultural lands), extractive damage and waste generation (including GHG emissions)?
- Will the cumulative effects foster more efficient allocation and use of energy and other resources in the region, in the province, in Canada and beyond?

Fostering responsible use of energy
- Will the proposed project in combination with other programs and infrastructure at Manitoba Hydro help foster short and long-term conservation and demand management initiatives in the region, Manitoba, Canada and beyond (e.g. American consumers)?
- Will the proposed project in combination with other programs and infrastructure at Manitoba Hydro encourage consumers and customers to match the quality of the energy supplied to the quality of the end-use?
- Will the proposed project in combination with other programs and infrastructure at Manitoba Hydro promote the consumption of energy only as necessary to provide services in the pursuit of constructive social ends?

Developing resilient energy supplies
- Will the proposed project in combination with other programs and infrastructure at Manitoba Hydro promote resilient energy supply systems with sufficient diversity, modularity and redundancy of energy pathways to respond to changing conditions (e.g. climate change, political change, changing demographics)?

- Will the proposed project in combination with other programs and infrastructure at Manitoba Hydro promote opportunities for multiple uses of energy inputs (e.g. cogeneration)?
- Will the proposed project in combination with other programs and infrastructure at Manitoba Hydro contribute to the development of new energy efficient technologies and practices?

Avoidance of resource conflicts

- Will the proposed project take steps to avoid potential future resource conflicts (such as for food and fibre)?

Mitigating perverse effects

- Will the proposed project in combination with other programs and infrastructure at Manitoba Hydro avoid perverse effects (e.g. increased electricity consumption due to increased supply, increased hunting and trapping due to increased access)?

Prioritizing precautionary and adaptive management

Goal

Favour the selection, design and implementation of the undertaking (including provisions for monitoring and adjustment) that reflect the application of precautionary approaches that respect uncertainty and avoid both well and poorly understood risks of serious or irreversible damage to the foundations of sustainability, and a willingness to act on incomplete but suggestive information where there may be risks to social and/or ecological systems that are crucial for sustainability.

Criteria

Responsive monitoring and adaptive management

- Are contingency plans in place and sufficiently effective to deal with unexpected events?
- Are there reliable grounds for entrusting governance capacities (e.g. of provincial government agencies) to manage adverse effects?
- Will the KHLP maintain sufficient resources (financial and otherwise) to respond to both anticipated and unanticipated issues that arise during and after the project lifetime?
- Are appropriate measures in place to respond to changing outcomes from ecological management strategies (e.g. stocking fish, creating spawning habitat)?

Developing baseline data

- Are the characteristics and potential vulnerabilities of relevant biophysical systems and human-environment relations well enough understood to provide a reliable base for confident prediction of effects?
- Given historical impacts of previous hydropower projects in Manitoba, has an appropriate baseline been established for assessing cumulative effects?

Dealing with uncertainty

- Will the selection, design and implementation of the proposed project (including provisions for monitoring and adjustment) favour resilience characteristics (diversity, flexibility, reversibility, mechanisms for learning, and management for adaptation)?
- Have the main uncertainties been identified and taken into account in identifying potential risks and opportunities, as well as in the prediction of effects?
- Are monitoring programs and management frameworks in place or reliably planned that focus on establishing or maintaining sustainability of valued biophysical and socio-ecological conditions?
- Are monitoring programs and management frameworks in place or reliably planned that focus on ensuring projected socio-economic benefits (e.g. employment opportunities, project income) are in line with projections?
- Are there sufficient means present to assess the effectiveness of monitoring and adaptive management?

Managing for climate change

- Does the project sufficiently address anticipated and unanticipated changing environmental conditions due to climate change (e.g. changing precipitation levels) and the increased rate of change (*i.e.* the rate of change is faster than 2007 IPCC expectations)?
- Does the project sufficiently anticipate changes in magnitude and probability of extreme weather events (e.g. 1/20 year flooding)?

Avoiding lock-in

- Will the project promote economic diversification and reduce vulnerability to world market volatility (e.g. fluctuating electricity markets)?
- Will the project favour energy options that minimize geopolitical risk (e.g. nuclear proliferation, terrorist attack)?
- Will the proposed project in combination with other programs and infrastructure at Manitoba Hydro maintain sufficient flexibility to change operations as new information becomes available on the impact of hydro dams on the climate in particular, and ecological integrity more generally?
- Will the proposed project in combination with other programs and infrastructure at Manitoba Hydro be responsive to changing economic cycles and societal patterns?

Ensuring due process and an informed citizenry

Goal

Build the capacity, motivation and habitual inclination of individuals, communities and other collective decision making bodies to apply sustainability requirements through more open and better informed deliberations, greater attention to fostering reciprocal awareness and collective responsibility, and more integrated use of administrative, market, customary and personal decision making practices.

Criteria

Maintenance of traditional ways of knowing and deciding

- Will the proposed project and assessment process foster better appreciation of and respect for traditional ways of knowing, even when such ways conflict with Western science?
- Does the assessment process ensure First Nations laws and ways of knowing are properly integrated into the decision making process?
- Was the assessment process sufficiently open, welcoming and rigorous to ensure First Nation individuals and communities are accepting of the long-term changes that will occur?

Promoting good governance

- Does the proposed project and assessment process promote local decision-making and more broadly participative and decentralized local multi-stakeholder governance?
- Does the proposed project and assessment process enhance collaborative and transparent governance, system legitimacy, accountability, and trustworthiness?

Fostering informed and responsible citizenry

- Does the proposed project and assessment process promote responsible consumption understood as an ecologically and socially shared privilege as opposed to an intrinsic right?
- Does the proposed project and assessment process promote respect for marginal members of society?
- Does the proposed project and assessment process promote a culture of conservation and resilience, and seek to delink welfare from energy and resource consumption?
- Does the proposed project and assessment process contribute to improved public understanding of socio-ecological systems and their interdependencies, and to the protection and conservation of natural resources?

Full cost accounting

- Will the proposed project and assessment process promote fair and full cost resource pricing both in the immediate and long term?
- Does the proposed project and assessment process sufficiently account for and justify the opportunity costs of the project (e.g. lost land for potential future mineral exploitation projects) and provide a strong business case?
- Does the proposed project and assessment process apply full-cost accounting principles, including appropriate valuing of natural and social capital?

Promoting open and informed decision making

- Will the cumulative effects encourage more open and better informed deliberations, greater attention to fostering collective responsibility, and more integrated use of individual and collaborative collective decision making practices?
- Will the cumulative effects strengthen individual and collective understanding of ecology and community, foster customary civility and ecological responsibility, and build civil capacity for effective involvement in collective decision-making?

Ensuring proper problem formulation

- Has the proposed project been sufficiently justified and been agreed upon by relevant stakeholders?
- Does the project respond to a mutually agreed upon need in the region, Manitoba, Canada and beyond?
- Has the consultation and decision making process been sufficiently responsive to the needs, concerns and opportunities of relevant stakeholders?

Integrating immediate and long-term planning objectives

Goal

Apply all principles of sustainability at once, seeking mutually supportive benefits and multiple gains so as to ensure the overall cumulative effects of the chosen alternative will make the strongest feasible contribution to sustainability while avoiding trade-offs.

Criteria

Promoting integrated assessment to seek the best alternative

- Have all reasonably foreseeable projects been appropriately and sufficiently accounted for in the project effects assessment (e.g. effects of cascading dams, Keeyask Transmission Project, Bipole III, Conawapa)?
- Have all principles of sustainability been applied together in the identification of project effects, the comparison of options and other key evaluations?
- Have possible interactions amongst the anticipated effects (specific and cumulative) been identified and evaluated?
- Does the proposed undertaking have, in comparison with the other broad alternatives and specific designs, the best prospects for delivering multiple, mutually supporting, fairly distributed and lasting benefits in all of the categories of concern noted above, while avoiding significant adverse effects?

Seeking mutually reinforcing positive gains

- Has the assessment evaluated whether the anticipated positive effects in various areas and at different scales will be mutually reinforcing and has it considered how these mutually reinforcing effects might be strengthened?

Avoiding trade-offs

- Are any trade-offs proposed where stronger mitigation or avoidance efforts would be feasible?
- Would any proposed trade-off displace significant adverse effects from the present to the future (and would this trade-off be unavoidable without displacing more serious adverse

effects to the future)?

- Have all remaining proposed trade-offs been sufficiently justified on grounds that the trade-offs are unavoidable and that the trade-offs involved in all other options are worse?
- Where more positive or more adverse cumulative effects have been predicted at different scales, have the trade-offs been identified and justifications presented?

Appendix 6 - Specifying the sustainability criteria for a given case and context

The process of specifying criteria requires integrating, organizing, and interpreting the collected information which provides an opportunity for exploring initial responses to the perceived problems; problem formulation and initial resolution are undertaken in a simultaneous manner (e.g. Rittel and Webber 1973). The sustainability criteria are specified for the case and context with the ultimate goal of choosing the best available alternatives. This section outlines the means by which the sustainability criteria are specified for case and context, with the general steps depicted in Figure 1 below. The description of criteria specification is kept at a general level to better encompass the multiplicity of situations in which sustainability assessment may be applied.

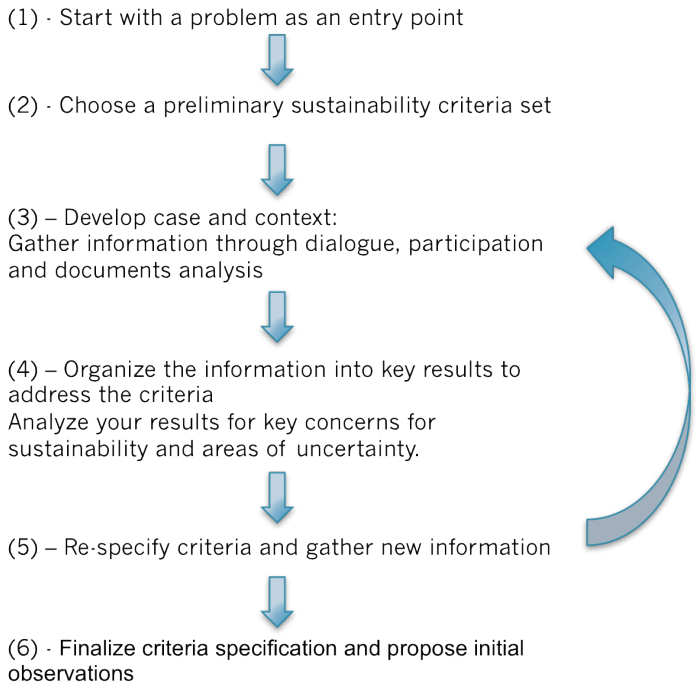

Figure 1 – Criteria specification for sustainability assessment

Step 1 – Begin with a problem and a set of alternatives

The first step in criterion specification is to begin with a problem or purpose, which is an entry point into the assessment. Depending upon the terms of reference the problem may remain fixed (e.g. a formal assessment process) or may change during the assessment process as relevant insights emerge (e.g. a more strategic level approach). The problem or purpose may take many forms, such as:

- an existing entity at the small scale – e.g. a biodiesel operation;
- a strategic large-scale question – e.g. a proposed provincial electrical power systems plan;
- a proposed project – e.g. the Mackenzie natural gas pipeline; or
- a system in crisis – e.g. Senegal's energy and agricultural system (Diop 2009).

In a formal process such as the proposed Keeyask dam, both the 'problem' (the decision to allow the dam to be built, and, if so, under what circumstances) is generally fixed. Likewise, alternatives to the proposed Keeyask dam are required as per the CEAA guidelines (CEAA 2012b).

Step 2 – Choose a preliminary set of sustainability criteria

Beginning with the initial problem, a generic set of sustainability criteria can be adopted to inform the criteria specification process. Gibson's eight evaluative and decision-making criteria for sustainability proposed in Table 4 provide one possible starting point. A more expanded criteria set for energy undertakings is provided in 0, which provides initial themes and areas of concern to guide the assessment process, and indicates important concerns that the alternatives (when they are defined) must address. The preliminary criteria set also offers a means of organizing the relevant considerations of case and context.

For the purposes of this document, the important aspects of case and context are organized in a table with two sets of headings: (1) Gibson's eight categories as the major headings; and (2) relevant themes within each category as a minor heading. Sample headings and a sample criterion, are provided in Table 12.

Table 12 - Sample sustainability criterion and headings

Socio-ecological system integrity – Category
GHG emissions and air pollution – Theme
• mitigate GHG emissions, particularly upfront GHG emissions (e.g. soil carbon debt) (criteria)

Source: Adapted from (adapted from Duarte et al. 2013)

The preliminary criteria set is generic and must be updated with the relevant information emerging from case and context (*i.e.* particular areas of challenge or opportunity, relevant cultural history, etc.).

Step 3 – Begin developing the case and context

Once the problem and preliminary set of criteria have been chosen, the case and context must be developed by drawing on the relevant available information. Sustainability assessments can draw from a variety of sources to identify the major case– and context–specific considerations. General sources of information include existing policy and planning documents that set out key concerns and priorities at the local, regional, territorial and/or national level;
considerations that emerged in prior assessments or similar processes dealing with the same context;
earlier deliberations on the case, especially involving the key stakeholders; and other sources of local and/or larger scale information that sheds light on how the various generic sustainability concerns are reflected in the circumstances and issues of the particular case and context.

With regard to the proposed Keeyask dam, the structure and specific contents of the framework are drawn from

- the literature on general principles for assessment of undertakings proposed to serve the long as well as short term public interest, including positive contributions to progress towards sustainability as well as avoidance or mitigation of significant adverse effects;
- the issues globally identified as particularly important in cases of proposed major hydropower undertakings, including in the final report of the WCD (2000);
- precedents established in previous sustainability-based assessments in Canada, especially those involving joint review panels with similar mandates, including criteria applied by these panels;
- the most evident issues concerning the potential positive and adverse cumulative effects of the proposed Keeyask project in its specific context (e.g. from document such as the EIS); and
- input from the various experts and intervenors in the process.

Any proposed listing of these case– and context–specific considerations should be open to public discussion, review, and adjustment. The objective is to identify the key sustainability-related questions raised by the project and its context. While many of these can be identified by informed observers and assisted by specialized experts, the importance of issues is also a matter of public preference and choice.

Ideally the collection of relevant information should cover a comprehensive suite of factors, including but not limited to: demographic trends, economic cycles, legal concerns, political dynamics, social conditions, technological change, and biophysical environmental impacts (including natural forces and disasters).

Given the long lifetimes of many projects, the information should include both impacts of the proposed project and its alternatives on the factors mentioned above, as well as the impact of the factors mentioned in the proposed project and its alternatives.

Of course, given the sheer volume of information that is available for reading (including the EIS and its supporting documents, intervener reports and testimony, relevant oral and written traditions, etc.), the factors should be assessed at a coarser level of detail than what is provided in the environmental reviews of proposed individual projects (e.g. the Environmental Impact Statement for the Keeyask Project), generally focusing on the most significant impacts and providing the necessary summary information to fully inform decision making. Furthermore, the findings should be based on the detailed existing analyses and the level of confidence about the conclusions ought to be clearly established.

Step 4 – Organize the information into key results to address the criteria

As the case and context are explored, it is possible to begin organizing and interpreting the information to better understand the major themes, challenges and opportunities.

To help with organization, the information gathered through the exploration of case and context is organized in a table that mirrors the criteria set, so that when alternatives are compared, the relevant information is mapped to the criteria. A sample results table, adapted from Chapter 7, is provided in Table 13.

Table 13 - Sample key results table

Socio-ecological system integrity *Biodiversity and land-use change*	Impact
• Due to fierce competition, sugarcane mills do not reveal where they intend to expand sugarcane plantations. Such secrecy limits the environmental licensing process, and hampers land-use change assessment.	-

Source: Adapted from (adapted from Duarte et al. 2013)

The right hand column could adopt a simple three-point scale, identifying potential positive impact (+), potential negative impact (−), and potential impacts that may be mixed, or positive or negative depending on their characteristics and how they are situated within the broader context (=). The purpose of ranking is not to sum up all the positive and negative aspects in a quantitative test, but rather to gain broad insights into areas of strengths and weakness, and associated opportunities for improving contributions to sustainability.

Step 5 - Re-specify the criteria and gather new information

As the information is organized into the key results table and discussed amongst stakeholders, and interactive effects and boundary crossing considerations are explored, relevant themes will emerge. In some instances the relevant themes are organized within Gibson's eight categories (Table 4), which use terminology generally familiar to assessment professionals.

For practical application in policy and project deliberations, it may be preferable to reorganize the criteria and results into categories and themes that facilitate understanding and informed discussion among the relevant stakeholders and panel members, so long as the criteria set maintains the full suite of requirements for progress towards sustainability (Gibson 2006b).

The process of organizing and analyzing the key results will also indicate what knowledge of case and context are missing and should be further developed. The new information will ultimately be analyzed and organized into the key results.

Step 6 - Finalize criteria specification and begin assessment of alternatives

When criteria specification is complete, the analysis of alternatives may begin. Alternatives should be analyzed against the complete set of sustainability criteria developed in the step above. A practical example of the analysis of alternatives is provided in Chapter 19 (Volume 2) of the report by the Joint Review Panel for the Mackenzie Gas Project (Mackenzie Gas JRP 2009, ch. 19).

The six steps above summarize the basic process of elaborating and organizing the relevant sustainability criteria for the particular case and context. A preliminary set of sustainability criteria for the Keeyask case was proposed in Appendix 5.