

# CHAPTER 9

## SUSTAINABLE DEVELOPMENT

# CHAPTER 9

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## 9.0 SUSTAINABLE DEVELOPMENT

### 9.1 INTRODUCTION AND PURPOSE

This chapter considers the Keeyask Generation Project (the Project) in the context of sustainable development. It considers the Project relative to the Keeyask Cree Nations' (KCNs) involvement and to federal, provincial and Manitoba Hydro's goals, principles and guidelines for sustainable development.

### 9.2 CONTEXT FOR SUSTAINABLE DEVELOPMENT

"*Our Common Future*," the 1987 report of the World Commission on Environment and Development, more commonly known as the Brundtland Commission, popularized "sustainable development" as both a phrase and a concept. The definition coined by that commission has remained as the most common definition among the many that have been framed since:

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts:

- "The concept of needs, in particular the essential needs of the world's poor, to which overriding priority should be given; and
- "The idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs."

As a concept, sustainable development has relevance to most major developmental and planning decisions in that it integrates social, environmental and economic considerations into decision making. Since 1987, much thought and debate has been focused on how to implement this concept in diverse circumstances and geographic regions.

Both the federal and provincial governments have instituted sustainable development as policy goals for future development in Canada and Manitoba, respectively. To this end the Government of Canada has embedded the goal of achieving sustainable development into the "Preamble" and "Purposes" sections of the *Canadian Environmental Assessment Act* (CEAA; s.c. 1992, c.37) and has enacted a *Federal Sustainable Development Act (FSDA)*. The Government of Manitoba has enacted the *Sustainable Development Act* for the same purpose within the province. Each of these acts sets out principles and guidelines or goals to guide the implementation of sustainable development. Manitoba Hydro has also adopted a sustainable development policy and a set of principles and guidelines that guide its activities.

## 9.2.1 KEYASK CREE NATIONS PRINCIPLES AND INVOLVEMENT

The World Commission on Environment and Development put forward the proposition that the empowerment of vulnerable indigenous people is a touchstone of a sustainable development policy (United Nations World Commission on Environment and Development 1987)<sup>1</sup>. The Commission was concerned that the gradual advance of development into remote regions would increase the vulnerability of indigenous people as they were often left out of the processes of economic development. The Keeyask Cree Nations (KCNs), in each of their respective Environmental Evaluation Reports, have shared their perspectives about how past hydroelectric projects have affected their communities.

In contrast to the past, the Project puts into practice the proposition of greater empowerment of local indigenous people. The KCN Partners have been directly involved in planning the Project and the environmental impact assessment, emphasizing the importance of respecting Mother Earth in a manner consistent with their Cree worldview. As expressed in their philosophy of *mino pimatisiwin* (or “living the good and honourable life”), everything is interrelated and must be respected. Each KCN received funding to undertake its own evaluation of the Project and to involve its community in the decision as to whether or not to become a partner in the initiative. The KCNs’ Environmental Evaluation Reports speak to a desire to restore harmony and balance with Mother Earth, to protect the environment, which is broadly defined to include people’s wellbeing, to maintain and enhance their culture and traditions, and to provide greater hope and opportunities for future generations. The decision to support the Project was difficult, requiring much study, discussion and soul searching. Ultimately, the decision to proceed was based on evaluations of social, economic and environmental considerations, and a focus on both present and future generations to whom the benefits of the Project would accrue. In deciding to proceed with the Project, the KCNs saw an opportunity for current and future generations to benefit economically and to build their communities’ capacity and self-sufficiency, while respecting and maintaining their Cree values, teachings, identity, culture and traditional knowledge.

As partners, the KCNs have been influential in identifying and advocating for measures to lessen the adverse environmental effects of the Project, and they will undertake appropriate activities, including rituals and ceremonies to show respect and give thanks to *Askej* at major Project milestones. The Adverse Effects Agreements (AEAs) will provide continued access to healthy country foods and programs to maintain and strengthen their traditions and culture. The KCNs will also have a hands-on role in monitoring and follow-up activities, opportunities for training and employment on the Project and in the operation of existing hydroelectric projects, and a continuing role as board members of the Partnership, and they will receive long-term income from their investment in the Project. All of this is consistent with the World Commission’s view of the role of indigenous people in sustainable development.

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<sup>1</sup> Our Common Future; United Nations World Commission on Environment and Development, 1987, page 116 (Chapter 4, paragraph 78).

Consistent with their Cree worldview, the KCNs established the following Principles for Respect for the Land, to be followed in the construction and operation of the Project, and had these principles embedded into the Joint Keeyask Development Agreement (JKDA):

**Principles Regarding Respect for the Land**

- Adopting measures that increase, to the extent ecologically reasonable, the abundance of species and/or growing conditions for species that have special social or economic importance for the Keeyask Cree Nations.
- Employing strategies that “go with” rather than “go against” nature, as they have a much higher probability of success.
- Planting species and promoting site conditions that are widespread in the sub-region in which the Keeyask Project is located, rather than planting species and promoting site conditions that may be popular in more southern areas.
- Being respectful of the Keeyask Cree Nations’ traditional relationships with the land.

For a more in-depth description of the KCNs worldview, Project evaluation and decision-making, see Chapter 2, the KCNs’ Environmental Evaluation Reports, and the video, *Keeyask – Our Story*.

## 9.2.2 THE KEEYASK PROJECT AND THE FEDERAL SUSTAINABLE DEVELOPMENT STRATEGY – GOALS

The Federal Sustainable Development Strategy (FSDS) is mandated by the *Federal Sustainable Development Act*, which received Royal Assent on June 26, 2008. The FSDA responds to a number of international commitments Canada has made to produce such a strategy, including at the Earth Summit in Rio de Janeiro, Brazil, in 1992 and at the 2002 World Summit on Sustainable Development in Johannesburg, South Africa.

The purpose of the FSDA is “to provide the legal framework for developing and implementing a Federal Sustainable Development Strategy that will make environmental decision-making more transparent and accountable to Parliament.” The basic principle is that the Government of Canada accepts that sustainable development is based on an ecologically efficient use of natural, social and economic resources and acknowledges the need to integrate environmental, economic and social factors in the making of all decisions by government. In October 2010, the report titled “Planning for a Sustainable Future: A Federal Sustainable Development Strategy for Canada” was published. The Federal Sustainable Development Goals are set out below, followed by a description of how the Project addresses each goal.

**Goal 1 – Climate Change:** *Reduce greenhouse gas emission levels to mitigate the severity and unavoidable impacts of climate change.*

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 to be 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.

**Goal 2 – Air Pollution:** *Minimize the threats to air quality so that the air Canadians breathe is clean and supports healthy ecosystems.*

There are very few air emissions from a hydroelectric generating station; compared to coal and gas fired generating stations, emissions from Keeyask would be considered minimal.

**Goal 3 – Water Quality:** *Protect and enhance the quality of water so that it is clean, safe and secure for all Canadians and supports healthy ecosystems.*

While the creation of the reservoir will result in some long-term effects to water quality, the area will generally remain suitable for aquatic life. As well, a series of good construction methods – e.g., the use of double-sided cofferdams that will reduce the release of fine sediments into the water – will help maintain water quality and avoid /minimize adverse effects to aquatic life.

**Goal 4 – Water Availability:** *Enhance information to ensure that Canadians can manage and use water resources in a manner consistent with the sustainability of the resource.*

Manitoba Hydro has been studying northern rivers and streams for over four decades and, in conjunction with KCNs, has undertaken Project specific studies for more than a decade. This has added numerous data to pre-existing information.

**Goal 5 – Wildlife Conservation:** *Maintain or restore populations of wildlife to healthy levels.*

Maintaining and restoring wildlife populations in the area have been major components of the planning and environmental assessment of the Project. Through a combination of mitigation measures that includes habitat replacement, a hatchery and stocking programs, the existing stocks of lake sturgeon should not only be maintained but improved. As well, mammal resources are not likely to be significantly affected by the Project, and Cree Nation Partners (CNP) are developing moose and fish harvest sustainability plans to address long term sustainability of those resources in the Split Lake Resource Management Area. Caribou

will be monitored to guide programs to maintain the sustainability of the regional populations.

**Goal 6 – 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.*

Special efforts have been undertaken to avoid or minimize Project effects to habitat and ecosystem intactness and to replace the loss of important habitat types; for example, sensitive terrestrial habitat sites were avoided to the extent feasible when routing roads and locating borrow and excavated material placement areas.

Overall, the likely Project related effects on ecosystem diversity are expected to be adverse but regionally acceptable because no stand level habitat types are lost, the distribution of area amongst the stand level habitat types is not expected to change substantially and the cumulative area losses for all of the priority habitat types remains below 10%.

**Goal 7 – Biological Resources:** *Sustainable production and consumption of biological resources are within ecosystem limits.*

The Project is being planned consistent with the need for sustainable production and consumption of biological resources. For example, sustainable harvest plans for moose and fish are being developed by CNP for the Split Lake Resource Management Area, which is consistent with the TCN Access and Healthy Food Fish programs under the TCN AEA and the Improved Access Program and the Community Fish Program under the WLFN AEA.

**Goal 8 – Greening Government Operations:** *Minimize the environmental footprint of government operations.*

Although not a government operation, a number of measures have been taken to minimize the Project footprint. The best example of this approach was the decision to reduce the size of the Project. At one time, a high-head project with over 180 km<sup>2</sup> of initial flooding was under consideration; in contrast, the Project now being proposed by the Partnership will produce 45 km<sup>2</sup> of initial flooding.

## 9.2.3 KEYYASK AND MANITOBA SUSTAINABLE DEVELOPMENT PRINCIPLES AND GUIDELINES

In 1998, the Province of Manitoba enacted the *Sustainable Development Act* 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” (Government of Manitoba 1998). Attached as schedules to the Act was a set of Principles and Guidelines of Sustainable Development to guide the behaviour and decision making of all government departments, agencies and Crown corporations.



### 9.2.3.1 PRINCIPLES OF SUSTAINABLE DEVELOPMENT

The following sets out these Principles, and how the Project has been planned and designed and will be constructed and operated in conformity with the province's directive.

**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.*

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.

**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.*

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.

**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.*

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.

**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.*

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.

**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.*

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.

**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.*

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.

**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.*

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.

### 9.2.3.1.1 GUIDELINES OF SUSTAINABLE DEVELOPMENT

The following are the Manitoba Guidelines of Sustainable Development (Manitoba Conservation n.d.) and a description of how the Project has been planned and designed and will be constructed and operated in conformity with the province's directive.

**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.*

The Project is an efficient use of a renewable resource to produce electricity, and it compares favourably to gas and coal which are the main sources of electricity in the mid-continent market area. The Project has been planned and designed with mitigation, compensation and enhancement measures to reduce adverse environmental and social impacts and maximize benefits. By incorporating these measures into the Project's capital and operating budgets, the Project costs closely reflect the full societal cost of the Project. Compared to earlier approaches to hydroelectric development, this approach increases the per unit cost of

Project power, but it also results in a more sustainable project. The integration of environmental and social costs of the Project is also a critical element in full-cost accounting. The Project will also pay water power rentals charged by the Province as part of its resource pricing policies.

The Project will be operated as part of Manitoba Hydro's integrated generation and northern collector system, allowing for peak efficiency and optimum water usage for all plants.

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

Discussions that began between TCN and Manitoba Hydro in the 1990s, and were later expanded to the other KCNs, resulted in the establishment of the Partnership. In addition to the discussions that led to the development of the Partnership, the communities have been closely involved with Manitoba Hydro in the environmental impact statement. These discussions and consultations have helped to shape the final design for the Project and monitoring of its effects. A Public Involvement Program (see Chapter 3) has been developed and implemented to reach interested Manitobans representing other communities and organizations.

**Access to Information:** *(a) Encouraging and facilitating the improvement and refinement of economic, environmental, human health and social information; and (b) Promoting the opportunity for equal and timely access to information by all Manitobans.*

In addition to the ongoing communication among the KCNs and Manitoba Hydro, each of the KCNs undertakes on-going communication with its Members. The Partnership is undertaking a Public Involvement Program for other communities and interested Manitobans, and relevant information is also made available to the public through the regulatory review process.

**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.*

The Partnership has established a governance structure that includes KCNs representation. As part of this structure, the communities have had direct involvement in the environmental assessment and will continue to have a strong role with their Aboriginal traditional knowledge (ATK) in the monitoring and follow-up programs.

Each partner concerns itself with the short and long-term benefits and costs of the Project. Multi-generational benefits are key to the commitment of the KCNs' participation in the Project.

**Waste Minimization and Substitution:** (a) *Encouraging and promoting the development and use of substitutes for scarce resources where such substitutes are both environmentally sound and economically viable; and (b) Reducing, reusing, recycling and recovering the products of society.*

While opportunities to recycle wastes in remoter northern areas are limited, waste generated by the Project will be minimized and waste materials will be recycled to the extent practical, and the remaining waste will be disposed of in accordance with license and regulatory requirements.

**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.*

A great deal of research, study and sharing of knowledge has contributed to the current plans for the Project. Associated with the environmental assessment processes, there have been many technical and ATK studies related to wildlife (including caribou), fish populations (including sturgeon), social and economic conditions, heritage resources, history and culture that will be part of the record of the Project and will be of ongoing benefit far beyond their use in the EIS for the Project. For example, thousands of cultural artifacts, some as old as 4000 to 5000 years, have been recovered and preserved during the Project planning phase and will be accessible to the KCNs (and the public), enhancing cultural memory and identity. Through the Project, the communities have undertaken many of their own studies and reports that have resulted in a clear enunciation of their Cree worldview. Monitoring activities, involving ATK and technical science will continue through the construction and operation phases.

### 9.2.3.2 THE KEYASK GENERATION PROJECT AND MANITOBA SUSTAINABILITY INDICATORS

The “2009 Provincial Sustainability Report for Manitoba” established categories of indicators within each of the three sustainable development “dimensions” (natural environment, economic and social well being) and indicators within each category. For each indicator, the province, after application of the appropriate criteria, determined and reported a province-wide trend for the indicator with respect to its sustainability; *e.g.*, stable, inconclusive, changing, variable, negative, positive, and other determinations as appropriate (Manitoba Conservation 2009).

Table 9A-1 in Appendix 9A utilizes the information and conclusions in the EIS to determine whether the Project will affect the Manitoba Government’s reported sustainability trends.

## 9.2.4 THE KEYASK GENERATION PROJECT AND MANITOBA HYDRO'S SUSTAINABLE DEVELOPMENT PRINCIPLES

In 1993, the Corporation adopted 13 sustainable development principles based on the principles and guidelines of sustainable development adopted by the Manitoba Round Table on Environment and Economy.

The policy and the 13 principles represent a guiding influence for Manitoba Hydro's decisions, actions and day-to-day operations. The general partner of the Partnership will operate within the Manitoba Hydro principles and guidelines of sustainable development.

The following illustrates how the Project is consistent with these 13 principles.

**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 and our natural resources, and safeguards our human health.*

Consistent with the KCNs' commitment to caring for *Askiy* and Manitoba Hydro's commitment to sustainable development, the Project has been designed to minimize adverse effects and maximize benefits to local and regional residents. Manitoba Hydro and the KCNs have planned the Project together and completed more than a decade of both ATK and technical studies to predict and mitigate adverse effects and enhance Project benefits.

These efforts have improved the Project in a number of ways. Bio-physical effects have been substantially reduced by: choosing a "low head" rather than a "high head" design, thereby reducing the amount of flooding required; siting and arranging the infrastructure utilizing environmental as well as engineering criteria; clearing the reservoir before impoundment to decrease floating debris and other environmental impacts; setting strict operating regimes to minimize reservoir elevation variation; and undertaking extensive mitigation measures to protect fish and terrestrial species. Activities such as the development of a partnership, extensive preconstruction consultations and studies, joint planning within the partnership, designing social and cultural mitigation measures, extensive use of ATK, and the use of AEAs and offset measures combine to reduce socioeconomic and cultural impacts from the Project. Through job training programs, preferential hiring, directly negotiated contracts, and equity participation with the KCNs, benefits to local and regional communities have been enhanced.

These mitigation, compensation and enhancement measures have been incorporated into the Project's capital and operating budgets, resulting in Project costs that reflect closely the full societal cost of the Project.

Compared to earlier approaches to hydroelectric development, this approach increases the per unit cost of Project power, but it also results in a more sustainable project. The integration of environmental and social costs of the Project is also a critical element in full-cost accounting.

**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.*

All contractors and workers on the site will be provided with Project-relevant information that incorporates the application of the principles. Partnership oversight of the Project will include compliance measures associated with regulatory and policy standards for Project construction and operation as well as in the associated monitoring and follow-up programs.

**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.*

A major example of this integration is the Project design. The Project incorporates mitigation, compensation and enhancement measures to reduce adverse environmental and social impacts and maximize benefits. By incorporating these measures into the Project's capital and operating budgets, the Project costs closely reflect the full societal cost of the Project.

**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.*

Hydroelectric development is a principal contributor to Manitoba's economy. The Project will generate revenues through power sales locally and to the US. Earnings will flow to the Partner communities as well as to the province through Manitoba Hydro. External power sales allow for sustainable low rates within the province, providing affordable electricity to the citizens of Manitoba and competitive advantage to the business community.

**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.*

Although Manitoba Hydro has exceptionally low domestic electricity rates which tends to encourage consumption, Manitoba Hydro also has an exceptionally strong program to explicitly encourage customers to be efficient in the use of electricity. In fact, the Manitoba Hydro Power Smart Program is recognized as a national leader for transforming the market through its ongoing commitment to promote energy efficient products and practices.

**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:*

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

A number of measures have been taken to prevent and minimize adverse effects, the most substantial being to reduce the size of the Project. At one time, a high head project with 180 km<sup>2</sup> of initial flooding was under consideration; in contrast, the current Project that will result in 45 km<sup>2</sup> of initial flooding. 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 another example of anticipating and remedying effects before they occur, AEAs with the KCNs were negotiated as proactive measures in advance of the development, and programs under those agreements will address effects on resource users.

Efforts have been made to avoid many effects, and once construction is completed, temporary facilities and structures not required for the operations phase will be decommissioned.

**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.*

Both ATK and over a decade of technical studies have contributed to the design of the Project in a manner that will avoid or reduce adverse effects and protect essential ecological processes and biological diversity. Hydropower utilizes a renewable resource, thus assisting in the conservation of non-renewable resources such as gas or coal that otherwise would be used to generate the electricity being produced at the Project.

**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; and
- Third, disposing of remaining waste in an environmentally sound manner.

While opportunities for recycling are limited in remote northern areas, waste generated by the Project will be minimized and waste materials will be recycled to the extent practical. All other waste will be disposed of in an environmentally sound manner and in accordance with regulatory requirements.



**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.*

Project information has been and will continue to be shared with interested parties dedicated websites, meetings, open houses and newsletters. Project information is also available at government registries.

Participation of the partners on the board of the general partner and in three ongoing committees (Construction Advisory Committee, Monitoring Advisory Committee and the Advisory Group on Employment) will be mechanisms for current and accurate information to the KCNs.

**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.*

KCNs undertook their own evaluations of the Project and their representatives were included in Partnership decisions. Discussion with the local communities began in the early 1990s and has resulted in a partnership with four First Nations and Manitoba Hydro participating in the Project. Ongoing communications have been undertaken within the communities. A Public Involvement Program has also been developed and has been implemented to reach the interested public in Manitoba. Information gleaned from these discussions and proponent consultations have improved the design and will be reflected in the construction of the Project.

This information was also used in determining and assessing environmental effects as part of the environmental assessment and in the design of mitigation and monitoring measures.

**Understanding and Respect:** *Strive to understand and respect differing social and economic views, values, traditions and aspirations when deciding upon or taking action. Give preference to those alternatives which best fulfil Corporate objectives while minimizing infringement on the ability, rights, and interests of others to pursue their aspirations.*

The Project proponent is a partnership comprising Manitoba Hydro and the KCNs. Considerable effort has been made in forging constructive relationships between Manitoba Hydro and the KCNs, including facilitating community studies aimed at understanding history, community history, and more importantly the Cree worldview and ATK. This growing understanding has had a major impact on Project design, construction and operation. It has also led to specific arrangements through community-specific AEAs.

**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.*

Due to the potential for injury and mortality of fish as they pass downstream through turbines, a number of variables were considered in the selection and development of turbines for the Project to reduce the risk of injury and mortality. These variables include the number, alignment, and shape of stay vanes and wicket gates, clearance at the wicket gates

and runners, wicket gate overhang, number of blades, blade leading edge thickness, blade trailing edge (related to turbulence), rotation rate, runner diameter, blade speed, and absolute lowest pressure.

The use of a fixed blade vertical shaft turbine design for the Project results in several advantages for fish passage survivability compared to other turbine styles. The fixed blade pitch of the vertical shaft units allows for the gap between the runner blades and the discharge ring to be minimized, reducing the likelihood of fish impingement and injury. The low rotational speeds associated with large diameter vertical shaft turbines also result in greater fish survivability. To reduce the risk of striking or impingement injuries, runner blades incorporate a thicker rounder leading edge, the gaps between wicket gates and both the bottom ring and head cover were minimized, and the wicket gate overhang was also minimized. To reduce turbulence levels experienced by fish passing through the turbines, the runner blades incorporate a thinner trailing edge, units will operate at best gate whenever possible, and the shape of the draft tubes incorporate large sweeping radii. These are all known to improve the probability of a fish passing through a turbine without incurring significant injury or mortality.

This is the first time that Manitoba Hydro has included these variables relevant for fish survival as part of the evaluation in the initial turbine design selection process, and as a priority for further turbine design development. Although there are many variables to consider beyond those relevant for fish survival (particularly efficiency and cost), the objective for the Project turbines is to achieve a minimum survival rate of 90%. Based on the Franke formula (Aquatic Environment Support Volume, Appendix 1A) for estimating the probability of survival of fish passed through turbines, fish up to 500 mm passing through the turbines will have a survival rate of over 90%.

**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.*

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.

## 9.3 CONCLUSIONS RE: THE KEEYASK GENERATION PROJECT AND SUSTAINABILITY

This analysis demonstrates that the Project is consistent with the KCNs, federal, provincial, and Manitoba Hydro approaches to sustainable development.

In addition to the specific analysis related to the goals, principles and guidelines of sustainable development, several general conclusions about the Project emerge, from the perspective of the three pillars of sustainable development:

### ECONOMY

- National
  - Increased tax revenue will accrue to the federal government from employment and business opportunities resulting from the Project; and
  - The Project is a model of First Nation and corporate partnership in new renewable resource development.
- Provincial
  - Increased employment opportunities and resultant employment income associated with the Project will stimulate the provincial economy during construction and operation;
  - Increased revenues from power sales will generate income into Manitoba Hydro, a provincial Crown corporation, and benefit Manitoba ratepayers over the long life of the Project;
  - Increased revenue from water power rights associated with the Project will generate ongoing revenue for the province over the life of the Project;
  - Employment income and business development associated with the Project will generate revenue for the province;
  - Over 4000 person-years of employment income and substantial business opportunities will decrease welfare/social assistance reliance, especially in northern Manitoba; and
  - Employment training has already benefitted hundreds of workers, the results of which will be long lasting skilled labour, transferrable to other projects in the future.
- Regional
  - Local indigenous (KCNs) people will have an opportunity to benefit economically through their ownership position in the Project and through training, employment and business opportunities;

- Local indigenous people (KCNs) are also participating in the governance of a major hydroelectric project being developed in their ancestral homelands;
- The costs of the many measures to avoid or mitigate adverse effects and to enhance social benefits have been integrated into the design of the Project. As a result, these costs have been internalized into the Project (moving an otherwise external social cost into a corporate internal cost);
- Employment opportunities and associated training and economic benefits have increased for workers throughout northern Manitoba;
- Economic activity associated with the Project will increase opportunities for regional commercial and industrial businesses; and
- There will be long-term population growth with well paid operational positions at the generating station.

## **SOCIAL**

- The Partnership is an example of consistency with the World Commission proposition that empowerment of vulnerable indigenous people is a touchstone of sustainable development policy.
- Funds were provided to each KCN to undertake its own evaluation of the Project and conduct referendums on whether to support the Project. The KCNs' Environmental Evaluation Reports speak to a desire to restore harmony and balance with *Askej*, to protect the environment which is broadly defined to include people's wellbeing, to maintain and enhance their culture and traditions, and to provide greater hope and opportunities for present and future generations.
- As partners the KCNs have been influential in identifying and advocating for measures to lessen the adverse environmental effects of the Project, and they will undertake appropriate ceremonies to show respect and give thanks to *Askej* at major Project milestones.
- The AEA's will provide the KCNs with access to healthy country foods and programs to maintain and strengthen their traditions and culture.
- Benefits associated with their partnership in a major development will contribute to independence of northern remote FN communities.

## **ENVIRONMENT**

- As the first step in environmental stewardship, the Project has been planned to avoid or reduce long-term environmental effects. For example, through the planning process, the Project was reduced from a 1150 MW generating station that would have flooded 183 km<sup>2</sup>, to a smaller 695 MW station that will flood 45 km<sup>2</sup>.

- Special attention has been given to sensitive species and habitats. One example is lake sturgeon, a species designated as endangered by COSEWIC and being considered for designation under the Species at Risk Act. Through a combination of mitigation measures that include habitat enhancement, a fish hatchery and stocking program, the objective is not only to maintain existing stocks but to improve the species' population.
- Attention has been given to sustainable resource use in the planning and design of the Project. Maintaining and restoring wildlife populations in the area have been major components of the planning and environmental assessment. Through a combination of mitigation measures the existing stocks of lake sturgeon should not only be maintained but improved. Fish and moose harvest sustainability plans are being developed by CNP to guide the sustainable harvest of fish and moose in the Split Lake Resource Management Area (SLRMA). Moose and caribou monitoring will be conducted to promote future sustainability of the regional populations.
- Consistent with federal and provincial government efforts to reduce GHG emissions, the Project will contribute to a substantial reduction in greenhouse gases by displacing electricity generated from coal or gas, which could produce more than 200 x's more GHGs than Keeyask over its productive lifetime.

**APPENDIX 9A**

**EFFECT ON MANITOBA  
GOVERNMENT  
SUSTAINABILITY INDICATOR  
TRENDS**

## EFFECT ON MANITOBA GOVERNMENT SUSTAINABILITY INDICATOR TRENDS

The “2009 Provincial Sustainability Report for Manitoba”<sup>1</sup> established categories of indicators within each of the three sustainable development “dimensions” (natural environment, economic and social well being) and indicators within each category. For each indicator, the province, after application of the appropriate criteria, determined and reported a province-wide trend for the indicator with respect to its sustainability; *e.g.*, stable, inconclusive, changing, variable, negative, positive, and other determinations as appropriate.

The two left hand columns in the following table comprise information directly from the 2009 Sustainability Report. The right hand column is the proponent’s comments respecting the Project’s impact on the provincial trend. Although the sustainability trends were established and reported on a provincial basis, the table provides regional information as required.

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<sup>1</sup> [http://www.gov.mb.ca/conservation/pdf/sustainability\\_report\\_2009.pdf](http://www.gov.mb.ca/conservation/pdf/sustainability_report_2009.pdf)

**Table 9A - 1: Keeyask Project Effect on Manitoba Government Sustainability Indicator Trends**

<b>Category</b>	<b>Indicator From MB 2009 Sustainability Report</b>	<b>Province-wide Trend from MB 2009 Sustainability Report</b>	<b>Predicted Effect of Keeyask Project on Manitoba Trend</b>
<b>NATURAL ENVIRONMENT FRAMEWORK</b>			
<b>Biodiversity</b>	Natural lands and protected areas	Stable	No predicted effect
	Wildlife species and ecosystems at risk	Inconclusive	No predicted effect on mammal resources
<b>Fish</b>	Fish species biodiversity and population	Changing	Minimal effect Positive effect on lake sturgeon in the lower Nelson River, when regional mitigation and enhancement measures are considered.
	Commercial fish harvest	Variable, depending on fishery	Minimal effect
<b>Forests</b>	Forest type and age class	Stable	Minimal effect
	Forest renewal	Stable	No predicted effect
<b>Air</b>	Air quality	Stable- Winnipeg, Brandon and Flin Flon	Short term local adverse effect, no effect on local or regional air quality in long term.
<b>Water</b>	Water quality	Stable	Negative effect on some back bays on the reservoir for 10-20 years after impoundment. No marked adverse effect on region.
	Water allocation and consumption	Stable	No predicted effect
<b>Climate Change</b>	Average annual and seasonal temperature	Negative	No predicted effect



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	Total annual and seasonal precipitation	Inconclusive	No predicted effect
	Greenhouse gas emissions	Stable	Positive – The Project will contribute towards global reductions in GHG emissions.
<b>ECONOMIC FRAMEWORK</b>			
<b>Economic performance</b>	Real gross domestic product per capita	Positive	Positive
	Gross domestic product by sector	Positive	Positive
<b>Agricultural sustainability</b>	Total net farm income	Variable	No predicted effect
	Farm structure	Increasing consolidation	No predicted effect
	Adoption of sustainable agricultural management practices	Positive	No predicted effect
<b>Mining</b>	Mineral exploration	Positive	No predicted effect
	Mineral reserves	Stable	No predicted effect
	Mineral production	Positive	No predicted effect
<b>Energy efficiency and conservation</b>	Energy intensity	Positive	No predicted effect
	Renewable energy consumed versus total energy consumed	Positive	Positive

**Table 9A - 1: Keeyask Project Effect on Manitoba Government Sustainability Indicator Trends**

<b>Category</b>	<b>Indicator From MB 2009 Sustainability Report</b>	<b>Province-wide Trend from MB 2009 Sustainability Report</b>	<b>Predicted Effect of Keeyask Project on Manitoba Trend</b>
<b>Consumption and waste management</b>	Waste disposal	Negative	No predicted effect
	Waste recycled or used	Negative	NTD – Needs answer
<b>Employment</b>	Labour force trends	Positive	Positive – Substantial local and regional employment opportunities during 8.5-year construction phase. - Enhanced skilled workforce.
	Labour force opportunities	Positive	Positive – 4,218 person-years of employment during 8.5-year construction phase. Substantial proportion of total Project employment is expected to be northern Aboriginal employment (34-51%). 46 long-term jobs are associated with operation of the Keeyask Generation Station, and 182 KCNs jobs for 20 years are also provided for in the JKDA.



**Table 9A - 1: Keeyask Project Effect on Manitoba Government Sustainability Indicator Trends**

Category	Indicator From MB 2009 Sustainability Report	Province-wide Trend from MB 2009 Sustainability Report	Predicted Effect of Keeyask Project on Manitoba Trend
	Building and maintaining vibrant communities	Stable/positive	<p>Positive for KCNs during construction phase due to employment and Direct Negotiation Contract benefits.</p> <p>Positive for the KCNs during the operation phase as a result of partnership income, which can contribute to increased self-sufficiency and provisions for Hydro jobs.</p> <p>AEA programming/initiatives reflect and respond to the KCNs' concerns, goals, and interests; for example, access programs contribute to strengthening traditional uses of lands within the Split Lake RMA that are away from the Nelson River. Participation in the Partnership contributes toward the sense of involvement by the KCNs in development within their vicinity.</p> <p>Positive for Gillam during operation phase as the community is planning for growth.</p>
<b>Education</b>	Readiness for school	Positive	No predicted effect
	Literacy and numeracy – youth, adult	Stable	Positive effect. Community based pre-Project training included educational upgrading programs.



**Table 9A - 1: Keeyask Project Effect on Manitoba Government Sustainability Indicator Trends**

<b>Category</b>	<b>Indicator From MB 2009 Sustainability Report</b>	<b>Province-wide Trend from MB 2009 Sustainability Report</b>	<b>Predicted Effect of Keeyask Project on Manitoba Trend</b>
	High school and post-secondary education completion	Increasing – high school Stable -- post secondary	Positive - Community based pre-Project training included trades and business management training programs. To encourage continuing education, a Manitoba Hydro Keeyask Leadership Scholarship has been established to be awarded to one grade 12 graduating student from each community who is pursuing post secondary education and has shown exemplary leadership. This annual scholarship will be continued for seven generations.
	Academic achievement and socio-economic status	Variable	Positive – Project has the opportunity to increase socio-economic status through employment income for construction workers (including Aboriginal workers who are the subject of preferential hiring provisions in the collective agreement governing the construction project). The Project is expected to contribute to long-term partnership income earned by the KCNs.
<b>SOCIAL WELL BEING FRAMEWORK</b>			
<b>Demographic</b>	Population growth	Positive	No predicted effect on Manitoba trend; localized population growth associated with 46 long term positions to be located in Gillam.
	Migration to Manitoba from other jurisdictions	Positive	No predicted effect.

**Table 9A - 1: Keeyask Project Effect on Manitoba Government Sustainability Indicator Trends**

<b>Category</b>	<b>Indicator From MB 2009 Sustainability Report</b>	<b>Province-wide Trend from MB 2009 Sustainability Report</b>	<b>Predicted Effect of Keeyask Project on Manitoba Trend</b>
<b>Equity and rights</b>	Low income	Positive	Positive – well-paying opportunities in construction and operation phases; substantial local and regional employment opportunities during 8.5 year construction phase. Forty-six long-term jobs are associated with operation of the Keeyask Generation Station.
	Income inequality	Positive	Positive – northern Aboriginal employment in well-paying operations jobs. KCNs partnership income could raise overall standard of living and degree of self-sufficiency in KCNs communities.
	Income dependency	Positive	Positive – northern Aboriginal employment in well-paying operations jobs will contribute to reduced income dependency on government transfers for those employed. KCNs partnership income is likely to raise overall standard of living and degree of self-sufficiency in KCNs communities.
	Community supported living	Positive	No predicted effects.
<b>Community and culture</b>	Community engagement	Positive	Positive – KCNs communities engaged as partners in Project planning, decision-making and economic expansion.
	Heritage conservation	Positive	Variable – loss of heritage resources in Project footprint; increased knowledge, identification and protection of heritage resources through fieldwork associated with the Project (that counterbalances the loss of heritage resources through construction).

**Table 9A - 1: Keeyask Project Effect on Manitoba Government Sustainability Indicator Trends**

<b>Category</b>	<b>Indicator From MB 2009 Sustainability Report</b>	<b>Province-wide Trend from MB 2009 Sustainability Report</b>	<b>Predicted Effect of Keeyask Project on Manitoba Trend</b>
	Language diversity	Positive	Positive – for KCNs communities, Cree language programs are part of adverse effects agreements that are intended to strengthen Cree culture and language.
<b>Governance</b>	Voting rates	Positive	No predicted effect.
	Progress toward debt repayment	Positive	Positive – substantial water rental and capital tax payments to provincial government.
<b>Health</b>	Health status	Stable	Stable – KCNs AEAs and partnership income as well as overall employment opportunities for Manitobans provide the favourable conditions to improve overall health status. Medium-term elevated mercury levels to be offset by other sources of domestic fish via programs in most AEAs. In addition, consumption guidelines and measures to encourage domestic consumption of low-mercury fish are intended to mitigate mercury changes in fish.
	Access and quality of care	Stable	No predicted effect
	<b>Justice</b>	Crime rate	Inconclusive