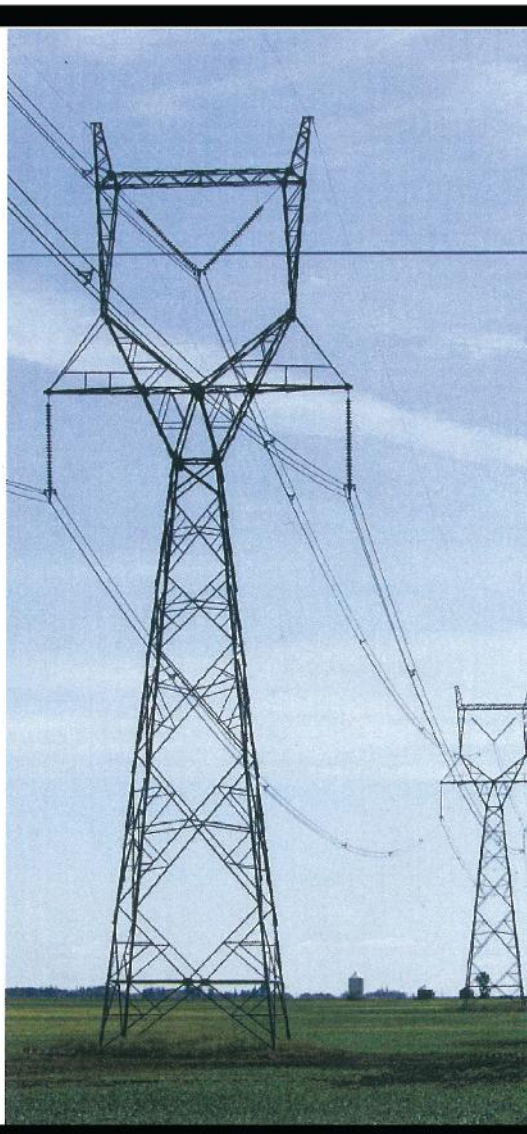


Source: Manitoba Hydro

NEEDS FOR AND ALTERNATIVES TO MANITOBA HYDRO'S PREFERRED DEVELOPMENT PLAN: SOCIO-ECONOMIC REVIEW

Prepared for: Public Utilities Board of Manitoba
Prepared by: TyPlan
Date: January 2014

TYPLAN
Planning & management

NEEDS FOR AND ALTERNATIVES TO MANITOBA HYDRO'S PREFERRED DEVELOPMENT PLAN

INDEPENDENT REVIEW OF SOCIO-ECONOMIC BENEFITS

FINAL REPORT

Prepared for:

MANITOBA PUBLIC UTILITIES BOARD

Prepared by:

TYPLAN
Planning & management

1461 Ioco Road, Port Moody, BC
V3H 2X3
Tel: (604) 461-6664 | Fax: (604) 461-6668

January 2014

Manitoba PUB 1

NEEDS FOR AND ALTERNATIVES TO MANITOBA HYDRO'S PREFERRED DEVELOPMENT PLAN

INDEPENDENT REVIEW OF SOCIO-ECONOMIC BENEFITS

FINAL REPORT

Prepared for Manitoba Public Utilities Board

Prepared by TyPlan Planning & Management

January 2014

Lead Author: Russ Tyson, Project Director

Executive Summary

Introduction and Purpose

The Manitoba Public Utilities Board (PUB) regulates a number of Manitoba Public Utilities, inclusive of Manitoba Hydro (MH). The Ministry of Innovation, Energy and Mines, Government of Manitoba requested the PUB conduct the Needs for and Alternatives to (NFAT) for Manitoba Hydro's (MH) Preferred Development Plan (PDP), using an independent body.

The proposed expenditure of approximately $20 billion dollars on the PDP will have a significant economic impact on the Province of Manitoba, northern Manitoba communities, impacted First Nations as well as other jurisdictions in Canada. The NFAT review requires that the PUB Panel examine the socio-economic impacts. TyPlan Planning and Management (TyPlan) has been retained to review the findings presented in the NFAT Business Case prepared by MH, and comment on the reasonableness of the assumptions and findings. The scope of work (SOW) undertaken by TyPlan is provided in the main report.

The PDP consists of the Keeyask Generating Project (695MW), the Conawapa Generating Project (1,485MW), North-South transmission upgrade project with an in-service date to correspond with Conawapa, the Manitoba-Minnesota Transmission Project, and simple gas thermal units. MH has incorporated a number of lessons learned from both historic hydroelectric developments and recent construction projects (Wuskwatim Generating Station) that have influenced MH's approach to project delivery, and correspondingly, the resultant socio-economic benefits. Lessons learned include: establishment of partnerships with First Nations, early start of construction for supporting infrastructure (developed via first Nations partnership agreements), engineering costs and constructability inputs, and human resource attraction and retention strategies.

Key Observations

Economic Impact Assessment

Interpreting the Results of the Input Output Model for various alternative plans

The Manitoba Bureau of Statistics Input Output Model (IOM) was used to compare the expected economic impacts associated with the PDP and other alternatives such as a Simple Gas Turbine and a Combined Gas Turbine project. While varying detail was provided regarding construction costs for the gas options, we note that IOM's are linear and therefore scalable. Scaling the gas options to reflect the Keeyask Generating Project construction costs ($2.2 billion) enables a comparison of economic impacts. The Keeyask Generating Project (and the PDP) creates significantly greater economic benefits than that of the gas turbine projects.

Interpreting the Results of the Input Output Model for the PDP

Specific to evaluating the overall economic benefits of the PDP, our review commented on the key steps and related assumptions required to preparing the model, namely:

- the level detail related to construction costs;
- allocation of construction costs into input output categories;

- removal of expenditures with no provincial economic benefit and other leakages from the provincial economy; and
- treatment of labour.

MH provided detailed costs as inputs into the model, and has for the most part, allocated cost input data to the corresponding IO expenditure categories based on an understanding of the expenditures involved. MH has removed expenditures with no provincial economic benefit and identified leakages from the provincial economy. The results of which are also reflected in the treatment of labour.

It is observed however, that the treatment of many purchases as leakages may tend to understate the impact of the PDP in Manitoba, while overstating the impact in the rest of Canada. This is due to the fact that the margins embedded in the purchase cost of these goods and services (treated as leakages), may not have been attributed to Manitoba producers who may be providing services such as transportation or wholesaling.

The extent of the leakages can be explained by a number of factors such as the relatively small manufacturing base of Manitoba economy compared to the rest of the provinces in Canada (Ontario and British Columbia), as well as the extensive experience of MH regarding recently constructed projects that would verify the of out-of-province purchases.

The extent of the out of province expenditures may be reasonable, but MH should have explicitly commented on this as part of reporting.

The issue pertaining to whether the impacts to the rest of Canada are overstated, whereas the impacts to Manitoba are understated remains, and is discussed below.

Canadian vs. Provincial Benefits

A generally accepted principle of input output modelling is that the "direct" benefits of any project are incurred in the jurisdiction in which the project is located. The approach used in the Statistics Canada Interprovincial Input-Output Economic Impact Simulation model (catalogue no. 15F0009XDB) focused on the expenditures (purchase of goods and services) and the location where these expenditures took place. This approach ensures that the results generated from the model show the entire direct impact in Manitoba. It should be noted however that when the expenditure approach is used with the Statistics Canada model, the model estimates where the goods and services purchased are supplied from.

The key difference in the MH IOM approach was that MH made decisions, based on local experience and knowledge, on where the goods and services originated from. Although such an approach is reasonable, one must be careful in how to interpret the direct and indirect impacts, as the production (supply) of goods and services might generate a direct impact in the jurisdiction where the production took place, but in reality, this production should be interpreted as indirect impact, because these goods and services were produced to satisfy the demand associated with the project.

The results of both the MH IOM and the Statistics Canada Interprovincial model are presented for comparison purposes in the main body of the report for the Keeyask Generating Station.

The analysis suggests that the allocation of impacts between Manitoba and the rest of Canada in the MH study is significantly different from what the normal allocation, based on the structure and characteristics of Manitoba's economy would be, according to the Statistics Canada model.

Based on the results of the Statistics Canada model one would expect the economic impact in Manitoba to be higher than what was suggested in the MH study (employment, labour income and GDP), while the impact in the rest of Canada would be lower.

Regardless, the results confirm that the PDP creates the greatest economic impacts, and if the Statistics Canada Interprovincial model is considered, the benefits to Manitobans is greater than what was reported.

Determining gross provincial financial benefits by examining benefits over the life of the project

The economic lives of hydroelectric facilities are much greater than those of other resource options. Based on the timing and value of replacement costs and net production costs based on MH Splash modeling, the PDP creates the greatest value over the economic life of the asset. The longer-term life (past the economic life) of hydroelectric facilities represents a consideration worth noting in this review. Referred to by MH as bequest value, is difficult to ascertain how long such facilities can be maintained and operated. Literature suggests over the longer term (past the economic life) hydroelectric facilities continue to contribute to the provincial economy well past the economic life of the facility evaluated in the NFAT.

Northern and Aboriginal community based impacts in terms of employment opportunities, incomes, community tax base, skills development and community based opportunities

Our review identified ten (10) provincial utility criteria/measurers, specific to optimizing economic benefits for First Nations and northern communities. It is noted MH has met and exceeded such practices.

Community Access Improvements related to Health, Education and Culture

Community access improvements and their implications (environmental setting, effects assessment, mitigation, and residual effects) related to health, education and culture are discussed in the Environmental Impact Statement (EIS) for the Keeyask Generating Project. The assessment followed standard environmental impact assessment process and all identified issues were evaluated.

On-going monitoring throughout construction, operation and beyond will be critical to ensure success of the identified mitigation.

Economic Displacement Impacts and Effects on Consumer Spending

Global Canadian and Provincial Electricity Rates

Manitobans (as of 2013) have one of the lowest residential electricity rates in Canada, and correspondingly, Canada has one of the lowest residential rates in the world (2009). In the literature

reviewed, continued pressure to increase rates throughout Canada is evident and is expected to continue into the next decades.

Review of Increased Energy Costs on Consumers

Literature suggests that the displacement effects of rate increases predominantly affect the poor and those with low income or fixed incomes. The middle and upper class are not as affected as such costs are absorbed through greater disposable income.

Energy Efficiency and Reduction Initiatives

The literature also suggests that best means of mitigating such affects on those most affected will be to aggressively pursue energy efficiency and reduction initiatives. While MH is known for such programs, continued emphasis on such programs is suggested, along with on-going monitoring, in light of the proposed rate increases.

Optimizing demand side management (DSM) will be critical moving forward to manage impacts to ratepayers.

Socio-economic Impact of Key Alternative Scenarios

Evaluation of Alternative Plans

The use of Multiple Account Benefit Cost Analysis (MA-BCA) to ascertain socio-economic benefits focuses on the identification of net benefits from a broader social perspective. It also enables comparisons of the distributional advantages and disadvantages of various plans over the stated life cycle of the plan. MA-BCA is a methodology utilized to evaluate options and used to assist in program and policy decision-making.

The MA-BCA assesses the preferred and three alternative resource development plans, and include:

- the Preferred Development Plan;
- the Smaller Interconnection Plan (K19/Gas 24/250MW Interconnection);
- Keeyask with No Interconnection (K2/Gas); and
- Gas Thermal with on new Interconnection (all Gas).

The MA-BCA was based on the reference scenarios assuming a 78-year net present value metric. It is noted that while sensitivity analysis was undertaken for all of the alternatives, there still remains key assumptions within the economic, financial and sensitivity analysis (future load forecasting, the effect of demand side management, drought exposure, export sales and provincial revenues etc.), that would materially affect the outcome of this review.

Market Valuation

The key assumption effecting results is the discount rate utilized. The discount rate is a critical parameter in cost benefit analysis especially when costs and benefits differ in distribution over time. This is especially important when they occur over a long period of time. The 6% real discount rate chosen for the PDP, based on a social cost of capital, is reasonable based on literature reviewed.

The results are correspondingly reasonable.

Manitoba Hydro Customer Account

Pressure on rate increases is expected to continue globally and throughout Canada, and residential users should expect to pay for increasing rates. While the PDP has the greatest annual projected rate increases proposed in all plans, it will require residents of Manitoba to pay higher rates in the short term (until year 2031). The cumulative rate increases of all plans are not substantially different, with the benefits of the PDP incurring over the longer term as inflationary costs are reduced with the PDP limiting rate increases over the longer term. The key observation is pay now, benefit later regarding rates. Flexibility regarding MH objective to achieving the 20-year 75:25 debt/equity ratio is one means of dealing with rate issues.

Further discussion regarding the short to medium term rate increases associated with the MH plans should be clearly outlined and understood by the people of Manitoba as part of this process.

From a system reliability perspective, the PDP is preferred; however all of the development plans can handle load requirements under the majority of adverse conditions.

Manitoba Government Account

This account focuses on the net benefits to government over the term of the PDP. The results are based on identifying only direct incremental taxes and fees paid by Manitoba Hydro, net of incremental Government cost or risks. The key driver for revenues to the Provincial government in this account is represented by the capital taxes and water rentals. The account also assumes a "wash" for various taxes, such as coal tax and carbon charges taxes, discussed in the environmental review of the NFAT, and the debt guarantee fund, while substantial, is balanced between what MH owes and what the government of Manitoba secures. The approach the MA-CBA takes regarding the other total charges to government, such as the provincial debt guarantee is reasonable.

Manitoba Economy Account

The Manitoba account is specific to the employment and wages generated by the project in each plan, and estimates the potential incremental income that employment (wages) offers for Manitobans. The assumptions regarding proportioning the net economic rent (the additional wages earned net of) that would be derived, is based on project location and the employment/unemployment characteristics in that region. Northern regions with greater unemployment would result in greater net benefits, and the PDP is preferred. The assumptions made are reasonable.

Social Account

The societal benefit of hydroelectric projects outlined in the PDP should be considered in context to the $1 billion dollars in sunk costs incurred for the Keeyask Generating Project, and the $300 million in sunk costs for the Conawapa Generating Project, during project development. Such costs are not considered in the evaluation undertaken to justify the PDP. From a socio-economic perspective, while the investment of the $1 billion invested for KGP as sunk costs, is substantial, the corresponding socio-economic benefits derived from some of the sunk cost expenditures, such as the Joint Keeyask Development Agreement and related project benefits as well as Keeyask

Infrastructure Project support the optimization of socio-economic benefits for First Nations and northern communities.

The MA-BCA is a reasonable approach to ascertain socio-economic benefits, and based on the reference scenarios provides insight into the distributional benefits of the alternative plans studied. Considerable risk and uncertainty remains. To address such issues the concept of pathways is introduced.

The Significance of Pathways

To deal with risk and uncertainty over the period of the plan, the concept of pathways were identified in the PDP. The decision pathways enable MH the flexibility to modify the PDP to address risk and uncertainty and the ever-changing market characteristics over the longer term of the plan. From a socio-economic perspective the critical decision point within the pathways, if the PDP is pursued, is decision specific to the construction of Conawapa, which does not have to be made until 2018.

Between 2014-2018, the risk and uncertainty factors should be studied in detail and reported back to the PUB prior to the decision date, to enable the government of Manitoba to make an informed decision regarding its future energy policy decisions. The Government of Manitoba should provide the PUB direction enabling the PUB to work directly with MH as such risk and uncertainty is addressed.

High-level review of approaches to optimizing Provincial economic benefits of large-scale resource projects

The utilities benchmarked (Québec Hydro and Nalcor) have benefited from lessons learned from previous hydroelectric developments and incorporated initiatives to optimize local and regional benefits, specifically for northern and indigenous populations. Provincial and Canadian wide benefits are driven for the most part from construction benefits (employment) and a lesser extent operational employment jobs which are local. Such economic impacts are derived from IOM's. Provincial revenues are secured from export sales and on-going government tax revenues from water rentals etc.

Legal or quasi-legal agreements with First Nations have been secured in all jurisdictions. Cooperation with other Federal and local agencies involved in employment training and social services has also been pursued and resulted in successful economic optimization strategies. Equity ownership and management and administrative assistance also help in building capacity within the organization, as outlined in the MH example via the Joint Keeyask Development Agreement.

Manitoba Hydro's approach to optimizing provincial economic benefits reflects industry practices. On-going monitoring of the success of all of the related socio-economic optimization strategies should be pursued; lessons learned identified and implemented going forward.

Summary

From a socio-economic perspective, the approach assumptions and findings MH has presented are reasonable. Overall the PDP exhibits the greatest socio-economic benefits to the people of Manitoba, northern communities and First Nations compared to other plans based on the reference plans evaluated.

Use of the Statistics Canada Interprovincial IOM in this review suggests that, based on MH assumptions that the Manitoba related economic impact benefits may have been understated while the rest of Canada benefits overstated, making the PDP more attractive to Manitobans as greater benefits are derived. The Statistics Canada Interprovincial model confirms the overall benefits derived from the PDP are reasonable.

Planned investments are significant over the next decade (as outlined in the proposed PDP), placing increased pressure on the provincial debt and rates, in the short and medium term. The PDP is intended to contribute to the growth of the Manitoba economy, strengthen relationships with First Nations and create a lasting legacy for future generations. By doing so the PDP supports Manitoba Hydro's Corporate Strategic Plan (MCSP) 2012-13 and goals of the corporation, with two corporate goals in the MCSP being highlighted, supporting Aboriginal people and Provincial economic development.[1]

Throughout the short/medium term the Keeyask Generating Project would generate significant socio-economic benefits for the people of Manitoba, First Nations and northern communities and if not pursued such benefits would be forgone, inclusive of the sunk costs already allocated to the Keeyask Generating Project.

Over the longer term considerable uncertainty and risk remains and the introduction of pathways in the decision making process enables such risk and uncertainty to be studied prior to a decision being made on Conawapa.

Both Keeyask and Conawapa are capital intensive projects, creating significant employment throughout construction, and on-going operational benefits. Monitoring issues related to access, health, education and the cultural implications of project development, while identified, should be monitored aggressively, and lessons learned implemented on an annual basis to ensure sustainable capacity building within First Nations and northern communities.

[1] Needs for and Alternatives to: Appendix H - Corporate Strategic Plan 2012-2013

TABLE OF CONTENTS

List of Tables

List of Exhibits

List of Appendices

1 INTRODUCTION AND SCOPE OF WORK

1.1 Background

The Manitoba Public Utilities Boards (PUB) regulates a number of Manitoba Public Utilities, inclusive of Manitoba Hydro (MH). In January of 2011, the Government of Manitoba notified MH of its intention to carry out a public needs for and alternatives to (NFAT) review and assessment of MH's preferred development plan (PDP), consisting of both the Keeyask and Conawapa hydroelectric projects and Canada-USA Interconnection facilities. In November of 2012, the Ministry of Innovation, Energy and Mines announced that the government of Manitoba asked PUB to conduct the NFAT for the PDP, using an independent body.

The proposed expenditure of approximately $20 billion dollars on new hydro generation and transmission assets will have a significant economic impact on the Province of Manitoba, northern Manitoba communities, impacted First Nations as well as other jurisdictions in Canada and the USA. A component of the NFAT review requires that the PUB Panel examine what these specific socio-economic impacts are to the Northern and Aboriginal communities as well as the benefits to Manitoba as a whole.

TyPlan Planning and Management (TyPlan) was retained to comment upon the reasonableness of the assumptions and results of the NFAT Business Case prepared by Manitoba Hydro available at (http://www.hydro.mb.ca/projects/development_plan/nfat_business_case.shtml)

1.2 Scope of work[2]

The scope of work (SOW) undertaken by TyPlan, as defined by the PUB, includes the following:

1. Perform a critical analysis of the socio-economic impacts and benefits of Manitoba Hydro's PDP and alternative plans. This should include examination of potential effects to the people of Manitoba, especially Northern and Aboriginal communities, including employment, training and business opportunities, infrastructure and services, personnel family and community life and resource use, including:
    a) Economic impact assessment to determine sector economic impacts, impacts to provincial GDP, long term and short term indirect and induced employment opportunities;
    b) Determining gross provincial financial benefits by examining benefits over and costs over the life of the project;
    c) Determining Canadian benefits;
    d) Northern and aboriginal community-based impacts in terms of employment opportunities, incomes, community tax base, skills development and community business opportunities; and

[2] NFAT Scope of Work, (http://www.pub.gov.mb.ca/nfat/terms_reference.pdf)

e) Community access improvements and related health, education and cultural benefits.

2. Consider the economic displacement impacts and effects on consumer spending to the extent consumers will face due to increased electricity rates as a result of the PDP.
3. Identify and evaluate the socio-economic impact of key alternative scenarios, and provide a comparison table between the PDP and such scenarios.
4. Provide high level analysis on how other Canadian jurisdictions maximize provincial economic benefits from the development of large-scale resource projects, and assess if the PDP provides the highest level of socio-economic benefit to Manitobans.

1.3 Key Reports Referenced

Key reference material sourced from the NFAT Business Case submission and other MH reports are referenced in Appendix A.

MH provided Typlan with additional support information necessary to undertake the independent review of the economic impact analysis and the multiple account evaluation. Data containing Commercially Sensitive Information (CSI) is not referenced in our reporting.

1.4 Report Outline

The report is presented in the following sections:

Section 1: **Introduction and Scope of Work**; provides an introduction and scope of work outline, reference materials and a report outline.

Section 2: **Manitoba Hydro's Preferred Development Plan and Lessons Learned from other Hydroelectric Projects**; provides a description of the PDP, as defined in Manitoba's filing and lessons learned from recent hydroelectric developments (Wuskwatim) that have impacted how MH has dealt with project delivery and related socio-economic benefits.

Section 3: **Socio-economic Impact Review**; provides, based on Manitoba Hydro's economic impact assessment, verification and the reasonableness of, the identified economic sector impacts inclusive of provincial GDP, employment opportunities, gross provincial financial benefits, examining benefits over the costs over the life of the project, Canadian benefits, northern and aboriginal community based impacts (e.g., employment, incomes, community tax base, skills development, community business opportunities), community access improvement and related health, education and cultural benefits.

Section 4: **Economic Displacement Impacts and Effects on Consumer Spending**; provides an evaluation of current trends and comparisons in Global, Canadian, Provincial utility pricing, and considers the extent to which consumers will be faced increased electricity rates as a result of the PDP. The section concludes with a literature review of the key initiatives to reduce such displacement effects, namely energy reduction and efficiency measures.

Section 5: **Socio-economic Impact of Five Key Alternative Scenarios**; provides at a high level, based on the multiple account benefit cost assessment (MA-BCA) framework undertaken by Manitoba Hydro, a comparison of the PDP and alternative scenarios, and concludes with the importance of pathways in managing project risk.

Section 6: **High Level Review of Approaches to Optimizing Provincial Economic Benefits of Large Scale Resource Projects**; provides a comparison of other practices in Canadian jurisdictions, specific to Québec Hydro's Eastmain 1A Rupert River Project and Nalcor (Newfoundland and Labrador) Lower Churchill Project, both of which have similar project characteristics.

Section 7: **Observations**; provides a series of observations pertaining to the key issues identified in the statement of work for consideration by the Public Utilities Board.

2 MANITOBA HYDRO'S PREFERRED DEVELOPMENT PLAN (PDP), AND LESSONS LEARNED FROM OTHER HYDROELECTRIC PROJECTS

2.1 Preferred Development Plan

MH has identified a PDP intended to meet local supply requirements, as well as existing electricity sale commitments and future export possibilities. The PDP consists of the following.[3]

Table 1: Overview of Preferred Development Plan Components

Preferred Plan Infrastructure	Capacity (MW)	Proposed In Service Date (ISD)
Keeyask Project *	695	2019
Conawapa Project	1,485	2026
North-South Transmission Upgrade Project, with an ISD to correspond with Conawapa	185	2026
Manitoba-Minnesota Transmission Project	750	2020
Simple Gas Thermal Units[4]	Not determined nor defined in PDP	2041

Notes: The Keeyask Project consists of three components:

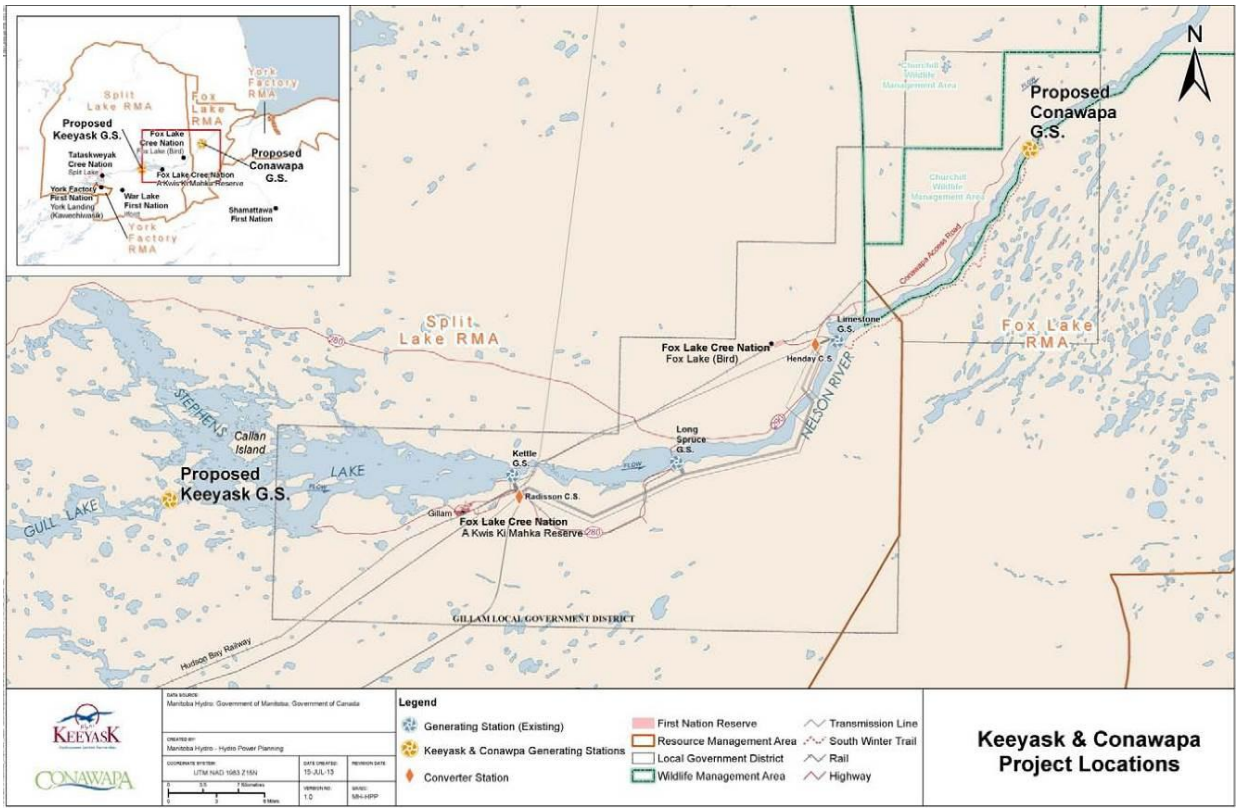
- 695 MW Keeyask Generation Project
- Keeyask Infrastructure Project
- Keeyask Transmission Project

Source: Needs for Alternatives to Chapter 2- Preferred Development Plan

Both the Keeyask Generating Project (KGP) and Conawapa Generating Projects (CGP) are sited on the Nelson River in Northern Manitoba. The Nelson River has historically been developed for hydroelectric development and has three (3) existing hydroelectric plants in operation, the Limestone Generating Stations (GS), Long Spruce GS and Kettle GS. The proposed Keeyask GS and Conawapa GS project locations are illustrated on Exhibit 1.

[3] Needs for and Alternatives to Chapter 2 - Preferred Development Plan Facilities (pg. 1-59)
[4] The simple-cycle gas thermal units towards the end of Manitoba's Hydro's Planning cycle (starting in 2041) to meet currently forecast domestic load growth. This assumption is used consistently in all plans to ensure the forecast load can be met through the end of the planning period without having to bring in additional types of supply. As such, this element of the Preferred Development Plan is not described further.

Exhibit 1: Keeyask and Conawapa Project Location



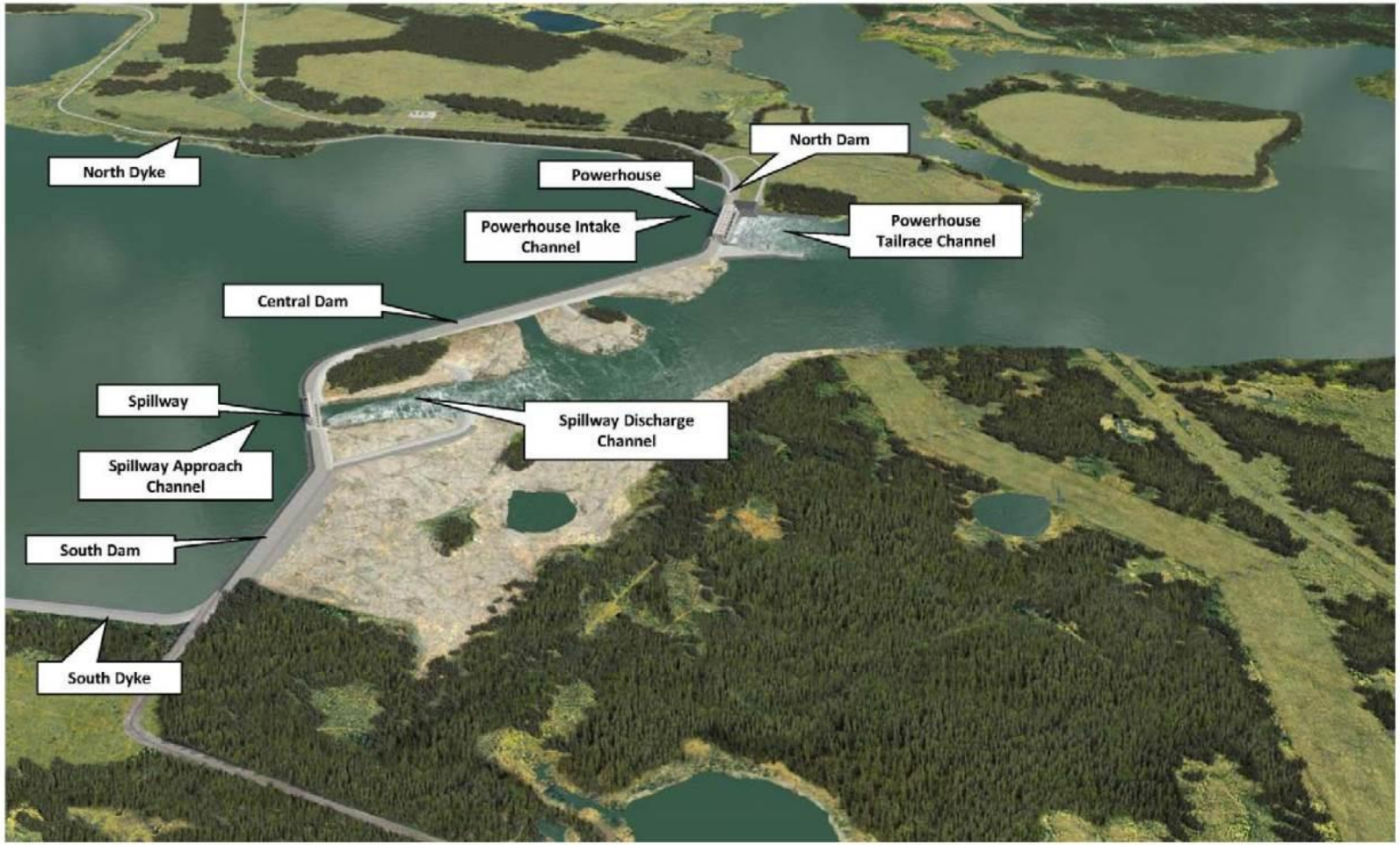
Source: Manitoba Hydro Needs for and alternatives to: Chapter 2 Preferred Development Plan Facilities

The typical works/infrastructure necessary to construct such facilities, inclusive of support infrastructure consists of the following, conceptually illustrated on Exhibits 2 and 3:

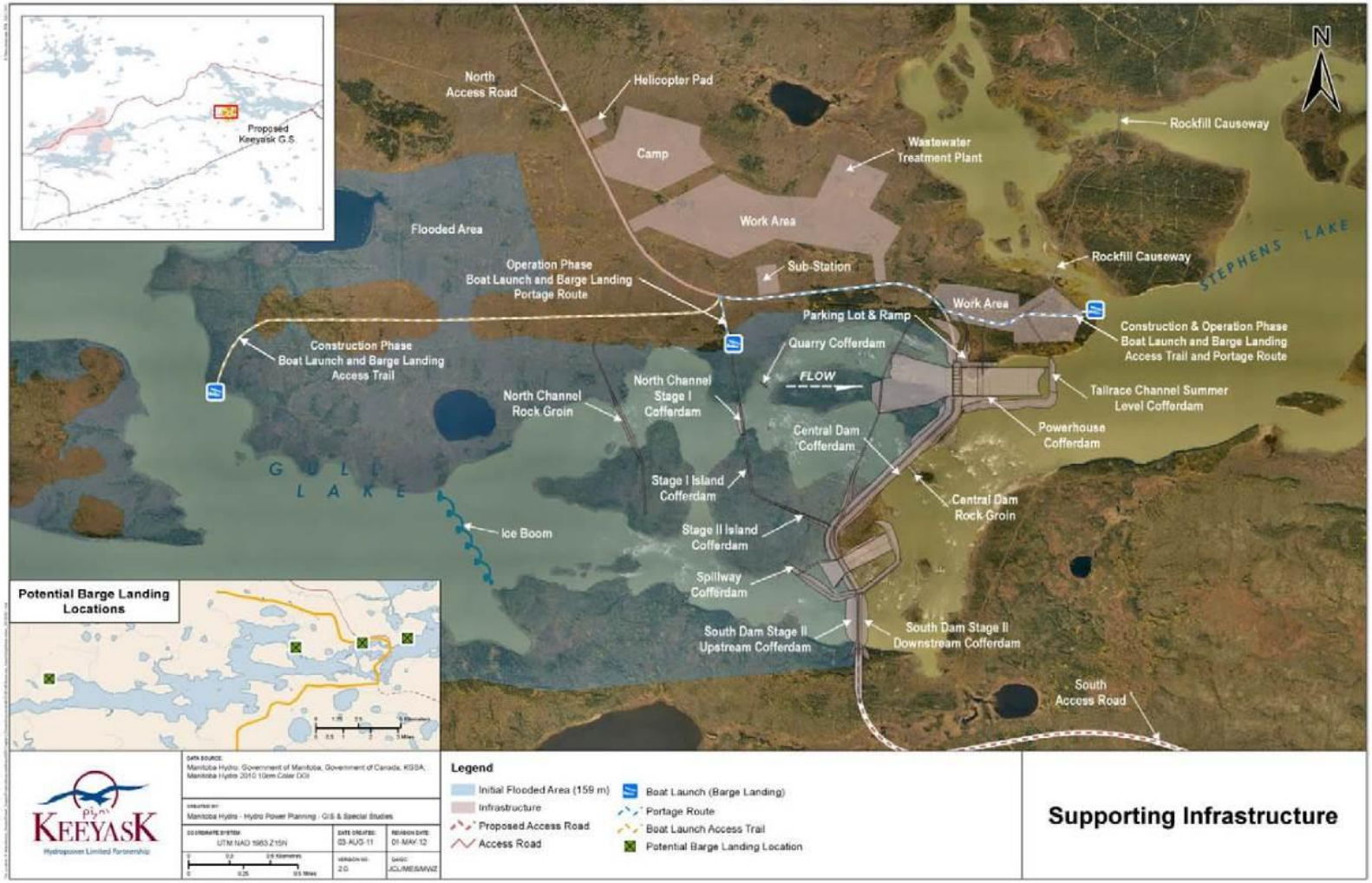
- Earth fill dam
- Spillway
- Powerhouse
- Powerhouse intake channel
- Powerhouse tailrace channel

It is those aforementioned components that represent the key capital-intensive construction activities and key project costs that generate economic benefits (via employment and supporting indirect and induced benefits from suppliers). Accordingly, construction of hydroelectric dams represents in general, the most capital-intensive resource options referenced in the NFAT review.

Exhibit 2: Keeyask Dam Site and Supporting Infrastructure

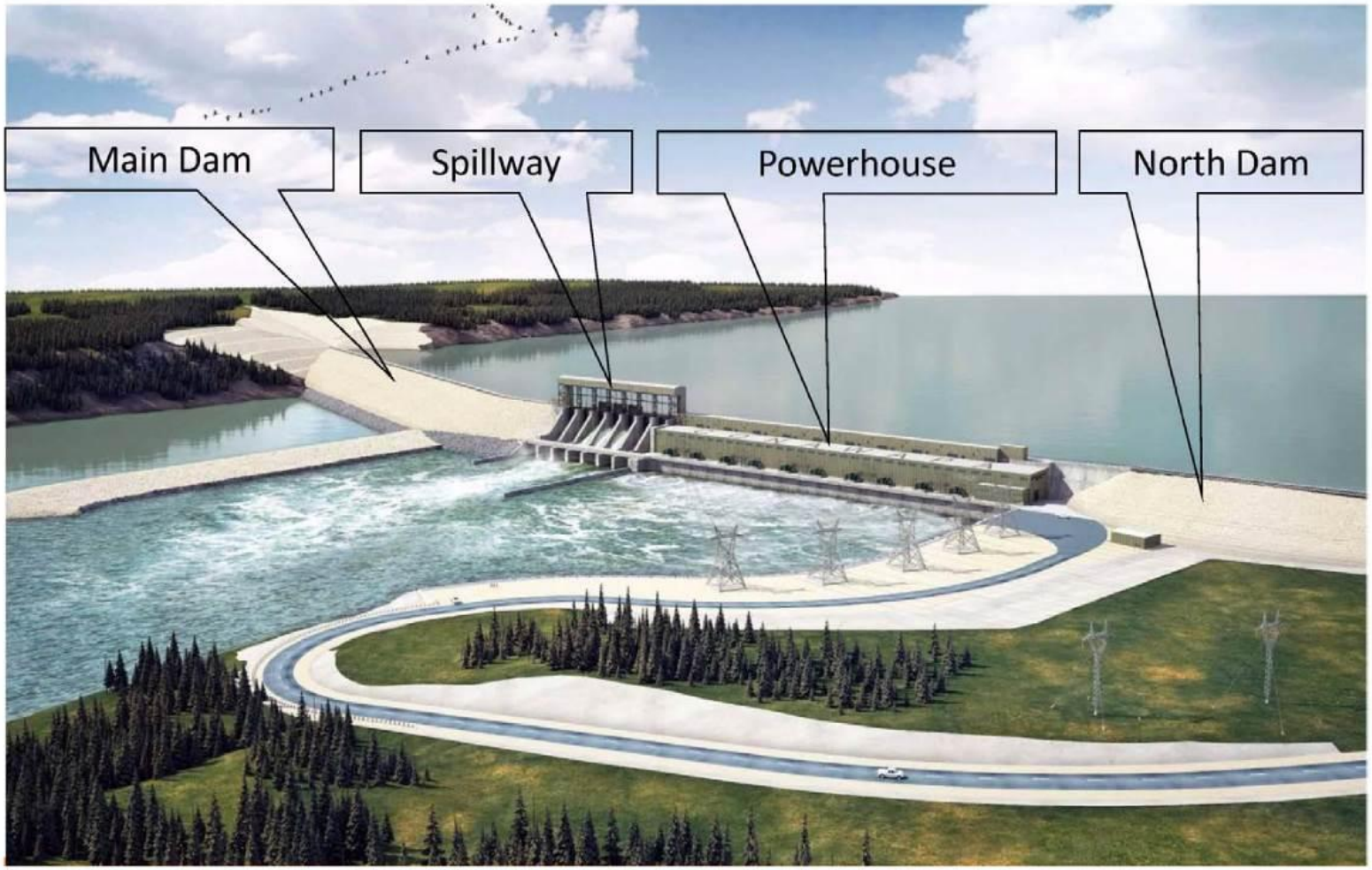


Source: Manitoba Hydro Needs for and alternatives to: Chapter 2 - Preferred Development Plan Facilities

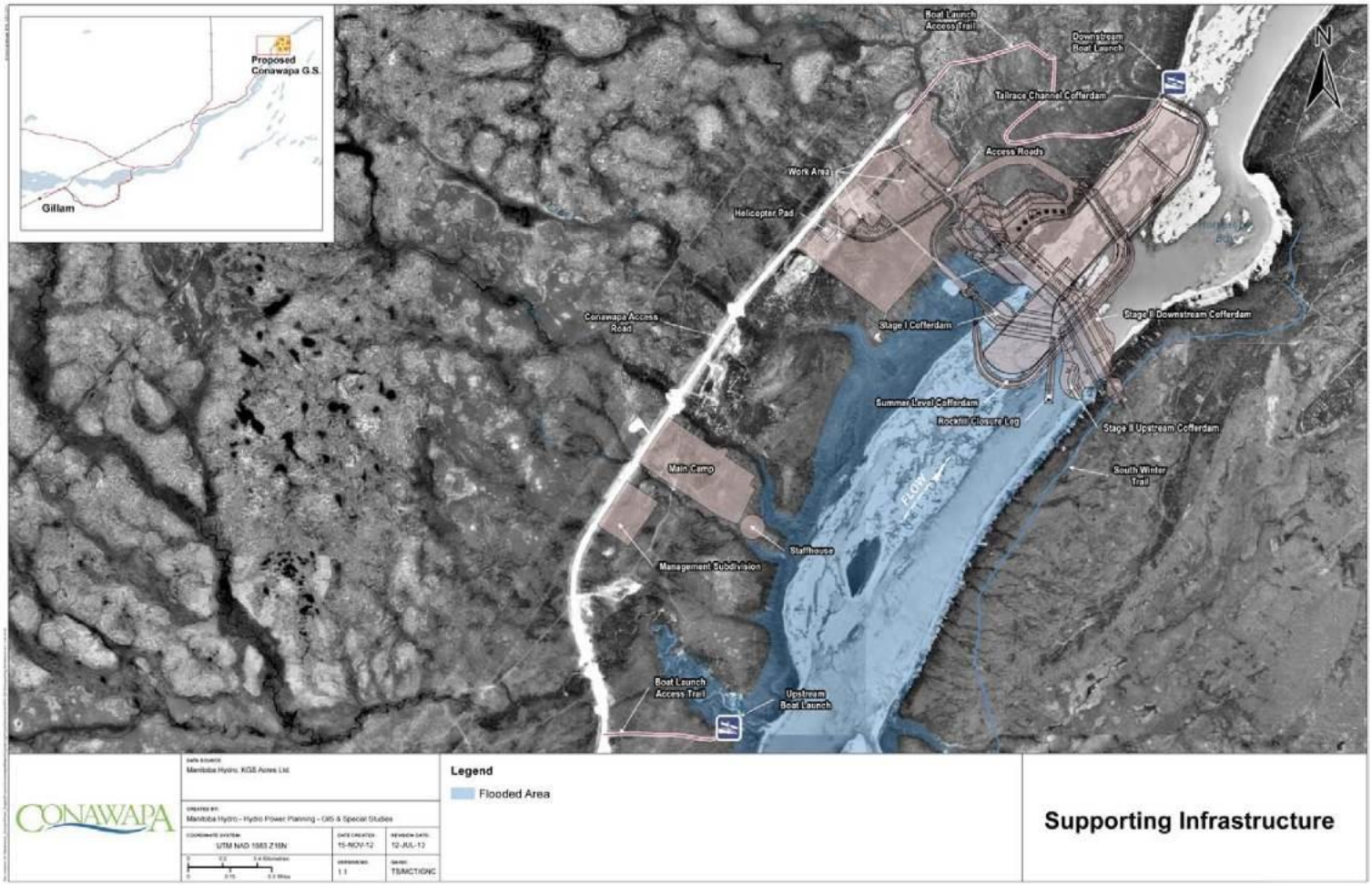


Source: Manitoba Hydro Needs for and alternatives to: Chapter 2 - Preferred Development Plan Facilities

Exhibit 3: Conawapa Dam Site and Supporting Infrastructure



Source: Manitoba Hydro Needs for and alternatives to: Chapter 2 - Preferred Development Plan Facilities

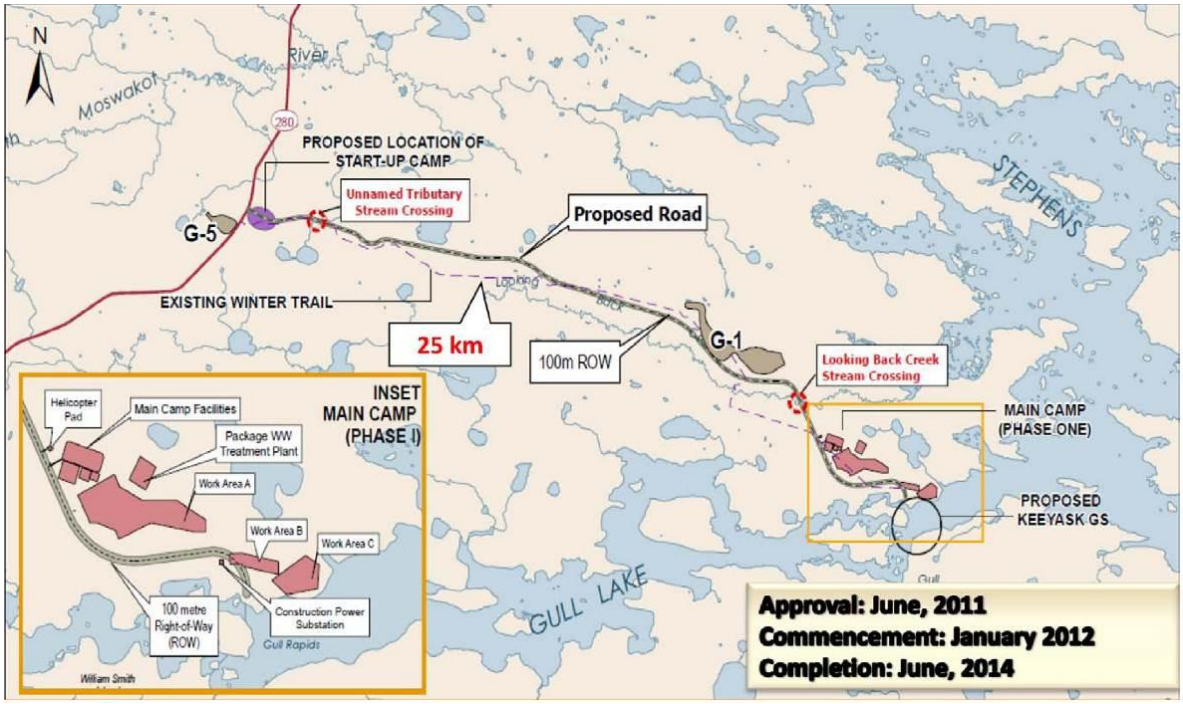


Source: Source: Manitoba Hydro Needs for and alternatives to: Chapter 2 - Preferred Development Plan Facilities

2.2 Keeyask Infrastructure Project

The Keeyask Infrastructure Project (KIP) forms part of the Keeyask Generating Project (KGP), and is currently being constructed prior to approval of the PDP. KIP consists of supporting infrastructure for the KGP, inclusive of a 25 km north access road, 35 km south access road, transmission line spur, communication tower, placement for excavated materials, remnants of some cofferdams and rock groins, boat launches, portage, barge landings, and haul roads. The KIP is an example of one of the lessons learned from Wuskwatim. The project will facilitate schedule implementation and on site readiness for the larger dam site construction. Main camp, work areas, concrete batch plant, water and wastewater and treatment facilities etc. are also part of the plan, illustrated below:

Exhibit 4: Keeyask Infrastructure Project



Source: Needs for and Alternatives to Chapter 2- Preferred Development Plan Facilities

Unique to the PDP, and building upon the Wekwatim Power Limited Partnership (WPLP) agreement, the Joint Keeyask Development Agreement (JKDA), was signed in March 2009 by Manitoba Hydro and each of the four Keeyask Cree Nations (KCN's):

- Tataskweyak Cree Nation (TCN)
- War Lake Cree Nation (WLFN)
- York Factory first Nation (YFFN)
- Fox Lake Cree Nation

The JKDA was established to address pre-construction issues and proactively involve local aboriginal groups to support related socio-economic benefits potentially resulting from the PDP. The Partnership will own the generation project. The total cost of the KIP project is $229.9 m dollars.

2.3 Lessons Learned from Wuskwatim

While not a specific requirement of this socio-economic review, it was important to acknowledge "lessons learned" from recent MH projects, and how those lessons learned have, in turn, influenced the development of the PDP. A number of such lessons learned have influenced and resulted in a number of related socio-economic benefits that are analyzed in this review.

MH completed the Wuskwatim Generating Station (WGS) in 2012. As part of the on-going planning, lessons learned were incorporated to better manage the planning and development of the PDP.

WGS is located on the Burntwood River, in the Nelson House Resource Management Area, approximately 45 km south of Thompson and 35 km southeast of Nelson House. The WGS was developed and is owned by WPLP, a legal entity involving Nisichawayasihk Cree Nation (NCN) and Manitoba Hydro. Manitoba Hydro operates the WGS as part of the Manitoba power grid on behalf of WPLP. WGS represents the first time Manitoba Hydro has entered into a partnership with First Nations community on a generating station project, a lesson learned which has been transferred to the KGP.[5]

The WGS project resulted in significant cost overruns due to two key issues: labour (cost to attract/retain labour and labour productivity) and escalation costs. Manitoba Hydro has been proactive in evaluating the reasons such overruns occurred and has put in place measures to prevent similar issues arising in the proposed PDP. The New Generation Construction Division, Power Supply Group of MH, responsible for construction works, has developed a project execution plan for Keeyask and the Keeyask-Infrastructure and Generating Station[6]. The Project Execution Plan defines and expands on internally accepted project management techniques required for effective project delivery, a key lesson learned from Wuskwatim.

A summary of lessons learned, and what has been done to address such issues, which have implications from a socio-economic perspective, are presented below.

[5] Manitoba Hydro http://www.hydro.mb.ca/corporate/facilities/gs_wuskwatim.shtml
[6] Keeyask-Infrastructure and Generating Station Project Execution Plan (Project Execution Plan -20130314) CSI

Table 2 Lessons Learned Wuskwatim

Key lesson Learned	Manitoba Hydro Response	PDP Response
Establishment of partnerships with First Nations	The WGS was developed and is owned by the Wekwatim Power limited Partnership (WPLP), a legal entity involving Nisichawayasihk Cree Nation (NCN) and Manitoba Hydro. Manitoba Hydro operates the WGS as part of the Manitoba power grid on behalf of WPLP. WGS represents the first time Manitoba Hydro has entered into a partnership with First Nations community on a generating station project, a lesson learned which has been transferred to the KGP as well	The KGP project will be developed with full support of the local area First Nations as outlined in the Joint Keeyask Development Agreement (JKDA) signed by all First Nations
Early Start of construction for supporting Infrastructure	The Keeyask Infrastructure Project represents a $229.9 m investment by MH (identified under the terms of the (JKDA) intended to facilitate job learning and effective construction delivery of the KGS project via developing supporting infrastructure associated with road access and worker accommodation camps. This will facilitate effective and efficient readiness for dam site construction	Construction site readiness for the dam construction will be facilitated via the KIP project currently being constructed. While such costs are assumed "sunk costs" on the project, the KIP will create significant benefits to northern and aboriginal peoples
Engineering – early completion and earlier assessment of constructability inputs	The Keeyask and Conawapa capital cost estimates were developed based on the Association for Advancement of Cost Engineering International (AACEI) recommended practices for estimate development Detailed costing essential to manage potential cost overruns	Accurate costing and lessons learned from WGS provided New Generation Construction Division Power Supply the opportunity to review and clarify project costs in accordance with industry best practices and put in place strategies to deal with labour and cost escalation
Human Resources – attract and retain project staff and Labour	Driven by a proactive approach to skill development and training with First Nations. Employment and training for identified jobs associated with both the KIP and Keeyask Generating Project have been identified and provided for. The construction of a premier construction camp for workers represents a means of attracting skilled labour to the dam sites construction	Retention of skilled labour throughout project construction was identified as a critical issue both from a First Nations perspective and general labour perspective. The creation of a world class construction camp to attract workers and separate workers from local populations to reduce health and cultural conflicts has been established

Key lesson Learned	Manitoba Hydro Response	PDP Response
Project Management Practices[7]	Strong project management practices are required to manage such a multi-disciplinary approach to project delivery. MH has implemented such a program, inclusive of the key project management principles associated with the Project Management Institute (PMI) key knowledge areas, inclusive of the creation of: • Project Integration Plan • Scope Management Plan • Schedule Management Plan • Cost Management Plan • Quality Management Plan • Human Resource Management Plan • Communication Management Plan • Procurement Management Plan • Risk Management Plan • Construction and Commissioning Management Plan • Project Close Out Plan	Larger corporations from an organizational perspective may have difficulties in delivery methods for specific projects, as evident in a number cost overrun issues related to major hydroelectric developments in Québec and Ontario a well as Manitoba.

Source: Capital cost Estimates for Keeyask and Conawapa Generating Stations (Dave Brown, Manager Project Services, presented at the Intervener Presentations September 5/6 2013).

[7] Project Management Institute - A Guide to the Project Management Body of Knowledge

Observations:

MH has adapted lessons learned from the construction of WGS in the development of the PDP that have resulted in how the project delivered, and correspondingly influence the socio-economic benefits identified. A structured project management approach to project delivery has also been incorporated into the PDP.

3 SOCIO-ECONOMIC IMPACT REVIEW

3.1 Resource Options Overview and High Level Development Plan Comparison Table

The NFAT provides an overview of resource supply options and development plans evaluated by MH. The Range of Resource Options inventory consisted of a range of 17 different technologies suitable for utility scale generation.

Specific to Appendix 9.1 of the NFAT, 15 development plans were compared based on technical, environmental, socio-economic criteria. The socio-economic criteria included health and safety concerns, Manitoba business opportunities (% of capital spent in Manitoba), cumulative development plan employment (direct construction, construction at northern work sites, permanent operations and maintenance, permanent O&M at northern work sites), present value royalties (water rental, capital taxes, guarantee fees) and nearby population centers that would potentially benefit from such developments.

Observations:

As part of the NFAT review, Appendix 7.2 - Range of Resource Options identified 16 preferred resource options (that included 12 hydroelectric options, three thermal options and one wind resource option) for further study. Appendix 9.1 High Level Development Plan Comparison reviewed 15 specific development plans. A high level comparison confirms that overall, hydroelectric options that consider both Keeyask and Conawapa provide the greatest socio-economic benefit followed closely by other combination options with just Keeyask.

The resource planning process undertaken by MH regarding the selection of the hydroelectric development plans is reasonable.

3.2 Economic Impact Assessment

The economic impact analysis (presented in Appendix 2.3 of the NFAT) provides an indication of gross provincial benefits, inclusive employment in person years, labour income, and contributions to gross domestic product (GDP), federal, provincial and local taxes. Appendix A provides a description of what an IOM does and produces.

3.2.1 Manitoba Bureau of Statistics Input Output Analysis

The Manitoba Bureau of Statistics IOM was utilized to assess the economic impact of the PDP. The IOM was also utilized to determine the economic impact associated with a simple gas turbine project and a combined gas turbine project.

The IOM was utilized for the following components of the PDP:

1. The Keeyask project (695 MW hydroelectric generating station, three new transmission lines and a switching station).
2. The Conawapa project (1,485 MW hydroelectric generating station and new transmission lines).
3. North-South upgrades.
4. 750 MW interconnection.

MH also used the model to assess the impacts of other resource options including:

- A simple gas turbine project (construction, operation and maintenance);
- A combined gas turbine project (construction, operation and maintenance);
- A 230 KV transmission line (construction, operation and maintenance); and
- A switching station (construction).

Construction and operating costs were considered and resultant outputs (benefits) identified.

3.2.2 Interpreting the Results of the IOM Analysis between the PDP, the Simple Gas Turbine and Combined Gas Turbine

The Manitoba Bureau of Statistics IOM was used to compare the expected economic impacts associated with the PDP and other alternatives such as a Simple Gas Turbine and a Combined Gas Turbine project.

While the information used to calculate economic impacts was available at a detailed level for the PDP, the data used to calculate the economic impact of the gas turbine projects was only available in summary form. For example, construction costs for the simple gas turbine project were broken down into six categories: turbine, iron/steel structural materials, concrete, wages and salaries, electric or other engineering construction and other operating surplus. The expected construction cost was estimated at $157.8 million. Similar categories (turbine, electric power construction, concrete, wages and salaries, electric or other engineering construction and other operating surplus) were used in the economic impact analysis of the combined cycle gas turbine option, with an expected construction cost of $406.3 million. In contrast, the information that was used in the economic impacts associated with the PDP was provided at a much more detailed level. The input data used in the analysis of the KGP, expected to cost $2.2 billion, included expenditure data for 41 different input-output commodities, based on construction costs developed for the project (see Section 3.2.3.1).

Based on the data and results:

1. The gas turbine projects considered as alternatives are expected to represent a much smaller capital investment than the projects included in the PDP. As such, the expected economic impact associated with these projects is significantly lower than for the projects included in the PDP.
2. Since input-output models are linear, the results of impact analyses are scalable. If the simple gas turbine project (expected to cost $157.8 million) is scaled up to represent a level of capital investment similar to the KGP ($2.2 billion), the total expected employment impact (direct, indirect and induced, including Manitoba and Canada) would still be about half (10,750) the 21,144 jobs expected to be supported by the construction of KGP. In other words, even when the difference in the scale of the projects is taken into account, the expected impact of the construction of a hydroelectric dam would be significantly greater than the impact associated with spending the same amount of money building gas turbine facilities.
3. The analysis of the PDP is based on detailed costing estimates, while the analysis of the alternative options is based on high-level cost estimates. Therefore, the results of the economic impact analyses are not strictly comparable. The extent to which the conclusions would differ if more information about the options had been available is unknown.
4. For the gas turbine options, turbines imported into Canada represent more than a third of the total cost of the projects. Purchases of imported turbines do not provide a significant economic benefit to either Manitoba or Canada. In contrast, the imported generators used in the Keeyask and Conawapa projects is expected to account for a much smaller share (about 10%) of the total capital cost. In other words, the extent to which the project uses goods imported from other countries is significantly greater in the case of the gas turbine projects.

5. The PDP is expected to have greater economic impacts in Manitoba as well as Canada than the other options considered.

Observations:

The Manitoba Bureau of Statistics IOM was used to compare the expected economic impacts associated with the PDP and other alternatives such as a Simple Gas Turbine and a Combined Gas Turbine project. While varying detail was provided regarding construction costs for the gas options, we note that the input-output models are linear and therefore scalable. The gas turbine projects are expected to create less economic benefits than that of the PDP. The PDP is expected to have a greater economic impact than the other options considered.

3.2.3 Interpreting the results of the IOM for the PDP

Modeling approaches can vary significantly, and results are dependent upon a number of assumptions and allocations made within IOM's (e.g., how construction inputs are allocated into the IO expenditure categories and the corresponding assumptions modelers utilize). This section comments on the reasonableness and assumptions that appear to have been made in preparing the estimated impacts of the PDP.[8] The following steps associated with preparing inputs into the IOM are commented upon in this review:

- Verification of construction cost estimates;
- Allocation of cost input data into IO categories;
- Removal of expenditures with no provincial economic benefit and other leakages and margins; and
- Treatment of Labour costs.

A brief discussion is outlined, followed by an analysis of what was undertaken as part of the PDP.

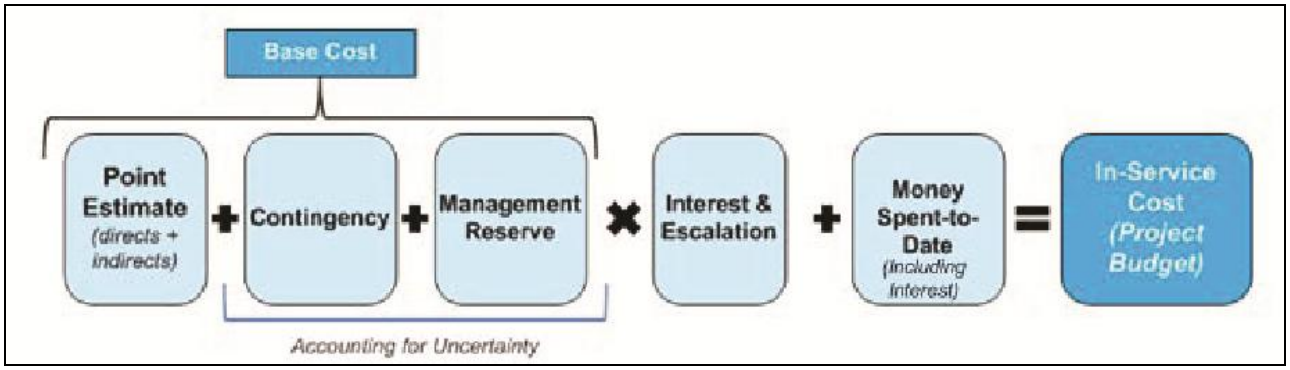
3.2.3.1 Verification of Construction Costs Estimates

The Keeyask and Conawapa capital cost estimates were developed based on the Association for Advancement of Cost Engineering International (AACEI) recommended practices for estimate development. The estimate development is a structured approach that builds estimates from the bottom up. Exhibit 5 illustrates the overall Manitoba Hydro Cost Development Process, inclusive of contingency and management reserve.[9]

[8] The comments provided in this review are limited, in that they are based on how the British Columbia IOM calculates economic impacts. It is not known if the Manitoba model uses the same process. However, it should be noted that input-output modeling methods are similar in nature and even though the application of modeling techniques may vary, the results of these exercises would normally be expected to fall within standard ranges.

[9] Needs for and Alternatives to Appendix 2.4 - Developing the Keeyask and Conawapa cost Estimates. Contingency and management reserves are excluded from the economic impact assessment model.

Exhibit 5: Manitoba Hydro's Cost Estimate Development Process



Source: Needs for and Alternatives to Appendix 2.4 - Developing Keeyask and Conawapa Cost Estimates

The first step in the process is the point estimate, representing a risk-free escalation based on initial set of assumptions and current costs within the marketplace. MH followed the AACEI recommended practice guideline 36R-08 to undertake this estimate.[10] Contractor indirect costs inclusive of mobilization supervising site facility costs; costs for major pieces of equipment (turbines generators and transformers etc.) are estimated from recent vendor quotations. In developing the point estimate information from other North American hydroelectric companies and market intelligence was utilized.

Keeyask

The last major re-estimate of the Keeyask project costs was undertaken in 2009/2010. The re-estimate involved detailed revision of estimate assumptions, incorporation of current market conditions and inclusion of additional lessons learned from Wuskwatim. The estimate can be considered to be between a Class 2 and Class 3 estimate, as (defined by AACEI), recommended practice 69R-12: Cost Estimate Classification system.[11]

Conawapa

The last major re-estimate of the Conawapa GS projects cost was undertaken in 2010/2011. The estimate was developed following the methodology outlined above and included incorporation of current market conditions and lessons learned from Wuskwatim and the 2009/2010 Keeyask re-estimate. This estimate can be considered a Class 3 estimate as defined by AACEI. Class 3 cost estimates are used for the purpose of budget authorization or control and based on semi detailed unit cost with assembly level line items. Class 2 cost estimates are used for bids and tenders, and include detailed unit cost with forced detailed take offs. Exhibit 6 illustrates the expected accuracy range of the various estimates derived from the AACEI methodology. The classes identified each represent a differing level of accuracy.

[10] The Point Estimate is based on the project definition report prepared by MH that provides a detailed and clear definition of project scope, compilation of all engineering design requirements, quantify definitions from current design and establishment of expected contract packages. Point estimates consist of both direct and indirect costs. Direct costs (costs directly attributable to the construction of the project) are identified, material cost databases, labour cost data bases and equipment cost data bases and productivity levels (human resources) are utilized as further inputs.

[11] The estimate is between these two classes because, despite a number of tender prices having been received, tender price for the General Civil contract (a major component of project expenditures) is still outstanding.

Exhibit 6: Cost Estimate Classification System

69R-12: Cost Estimate Classification System – As Applied in Engineering, Procurement, and Construction for the Hydropower Industry — 3 of 14

January 25, 2013

COST ESTIMATE CLASSIFICATION MATRIX FOR THE HYDROPOWER INDUSTRY

	Primary Characteristic	*Secondary Characteristic*		
ESTIMATE CLASS	**MATURITY LEVEL OF PROJECT DEFINITION DELIVERABLES** Expressed as % of complete definition	**END USAGE** Typical purpose of estimate	**METHODOLOGY** Typical estimating method	**EXPECTED ACCURACY RANGE** Typical variation in low and high ranges [a]
Class 5	0% to 2%	Concept screening	Capacity factored, parametric models, judgment, or analogy	L: -20% to -50% H: +30% to +100%
Class 4	1% to 15%	Study or feasibility	Equipment factored or parametric models	L: -15% to -30% H: +20% to +50%
Class 3	10% to 40%	Budget authorization or control	Semi-detailed unit costs with assembly level line items	L: -10% to -20% H: +10% to +30%
Class 2	30% to 75%	Control or bid/tender	Detailed unit cost with forced detailed take-off	L: -5% to -15% H: +5% to +20%
Class 1	65% to 100%	Check estimate or bid/tender	Detailed unit cost with detailed take-off	L: -3% to -10% H: +3% to +15%

Notes: [a] The state of technology, availability of applicable reference cost data, and many other risks affect the range markedly. The +/- value represents typical percentage variation of actual costs from the cost estimate after application of contingency (typically at a 50% level of confidence) for given scope.

Table 1 – Cost Estimate Classification Matrix for the Hydropower Industry

Source: Manitoba Hydro Appendix 7.2 - Range of Resource Options: Appendix C AACE Cost Estimate Classification System

MH construction costs derived from this methodology were subsequently utilized to populate the commodity tables in the IOM.

Observations:

The construction costs defined by MH for the PDP are based on the Association for Advancement of Cost Engineering International (AACEI) practices and represent standard practice in industry. For the KGP they represent between a Class 2 and Class 3 estimate. The CGP is based on a Class 2 estimate. The construction cost estimates developed by MH for the purpose of economic impact are reasonable. The identification of operating and maintenance, and other costs related to both the Keeyask and Conawapa within the IOM fall within normal boundaries.

3.2.3.2 Allocation of cost input data into IO categories

The next step in impact modeling is to allocate project expenditures (above) to specific expenditure categories in the IOM. Proper categorization of expenditures to IO commodities can have a significant impact on the modeling results. The allocation of cost input data into the IO expenditure categories is dependent upon MH's and the modellers' understanding of how construction costs are allocated to the expenditure categories.

A review of the allocations indicates that a number of capital cost allocations may have been miscoded, and clarification from MH would be required.[12]

[12] Examples cited include (specific to Conawapa per dollar breakdowns as provided by MH): Sheet: CGOT – Construction, "Construction" coded to: "568 Gas & Oil facility construction" (given this is a dam, this does not appear to represent appropriate coding); "Anchors &

Observations:

The allocation of cost input data into IO categories by MH is based on their understanding of the expected cost breakdown. The allocation of cost data into the IOM categories, in a number of instances appears to be miscoded. MH should clarify.

The allocation of operating and maintenance, and other costs related to both the Keeyask and Conawapa within the IOM expenditure categories fall within normal boundaries.

3.2.3.3 Removal of expenditures with no Provincial benefits

Some types of construction expenditures do not result in a change to economic output as they are produced out of Province or in foreign countries, and are excluded from the analysis. These include goods that are purchased directly from suppliers outside of the province and the purchase of assets such as land and buildings.[13]

Based on the IOM expenditure categories those project expenditures that would not create an economic benefit were removed from the IOM. Turbines are such an example. In addition, based on MH experience with other recent projects other commodities were proportioned based on the percentage attributable to Manitoba and the rest of in Canada, essentially defining economic leakages from Manitoba.

The treatment of many purchases (identified in the IO expenditure categories) as leakages, as presented by MH, may result in understating the impact of the projects in Manitoba, while overstating the impact in Canada. This is due to the fact that margins embedded in the purchase cost of these goods and services may not have been attributed to Manitoba producers who may be providing services such as transport or wholesaling. Another example would be the treatment of cement, which is currently treated as a leakage from the economy. As of 1992 no cement plants operated in Manitoba, and cement is assumed to be 100% imported. If treated as a leakage, then the input-output model would fail to capture any margins or taxes associated with the use of the cement. For example, the cost of transporting the cement within Manitoba, mixing the cement in a batch plant (that would be required on site) represents provincial benefits that should be identified. Such benefits should be tracked through the model. It is not known how this has been accomplished in the model as presented.

The extent of such leakages may be explained, in part, by the fact that the majority of contracting opportunities (such as the General Civil Contractor) will be issued to out-of-province vendors. This review is limited as without a full understanding of either the Manitoba economy and how it functions, and an understanding of on-going contractual arrangements between MH and service providers, it is difficult to ascertain the extent of such leakages and how margins are treated.

To illustrate, from a theoretical perspective, standard economic multipliers produced by Statistics Canada, referencing their interprovincial input-output model (which takes into account the unique characteristics of each

---

Foundation" coded to "438 Lime"; "Alum. Phase Conductors" coded to: "431 Wire & cable, insulated, excl. aluminum"; "Steel Ground Conductors" coded to: "321 Food, beverage and other cans"; Potential inconsistency with "Insulators" coded to "441 Bricks & other clay building products".

[13] Goods that are purchased directly from a supplier outside the province. For example, there are no provincial economic impacts associated with the manufacture of a turbine overseas. However, if there are local services (or tax revenues) associated with such a purchase, they should be accounted for in the analysis, particularly if the purchase represents a significant percentage of total expenditures. For example, in the case of the turbine purchased from a foreign supplier, transportation and other services required to move, install and test the turbine could potentially be provided by local companies. There may also be associated tax revenue or other impacts that should be taken into consideration. If these represent significant expenditures, they should be explicitly accounted for in the analysis. In the case of transporting and installing turbines such might be the case but are not noted in the model. Purchases of existing assets such as land or buildings. Legal or real estate services associated with the transfer of the asset represent actual costs and should be included

provincial economy, and traces flows of goods and services across provincial borders), illustrates the number of jobs created by 1 million dollars of spending.

The following table shows the expected employment impact of electric power and other engineering construction projects in Manitoba, based on the Statistics Canada model and average industry expenditure patterns.

Table 3: Provincial Input Output Multipliers

Jobs per million dollars of output	Direct Employment Only	Direct, Indirect and Induced Employment by Area		
	Manitoba	Manitoba	Rest of Canada (ROC)	All Provinces
Provincial Input Output Multipliers , 2009 Statistics Canada				
Electric power engineering construction	5.5	8.3	2.7	11.0
Other engineering construction	6.3	9.6	3.9	13.5

Source: Statistics Canada; Interprovincial Model

The table shows that, for a typical "other engineering construction" project in Manitoba, there would be 9.6 direct, indirect and induced jobs for every $1 million spent on construction. The employment impact in the rest of Canada would be less than half that amount at 3.9 jobs.

These employment impacts are similar to those observed in other provinces, although provinces that have a larger manufacturing base rely less on imported goods and have fewer leakages, and therefore more of the jobs are in the province rather than in the rest of the country. In British Columbia, for example, the Statistics Canada data suggests that $1 million of engineering construction activity would generate an estimated 10.0 jobs in the province, and 2.2 jobs in other parts of Canada. Ontario, with its manufacturing base, would see 11.0 jobs in the province, with just 1.0 job generated in other parts of the country.

While it is true that Manitoba's economy is different and has a smaller manufacturing base, the expected leakages (based on industry averages) to the rest of the country from a major capital construction project may be less than those assumed in the MH analysis. While the allocation of expenditures for the MH projects may differ from the industry average based on MH experience, the reasons for these differences should be clearly explained as the results of this analysis fall outside the normal range.

Observations:

The treatment of many purchases as leakages and treatment of margins may tend to understate the impact of the project in Manitoba, while overstating the impact in the rest of Canada, since the margins embedded in the purchase cost of these goods and services may not have been attributed to Manitoba producers who would be providing services such as transportation or wholesaling.

Such extensive leakages to the rest of Canada may be reasonable and realistic if they accurately reflect MH's past experience and the Manitoba economy. The reasons for these differences should be clearly articulated in the reporting.

The allocation of operating and maintenance, and other benefits to both the Keeyask and Conawapa projects fall within normal boundaries.

3.2.3.4 Treatment of Labour Costs

It is assumed for both Keeyask and Conawapa that most of the Labour costs associated with construction of the generating station will be incurred outside the Province, which supports the observations provided in regard to the removal of expenditures with no provincial benefits (see Section 3.2.3.3). Labour costs should only include payments to workers directly employed on the project.

If it is expected that most of the people working on the project will come from outside of Manitoba, then the assumptions that most of the wages are paid outside the province is reasonable, and would help explain the higher than average impact on the rest of Canada. Regardless, if such is the case it should be explicitly stated.

Observations

If it is expected that most of the labour working on the project will come from outside Manitoba, then the assumptions that most of the wages are paid outside the province and wages being paid out of province is reasonable, and would partly explain the higher than average impact on the rest of Canada. A statement confirming that major contracts (i.e., such as the General Civil Contractor) will be issued to out-of-province companies should be clarified in the economic impact assessment.

3.2.4 Analysis of Results

In general, the results of the economic impact analysis appear to be consistent with the input data provided by Manitoba Hydro.

Table 4: Assessment of Manitoba Hydro's Approach to Economic Impact Assessment for the Preferred Development Plan

Steps Required for Input Output Modeling	Manitoba Hydro Approach	Observations	Implications On Model Results	Compliance to standard practice (Yes=☑ , No=N)
Step 1: Verification of construction cost estimates	The Keeyask and Conawapa capital cost estimates were developed based on the Association for Advancement of Cost Engineering International (AACEI) recommended practices for estimate development.	The Keeyask construction cost estimate can be considered to be between a Class 3 and Class 2 estimate, as (defined by AACE). The Conawapa cost estimate can be considered a Class 3 estimate as defined by AACE	The construction cost estimates provided to the Bureau of Statistics from Manitoba Hydro are detailed and accurate for purposes	☑
Step 2: Allocation of cost input data into IO commodity categories	Manitoba Hydro has allocated all cost inputs into commodity categories. In total over 40 commodity categories identified	MH has a comprehensive listing of commodity inputs that were generally appropriately allocated into the commodity expenditure categories within the IOM	The allocation of cost input data into the IO commodity categories was reasonable	☑
Step 3: Removal of expenditures with no Provincial benefit	Manitoba Hydro has removed all expenditures that are not produced in Canada and further proportioned Canada vs. Provincial expenditures	MH based on experience and knowledge of the provincial economy, has identified a number of expenditures representing leakages from the provincial economy	The treatment of many purchases as leakages may tend to understate the impact of the project in Manitoba, while overstating the impact in other provinces. the results might be in part from the fact that the margins embedded in the purchase cost of these goods and services may not have been attributed to Manitoba producers who may be providing services such as transportation or wholesaling	☑ The assumption here is that the extent of leakages is representative or the provincial economy. However construction of a major capital intensive hydroelectric project should by its nature contribute significantly to the provincial economy unless the majority of commodities are made and purchased out of province

Steps Required for Input Output Modeling	Manitoba Hydro Approach	Observations	Implications On Model Results	Compliance to standard practice (Yes=☑ , No=N)
Step 4: Treatment of Labour costs	It is assumed for both Keeyask and Conawapa that most of the Labour costs associated with construction of the generating station will be incurred outside of the Province, which supports the observations provided in regard to the removal of expenditures with no provincial benefits	If it is expected that most of the people working on the project will come from outside Manitoba, then the assumptions that most of the wages are paid outside of the province is reasonable, and would explain the higher than average impact on the rest of Canada	The current treatment of labour costs results in an potential overstatement of Canada wide benefits and an understatement of provincial benefits	☑ The assumption here is that the majority of labour originates out of Province. If that is the case results are reasonable

Source: BC Stats

Observations:

MH has provided detailed costs as inputs into the model; allocated cost input data to the IO expenditure categories based on their understanding of the expenditures involved; removed expenditures with no Provincial economic benefit and identified leakages from the provincial economy, the results of which are also reflected in the treatment of Labour. Manitoba Hydro has taken a reasonable approach to this review.

It is observed however, that the treatment of many purchases as leakages and the treatment of margins may tend to understate the impact of the PDP in Manitoba, while overstating the impact in the rest of Canada. The extent of the leakages can be explained by a number of factors such as the relatively small manufacturing base of Manitoba compared to the rest of Canada, and extensive experience of MH regarding recently constructed projects, that verifies that out-of-province service providers will be retained.

It is important to explain such assumptions regarding contracting opportunities, and if the majority of the contracts are to be secured by non-provincial firms, the results appear reasonable.

3.3 Canadian Benefits

In order to provide a theoretical comparison against which the impact estimates could be compared, the Canadian Interprovincial input-output model was used to assess the economic impact associated with expenditures on the goods and services expected to be purchased for the construction of the KGS. The Statistics Canada Interprovincial IOM is similar to the national model but consists of 12 regional economies (10 provincial and two territories) and has an interprovincial trade or regional commodity share matrix for each commodity.[14]

A generally accepted principle of input output modelling is that the "direct" benefits of any project are incurred in the jurisdiction in which the project is located. The approached used in the Statistics Canada Interprovincial Input-Output Economic Impact Simulation model (catalogue no. 15F0009XDB) focused on the expenditures (purchase of goods and services) and the location where these expenditures took place. This approach ensures that the results generated from the model show the entire direct impact in Manitoba. It should be noted however that when the expenditure approach is used with the Statistics Canada model, the model estimates where the goods and services purchased are supplied from.

The key difference in the MH IOM approach was that it considered the supply side, in which MH made decisions, based on local experience and knowledge, on where the goods and services originated from based on experience. Although such an approach is reasonable, one must be careful in how to interpret the direct and indirect impacts, as the production (supply) of goods and services might generate a direct impact in the jurisdiction where the production took place, but in reality, this production should be interpreted as indirect impact, because these goods and services were produced to satisfy the demand associated with the project.

Either approach is reasonable, however as noted earlier in this report, assumptions are critical regarding the results. The results of both the MH IOM and the Statistics Canada Interprovincial model are presented for comparison purposes. Refer to Appendix C for details.

[14] Canadian Journal of Regional Science XV111:2 Summer 1995): A Concise Description of Statistics Canada's Input Output Models: Erik Poole; Input Output Division Statistics Canada, and Department of Economics Simon Fraser University

Table 5: Comparison of Manitoba Hydro Results vs. Statistics Canada Closed Model Keeyask Generating Station

	Manitoba Hydro Results			Statistics Canada Closed Model		
IOM Results by Category	Manitoba	ROC	Total	Manitoba	ROC	Total
Employment						
Project direct (#)	2,014	2,463	4,477	12,792	0	12,792
Other direct (#)	1,887	2,644	4,531	4,345	3,826	8,171
Indirect and Induced (#)	3,089	9,047	12,136	8,360	7,023	15,383
Total employment (#)	6,990	14,153	21,144	21,152	7,023	28,175
Labour income	532,748	925,178	1,457,926	996,575	357,620	1,354,195
GDP ($ millions)*	706,393	1,285,069	1,991,462	1,456,863	703,309	2,160,172
Tax Revenues ($ millions)*	171,154	225,519	396,673	147,993	29,306	177,299
Provincial ($ millions)	34,745	59,340	94,085	107,375	18,090	125,465
Local ($ millions)	135,280	272,249	407,529	955	72	1,027
Federal ($millions)	341,180	557,108	898,288	39,663	11,144	50,807
Average Wage (calculated)($)	76,216	65,370	68,952	47,115	50,924	48,064
Total employment estimate using average wage assumed by MBS	6,990	14,153	21,144	13,076	5,471	19,640

* Statistics Canada tax revenues only include commodity taxes

ROC: Rest of Canada

Based on the information provided in table 5 the following comments are provided.

Overall, the Stats Canada model validates the total economic benefits derived by MH IOM results. There are however, important differences in the distributions between the benefits in Manitoba and the rest of Canada (ROC) between the two approaches used.

The Statistics Canada model estimated total employment to be about 28,175 jobs based on an average employment income of $48,064. The MH IOM model estimated total employment to be about 21,144 jobs based on an average employment income of $68,952. The average employment income generated from the Statistics Canada model is thought to be underestimated (and hence the number of jobs to overestimated) because the income estimate is based on the overall average employment income for the Electric power engineering construction industry as shown in the Input-Output Tables, whereas the average employment income generated by the MH IOM model is more reflective of the fact that the project takes place in a remote region of the province where one would expect the average employment income to be higher (thus generating a lower number of jobs). As such, it is assumed that the total number of jobs estimated by the MH IOM study is more accurate than the estimate generated by the Statistics Canada model.

The Statistics Canada model estimated all the direct jobs as well as 75% of all jobs to be in Manitoba. The MH model estimated that 43% of direct jobs and 33% of all jobs to be in Manitoba. The MH distribution of jobs is not reasonable, given that all direct jobs should take place on Manitoba. As well, the overall percentage of jobs in Manitoba appears to be very low given the significant investment taking place in Manitoba. If one were to allocate all the direct jobs from the MH IOM study to Manitoba, the overall percentage of jobs in Manitoba would increase from 33% to 57%, which seems to be a more reasonable estimate.

The Statistics Canada and MH IOM models provide consistent estimates of GDP and labour income generated from this project, suggesting that these estimated values are reasonable. The two models, however, show very significant differences of these impacts in the province of Manitoba and the rest of Canada. The proportion of the

benefits estimated in the province of Manitoba by the MH IOM models appears low, for the same reasons explained in the allocation of jobs mentioned above. It would not be unreasonable to reallocate a portion of the GDP and labour income benefits from the rest of Canada to Manitoba to be consistent with the suggested reallocation of the employment.

The Statistics Canada model does not include estimates for income taxes and therefore no comparison is made.

Observations:

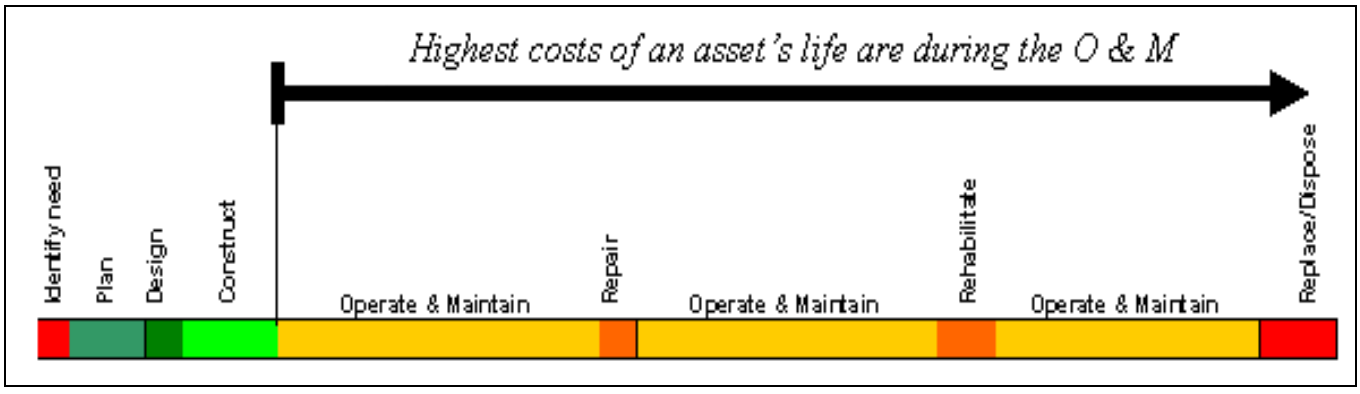
The Statistics Canada model suggests that the PDP will likely benefit the local economy more than was originally thought, while benefitting the rest of Canada less than was originally anticipated. These differences can be explained in part based on the approach taken by MH, which should be clearly articulated by MH as part of project assumptions. The results do not change the overall conclusions. The conclusion that the PDP provides greatest economic benefit is confirmed.

3.4 Determining Gross Provincial Financial Benefits by Examining Benefits over the Life of the Project

The determination of the gross provincial financial benefits is examined in this section by providing comment on the benefits of such assets over the life of the project. Provincial benefits of any major infrastructure project must consider all costs that would be incurred throughout the entire life of the project. Such costs include planning, design and construction as well as costs to operate and maintain, repair, rehabilitate and replace.

From a life cycle perspective significant costs are incurred throughout the operational and maintenance phases of a project. The following exhibit provides a representation of such costs. Different infrastructure projects have their own life cycle costs incurred throughout the entire life of the project. Hydroelectric facilities tend to have capital-intensive costs associated with planning, design and construction and extended economic lives, provided stringent maintenance repair and rehabilitation programs are followed.

Exhibit 7: Life of a Project: The range of planning, construction and operation and maintenance costs



Source: UMA Engineering

Appendix 9.3 Economic Evaluation Documentation considers the economic life of new generation resources used in economic evaluations.

Table 6: Economic Lives of New Generation Resources

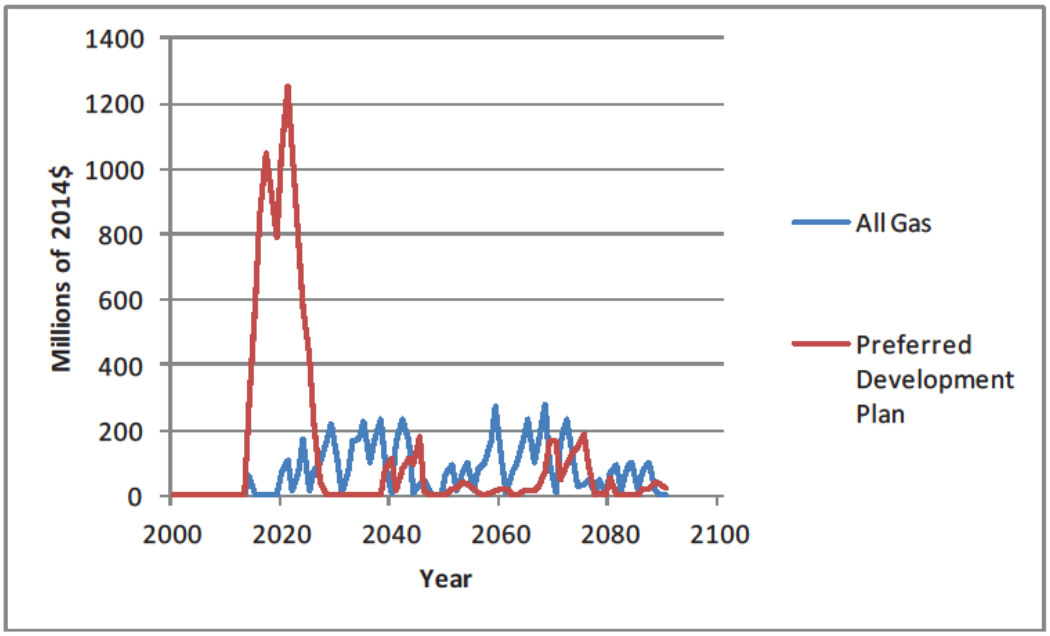
New Generation Resource Options	Economic Life (years)
Hydro-Electric Generating Station	67
Wind Generating Stations	20
Simple Cycle Gas Turbines (SCGT)	30
Combined Cycle Gas turbine (CCGT)	30
Individual Turbines and generators for hydro-electric stations	25
Transmission Stations	35
Transmission Lines	50

Source Appendix 9.3 - Economic Evaluation Documentation, Table 1.1

The economic evaluations undertaken by MH for all alternative plans considered a total study life of 78-years. Total study life considers a 35 year detailed evaluation, and an extension to the end of the hydroelectric facilities service life. Beyond the 35 year study period, replacement capital costs are assumed for assets that reach the end of their economic lives, up to the 78 total study lives. This means that for those resource options with an economic life of 30 years (simple cycle gas turbines and combined cycle gas turbines) replacement costs would be considered.

Exhibit 8 shows the timing and value (in millions of 2014) of replacement capital costs of the PDP and the all gas plan over the total study life.

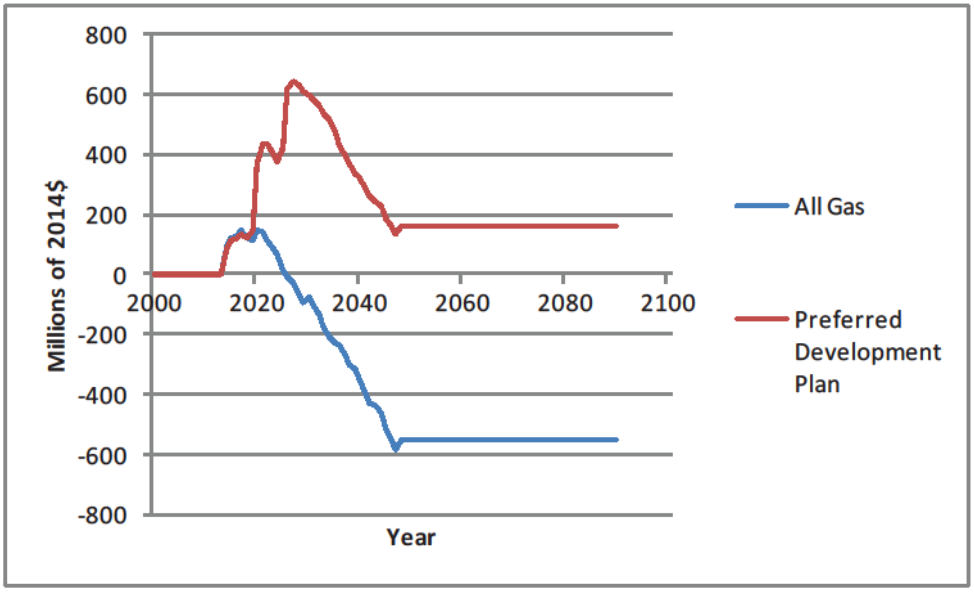
Exhibit 8: Timing and Value of Replacement Capital Costs: Total Capital



Source: Needs for and Alternatives to Appendix 9.3 - Economic Evaluation Documentation, Figure 1.1, Page 4

Exhibit 9 shows the timing and value of net production costs net revenues throughout the life of the total study life. The net average flow related revenue (production costs and revenues) are made of components using MH's System Simulation Computer Model (Splash). The exhibit highlights the benefits of the PDP over the study life.

Exhibit 9: Timing and Value of Net Production Costs: Net Revenue



Source: Needs for and Alternatives to Appendix 9.3 - Economic Evaluation Documentation, Figure 1.2, Page 4

While the benefits over the total study life of the project identify a preference for the PDP, the key consideration is the determination of the replacement timelines of the hydroelectric facilities past the total study life. The longer such a facility can be maintained the greater the extended societal benefits.

According to a research paper pertaining to the lifespan of a storage facility (hydroelectric facility) a dam can range from 80-150 years.[15] For example the average lifespan in years, for different components of a storage power station are presented below:

Table 7: Average lifespan in years of different parts of storage and run of river power stations (Frischnecht et al. 1996)

Parameter	Storage power station
Concrete	200
Reinforced steel	150
Steel (rest)	80
Cooper	150

Source: Life Cycle Inventories of Hydroelectric Power Generation ESU Fair Consulting in Sustainability (Karin Flury, Rolf Frischknecht).

The longer-term life (past the economic life) of hydroelectric facilities represents a consideration worth noting in this review. Referred to by MH as bequest value, is difficult to ascertain how long such facilities can be maintained and operated. Literature suggests over the longer term (past the economic life) hydroelectric facilities continue to contribute to the provincial economy.

[15] Life Cycle Inventories of Hydroelectric Power Generation ESU Fair Consulting in Sustainability (Karin Flury, Rolf Frischknecht)

Observations:

The economic lives of hydroelectric facilities are much greater than those of other resource options. Based on the timing and value of replacement costs and net production costs based on MH Splash modeling, the PDP creates the greatest value over the economic life of the asset. The longer-term life (past the economic life) of hydroelectric facilities represents a consideration worth noting in this review. Referred to by MH as bequest value, is difficult to ascertain how long such facilities can be maintained and operated. Literature suggests over the longer term (past the economic life) hydroelectric facilities continue to contribute to the provincial economy well past the economic life of the facility.

3.5 Northern and aboriginal community based impacts in terms of employment opportunities, incomes community tax base, skills development and community business opportunities

Northern and Aboriginal based community benefits represent a critical component of the PDP's rationale and a key corporate goal of MH. MH's ability to meet specific criteria/measures is examined. The criteria/measures utilized by large crown utilities approach to Aboriginal issues should include, in varying degrees of compliance, the following initiatives/practices:[16]

- Proactive (longer term) approach to engagement
- Establishment of benefit agreements
- Community ratification and support
- Provision of equity ownership opportunities
- Identifications of skill sets, training requirements, education and job opportunities
- Comprehensive education and training programs and supporting Federal and Provincial agency involvement in the delivery of programs
- Clear mandates and performance measures
- Pilot projects to assist in training
- Provision of administrative and management support
- Post project funding for other opportunities

[16] Criteria/measures were also derived from the review of Quebec Hydro's approach to Eastmain and Rupert Diversion Project and Nalcor's Lower Churchill River Hydroelectric Project outlined in section 6 of this report, and further defined by TyPlan based on experience with First Nations involved in hydroelectric facility developments in British Columbia.

The historic development of MH hydroelectric facilities in northern Manitoba (the construction of the Limestone Generating Stations (LGS), Long Spruce (LSGS) and Kettle (KGS), provides insight into and context to, the establishment of the benefit agreements with First Nations that have been established for KGP. Historic agreements that have influenced MH approach to First Nations include:

- Northern Flood Agreement[17]
- Burntwood Nelson Agreement[18]
- Adverse Effects Agreements[19]

3.5.1 The Joint Keeyask Development Agreement

In June 2008, the Joint Keeyask Development Agreement (JKDA) was ratified by Tataskweyak Cree Nation, War Lake First Nation, Fox Lake Cree Nation, and York Factory First Nation. The Keeyask Cree Nations collectively have the right to own up to 25 percent of the partnership, with 75 percent remaining with Manitoba Hydro.

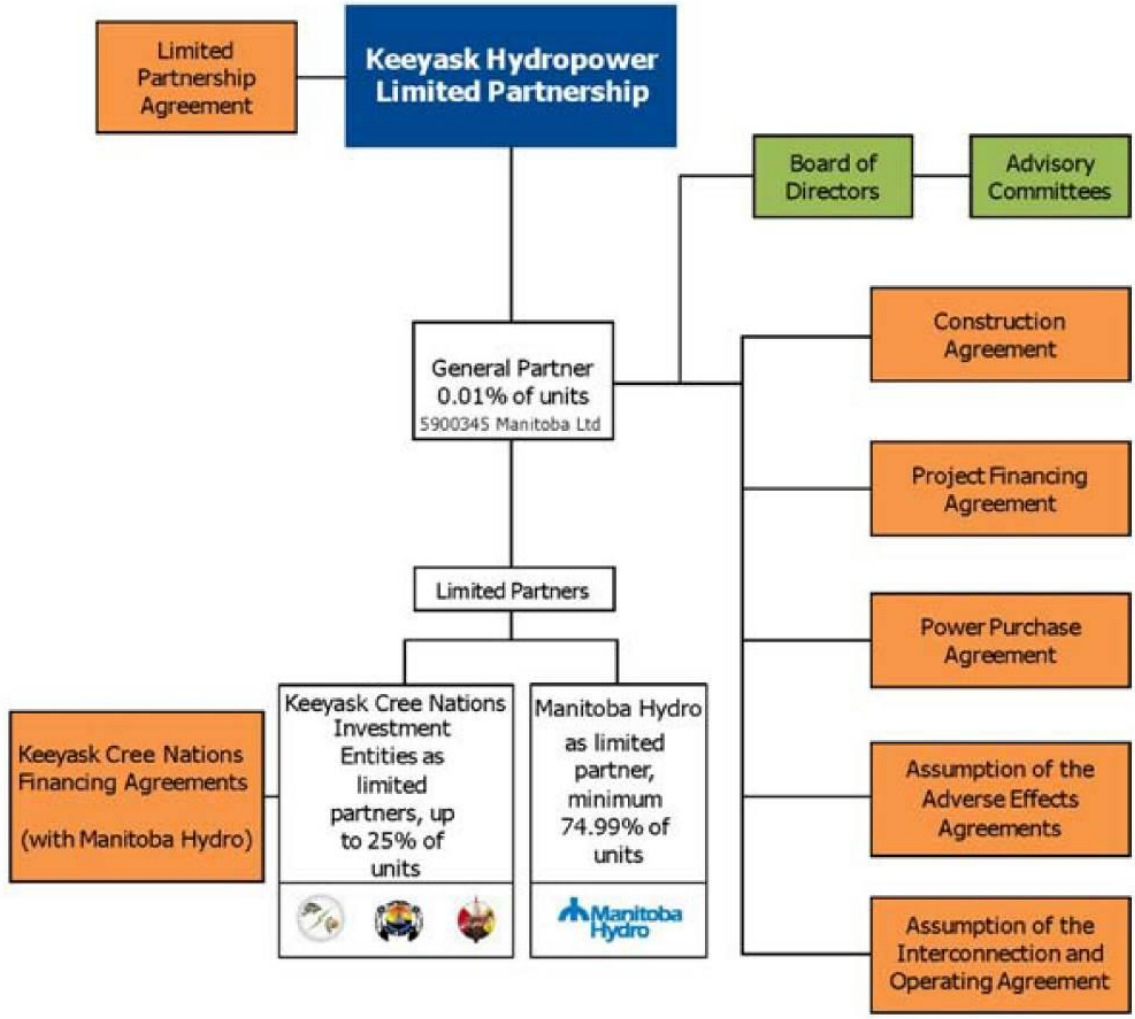
The JKDA lays out the terms of the partnership through which Manitoba Hydro and the four First Nations would become co-owners of and investors in the KGS. The JKDA sets out the rules for how the partners would invest and receive revenues. The JKDA also sets out provisions for training and employment business opportunities, the construction and operation of the project, and environmental monitoring. The business partnership created through the JKDA is the Keeyask Hydropower Limited Partnership (KHLP). The KHLP governance structure is illustrated below:

[17] Northern Flood Agreement Adverse effects to First Nations in the early 1970's by flooding arising from hydroelectric projects on the Nelson, Churchill Rivers and by the Lake Winnipeg Regulation Project were considered in the Northern Flood Agreement (NFA). To compensate First Nations for such adverse effects the Manitoba NFA and an accompanying Economic Development Agreement (EDA) was signed in 1977. Parties to the agreement included Canada, the Province of Manitoba, Manitoba Hydro and the Northern Flood Committee Inc. (NFC), an Aboriginal corporation acting on behalf of the five affected First Nations (Cross Lake First Nation, Nelson House - now Nisichawayasihk Cree Nation, Split Lake - now Tataskweyak Cree Nation, York Factory First Nation and Norway House Cree Nation).

[18] Established in 2005 the Burntwood Nelson Agreement (BNA) is a collective agreement between Hydro Projects Management Association (HPMA), representing contractors and the allied Hydro Workers of Manitoba, namely unions which sets out terms of employment for all workers including aboriginal peoples who work on northern construction projects. While many provisions exist in the BNA one important provision is the preference for, on all major northern hydro projects, will be offered to northern aboriginals who register with the job placement referral agency for the Keeyask project. The Job Referral Service is set up by the Provincial governments Entrepreneurship, Training and Trade (ETT) branch, and can be submitted at one of 17 of Employment Manitoba's 17 centers across the Province. A complete listing of jobs covered by the BNA is outlined on MH's web site.

[19] Individual adverse effects agreements with four first Nations have been signed. These agreements identify potential negative impacts of the Keeyask Project, and outline measures to prevent or reduce these effects. Where adverse effects cannot be avoided, offsetting measures are being pursued or compensation will be provided.

Exhibit 10: Keeyask Hydropower Limited Partnership Governance Structure



Source: Joint Keeyask Development Agreement Summary for members of York Factory First Nation

The general partner (Manitoba Hydro) is the entity that will have management and control over the Keeyask Project, awarding work contracts coordinating construction and ultimately operating the Keeyask Project. The general partner only owns 0.01% of the KHLP and is owned and controlled by Manitoba Hydro. Ownership is as follows:

- Manitoba Hydro 75% ownership;
- CNP 15% ownership;
- YFFN %% ownership; and
- FLCN 5% ownership.

The KCN's have the opportunity to negotiate up to $203.1 million of direct negotiated contracts (DNC) related to the Keeyask project.[20]

3.5.1.1 Keeyask Infrastructure Project

The Keeyask Infrastructure Project, which forms part of the JKDA commencing in early 2012, will consist of work on access road construction and camp development. This would enable a timely and efficient construction of the KGP based on the lessons learned from Wuskwatim (refer to Section 2).

The Keeyask Infrastructure Project is being undertaken to achieve the following objectives to:

- Provide early business opportunities for the Keeyask Cree Nations;
- Provide early and more employment opportunities for First Nation members, northern Aboriginal people and other northern and Manitoba workers;
- Provide more time for Cree Nation businesses to develop their management capabilities; and
- Accelerate investment to support the promotion of sustainable growth in the Province of Manitoba.

The Keeyask Infrastructure Project will provide an estimated 184 person years of employment over an estimate three-year period beginning the summer of 2011.

3.5.1.2 Training

The First Nations project partners are receiving pre-project training dollars through the Hydro Northern Training and Employment Initiative (HNTEI), established in 2004.Developed to support construction at Wuskwatim and Keeyask, Manitoba Hydro, Provincial and Federal Governments funded a $60 million dollar pre-training initiative.

During the period 2001 to 2010, the KCN's received $33.75 million of these funds to train their members.[21]

The results compiled by MH in the environmental impact statement suggested that[22]:

- 1402 trainees participated in 3272 training activities.
- 627 individuals completed project-related trades or occupational training.
- Of the 627, there are 13 carried journeypersons, 135 active apprentices and 97 pre-apprenticeship trainees.
- Aboriginal partners report 267 individuals employed in jobs related to training completed as well as other occupations.

3.5.1.3 Construction Jobs at Keeyask

A target of 630 person years of employment for members during construction has been identified within the JKDA.[23]

[20] Source: Joint Keeyask Development Agreement Summary for members of York Factory First Nation

[21] Needs for and alternatives to; Appendix 2.3 - Joint Keeyask Development Agreement - Benefits Summary

[22] Source Keeyask Environmental Impact Assessment Public consultation round 1 (http://www.hydro.mb.ca/projects/keeyask/panels_round_one.pdf)

[23] Needs for and alternatives to; Appendix 2.3 - Joint Keeyask Development Agreement - Benefits Summary

3.5.1.4 Monitoring

Under the JKDA two advisory committees have been negotiated designed specifically for the Keeyask project these include:

- Advisory Group on Employment (AGE)
- Construction Advisory Committee (CAC)

AGE has been negotiated under the BNA. Its aim is to increase the numbers of Keeyask Cree employed in the Keeyask Project. CAC was established o inform workers on issues and provide updates related to construction on Keeyask inclusive of upcoming contracts.

3.5.2 Manitoba Hydro's Ability to Support Northern and Aboriginal Community based Economic Development

MH's ability to satisfy meet the criteria/measures identified in Section 3.5 is summarized below.

Table 8: Northern and Aboriginal Community based Impacts

Criteria/measures	Manitoba Hydro Responses	Has Manitoba Hydro satisfied criteria/measure (Yes ☑ / No X)
Proactive approach to engagement	Aboriginal community engagement with Manitoba Hydro has been on-going for 40 years, from the Northern Flood Agreement, the Burntwood Agreement, Adverse Effects agreement and the Joint Keeyask Development Agreement (JKDA). The JKDA clearly defines the terms of the partnership through which Manitoba Hydro and the four first Nations would become co-owners of and investors in the Keeyask project. The JKDA sets out the rules for how the partners would invest and receive revenues. The JKDA also sets out provisions for training and employment business opportunities, the construction and operation of the project, and environmental monitoring.	☑
Establishment of benefit agreements	The JKDA as well as Adverse Effects Agreements have been signed with four First Nations affected by Keeyask Project. Each First Nation has signed the JKDA.	☑
Community ratification and support	Community ratification of the JDKA was achieved in 2009.	☑
Equity ownership	Equity ownership has been provided under the terms the JKDA.	☑
Identification of skill sets training, education and jobs	The JKDA sets out job opportunities. Targets for construction and operations are established.	☑
Comprehensive education and training programs with federal and provincial agency involvement	Jobs training and education has been coordinated with a variety of Federal and provincial agencies involved in the delivery of such programs. Hydro Northern Training and Employment Initiative (HNTEI) is one such example.	☑
Clear mandate and performance measures	JKDA sets out mandates and performance measures for the Keeyask Project.	☑
Pilot projects to assist in training workers	The Keeyask Infrastructure Project (KIP) represents such a pilot project enabling First Nations to gain employment, establish businesses related to various contracting and service opportunities.	☑
Provision of management and administrative services	Under the JKDA Manitoba Hydro is providing administrative and management support.	☑
Post project funding for other project opportunities	This represents a follow up activity related to overall approvals.	☑ (Monitoring of performance of the above should be emphasized).

Source: TyPlan

Observations:

The historic agreements between First Nations, MH, the Province and Federal government pertaining to past hydroelectric development projects has provided a context upon which MH has pursued and secured agreements with affected First Nations (e.g., JKDA). MH has been proactive at creating and securing relationships and legal agreements investing considerable time and effort in establishing such agreements. The identification of skill set requirements, job opportunities and the provision of training and education has been coordinated with other Federal and Provincial agencies to optimize opportunities. A pilot project in the form of Keeyask Infrastructure Project (KIP) enables First Nations to deliver on such benefits. The JKDA has clear mandates and performance measures related to jobs and training requirements. MH has also provided both administrative and management support to as part of the JKDA, to ensure project success. First Nations have also been provided ownership opportunities in the Keeyask Project.

The above represent aspects of industry best practices that MH has not only met but exceeded. On-going and post project monitoring regarding the success of this approach should be undertaken to ensure lessons learned are incorporated into future projects.

3.6 Community Access Improvements Related to Health, Education and Culture

Community access improvements and their implications (environmental setting, effects assessment, mitigation, and residual effects) related to health, education and culture are discussed in the following sections of the Environmental Impact Statement (EIS) for the KGP:

- Socio-economic Environment Resource Use and Heritage Resources, Section 3: Economy.
- Socio-economic Environment Resource Use and Heritage Resources, Section 4: Population and Infrastructure.
- Socio-economic Environment Resource Use and Heritage Resources, Section 5: Personal Community and Family Life.

Each volume comments upon communities within the local study area (inclusive of Keeyask Cree Nations, Thompson and Gillian). The construction of the access road forming part of the KIP, designed as a two lane gravel road, will remain in perpetuity and establish improved access to Tataskweyak First Nation, the Keeyask Generating Station site and Gillam, as well as Fox Lake Cree Nation (immediately west of Gillam) and to York Factory First Nation, War Lake First Nation to the south of the Nelson River.

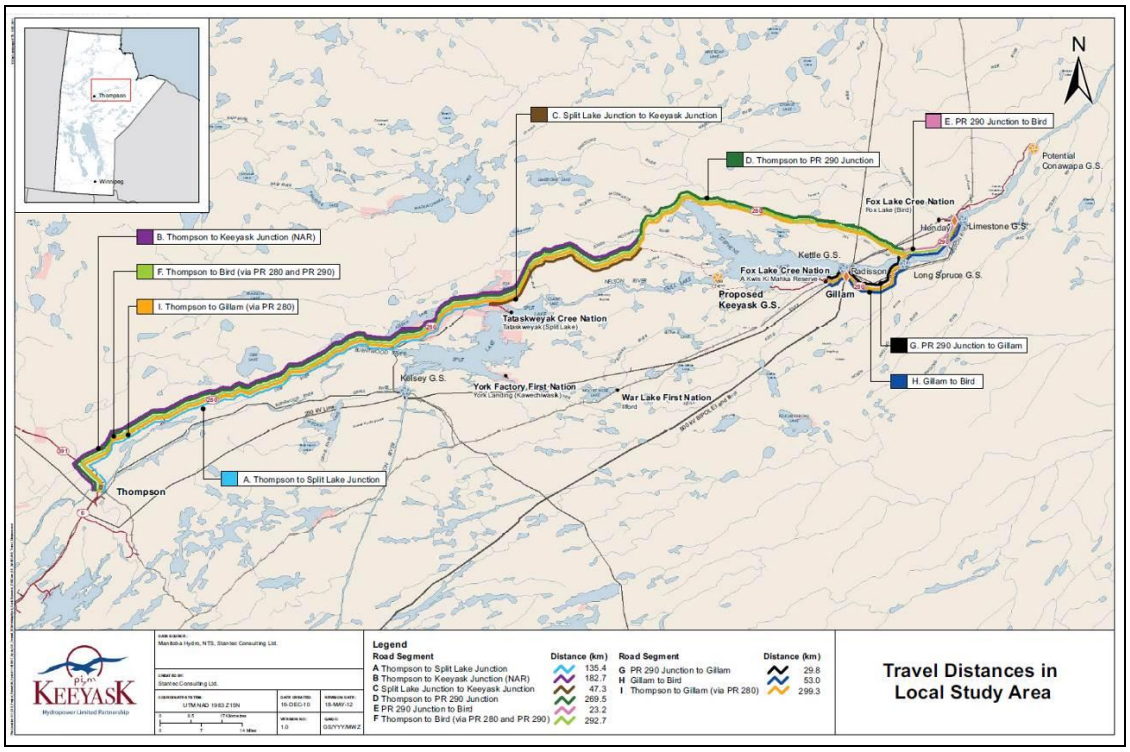
Correspondingly, improved access can create both positive and negative effects to aspects of health, education and culture. Education and training is discussed in Section 3.5.

3.6.1 Community Access

The main access route to the site would be via the North Road access road, which is being constructed under the KIP, in advance of the KGP. The north access road would be a two-lane all weather gravel road, meeting the Ministry of Infrastructure and Transportation (MIT) standards, starting at kilometer 174 on Provincial Road (PR) 280 approximately 185 km east-northeast from Thompson, and extending 25 km east to the north shore of Gull Rapids, the site of the KGP.

The potential effects of transportation infrastructure within the local study area would include increased use of rail, air, and road networks related to the transportation of people, equipment and materials to the Project site. No effect on transportation infrastructure is expected as a result of project construction. Post construction improved accessibility and reduced travel times to and from the local study area communities would result.

Exhibit 11: The Keeyask Infrastructure Project Access Road



Source: Socio-economic environment, Resource Use and Heritage Resources, Section 4, Figure 4.1

The proposed access improvements represent an overall benefit to the area communities providing a safer and more direct road transportation route to Gillian via Thompson and vice versa.

3.6.2 Community Health

The EIS Section 5: Personnel, Family and Community and Family Life, discusses MH approach to community health. The effects of which were discussed for both the construction and operation phases of the project in accordance with standard environmental assessment practices. The EIS provided an environmental setting (baseline); environmental effects assessment and mitigation; and summary of residual effects.

Specific to community health, the health of individuals, families and communities is shaped by a variety of factors or determinants of health, which include the social and economic environment, the physical environment and a person's individual characteristics and behaviors[24]. Community health in context to the environmental impact assessment prepared by MH goes beyond the absence of disease and considers a more holistic perspective. The EIS notes that from a Cree perspective, health has as much-to-do with social relations, land, and cultural as it does with individual physiology and disease. This is similar to the current day perspectives on population health research, with a focus on broad social and economic determinants, and the interaction with and impacts on health.

Community health issues directly associated with Project construction, as identified in the EIS, included water quality, community well being, and health services. Operational effects included mercury and human health, water quality, community well-being.

[24] World Health Organization (http://communityhealth.ku.edu/publications/publications.shtml)

The EIS provides a detailed and comprehensive assessment of the issues, potential effects and mitigation to address such issues. From a residual effects perspective increased demand for community health and social services was identified and mitigation inclusive of monitoring health and safety service levels; and the provision of health and safety services at the construction site were defined. MH has committed to working with other government agencies to manage this concern going forward.

Observations:

Manitoba Hydro has been proactive in identifying health issues based on the Cree perspective of community health and has identified appropriate mitigative measures, inclusive of on-going monitoring.

3.6.3 Cultural Benefits

Culture and spirituality according to Cree definition represents a composite of values, beliefs, perceptions, principles, traditions and worldviews that are based on individual and collective history experiences an interpretation. Cultural indicators include worldview, language, traditional knowledge, cultural practices, health and wellness, kinship, leisure, law and order and cultural products.

As part of the effects assessment reference is made to the JKDA, adverse effects agreements, employee retention and support services, highlighting the approach MH has taken to identify and understand Cree values and beliefs and engaging First Nations in the assessments.

The report considers the potential effects of in-migration to the communities, increased alcohol abuse, housing demand and potential pressures of local employees moving to work at the KGS. The creation of the construction camp in proximity to the KGS, at a distance from First Nation communities to the construction site, represents one mitigative measure to reduce potential interactions, as well as other mitigative measures that were identified limiting residual effects. Critical to the success of mitigation will be the on-going monitoring. Investment income generated as a result of the JKDA, equity partnership in the project also highlights MH attempts to address such issues (refer to Section 2 of this report).

It is further noted that the under the terms of the Burntwood Agreement, Adverse Effects Agreement and the JKDA proactive measures has be established to address concerns.

Observations:

Manitoba Hydro has been proactive in identifying cultural issues, appropriate mitigation and on-going monitoring.

4 ECONOMIC DISPLACEMENT IMPACTS AND EFFECTS ON CONSUMER SPENDING

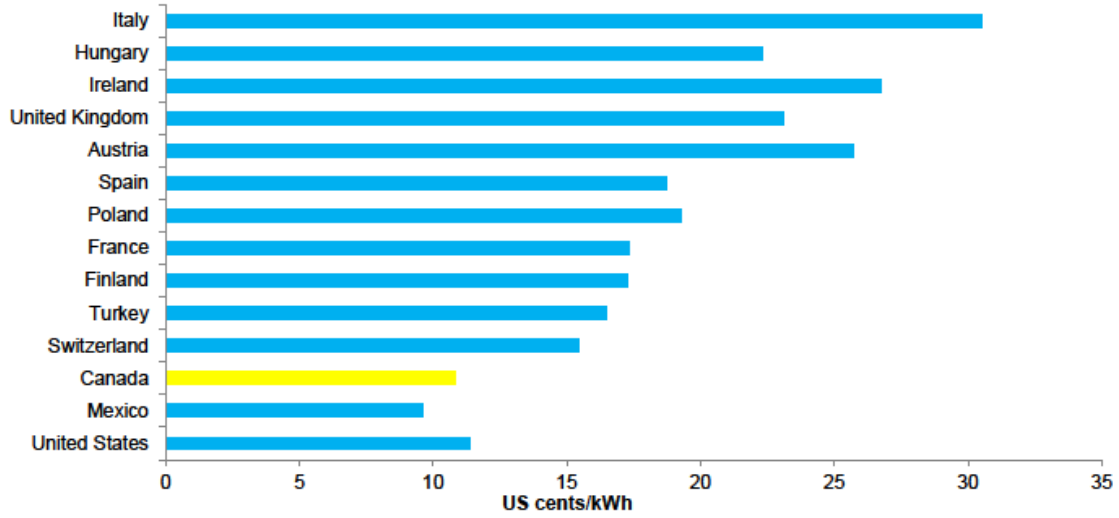
This section considers the economic displacement impacts and effects on consumer spending to the extent consumers will face increased electricity rates as a result of the PDP. Specifically, this section provides an overview of residential electricity prices in other countries relative to Canada, provincial utility rates relative to each other, and recent literature on proposed rate increases throughout Canada as context regarding current status and trends. The section concludes with a literature review of the effects of increasing utility prices (outlined in trends) on consumer spending, identifying those most affected (displaced) by such increases, and the key initiatives to reduce such effects, namely energy reduction and efficiency measures.

4.1 Review of Global, Canadian and Provincial Electricity Rates

4.1.1 World Electricity Rates

The Canadian Electrical Association (CEA) provides insight into Canadian electricity pricing. Based on selected world residential electricity prices in 2009, Canada benefits from some of the lowest rates, resultant from the historic capital investments associated with major hydroelectric projects in renewable energy. [25]

Exhibit 12: Selected World Residential Electricity Prices 2009



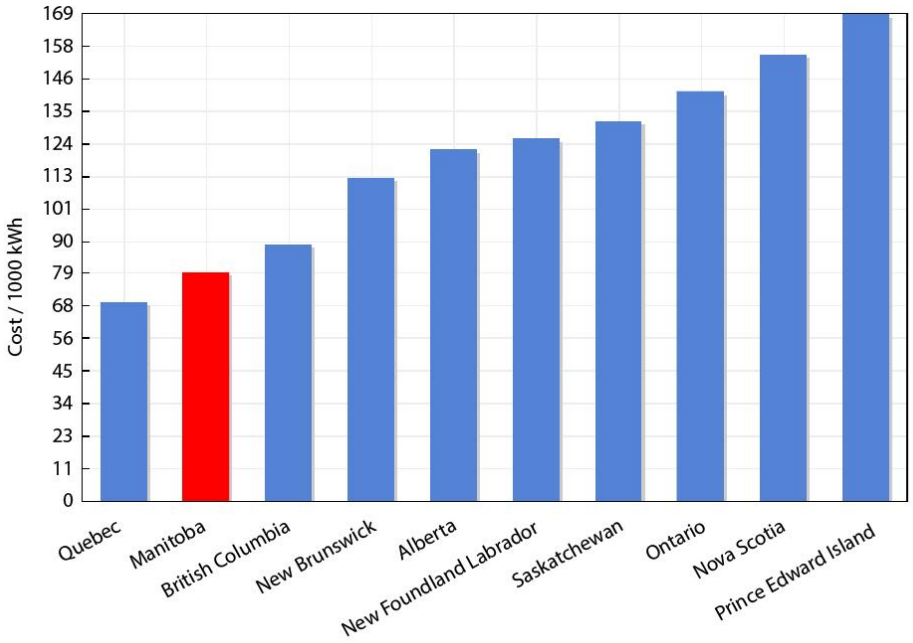
Source: Canadian Electricity Association: Electricity Pricing - An Introduction to Canadian Electricity Rates
Source for Canada: Hydro Québec, Comparison of Electricity prices in Major North American Cities 2009
Source for rest of the world: International Energy Agency Key World Energy Statistics 2009

[25] Canadian Electricity Association Power Point presentation: Energy Pricing An introduction to Canadian Electricity Rates

4.1.2 Provincial Utility Rates Overview

Correspondingly, provinces throughout Canada have low rates. The provinces associated with historic hydroelectric developments namely; Manitoba, Québec and British Columbia, exhibit the lowest rates. The chart below shows the average monthly electricity bill by province for 1,000 kWh of electricity consumption (which is typically about what most households use) as of May 1, 2013.

Exhibit 13: Domestic Electricity Rates across Canada based on 1,000 kWh Consumption per month as of May 2013



Source: Ontario Hydro http://www.ontario-hydro.com/index.php?page=electricity_rates_by_province

4.1.3 Current Rate Applications in Canada

Rates are overseen by each province's respective regulator authority (e.g., Provincial Energy Board or Public Utility Board), and in most provinces prices are set by the electricity regulator. Any changes in rates require the electric utility to submit applications and seek regulatory approvals. As a result, prices in these jurisdictions are adjusted periodically and are not immediately affected by market conditions. A number of the more common reasons for rate increase applications include:

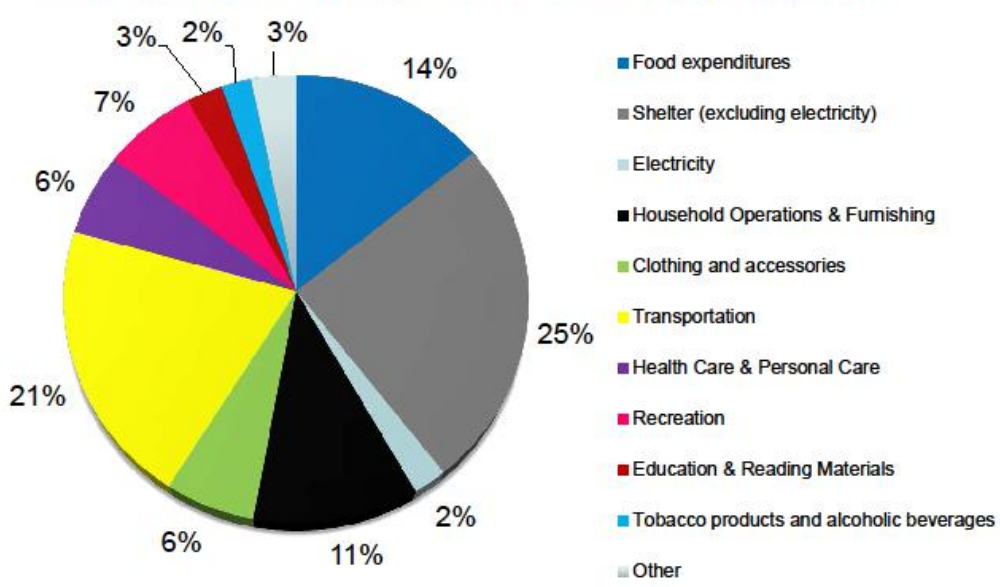
- Replacement of aging infrastructure;
- Inflation;
- Higher cost of new contracted/constructed generation; and
- Upgrades and expansions to infrastructure.

The state of the economy also plays a part in electricity pricing as economic downturns can put downward pressure on pricing due to decreased demand. For example in Nova Scotia, in which reduced payments from the economically struggling pulp and paper industry (key industrial users whom generally consume significant energy) has recently been noted. In Manitoba, the net income fell on lower export revenues. As noted the economic deterioration reduced the need for power demand in the US and low natural gas prices contributed to lower US electricity rates, resulted in a decrease in the volume and price of Manitoba electricity.

The Canadian Broadcasting Corporation (CBC) undertook a study of provincial utilities' power-purchase agreements and financial statements that indicated that the average cost per kilowatt-hour countrywide will rise more than 50 % by 2020. The article indicated that BC Hydro has raised its rates 7.3 per cent last year and has announced it will seek an additional 30 per cent hike over the next three years. The Ontario government declared that the province's rates would rise 46 per cent by 2015.[26]

The potential effects of such proposed rate increases on households require an understanding of household spending expenditures. Based on 2011 Surveyed Household Expenditures, electricity accounts for 3% of total household expenditures.

Exhibit 14: 2011 Surveyed Household Expenditures



Source: Statistics Canada, CANSIM 203-0021 Survey of household spending, retrieved April 10 2013

* total current consumption excluding income taxes, personnel insurance payments and pension contributions, gifts of money alimony and contributions to charity

Observations:

Canada has one of the lowest electricity rates in the world and Manitoba has one of the lowest utility costs in Canada. Literature suggests that such rates are resultant from the historical investment in major hydroelectric developments, notably those in Manitoba, Québec and British Columbia. Aging infrastructure, refurbishment, new construction, inflation and higher costs to produce electricity, are cited examples of increasing rate pressure. The majority of provincial electricity utilities throughout Canada are seeking rate increases. Continued upward pressure is expected on rates in both the short and medium term throughout Canada and the world.

[26] Electric shocker: Power prices set to rise sharply Zach Dubinsky, CBC News Posted: Mar 30, 2011 6:04 PM ET Last Updated: Mar 31, 2011 1:09 PM ET

4.2 Review of Increased Energy Costs on Consumers

A high level literature review was undertaken of selected documents pertaining to the impact of increased energy costs on consumers and their spending patterns. Much of the available literature in North America on-line focuses on the impact of rising gasoline or oil prices on consumer spending, rather than the impact of increased home energy (electricity) costs. Specific quantitative evidence regarding the effect of increasing household electricity bills is not evident; however the findings identify the socio-economic characteristics of those most affected households.

The impact of increased energy prices will vary significantly by household income, with high-income households being the least impacted and low-income households and those on fixed incomes such as low-income seniors, being the most impacted.

High-end retailers will be less impacted than low-end retailers as high-income households will still spend on discretionary items, as increased energy costs can be absorbed by households through higher disposable income and savings. Spending by middle income households may be decreased as a result of higher energy costs through less discretionary spending and substitution toward lower cost goods, particularly groceries, and curtailing the purchase of non-essential goods, dining out and entertainment. In case of studies on the impact of increased gasoline costs, it was estimated that a 25% increase in gas prices would cut the net cost of price paid by grocery item by 2-3% due to consumer substitution of usual grocery products toward promotional items.[27] Other retail categories most impacted for middle-income households are less essential goods such as sporting goods, clothing, and personal care items.

Spending by low income households will be the most impacted segment of consumer spending as their income is often inadequate to cover basic needs, which may result in the choice being made between spending on groceries, other essentials or heat.

The overall impact to the retail sector at a community level will depend on the income distribution in the community, energy costs, consumption, and needs (which will differ by climate), and programs available to offset the costs for low income households.

Aside from energy costs relative to income, other key variables in the level of impact are energy efficiency programs related to demand side management (e.g., Power Smart) as well as initiatives by households toward increasing energy efficiency of their homes and use of energy during off peak hours.

The table below provides a summary of the literature review, considering studies by major banks, US studies, Canadian energy poverty groups, and literature from jurisdictions with high-energy costs and an example from South Africa.

[27] CIBC Economics: Consumer Watch Canada' Sucking Energy Out of Households' April 2011 http://research.cibcwm.com/economic_public/download/cw-20110411.pdf

Table 9: Review of the Effects of Increased Energy Costs on Consumers

Report	Observations	Conclusions
CIBC Economics - Sucking Energy Out of Households'[28]	The conclusions of the report confirms that the impact will vary by income and are consistent with studies focusing on the impacts of rising home energy costs "Higher-income households are better able to absorb the increase in energy spending without much sacrifice to their non-energy spending." In other words, the extra cost is largely borne by their savings. But low and middle-income Canadian consumers are less likely to do so because energy represents a much larger share of their overall spending. For example, low income households spend more than twice as much of their income on energy as do high-income households. That suggests that high-end retailers will bode better in this environment compared to low-end retailers that service low to medium income households."	CIBC was contacted to determine if they had done any recent analysis on the impact of home energy prices (response was no, and "although power prices have risen in some jurisdictions, overall energy inflation has been much quieter of late".)
Scotiabank Group - Global Economic Research - report in 2011 "Energizing Household Energy Efficiency"[29]	The report notes that there is an on-going urgency to reduce household energy consumption because of the discernible upward trend in the price of energy. The report states: "Energy costs have, on average, outpaced the general rate of inflation since the 1980s, and increasingly so over the past decade. From the perspective of households, reducing energy consumption, or at least slowing its rise, could generate significant long-term cost savings. It would also reduce the sensitivity of household spending to future energy price shocks".	The report concludes that substantial progress has been made in improving household energy efficiency. However, more needs to be done, especially with energy usage and pricing on the upswing. Rising energy prices should help speed more efficiency gains in the future, generating long-term cost savings for households."
American Coalition for Clean Coal Energy report "Energy Cost Impacts on American Families, 2001-2012[30] [31]	The report noted that there is a disproportionate impact on low income households. "Lower-income families are more vulnerable to energy costs than higher-income families because energy represents a larger portion of their household budgets. Energy is consuming one-fifth or more of the household incomes of lower and middle-income families, reducing the amount of income that can be spent on food, housing, health care, and other necessities".	The report confirms that the key vulnerable segments are fixed income seniors and minorities due to their relatively low incomes
Canadian Energy Poverty Groups [36] Wellington and Guelph Task Force for Poverty Elimination[32]	Various academic and community groups have written about' energy poverty' – definitions vary by group but it is often defined as being when a household spends more than 10% of its after tax income on energy costs. In a recent report by the Wellington and Guelph Task Force for Poverty Elimination[33], several supporting studies are referenced. Key findings of the study are: "energy poverty affects about 1 million households in Canada, forcing many to choose between	The report concluded that Municipal, Provincial and Federal governments all have an integral role to play in eliminating energy poverty".

[28] http://research.cibcwm.com/economic_public/download/cw-20110411.pdf

[29] http://www.scotiabank.com/ca/en/files/11/09/Energizing_Household_Energy_Efficiency.pdf

[30] http://www.americaspower.org/sites/default/files/Energy_Cost_Impacts_2012_FINAL.pdf

[31] American Coalition for Clean Coal Energy 'Energy Cost Impacts on American Families, 2001-2012, Feb. 2012 http://www.americaspower.org/sites/default/files/Energy_Cost_Impacts_2012_FINAL.pdf

Report	Observations	Conclusions
	heating their homes and buying groceries; energy poverty is expected to rise without intervention as the result of rising energy costs which are expected to increase 6.7 to 8 percent annually over the next five years; energy poverty directly and indirectly impacts resident's health and can result in disconnection and eviction leading to homelessness; energy poverty can be eradicated by increasing income, regulating energy pricing and improving energy efficiency of homes.	
Literature from Jurisdictions with High Energy Cost Increases	There are a lot of examples of reports and studies in jurisdictions hard hit by energy costs increases. Examples: Canadian Centre for Policy Alternatives: 'Energy Cost Politics and the Environment in Nova Scotia'; Ecology Action Centre Recommendations for Nova Scotia Energy Policy 'Energy Affordability vs. Rising Electricity Costs'; Environmental Law Centre, University of Victoria: 'Conserving the Planet without Hurting Low Income Households', etc.	
The Impact of Electricity Price Increase and Eskom's six-year Capital Investment Program on South African Economy[34]	Eskom is a South African electricity public utility established in 1923 as the Electricity Supply Commission (ESCOM) by the government of South Africa under the terms of the Electricity Act (1922). Eskom operates a number of notable power and nuclear stations. The company is divided into Generation, Transmission and Distribution divisions and together Eskom generates approximately 95% of electricity used in South Africa.[35] Generally speaking the report suggests that electricity price hikes have, by and large, a negative impact on the South African economy whereas extensive capital investment in hydroelectric developments leads to positive outcomes in both the short (employment) and long term from an economic development policy perspective. [36]	Eskom has put in place measures that will soften the burden on the poor, namely the Inclining Block Tariff (IBT).

[32] Guelph and Wellington Task Force for Poverty Elimination, Energy Poverty, May 2011 http://gwpoverty.ca/wp-content/uploads/2011/06/Energy-Poverty.pdf

[33] (www.gwpoverty.ca)

[34] Pan-African Investment and Research Services the Impact of Electricity Price Increase and Eskom's Six-Year Capital Investment Programme on the South African Economy (May 2011)

[35] Wikipedia http://en.wikipedia.org/wiki/Eskom

[36] In countries in which the energy sector remains an integral part of infrastructural development to support economic development (e.g. hydroelectric intensive industries like mining), sets the foundation for broad based sustainable long term economic growth and development.

It is apparent in South Africa's case that the current and future growth of the economy is also tied to sufficient and reliable energy availability and equitable access to it.

The report suggests a bi-directional causal relationship between GDP and energy production (GDP determines the level of energy produced and vice versa) and it is argued that the prosperity of the country is dependent on efficient and sustainable supply of and distributions energy. Simply stated, availability of energy is a pre-condition of growth. An increase in electricity pricing that is in general considered sudden and substantial increases (e.g., Manitoba Hydro's short term price increases) leads to disruptions for many businesses that had not anticipated sharp increases. Businesses that are at the margins of profitability cannot absorb substantial cost increases, be it electricity or otherwise. For such firms it is not the increase per se that matters, rather it is the quantum increases in the short term that leaves them with no degrees of freedom to absorb the production cost increases.

However increasing electricity rates based on capital investment does have distinct benefits, as increases establish the platform for sustainable and reliable power, helps set electricity prices at cost-reflective levels, creates economic stability over the longer term via sustainable use of resources and opens up other opportunities for alternative energy options.[36]

Observations:

The economic displacement effects of increasing rates identify that the lower income households, seniors with limited incomes will be most impacted, whereas the middle and upper class will adjust spending habits via savings or disposable income. The literature does not quantify the magnitude of potential effects, but confirms that federal, provincial and local programs (including utilities), designed to reduce the effects of increased energy prices on low-income households and the poor is the preferred solution. This solution is directed towards energy efficiency and reduction initiatives.

4.3 Energy Efficiency and Reduction Initiatives

The challenges of increasing energy costs are being faced by jurisdictions across Canada, the USA, Europe, and beyond. The focus of addressing this challenge is on initiatives to increase energy efficiency and reduce waste, which will have the effect of lowering the cost of energy for households, and on developing new methods to ensure energy affordability for those groups most impacted by rate increases. Both MH and British Columbia Hydro have a on-going programs designed to enable users to conserve and reduce energy demand. An overview of some of the strategic directions of other jurisdictions is provided in the table below.

Table 10: Literature Review of Energy Efficiency Programs and Reduction Initiatives

Province or Territory	Report / Program	Conclusions
Nova Scotia	Ecology Action Centre for Nova Scotia Energy Policy, as documented in the 2013 report 'Energy Affordability vs. Rising Electricity Prices'[37]	Key conclusion is that 'energy cost security will not be provided via lower prices, but by providing universal access to energy efficiency services and renewable energy generation opportunities… a new social bargain whereby government, citizens, and industry agree to respond to rising energy prices by developing new methods of ensuring energy affordability". "The best way to address energy security (i.e. affordability for low income households) is to implement a Universal Service Program that directly addresses energy cost security by making energy costs affordable to low income households. The target should be households whose total energy costs exceed 6% of income or whose electricity costs exceed 3% of income with an income cap." Recommendations pertaining to implementing an energy cost relief program for targeted low income households; developing a relief program to deal with arrears; fund crisis intervention assistance; and expansion of efficiency programs for low income households.
British Columbia	A report 'Conserving the Planet Without Hurting Low-Income Families: Options for Fair Energy-Efficiency Programs for Low-Income' by the University of Victoria. The report focuses on the importance of energy efficiency programs as a way to decrease energy costs[38]	Based on a review of various programs and related literature on low-income programs yields, the following best practices for low-income energy efficiency programs (LIEEPs) were identified in that paper for consideration in British Columbia: "A central energy-efficiency body should oversee, fund, and monitor household energy efficiency programs and low-income energy efficiency programs; LIEEPs should be comprehensive, addressing all savings opportunities, including household behaviours, and serving all fuel types; LIEEPs should also have mechanisms in place to provide basic health and safety upgrades where needed; all housing types, including rental and mixed-occupancy/mixed-use buildings, should be eligible for LIEEPs; LIEEP elements should be consistent with target populations, such as renters and minority groups; income criteria for participation in LIEEPs should be simple and consistent with other low income programs; and LIEEPs should be delivered by and in partnership with trusted non-profits and community organizations to improve outreach, participation, and delivery; develop partnerships with other governments and organizations to leverage funds and services, and where possible, pool resources and minimize delivery costs." Other recommendations are outlined in above noted report.
Ontario	The Low-Income Energy Assistance Program (LIEAP) was developed by the Ontario Energy Board (OEB) and has three	Households are eligible if they meet the Statistics Canada determination of low-income levels along with additional 15% thresholds.

[37] Ecology Action Centre Recommendations for Nova Scotia Energy Policy 'Solving Nova Scotia's Electricity Pricing Problem: Energy Affordability vs. Rising Electricity Prices, August 2013 http://www.ecologyaction.ca/energy_policy_reports,http://www.ecologyaction.ca/files/images/file/Energy/SolvingNSElectricityPricingProblem_LoRes.pdf

[38] Environmental Law Centre, University of Victoria, Conserving the Planet without Hurting Low-Income Families: Options for Fair Energy-Efficiency Programs for Low-Income Households, April 2010

Province or Territory	Report / Program	Conclusions
	components to assist low-income customers:[39] • emergency financial assistance fund; • targeted conservation programs; and • more flexible customer service rules.	These vary by community size to take into account the higher cost of living in large communities. For example, a 3-person household with a pre-tax family income of $28,651 in rural areas would qualify for the program. This increases to a pre-tax income of $41,622 in a community with a population of 500,000 or over. Information on the program is available at: http://www.hydroone.com
Manitoba	The practices of Manitoba are reviewed in a report to identify and quantify among the provincial programs that build on federal funding The report concludes Manitoba has been a leader through its collaborative, community-based LIEEPs. Successful pilot projects in Winnipeg and Brandon drew on provincial and federal funding, as well as support from Manitoba Hydro and non-profits". [40]	Manitoba Hydro has established a number of programs and loans geared towards reducing costs for qualified households inclusive of the home insulation program, refrigerator retirement program, water and energy saver program, Pays Financing, First Nations program, and the On-going residential loan and Affordable Energy Program. The affordable energy program is intended for homeowners and renters on limited incomes to save money via energy efficient upgrades. Programs are also available for commercial and industrial users.

[39] Ryerson University, Centre for Urban Energy: Roundtable Series 2012 – Electricity Prices: How Will Consumers Manage, June 2012: http://cue.ryerson.ca/publications/Roundtable_1_Electricity%20Prices.pdf

[40] http://www.hydro.mb.ca/savings_rebates_loans.shtml

Observations:

Energy efficiency and reduction initiatives have been identified and are supported by utilities throughout Canada, to reduce the burden on those socio-economic classes most affected by rates increases, low income households, citizens and elderly on fixed income. MH has established a number of programs and loans geared towards reducing costs for qualified households inclusive of the home insulation program, refrigerator retirement program, water and energy saver program, First Nations program, and the on-going residential loan and Affordable Energy Program. The affordable energy program is intended for homeowners and renters on limited incomes to save money via energy efficient upgrades.[41] *Programs are also available for commercial and industrial users.*

While such programs are prudent, continued effort and focus should be considered to ensure such programs, and related benefits are optimized in Manitoba in relation to the proposed rate increases outlined in the PDP, specifically referencing those most impacted, low income households and those on fixed incomes.

[41] http://www.hydro.mb.ca/savings_rebates_loans.shtml

5 SOCIO-ECONOMIC IMPACT OF KEY ALTERNATIVE SCENARIOS

This section evaluates the socio-economic impact of key alternative scenarios identified in Chapter 13 of the NFAT focusing on the reasonableness of the assumptions made (Section 5.2), and high-level comparison table between the PDP and alternatives (Section 5.3).

Manitoba Hydro undertook a Multiple Account Benefit Cost Analysis (MA-BCA) of Manitoba Hydro's PDP compared to a number of the alternative plans.

MA-BCA is different than Economic Impact Assessment (presented in Section 3).[42] Traditional cost-benefit analysis is a standard method economists use to assess the net benefits of alternative plans, projects or programs from a broad social perspective. Such analysis takes into account both the positive (advantages) and negative (disadvantages) of the alternatives, inclusive of social and environmental consequences[43]. The MA-BCA varies from traditional cost-benefit analysis, as it recognizes acknowledges non-monetized advantages/disadvantages to calculate the bottom line. A unique aspect of MA-BCA is that it also provides an assessment of the nature and distribution of those benefits and costs over time.[44]

Specific to MH's evaluation of the broader socio-economic benefits, the following accounts have been assessed:

- Market Valuation
- Manitoba Hydro Customer
- Manitoba Government
- Manitoba Economy
- Environment
- Social
- Risk

Each account, its purpose, the type of analysis undertaken, and indicators are provided below. It is noted that the environmental account is not included in this review as it is dealt with outside of this scope of work.

[42] Compared to economic impact analysis that focuses on gross impacts (benefits), the MA-BCA provides a **net** measure of the benefits inclusive of project expenditures. Economic impact analysis does not consider the opportunity cost of labour and capital in the project nor does it consider the revenue generated by the project.

[43] Multiple Account Cost Benefit Analysis: A Practical guide for the systematic Evaluation of Project and Policy alternatives, University of Toronto Press 2010 pp 3-15 Marvin Shaffer.

[44] As noted in Chapter 13 and referenced by Dr. Shaffer one of the first government agencies to adopt a multiple account approach to project assessment in North American was the U.S Water Resources Council, economic and Environmental Principles and Guidelines for Water and related Land resources Implementation Studies 1983.

Table 11: Multiple Account Benefit Cost Assessment Accounts

Account	Purpose	Analysis	Indicators
Market Valuation	Net benefit to Manitoba Hydro and project partners	Incremental revenues from surplus sales less incremental capital and O@M expenditures	Present value of net revenues or cost (market variation of investment)
Manitoba Customer	Consequences for customers (rate payers) in short to medium and long term and system reliability	Rate increases required to recover costs and meet MH financial targets System reliability	Average annual and cumulative rate increases over the planning period System reliability /Load carrying capability and cost of expected unnerved load
Manitoba Government	Net benefit to taxpayers	Incremental government net revenues	Present value of incremental revenues to government
Manitoba Economy	Consequences to the economy (net employment benefits)	Employment generated and incremental income earned	Present value of incremental income
Social	Consequences to aboriginal and non- aboriginal communities and Manitoba as a whole	Benefits to project partners Benefits/ Impacts on affected communities Benefits to the people of Manitoba	Nature and significance of partner benefits Nature and extent of residual community benefits /impacts Nature and benefits to Manitoba's (Potential bequest value of remaining assets)
Risk	Nature and significance of risk	Range of possible consequences Risk mitigation potential	Options to reduce risk

Source: Needs for and alternatives To Chapter 13 - Integrated comparisons of Development Plans - Multiple Account analysis, Table 13.1 Summary of Multiple Account Framework

Observations:

Multiple Account Benefit Cost Analysis focuses on the identification of net benefits from a broader social perspective. It enables comparisons of the distributional advantages and disadvantages of various plans over the stated life cycle of the plan. MA-BCA is a standard approach to evaluate policy options.

5.1 Evaluation of Alternative Development Plans

The MA-BCA assesses the preferred and three alternative resource development plans, two of which assume no US interconnection or firm export sales (one based on gas fired thermal generation and one specific to hydro development of Keeyask) (see Table 12 below). The concept of decision pathways are introduced here as they provide MH considerable flexibility in changing the development plan as new information becomes available. Pathways and their significance are discussed at the end of this section (See Section 5.3).

Table 12: Resource Development Plans Evaluated via the Multiple Account Cost Benefit Analysis

Resource Development Plan and objective	Description	Pathway (footnote 45)
Preferred Development Plan	Development of Keeyask and related transmission for 2019/2020; Conawapa and related transmission, and the North-South network upgrades for 2025/26, New 750 MW interconnections with US from 2020/2021 New export sales with Minnesota Power (250MW from 2020-2035) and Wisconsin Power (108 MW from 2014-2021, 100MW from 2021 to 2027, and 300MW from 2026-2036) Expansion of the Northern States Power Export sale (125MW from 2021-2025). Single cycle gas thermal units to be installed after 2041.	Commitment to develop Keeyask, the 750MW interconnection and new export sales. The pathway anticipates the development of Conawapa for 2025/26.The decision on that is not required at this time, and the precise in service date could be deferred if warranted by load growth or market conditions.
The Smaller Interconnection Plan (K19/Gas24/250MW)	Combines the development of hydro generation to meet growing domestic requirements with new export interconnection and export sales in the US (only 250 MW) Construction of Keeyask and related transmission for in-service date of 2019/20 Construction of new 250MW transmission interconnection with the US with an in service date of 2020/21 New export sale commitments of 250MW with Minnesota Power from 2020-2035, 100 MW with Wisconsin Power Service from 2021-2027, and 125MW with Northern States Power from 2021-2025	Commits to the development of Keeyask and a small interconnection. What transpires after the development of Keeyask could change. One variant would be the development of Conawapa instead of gas to accommodate domestic load.
Keeyask with No Interconnection (K22/Gas)	Construction of Keeyask and related transmission with an in service date of 2022/23 New export sale commitments of 100 MW with Wisconsin Power Service from 2023-2027 New SCGT starting 2029/30 and CCCTs starting 2034/35	Commits to the development of Keeyask and abandons the opportunity for and benefits of the current new interconnection opportunity. What happens after the construction of Keeyask can change such as the development of Conawapa instead of gas plants.
Gas Thermal with non-new interconnection (All Gas)	No new interconnection, any new firm export sales with the US and would only rely on gas - fired thermal generation to meet growing load Manitoba Hydro would developed SCCTs starting in 2022/23 and Act's starting 2031/32	Abandons the development of Keeyask for the foreseeable future and the current opportunity for and benefits of a new interconnections.

Source: Needs for and Alternatives to Chapter 14, Pages 17-20

[45] The concepts of pathways recognize that the long-term development plans may be modified in the future as new information becomes available. In this sense pathways defines what is set and what adjustments to the plan may be considered after initial decisions and commitments are made following the NFAT review.

5.2 Comparative Analysis

All of the accounts (except for the environmental account) identified in Table 12 are commented upon in terms of the reasonableness of the assumptions made.

5.2.1 Market Valuation

This account assesses the net benefit or cost of the preferred and alternative plans to Manitoba Hydro and its project partners. It quantifies the incremental revenues generated by the surplus electricity supply relative to the incremental capital and operating expenses incurred, based on a net present value, assuming a certain discount rate. The evaluation is based on the economic and financial appendices as provided by Manitoba Hydro in the NFAT submission.

The key assumption effecting results is the discount rate utilized. The discount rate is a critical parameter in cost benefit analysis especially when costs and benefits differ in distribution over time. This is especially important when they occur over a long period of time.

Two general approaches to discount rates are common, each providing a range of rates:[46]

- descriptive approach based on the opportunity cost of drawing funds from the private sector; and
- prescriptive approach that derives from ethical views about intergenerational equity.

As noted the net present value of any project with future costs and benefits crucially depends on the discount rate chosen especially when the costs are born in a different time frame than the benefits received. The size of the discount rate makes an even more significant difference when benefits occur in the distant future, such as many environmental policies/programs government initiate. Hydroelectric projects are one such example.

As part of the NFAT submission a detailed rationale for the selection of the discount rate is provided. A real rate of 6% has been used in the NFAT review that reflects the social cost of capital. The use of 6% is based on research on discounting in cost -benefit analysis outlined in supporting footnotes of the NFAT. Supporting references suggest that the social cost of capital can range from 5-7.3 % (as outlined in Chapter 13 Page 5 of 74), 6% is used as the mid-point between such variations. For comparative purposes the BC Hydro Site C clean energy project assumes a real discount rate from 5.5 to 6 per cent.[47]

The K19/G24/250MW appears to represent the best plan in this account.

Observations:

The discount rate utilized for the market evaluation account is the critical factor effecting results of this account review. The 6% real discount rate chosen for the PDP, based on a social cost of capital is reasonable.

5.2.2 Manitoba Hydro Customer

This account assesses the consequences of the alternative plans for Manitoba Hydro's customers relying on the financial analysis in Chapter 11 of the NFAT, that provides estimates of the rate increases in the short to medium

[46] Valuing the Future: the social discount rate in cost benefit analysis visiting Research Paper Australian government, Dr. Mark Harrison (April 2010)

[47] Site C Clean Energy Project Information sheet cost Estimate for Site C
http://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/projects/site-c/cost-estimate-site-c.pdf

and long term that would be required to cover net system costs and meet 75:25 debt/equity ratio by the 20th year of the planning period. After year 20, the rates were adjusted each year to maintain an interest coverage ratio of 1:2.

This account also considers system reliability, defined as the ability to meet MH and industry standard reliability criteria.

Rate Impacts

Section 4 of this report provides a summary of Global, Canada wide and Provincial trends in electricity pricing and confirms continued upward pressure on rates. The rate impact undertaken under the Customer Account provides a discussion in short to medium term to longer-term impacts.

The results indicate the:[48]

- Projected cumulative rate increase by 2031/32 for the PDP would be 108% equating to a rate increase of 3.95% annually.
- Projected cumulative rate increase to the year 2031/32 for the all gas plan and small interconnection would be 90%, a 3.4% to 3.5% annual increase.
- Projected cumulative rate increase to the year 2031/32 for the Keeyask but no interconnection at 92 %, a 3.4% to 3.5 % annual increase.

The key difference between the plans is that higher rates would be needed in the short to medium term with the PDP as opposed to the long term to cover the 75:25 debt/equity ratios. After the debt ratio is achieved in year 20 there would be reduced inflationary pressure on costs. Conversely, lower rate increases would be required for the other options over the short term.

System Reliability

The different development plans are all designed to ensure MH has sufficient resources to be able to meet its peak and annual load, even under a wide range of forced outage and other contingencies. Manitoba's planning criteria for all alternatives provide for a very high degree of system reliability, and MH confirms there is a high probability of being able to meet system requirements under all contingencies.

Reliability assumes all plans are designed to meet Manitoba Hydro and industry standard reliability criteria. Loss of load expectation is the average number of days per year that the load could not be fully met. The common industry a standard is 0.1 days per year or an inability to meet system load one day every 10 years. Figure 13.2 of the NFAT review shows the estimated load carrying capability of the Manitoba Hydro system.[49]

Observations:

Manitoba currently has one of the lowest residential electricity rates in Canada. Pressure on rate increases is expected to continue throughout Canada and residential users should expect to pay for increasing rates. While the PDP has the greatest rate annual projected rate increases proposed in all plans evaluated, all plans will require rate increases (until year 20, the cumulative rate increases of all plans are not substantially different, with

[48] Chapter 13 - Integrated Comparison of Development Plans

[49] Appendix 13.1 - Reliability Evaluation confirms that Peak load carrying capability assessment shows there are some deficits in all alternatives to the Preferred Plan. In this case, the differences in the estimate of the loss of load probability and consequently load carrying capability are used to indicate the difference in the system reliability. This is measured by multiplying the expected unnerved energy by the cost of supply interruptions to calculate the differences in the expected costs of the bulk system failures. On average the Preferred Plan is able to carry approximately 10-15% more load than its alternatives.

the benefits incurring over the longer term as inflationary costs are reduced with the PDP). As the current PDP has greatest impacts on customers in the short term, one possible means of addressing this issue with rate payers would be to consider changing the 75:25 debt/equity ratio within 20 years. Rate impacts should not only be discussed, but also fully understood by Manitobans regardless of which plan is considered.

From system reliability perspective the PDP is preferred; however all of the development plans can handle load requirements under the majority of adverse conditions. The approach and assumptions are reasonable.

5.2.3 Manitoba Government

This account assesses the net benefit or cost (incremental net revenue) of the different plans to the Manitoba Government (ultimately the taxpayer). The key assumption under this account is to remove tax impacts that do not constitute incremental net revenues for government. The account identifies only direct incremental taxes and fees paid by Manitoba Hydro, net of incremental Government cost or risks. Issues pertaining to government cost or risk are dealt with under other aspects of the NFAT review.

The account provides a summary of the total payments made to government inclusive of capital tax, water rentals, debt guarantee fee, sinking fund administration fee, coal tax and potential carbon charges to derive total payments to the Manitoba government. Table 13.3 of Chapter 13 of the NFAT provides a summary of direct payments (which are substantial) for context, however such costs must be considered in relation to net benefits to government.

The key net benefits are the direct incremental taxes and fees paid by Manitoba Hydro net of incremental government costs or risks, essentially, water rentals and capital taxes, which are greater in the hydro, based plans.

This account also illustrates the net debt in context to the overall balance sheet. It is noted that debt is high with the PDP, in the early years due to construction; the debt is offset in later years due to overall higher fixed assets and retained earnings.

Observations:

The Manitoba Government account is specific to net benefits to government over the period of the Plan (78-years). PDP provides the greatest net benefit based on this accounts assumptions that are reasonable. The key generators of revenues to the Provincial Government are the capital taxes and water rentals.

5.2.4 Manitoba Economy

The Manitoba Economy account assesses the consequences of the different plans for the Manitoba economy and considers based on the NFAT reference scenario:

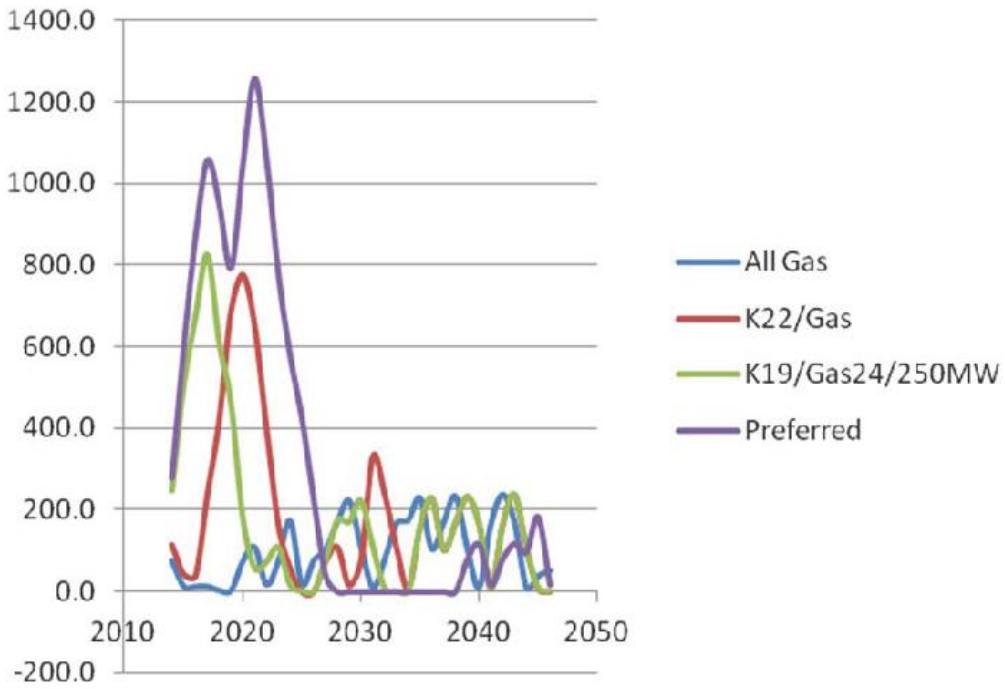
1. Annual capital expenditures with each plan over the alternatives life cycle.
2. Annual employment for project construction over the alternatives life cycle.
3. Annual employment for project operations and maintenance over the alternatives life cycle.
4. Comparison of gross wages for construction and operations and maintenance over the alternatives life cycle.
5. Comparison of the incremental income based on assumptions regarding the economic rent and jobs being filled based on regional employment differences.

The employment information utilized for this account was based on raw data provided by the construction and planning groups. The PDP is more capital and labour intensive than the alternative plans. It stands to reason that annual employment projected for construction would also be greater.

An important assumption made in the Manitoba Economy Account is that in well-functioning economies, the incremental income (defined as economic rent) is relatively small, as incentives are required to attract workers away from existing jobs (regions with relatively low unemployment), whereas in poorly performing economies (with high unemployment), in which new wages (jobs) are created and those unemployed can secure such jobs, the economic rent can be significant. As noted in the EIS (supported in Chapter 13) there is higher unemployment in northern Manitoba than in southern Manitoba. Consequently, the economic rent derived in northern Manitoba would be greater than that of southern Manitoba.[50]

The exhibit below depicts the total annual employment, directly required for the construction of all plans. The greatest amount of construction employment is generated by the PDP followed by the two plans, which include Keeyask. The gas plans generates the least amount of construction employment.

Exhibit 15: Annual Employment for Project Construction



Source: Figure 13.5, Chapter 13, Multiple Account Analysis

[50] As noted in Chapter 13 Statistics Canada data indicated that at the 2001 unemployment rate for Keeyask Cree Nation was 40% and for the Northern Manitoba Aboriginal population (census divisions 19,2122, 23) was 28% compared to 6.1% to Manitoba as a whole.

The demand for Labour during operations is different. While all of the alternative plans generate increasing amount of annual O@M employment towards the end of the planning period, the three alternatives without Conawapa GS generate more annual employment than the preferred PDP, because of the need for more thermal plants to be constructed and maintained to meet growing load over the longer term.

Potential incremental income that employment (wages) offers for Manitobans is derived from assumptions made in regard the willingness to take jobs in the regions in which the alternative plans are located.[51] For the purpose of this account employment net benefits are measured by wages that are paid less the minimum amount of workers would have to be paid to take the jobs. This approach nets out the economic rent.[52]

Table 13.5 of Chapter 13 (Gross Wages for Construction and O&M) presents gross wages compared to the alternative plans. Again to derive the net benefits (which are measured not by the gross impact (Table 13.5) but by the incremental income) assumptions regarding northern and southern communities overall net benefit are identified:

- Construction: Northern communities the net benefit would 19.14%, southern communities 15% of the gross wages paid.
- Operations: Northern communities net benefit would be 30.75 % of the total gross wages paid, southern net benefits of wages paid would be 15%.

The results are presented In Table 13 below.

Table 13: Employment Net Benefits for Project Construction and O&M

	Preferred Development Plan	K19/G24/250MW	K22/Gas	All Gas
Construction Northern Manitoba	234.4	113.2	95.1	0.0
Construction Southern Manitoba	6.1	12.7	10.6	9.0
Total Construction	240.5	125.8	105.7	9.0
O&M Northern Manitoba	39.2	23.6	18.9	0.0
O&M Southern Manitoba	0.5	7.1	5.6	10.9
Total O& M	39.7	30.7	24.5	10.9
Gross Wages	280.20	156.5	130.3	19.8
Difference from the Preferred Development Plan	0	(123.7)	(150.0)	(260.3)

Source NFAT: Reference Scenario Assumptions (2014 Present Value in Millions).

[51] This account is different than the economic impact analysis that serves to estimate the direct, indirect and induced demand for labour generated by project expenditures. Economic impact measures gross effects not incremental employment or wages.

[52] Economic rent arises from conditions of exclusivity or scarcity. Economic rent can be used to demonstrate numerous pricing discrepancies in the real world. For example, a worker may be willing to work for $15 per hour, but because she belongs to a union, she receives $18 per hour for the same job. The difference of $3 is the worker's economic rent. As another example, the owner of a property in an exclusive shopping mall may be willing to rent it out for $10,000 per month, but a company that is keen to have a retail storefront in the mall may offer $12,000 as monthly rent for the property to secure it and forestall competition. The difference of $2,000, in this case, is the owner's economic rent.
(http://www.investopedia.com/terms/e/economicrent.asp) Essentially it is the difference between moving from one job to another for greater pay and the

Observations:

The Manitoba account is specific to the net employment and wages generated by the project in each plan, based on assumptions related to the net benefits based on location (southern vs. northern Manitoba). The approach and assumptions are reasonable.

5.2.5 Social

The social account addresses the consequences of the different plans for aboriginal and non- aboriginal communities as well as other social effects not addressed in the other accounts. Benefits to project partners, local and regional partners and Manitoban's as a whole are considered.

This account also considers the long-term sustainability attributes of the plans, namely the heritage/bequest value (or legacy value) of assets remaining at the end of the planning period (refer to Section 3.4). The bequest value is the acknowledgement that society is willing to pay or allocate resources today for the benefit of future generations.

Project Partners

The JKDA outlines the investment; employment and direct contract awarding that would benefit the four Cree Nations (refer to Section 3.5 of this report), inclusive of the current construction of the KIP project. As per the JKDA which guarantees that certain person years of construction employment be provided to the Partnership, as well as direct award contracts, such opportunities represent significant contributions to project partners and foster capacity building within these communities. Over the longer term (operations) there is a target under the JKDA of 182 KCN members in operating positions within Manitoba Hydro[53].

Equity ownership up to 25% is also provided to project partners that would generate significant returns, and while a similar approach has not been signed for Conawapa Generating Project (CGP) there is intent to do so.

MH has secured unique relationships with First Nations and northern communities that will generate significant socio-economic benefits, and satisfy MH corporate objectives related to economic development and fostering relationship with Aboriginal people.

Local and Regional Partners

Local and regional community impacts and mitigation are outlined in detail in the EIS Report:

- Socio-economic Environment Resource Use and Heritage Resources;
- Section 3: Economy;
- Section 4: Population Infrastructure and Services; and
- Section 5: Personnel Family and Community Life.

Overall the PDP generates significant employment benefits throughout the region both for First Nations and northern communities (the communities of Gilliam (MH company town) and to a lesser extent Thompson). While concerns regarding wage pressures, commercial trapping and drug and alcohol abuse are noted in the environmental impact statement as well as potential impacts on housing, the effects will be dealt with via on-going monitoring of the issues as commitments made in the EIS.

[53] Refer to Keeyask Hydro Power Limited Partnership EIS, Chapter 6

There will be significant benefits during the construction and to a lesser extent operations. MH has also made commitments in local communities. The improvements to the road access to the Keeyask will also represent a long-term benefit to northern Manitobans (refer to Section 3.6 of this report).

Manitobans as a Whole

The NFAT business case speaks to the perceived societal benefits of renewable energy vs. fossil fuels, and GHG gas emissions. One key noted benefit to Manitoban's is the bequest value (or legacy value) of the hydroelectric assets. The bequest value of the assets is defined as the benefits for future generations of Manitobans. Hydroelectric assets have long been recognized as having significant bequest value, and is suggested that this is evident in the low rates exhibited in provinces that have undertaken such investments, such as British Columbia, Québec and Manitoba (refer to section 4).

From an economic theory perspective the concept of the intergenerational consequences of investment and policy decisions remains an on-going point of contention. Lower discount rates utilized in the NFAT business case regarding the social cost of capital enhance the attractiveness of such investments compared to how the private market would discount the project. Economists suggest (as highlighted the NFAT Chapter 13, Pages 66 of 74), some government cost-benefit guidelines have in fact adopted declining real discount rates over time to give greater weight to intergenerational impacts.

Hydroelectric facilities do have a significant bequest value, which is a significant benefit to all Manitobans.

However, Appendix 9.3 - Economic Evaluation Documentation, Table 1.2, identifies sunk costs associated the Keeyask and Conawapa related to as stated in-service dates.

Table 14: Capital cost as Net of Sunk costs Used for Economic Evaluation Keeyask GS and Conawapa GS by In-service Date

	Keeyask 2019	Keeyask 2022	Conawapa 2025	Conawapa 2026	Conawapa 2029	Conawapa 2031
Base Cost	$4.3	$4.4	$6.0	$6.1	$6.2	$6.3
Sunk cost to June 2014	($1.0)	($1.0)	($0.3)	($0.3)	($0.3)	($0.3)
Evaluation Costs	$3.3	$3.4	$5.7	$5.8	$5.9	$6.0

Source: Appendix 9.3 - Economic Evaluation Documentation, Table 1.2

While bequest value is significant and not monetized in context to this review, one also has to consider the initial sunk costs that are not reflected in the evaluation.

Observations:

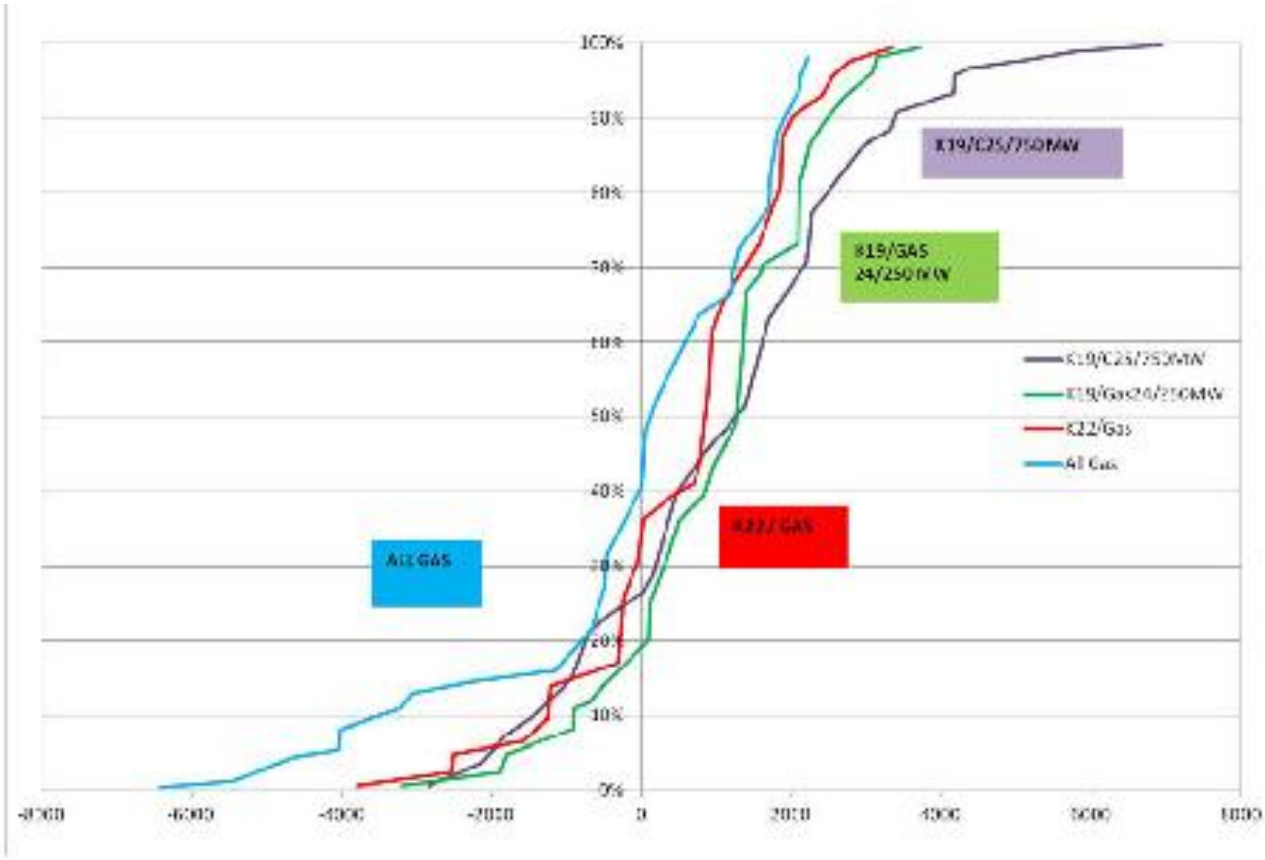
From a social perspective there are significant benefits to project partners, local and regional communities and Manitobans as a whole resultant from the PDP. The bequest value of such hydro facilities is also significant and is highlighted for the PUB board in its decision-making.

5.2.6 Risk and Uncertainty

How MH manages risk and uncertainty in relation to all alternatives is critical, and affects the results of this review. Longer-term assumptions past the 20-year forecast period are subject to considerable variation and ambiguity (load forecasts, construction costs, demand side management etc.).

Risk and uncertainty is addressed through the presentation "S"-curves illustrating the growth and variability of each alternative plan over time. Each reference plan (and the assumptions inherent in each) is presented as "S"-curve, illustrating the cumulative probability outcome values ($) over time, both positive and negative.[54]

Exhibit 16: Manitoba Hydro Net Revenue S-Curves



Source: Chapter 13 - Integrated Comparison of Development Plans - Multiple Account Analysis

Key aspects of risk and uncertainty are presented in context to the net present value variation associated with each plan. While a wide range of outcomes are presented, the PDP does offer the greatest upside potential, whereas the gas plans the most downside potential. The options with both hydro and gas small interconnection has less downside risk but not the upside of the PDP.

As Chapter 13 notes, what differentiates the plans is not the extent of downside risk but what is foregone by initial decisions to proceed, such as the revenues secured as part of export contracts.

Ultimately the ability of risk and uncertainty to be managed by each resource plan is dealt with and discussed in Chapter 14 - Conclusions. Chapter 14 presents a synthesis all of the technical information presented in the NFAT Business Case and introduces the concept of "pathways" in relation to critical time based decisions that enable

[54] An S curve is a type of curve that shows the growth of a variable in terms of another variable often expressed as unities of time (http://www.businessdictionary.com/definition/S-curve.html#ixzz2nZI1dTDD)

MH to verify the various components of the PDP, as presented, based on new information and changing market conditions. Chapter 14 is based on grouping the development plans into 5 pathways to assist the integration of results and assist in drawing conclusions on each commitment choice that must be made in 2014 and thereafter.

The pathways are established to enable MH modify the PDP based on continued input into those areas of uncertainty.

The ability to adapt to changing market conditions and change the ultimate plan represents a critical means of minimizing risk and uncertainty from a socio-economic perspective. The importance of which cannot be overstated.

Observations:

The Multiple Account Benefit Cost Approach (MA-BCA) was utilized to evaluate alternative plans identified by MH. The MA-BCA approach is a standard method in assessing the broader socio-economic benefits of an infrastructure investment, focused on the identification of net benefits. The MA-BCA consisted of the following accounts in the determination of the relative advantages and disadvantages and incremental benefits of each alternative plan: a market evaluation account, Manitoba Hydro customer account, Manitoba government account, Manitoba economy account, environment account, Social and Risk and uncertainty account. The assumptions utilized in the determination of MA-BCA results are reasonable.

The following table provides a summary of the MA-BCA as presented based on the reference scenarios. As noted the assumptions utilized in the analysis are commented upon above.

Table 15: Summary Comparison of Alternative Plans from a Socio-economic Perspective

Account	All Gas	K22/Gas	K19/G24/250MW	Preferred Development Plan
Market Valuation Account (1)	This option exhibits the highest net costs, significantly higher than the other options	This options net cost is $270.5 m higher than the PDP	This options net cost is the lowest	The PDP has 2nd lowest net costs. This plan entails much higher capital expenditures, which is offset by higher firm export sales and residual value of the assets
Manitoba Customer Account (2)	**Rate Impacts** The projected cumulative rate increase would be 90%, a 3.4 to 3.5% annual rate increase **System Reliability** This option has the least load carrying capacity	**Rate Impacts** The projected cumulative rate increase would be 92% a 3.4 to 3.5% annual rate increase **System Reliability** This option has the third greatest peak load carrying capacity. The interconnection and additional hydro resources contributes to reliability	**Rate Impacts** The projected cumulative rate increase would be 90% a 3.4 to 3.5% annual rate increase **System Reliability** This option has the second greatest load carrying capacity. The interconnection and additional hydro resources contributes to reliability	**Rate Impacts** The projected cumulative rate increase is 108%, a 3.95 % annually rate increase **System Reliability** The PDP has the greatest load carrying capability. The interconnection and additional hydro resources contributes to reliability
Manitoba Government (3)	The all gas plan generates the least net benefit to government	The K22/ Gas plan generates less than the PDP but more than the all gas plan due to capital taxes	The K19/ G24/250MW generates less than the PDP but more than the all gas plan due to capital taxes	The PDP generates the greatest net benefits to the Manitoba government, driven predominantly from water rentals and capital taxes
Manitoba Economy (4)	**Employment Net Benefits** The all gas plan generates the least net benefits during construction (9.0 m) **Operational Net Benefits** Total O@M benefits are $10.9m	**Employment Net Benefits** This plan generates $105.7m in construction net benefits **Operational Net Benefits** Total O@M benefits are $24.5m	**Employment Net Benefits** This plan generates $125.8m in construction net benefits **Operational Net Benefits** Total O@M benefits are $30.7m	**Employment Net Benefits** The PDP generates $240.5 m in construction net benefits **Operational Net Benefits** Total O@M benefits are $39.7

Account	All Gas	K22/Gas	K19/G24/250MW	Preferred Development Plan
Social Account (5)	**Project Partners** No plans to enhance local employment opportunities (no JKDA). **Local and Regional Partners** No plans to enhance local employment opportunities (no JKDA). **Manitoban's as a whole** Support in fossil fuel rather than a renewable energy solution - fossil fuels may not be supported socially. While jobs will be generated they will be located in areas that do not suffer high unemployment and therefore economic rent will be lower.	**Project Partners** Secures the benefits under the JKDA to project partners. **Local and Regional Partners** Significant employment benefits would occur throughout the region, inclusive of spin off benefits in Gillam and Thompson as a result of Keeyask construction. Potential adverse effects such as alcohol abuse and community conflicts with workers identified but appropriate mitigation identified in the EIS. **Manitoban's as a whole** Societal benefits of renewable energy solutions rather than fossil fuels and bequest value (the benefits of assets benefiting future generations).	**Project Partners** Secures the benefits under the JKDA to project partners. **Local and Regional Partners** Significant employment benefits would occur throughout the region, inclusive of spin off benefits in Gillam and Thompson as a result of Keeyask construction. Potential adverse effects such as alcohol abuse and community conflicts with workers identified but appropriate mitigation identified in the EIS. **Manitoban's as a whole** Societal benefits of renewable energy solutions rather than fossil fuels and bequest value (the benefits of assets benefiting future generations).	**Project Partners** The greatest benefit to Project partners is achieved under the PDP provided a similar agreement is established for Conawapa, which is envisioned **Local and Regional Partners** Significant employment benefits would occur throughout the region, inclusive of spin off benefits in Gillam and Thompson as a result of both Keeyask and Conawapa construction. Potential adverse effects such as alcohol abuse and community conflicts with workers identified but appropriate mitigation identified in the EIS. **Manitoban's as a whole** Societal benefits of renewable energy solutions rather than fossil fuels and bequest value (the benefits of assets benefiting future generations) are greatest in the options due to both Keeyask and Conawapa being constructed.
Uncertainty and Risk Account (6)	The downside (negative impacts) risk is greatest for the all gas plan, whereas the upside risk (positive impacts) is least for the all gas plan. The development of Pathways provides further opportunities to modify plans going forward.	The downside (negative impacts) risk are relatively even for the PDP and K19/Gas 24/250MW options, whereas the upside risk (positive impact) is greater than all gas but less than the PDP and the K19/Gas24/250MW. The development of Pathways provides further opportunities to modify plans going forward.	The downside (negative impacts) risk are relatively even with the K22/Gas and the PDP options whereas the upside risk (positive benefit) from partial export sales is greater than the all gas and K22/Gas options. The development of Pathways provides further opportunities to modify plans going forward.	The downside (negative impacts) risks are relatively even the K22/Gas and K19/Gas24/250mw options whereas the upside risk from export sales is the greatest. The development of Pathways provides further opportunities to modify plans going forward.

Notes

(1) Under the Market Valuation Account the discount rate represents the key factor affecting the outcome in this account. Projects with longer life cycles, such as hydroelectric projects, consider the social cost of capital in their economic evaluations , with the lower the discount rate the greater the net present value , the higher the discount rate the less the net present value .A discount of rate of 6% is utilized reflecting current literature and other utility benchmarks, as the social opportunity cost of capital. The present value are based on the estimated incremental capital and system operating expenditures and revenues over the 2014-2047 period.

(2) Under the Manitoba Customer Account the rate increases would be required to achieve a target 75:25 debt/equity ratio by year 20 (2031/32). The rates identified are expressed in nominal dollars that include the general rate of inflation. The real increase after adjusting for inflation would be approximately 1.9% per year less. Under the Manitoba

Customer Account the system reliability section confirms that all of the different plans are designed to ensure MH has sufficient resources to be able to meet its peak and annual load even under a wide range of forced outage and extreme weather conditions.

(3) Manitoba Government Account assesses the net benefit or cost of the different plans to the Manitoba government and analyses the incremental net revenues accruing to the government. Capital tax (a tax on a corporation's taxable capital, comprising capital stock, surpluses, indebtedness and reserves. Capital tax is applicable to capital owned by a company, not its spending. Capital taxes, in contrast to income taxes, are charged regardless of the profitability of the firm). Also known as "corporation capital tax", water rentals, debt guarantee fee, sinking fund administration fee, coal tax and potential carbon taxes are dealt with within this account.

(4) The Manitoba economy account is specific to the demand for Labour associated with construction and operations. The development plans that support the greatest potential for economic rent or net benefits associated with wages and salaries provides the greatest socio-economic benefit. The Manitoba economy account considers and incorporates the northern and southern employment /unemployment rates and a proportion of wages that would generate net benefits. Numbers are based on 2014 dollars.

(5) The social account provides a summary of the benefits to project partners local and regional partners and Manitobans' as a whole, which pertains to the use of renewable energy and bequest value of the reaming hydroelectric or gas assets upon completion of the assets life cycle.

(6) The uncertainty or risk account of the MA-CBA presents "S" curves illustrating the growth and variability of each alternative plan over time. Each reference plan (and the assumptions inherent in each) is presented as "S" curve, illustrating the cumulative probability outcome values ($) over time, both positive and negative. From a socio-economic perspective key aspects of risk and uncertainty are presented in context to the net present value variation associated with each plan, and whether to residents of Manitoba will be responsible for such risks.

5.3 The Significance of Pathways

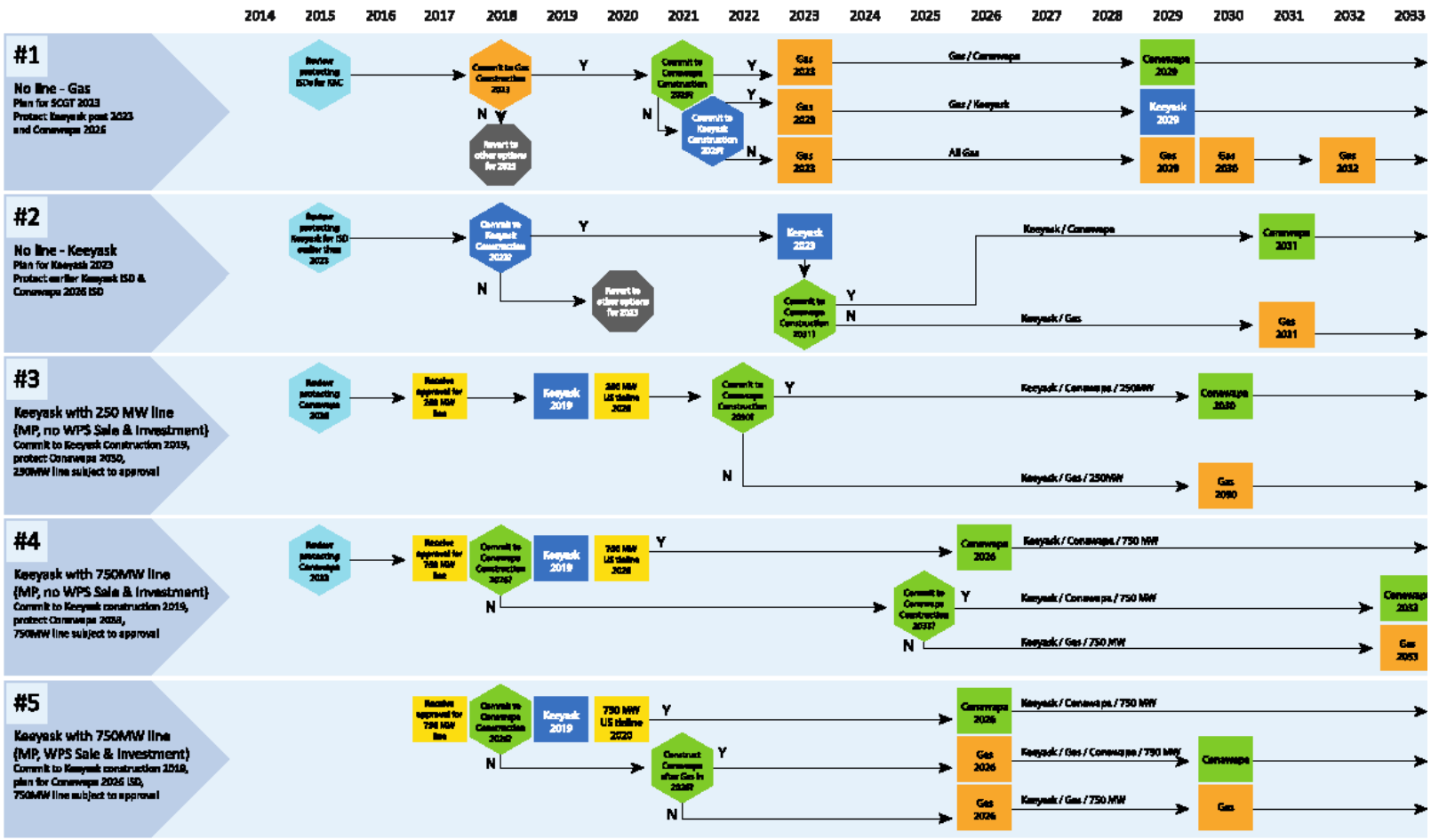
Pathways are established to address future uncertainties inherent in the NFAT submission related to the plans for new generation. Load growth forecasts, on-going plans, new export contracts, natural gas price forecasts, export price forecasts capital cost estimates, retirement of existing gas generation and other parameters all impact on the recommendation associated with the PDP. Over time although such forecasts remain uncertain, the passage of time will provide additional information learning's available to reduce such uncertainty.

Accordingly, the ability of MH to adapt to changing conditions enables the province of Manitoba MH to make more informed decisions. The decision pathways enable MH the flexibility to modify the PDP. For example, the PDP can be supported currently although a decision specific to the construction of Conawapa does not have to be made until 2018.

Long term flexibility to respond to events or changing market conditions as they unfold is fundamental to managing risks and dealing with such fundamental uncertainties. Five pathways have been identified and are depicted below.

Thus, if circumstances warrant the selected development plan will and can be modified over time. The specific components in the preferred and alternative plans assessed in the MA-BCA are shown below.

Exhibit 17: Project Pathways for the preferred and Alternative Development Plans



Observations:

MH has considered potential pathways to limit the longer-term risk and uncertainty within the PDP. The decision pathways enable MH the flexibility to modify the PDP to address those longer term risk factors such as load growth, on-going (DSM), new export contracts (and prices), natural gas price changes, capital costs etc. From a socio-economic perspective the ability to adapt policy to evolving and ever changing social and market conditions is crucial. The most critical decision point within the pathways if the PDP is pursued (i.e., construction of Keeyask) is a decision specific to the construction of Conawapa, which does not have to be made until 2018. In the in-term if the PDP is pursued the above risk factors should be studied in relation to the Conawapa decision, and reported back to the PUB. The government of Manitoba should provide the PUB legislative authority to review such plans as such risks are addressed.

6 HIGH LEVEL REVIEW OF APPROACHES TO OPTIMIZING PROVINCIAL ECONOMIC BENEFITS OF LARGE SCALE RESOURCE PROJECTS

This section provides a high-level analysis of how other Canadian jurisdictions maximize provincial economic benefits from the development of large-scale resource projects and assesses if the PDP provides the highest level of socio-economic benefits to Manitobans.

6.1 Benchmark Review of Manitoba Hydro, Québec Hydro and Nalcor Energy

This section compares NALCOR's (Newfoundland and Labrador Hydro) Lower Churchill Project and Québec Hydro's Eastmain and Rupert Diversion Project with that of MH PDP. As both hydroelectric projects are sited in northern boreal forests and sparsely populated areas, they have similar geographical characteristics as with PDP. The power produced is intended to support future load requirements as well as export markets (provincial revenues), and the projects are sited on rivers that have historically been developed for hydroelectric power, the selection of such provides a defensible benchmark.

This high level review is based on available published information of the utilities website, inclusive of environmental impact statements and joint panel review hearing reports.

6.2 Manitoba Hydro: the Preferred Development Plan

Sections 1 and 3 of this report provide insight into the initiatives taken by Manitoba Hydro regarding optimization of provincial benefits via a review of the economic impact assessment results, and benefits to First Nations.

6.3 Nalcor Energy

6.3.1 The Lower Churchill Hydroelectric Project: Muskrat Falls and Gull Island Newfoundland and Labrador

The Muskrat Falls and Gull Island Hydroelectric Project have a combined capacity of more than 3,000 megawatts and are located on the lower Churchill River in Labrador. The Lower Churchill Project will be developed in two phases first, Muskrat Falls (824 megawatts) and then Gull Island (2,250 megawatts).[55]

6.3.1.1 Muskrat Falls

Phase one of the Lower Churchill Project is referred to as the Muskrat Falls Project. The project includes an 824-megawatt hydroelectric generating facility at Muskrat Falls, the Labrador-Island Link that will transmit power from Muskrat Falls to Soldiers Pond on the Avalon Peninsula, and the Maritime Link connecting Newfoundland and Nova Scotia. The Muskrat Falls project was sanctioned by the Government of Newfoundland and Labrador in December 2012, and construction is expected to take five years to complete.

[55] As noted in this review the MH Plan includes the 695MW Keeyask project followed by the 1485 MW Conawapa Hydroelectric project

6.3.1.2 Gull Island

Phase two of the Lower Churchill Project will consist of the development of the 2,250 MW Gull Island generation facility and associated transmission to markets. The proposed development of Gull Island would follow no earlier than three years after the sanction of Muskrat Falls, similar to what is proposed for Conawapa.

6.3.2 Determination of Economic Benefits

Provincial input output modeling was utilized in the determination of Canada wide and provincial benefits.

6.3.2.1 Canadian Wide Benefits

Canadian, Provincial and Regional (site specific) benefits are outlined on the Provincial website. It is noted that the development of Muskrat Falls and the transmission link to Nova Scotia is a national project (interprovincial interests), as reflected by the estimated Canada-wide benefits realized during construction and operations.[56]

6.3.2.2 Provincial Benefits: Newfoundland and Labrador

Newfoundland and Labrador Provincial Benefits will be optimized as per the Province's Benefits Strategy for the Lower Churchill Construction Project with Nalcor, which ensures opportunities for the people of the province. Total direct, indirect and induced employment in the province is estimated to be 18,400 person years. Peak direct employment in Newfoundland and Labrador will be approximately 2,700 people in 2013. After construction is complete, Newfoundland and Labrador employment will continue with an estimated 120 direct full-time jobs.[57]

6.3.2.3 Regional (Labrador)

The Provincial Government's regionally based benefits strategy for the project was developed to provide consideration to Labrador's Innu Nation and qualified residents of Labrador before those from other parts of the province. Studies suggest more than 7,500 person-years of direct, indirect and induced employment will take place in Labrador – an average of 1,150 people per year – throughout the development of Muskrat Falls. More than 75 percent of the direct Labour for the Muskrat Falls Generation Facility will be undertaken in Labrador. Approximately $450 million in income to business and labour will be earned by Labradoreans' and Labrador-based businesses.

Nalcor, to facilitate regional (local) benefits has committed to competitive terms and conditions of employment for workers. Workers receive an attractive compensation package inclusive of competitive wages, and high quality accommodations, transportation and accessible training. In 2012, Nalcor Energy launched (www.muskratfallsjobs.com), an online employment database where anyone interested in working on the project can be included in a database, with the objective that individuals can create an online resume, find information about contractors working with the project, and learn more about the many job opportunities that will be available throughout construction.

Registering with muskratfallsjobs.com represents the key means NALCOR pursued to ensure an individual's resume and information is accessible to contractors and unions seeking qualified workers with the project.

[56] Newfoundland and Labradorhttp://www.gov.nl.ca/lowerchurchillproject/backgrounder_4.htm

[57] Ibid

6.3.3 Provincial Economic Benefit Agreements

The Provincial Government and Nalcor committed to optimizing benefits with the business community via the following commitments made in:[58]

- Benefits Strategy with the Government of Newfoundland and Labrador
- Benefits Memorandum of Understanding between the Governments of Newfoundland and Labrador and Nova Scotia.

6.3.4 Economic Benefit Agreements with Innu Nations (November 11 2011)

Negotiations have been on-going between the Innu Nation and the Province of Newfoundland and Labrador in separate forums for many years. On September 26, 2008, Nalcor Energy, the Government of Newfoundland and Labrador and Innu Nation signed the Tshash Petapen (New Dawn) Agreement. Since that time, the parties have worked to complete three agreements:[59]

- A tripartite Innu Land claim and Self-government Agreement-in-Principle between Canada, Newfoundland and Labrador and Innu Nation (AIP)
- The Lower Churchill Project Innu Impacts and Benefits Agreement (IBA)
- The Upper Churchill Redress Agreement (UCRA)

These three agreements were ratified by the Innu in, 2011, and signed by the parties on November 18, 2011. The IBA and the UCRA come into effect immediately upon signing. The AIP will form the basis for on-going treaty negotiations between the Innu, Canada and Newfoundland and Labrador.

6.3.4.1 Land Claims and Self-Government Agreement-in-Principle with the Innu of Labrador (AIP)

The Labrador Innu asserts Aboriginal rights and title throughout a large area of central Labrador and Eastern Québec including the North Shore of the Gulf of St. Lawrence. No treaty has ever been signed with the Innu of Labrador. The Agreement-in-Principle (AIP) sets out jurisdictions, rights, benefits and limitations for the Labrador Innu in a variety of subject areas. These include the harvesting of forest resources and plants; fish; migratory birds; and wildlife. All rights and benefits are directly tied to specific geographically defined lands. Specific to the AIP four types of lands referenced, inclusive of the area of land under Innu control, the Labrador Innu settlement Area (LISA), and the rights to harvest within permit free hunting area and the economic and hydroelectric major development impacts and benefits areas, that would give the Innu the right to Impact and Benefit Agreements for Major Developments as defined in the AIP. While the AIP is not a legally binding document it does set the context for the related benefit agreements related to proposed hydroelectric developments.[60]

6.3.4.2 Lower Churchill Project Impacts and Benefits Agreement

The following benefits have been determined:

- Financial benefits:
  - Five per cent of net project revenue

[58] Backgrounder Execution of Agreements with the Innu Nations November 18, 2011

[59] Execution of Agreements with Innu Nations (November 11 2011 http://www.gov.nl.ca/lowerchurchillproject/backgrounder_9.htm

[60] Backgrounder: Highlights: Land claims and Self Government Agreement in Principle with the Innu of Labrador (www.aadnc-aandc.gc.ca/eng/1321571114945/1321571168634)

  - Five million dollars per year payable upon Lower Churchill Project sanction until commercial power
- Employment and training participation objectives in place for construction and operations.
- A target of $400 million in contracts for Innu businesses.
- Joint Nalcor-Innu Environmental Management Committee responsible for:
  - Environmental policies
  - Environmental Management System
  - Review and consideration of Innu knowledge
- Innu Nation will provide Nalcor with a comprehensive release and indemnity relating to any adverse effects associated with the development of the Lower Churchill Project.

6.3.4.3 Upper Churchill Redress Agreement

The Agreement provides compensation to the Labrador Innu for impacts associated with the Upper Churchill Falls development over the full project lifecycle.

- The compensation structure is an annual settlement payment of $2 million per year (indexed annually at 2.5 per cent) upon execution of the Final agreement until August 31, 2041, after which the Labrador Innu will be entitled to an annual dividend share of three per cent of Nalcor's revenue from the existing Churchill Falls development.
- Prior to September 1, 2041, the Innu Nation has the option to convert the annual settlement payments into an annual dividend share or percentage of revenue from the existing Churchill Falls development. This option is triggered if the revenue from the Power Contract between Churchill Falls (Labrador) Corporation and Québec Hydro changes.
- The Agreement provides the Province of Newfoundland and Labrador and Nalcor with a comprehensive release and indemnity against claims by the Labrador Innu relating to the Churchill Falls development.

6.3.5 Procurement Process

Throughout project construction, business opportunities will be made available via direct supply to Nalcor Energy or as a subcontractor or supplier to the project's primary contractors. Businesses interested in supplying works, goods and services to the project are encouraged to monitor the website for forecasted, active and awarded contract packages to identify potential opportunities matching expertise. All contractors, subcontractors and suppliers interested in supplying works, goods and services to the project are required to complete and return a Vendor/Contractor Registration Questionnaire to be added to the database of potential suppliers. The procurement process for primary contract opportunities with the project is managed by the following:

1. Upcoming contract packages and scopes of work are identified in the procurement forecast, available by selecting the Procurement Forecast link on Project website.
2. Expressions of Interest (EOI) and Bidder selection documents for contract packages are posted online in the Bidder Selection and RFP section of Project website.
3. Evaluation and selection of bidders.
4. Requests for Proposals (RFP) are issued to bidders selected through the Bidder Selection phase. The bidders list is then available online through the corresponding contract package.
5. Evaluation of proposals received through the RFP process.
6. Contact information for the successful contractor is available in the Awarded Contracts section of the Project website.

6.3.5.1 Subcontractor Opportunities

In addition to major contract awards, the project will generate significant subcontract opportunities for goods and services that will be required throughout construction. Subcontracted opportunities will be managed by primary contractors and suppliers with the project. Businesses can take advantage of subcontract opportunities by:

- Contacting bidders and primary contractors/suppliers directly. Contact information for approved bidders and primary contractors/suppliers with the project is available in both the Bidder Selection and Request for Proposals section and the Awarded Contracts section of the Project website.
- Regularly monitoring forecasted, active and awarded packages to identify areas for potential subcontract opportunities matching their area of expertise. All procurement information and scopes of work for contract packages are available by navigating the Project website.

While an Engineering, Procurement and Construction Management (EPCM) consultant for the development of the Muskrat Falls hydroelectric generating facility and the Labrador-Island Link has been selected, procurement opportunities with the project are managed by an integrated supply chain team with representatives from Nalcor and EPCM contractor to further ensure regional (local) content is supported.

Observations:

Nalcor, the Federal and Provincial Governments, and Innu peoples have worked to establish agreements to support economic development within the north. Long-term provincial economic benefits are derived by the sale of surplus power. In the short term, optimization of employment provincially and locally during construction has been identified via procurement strategies in which local businesses, service providers and individuals looking to obtain work are solicited and given preference too. While it is up to the contractors to assemble teams, procurement opportunities with the project are managed by an integrated supply chain team with representatives from Nalcor and contractor to further ensure regional (local) content is matched.

The Innu people's long term negotiations with the Province of Labrador and Newfoundland has resulted in the signing of the New Dawn agreement that articulates through AIP, IBA UCRA the benefits associated with undertaking the Muskrat Falls project for the regional populations.

6.4 Québec Hydro

6.4.1 The James Bay Hydro Electric Project: Québec Hydro; an Overview

In 2002, the Québec Government and the Grand Council of the Crees signed an agreement, "La Paix des Braves" ("The Peace of the Braves"), ensuring the completion of the last phase of the original James Bay Project: construction of the Eastmain-1 generating station, with a capacity of 480 MW, and the Eastmain Reservoir with a surface area of about 600 km^2. A subsequent agreement in April 2004 opened the way to a joint environmental assessment of the projected diversion of the Rupert River, to the south of the Eastmain River.[61] The project entails the diversion of about 50% of the total water flow of the Rupert River (and 70% of the flow at the diversion point)

[61] By 1986, the largest generating stations and reservoirs on the La Grande River were completed, including the Robert-Bourassa (originally named La Grande-2), La Grande-3 and La Grande-4 generating stations, with an installed capacity of 10,800 MW, and five reservoirs covering an area of 11,300 $km^{2.}$ Collectively these projects are known as the James Bay Hydro Electric Project. The Eastmain and Caniapiscau River diversions each added 800 m^3/s of water to the La Grande River. During the late 1980s and early 1990s, construction of the second phase of the James Bay Project centered on the construction of five secondary power plants on the La Grande River and its tributaries (La Grande-1, La Grande-2A, Laforge-1, Laforge-2 and Brisay), adding a further 5,200 MW of generating capacity by the end of 1996.

towards the Eastmain Reservoir and into the La Grande Complex, and the construction of two additional generating stations: Eastmain-1A and Sarcelle, with a combined capacity of 888 MW.[62]

6.4.2 Eastmain-1A and Rupert Diversion Hydropower Project

Specific to the Eastmain-1A and Rupert Hydro Project consists of:

The project estimated to cost $5 billion dollars consists of three main components:[63]

- Construction of a 768-MW powerhouse, Eastmain-1A, near the existing Eastmain-1 powerhouse.
- Construction of a 150-MW powerhouse, Sarcelle, at the outlet of Opinaca reservoir.
- Partial diversion of the Rupert River to these two generating stations and from there to Robert-Bourassa, La Grande 2A and La Grande-1 generating stations.

The Rupert diversion includes four dams, a spillway 74 dykes, two diversion bays and a 2.9 km long tunnel and a network of canals with a total length of about 12 km to facilitate flow in the various portions of the diversion bay. To bring the output from the new generating facilities onto the power grid, 315-kV lines were built.

6.4.2.1 Provincial Economic Benefits of the Eastmain-1A/Rupert Project

Construction of the Eastmain-1A and Rupert Diversion project will generate economic spinoffs of nearly $2.4 billion for all of Québec, including direct, indirect and induced spinoffs. As for the northern region of Québec (Nord-du-Québec administrative region), where the project will be carried out, it will benefit from 9% of the economic spinoffs.[64]

To optimize the potential economic benefits for northern Québec residents (predominantly Cree) a number of agreements were concluded to promote economic development in the region. A brief description of each is provided below:

6.4.2.2 Provincial Economic Benefits: Aboriginal Agreements

The James Bay and Northern Québec Agreement (JBNQA) – was signed on November 11th 1975. This agreement originally only covered claims made by Québec Cree Indians and Inuit, on 31 January, 1978; the Naskapi Indians of Québec signed a parallel agreement – the Northeastern Québec Agreement - and joined under the 1975 accord.[65]

---

[62] Wikipedia

[63] Quebec Hydro http://www.hydroquebec.com/rupert/en/projet_en_bref.html

[64] Government of Quebec (http://www.mddep.gouv.qc.ca/evaluations/eastmain-rupert/rapport-comexen/economic.htm)

[65] In the 1960s, Quebec began developing potential hydroelectric resources in the north, and in 1971 created the *James Bay Development Corporation (JBDC)* to pursue the development of mining, forestry and potential resources starting with the James Bay Hydroelectric Project (JBHP). This undertaking, which had been directed by the government of Quebec without consulting native people, was opposed by the majority of northern Quebec's Cree and Inuit.
The *Quebec Association of Indians* - an *ad hoc* representative body of native northern Quebecers - sued the government and, on 15 November 1973, won an injunction in the Quebec Superior Court blocking hydroelectric development until the province had negotiated an agreement with the natives. This judgment was overruled by the Quebec Court of Appeal seven days later, after the government's efforts to quickly negotiate an agreement failed. The legal requirement that Quebec negotiate a treaty covering the territory had not been overturned, even though construction continued.

The JBNQA agreement identifies a number of subjects and, as the first Canadian native treaty since the 1920s, has become the prototype of the many agreements made since then. It established a number of provisions, principally in the following areas:

- lands
- environmental and social protection
- economic and social protections
- economic development and financial compensation
- education
- local government
- heath and social services

In return for their signatures the governments of Québec and Canada and Québec Hydro agreed to provide northern Québec natives with extensive direct financial compensation to manage economic development through three native owned development corporations: The Cree Board of Compensation, the Makivik Corporation and the Naskapi Development Corporation.

A number of development agreements were subsequently established to compensate northern Québec Natives and include:[66]

- Nadoshtin Agreement
- Boumhounan Agreement
- Cree Employment Agreement
- Mercury agreement
- Decommissioning Agreement
- Waskaganish Transmission Line Agreement
- Whapmagoostui Transmission Line Agreement

The above agreements are summarized below.[67]

Over the course of the next year, the government of Quebec negotiated the required accord. On 15 November 1974 – exactly a year after the Superior Court decision – an *agreement-in-principle* was signed between the governments of Canada, Quebec, publicly owned Hydro-Québec, the Grand Council of the Crees, and the Northern Quebec Inuit Association.

[66] Agreements between Hydro Quebec the society d'energie de la Baie James and the Cree of Quebec summaries Quebec Hydro February 72002

[67] Summary of the complementary Agreement No.13 and Summary of the Agreement respecting Disputes and Dispute Resolutions committee are not presented.

Table 16: Québec Hydro and the Province of Québec: Provincial Benefit Agreements

Agreement	Objective of Agreement /Amounts ($)
Nadoshtin Agreement	The agreement allows Québec Hydro to build and operate the Eastmain 1 Project, as contemplated in the James Bay and Northern Québec Agreement (JBNQA). The agreement provides for the implementation of various environmental measures and allocated costs, including remedial and mitigating initiatives, with a view to reducing impacts of the project on concerned Cree. This includes the remedial measures fund ($1.8 m), archaeology and cultural heritage fund ($2.5m), Eenou Indohoun fund ($3.9 m), wildlife management fund (0.75 m), training fund ($1.5 m) and the EM-1 mercury fund ($3.0m)[68]
Boumhounan Agreement	The Crees consent to the construction and operation of the project in accordance with the terms set forth in the Boumhounan Agreement and subject to government authorizations, including those in conformity with the environmental and social protection regime prescribed in the JBNQA. The Crees will participate directly with Québec Hydro in studies and works rated to the project and will be involved throughout the feasibility phase, during which the necessary permits must be obtained. The agreement provides for the implementation of various environmental mitigating and remedial works, measure and programs aimed at reducing the impacts of the project. Contracts established by negotiation, subject to Québec Hydro's scheduling, cost, quality and guarantee requirements to be included consist of during the feasibility phase contracts totaling $5 m, construction phase, contracts totaling $240 m, and operations phase totaling $45 m.
Cree Employment Agreement	In total 150 Cree First Nations will be employed in permanent positions associated with the James Bay Project. To assist the Cree's in obtaining temporary jobs in the James Bay region, the agreement provides for the implementation of incentives and temporary employment programs designated to alleviate the negative impacts of the James Bay Project on traditional Cree activities and to improve the Cree's use of affected areas. The Apatisiiwin Corporation, a joint non-profit company, will be established under the agreement among others to facilitate and foster the employment of James Bay Cree, to reduce the barriers to employment, to recreate employment opportunities, to provide employment training and the create economic opportunities and jobs for the Crees, thereby creating a framework for improved relations between the James Bay Crees and Québec Hydro. A budget of $7 m has been established.
Mercury Agreement	This agreement was established to support human health authorities in the development and delivery of programs designed to manage the risks associated with human exposure to mercury. The Eye Names Corporation, a joint non-profit company, will be established to carry out studies monitoring etc. The corporation will be funded by $24 m as well as additional $3 m under the Nadoshitin Agreement and 3 m under the Boumhounan Agreement.
Decommissioning of work sites	This agreement is established to ensure the decommission of Québec Hydro's sites and installations that are no longer in service in the James Bay region and to agree upon a mechanism forth resolution of disputes with respect to decommission procedures.
Waskaganish Transmission Line Agreement	This agreement pertains to connect the community of Waskaganish to Québec hydro's main power grid by means of a transmission line.

Observations:

The Québec Government, the Federal and Provincial Governments, and Cree peoples worked to establish agreements to support economic development within the north. The Québec Government and the Grand Council of the Cree's signed the "The Peace of the Braves", ensuring the completion of the last phase of the original James Bay Project and identifying future opportunities. Provincial economic benefits were driven, in part by export sales and the revenues generated to the Province of Québec. From a regional perspective the economic benefits were focused on addressing economic disparity with the northern residents the majority of which were local aboriginals of Cree decent. A number of agreements were established inclusive of: The Nadoshtin Agreement, Boumhounan Agreement, Cree Employment Agreement, Mercury Agreement, Decommissioning Agreement, Waskaganish Transmission Line Agreement, and Whapmagoostui Transmission Line Agreement. All agreements

[68] Source: Agreements between Hydro-Québec, the Societies demerge de las Baie James and the Cree of Québec

provide insight into Québec Hydro's initiatives to optimize local benefits and address adverse effects of such projects. Agreements outline initiatives to train, educate and provide employment opportunities and address regional disparity felt in northern communities. The connection of communities of Waskaganish and Whapmagoostui within the Québec Hydro grid is one such example of capacity building. While such agreements evolved in part from addressing past issues resultant from historic hydroelectric development from aboriginal rights and title perspective, they have benefited from lessons learned from earlier hydro developments as outlined in the original The James Bay and Northern Québec Agreement (JBNQA).

Summary of Observations: NALCOR and Québec Hydro

Manitoba, Québec and Newfoundland and Labrador in cooperation with Federal and Provincial agencies have negotiated benefit agreements with local First Nations related to hydroelectric projects with the objectives of addressing outstanding issues pertaining to historic hydroelectric projects. In historic context, all of the utilities benchmarked have benefited from lessons learned from previous hydroelectric developments and incorporated initiatives to optimize local and regional benefits, specifically for northern and indigenous populations. Provincial and Canadian wide benefits are driven for the most part from construction benefits (employment) and a lesser extent operational employment jobs, and the on-going revenues secured as a result of export sales. Provincial input out models were utilized to determine benefits. First Nations benefit agreements have been tabled to address adverse effects and facilitate co-operation with other federal and local agencies involved in employment training and social services. Equity ownership and management and administrative assistance also help in building capacity within the organization. Manitoba Hydro's approach in this regard represents an industry best practice. On-going monitoring represents the key to ascertaining the success of the programs.

7 OBSERVATIONS

This section provides the PUB a series of observations derived from the NFAT review of the socio-economic considerations associated with the preferred development plan.

Economic Impact Assessment

Interpreting the Results of the Input Output Model for various alternative plans

The Manitoba Bureau of Statistics Input Output Model (IOM) was used to compare the expected economic impacts associated with the PDP and other alternatives such as a Simple Gas Turbine and a Combined Gas Turbine project. While varying detail was provided regarding construction costs for the gas options, we note that IOM's are linear and therefore scalable. Scaling the gas options to reflect the Keeyask Generating Project construction costs ($2.2 billion) enables a comparison of economic impacts. The Keeyask Generating Project (and the PDP) creates significantly greater economic benefits than that of the gas turbine projects.

Interpreting the Results of the Input Output Model for the PDP

Specific to evaluating the overall economic benefits of the PDP, our review commented on the key steps and related assumptions required to preparing the model, namely:

- the level detail related to construction costs;
- allocation of construction costs into input output categories;
- removal of expenditures with no provincial economic benefit and other leakages from the provincial economy; and,
- treatment of labour.

MH provided detailed costs as inputs into the model, and has for the most part, allocated cost input data to the corresponding IO expenditure categories based on an understanding of the expenditures involved. MH has removed expenditures with no provincial economic benefit and identified leakages from the provincial economy. The results of which are also reflected in the treatment of labour.

It is observed however, that the treatment of many purchases as leakages may tend to understate the impact of the PDP in Manitoba, while overstating the impact in the rest of Canada. This is due to the fact that the margins embedded in the purchase cost of these goods and services (treated as leakages), may not have been attributed to Manitoba producers who may be providing services such as transportation or wholesaling.

The extent of the leakages can be explained by a number of factors such as the relatively small manufacturing base of Manitoba economy compared to the rest of the provinces in Canada (Ontario and British Columbia), as well as the extensive experience of MH regarding recently constructed projects that would verify the of out-of-province purchases.

The extent of the out of province expenditures may be reasonable, but MH should have explicitly commented on this as part of reporting.

The issue pertaining to whether the impacts to the rest of Canada are overstated, whereas the impacts to Manitoba are understated remains, and is discussed below.

Canadian vs. Provincial Benefits

A generally accepted principle of input output modelling is that the "direct" benefits of any project are incurred in the jurisdiction in which the project is located. The approach used in the Statistics Canada Interprovincial Input-

Output Economic Impact Simulation model (catalogue no. 15F0009XDB) focused on the expenditures (purchase of goods and services) and the location where these expenditures took place. This approach ensures that the results generated from the model show the entire direct impact in Manitoba. It should be noted however that when the expenditure approach is used with the Statistics Canada model, the model estimates where the goods and services purchased are supplied from.

The key difference in the MH IOM approach was that MH made decisions, based on local experience and knowledge, on where the goods and services originated from. Although such an approach is reasonable, one must be careful in how to interpret the direct and indirect impacts, as the production (supply) of goods and services might generate a direct impact in the jurisdiction where the production took place, but in reality, this production should be interpreted as indirect impact, because these goods and services were produced to satisfy the demand associated with the project.

The results of both the MH IOM and the Statistics Canada Interprovincial model are presented for comparison purposes in the main body of the report for the Keeyask Generating Station.

The analysis suggests that the allocation of impacts between Manitoba and the rest of Canada in the MH study is significantly different from what the normal allocation, based on the structure and characteristics of Manitoba's economy would be, according to the Statistics Canada model.

Based on the results of the Statistics Canada model, one would expect the economic impact in Manitoba to be higher than what was suggested in the MH study (employment, labour income and GDP), while the impact in the rest of Canada would be lower.

Regardless, the results confirm that the PDP creates the greatest economic impacts, and if the Statistics Canada Interprovincial model is considered, the benefits to Manitobans is greater than what was reported.

Determining gross provincial financial benefits by examining benefits over the life of the project

The economic lives of hydroelectric facilities are much greater than those of other resource options. Based on the timing and value of replacement costs and net production costs based on MH Splash modeling, the PDP creates the greatest value over the economic life of the asset. The longer-term life (past the economic life) of hydroelectric facilities represents a consideration worth noting in this review. Referred to by MH as bequest value, is difficult to ascertain how long such facilities can be maintained and operated. Literature suggests over the longer term (past the economic life) hydroelectric facilities continue to contribute to the provincial economy well past the economic life of the facility evaluated in the NFAT.

Northern and Aboriginal community based impacts in terms of employment opportunities, incomes, community tax base, skills development and community based opportunities

Our review identified ten (10) provincial utility criteria/measurers, specific to optimizing economic benefits for First Nations and Northern communities. It is noted MH has met and exceeded such best practices.

Community Access Improvements related to Health, Education and Culture

Community access improvements and their implications (environmental setting, effects assessment, mitigation, and residual effects) related to health, education and culture are discussed in the Environmental Impact Statement (EIS) for the Keeyask Generating Project. The assessment followed standard environmental impact assessment process and all identified issues were evaluated.

On-going monitoring throughout construction, operation and beyond will be critical to ensure success of the identified mitigation.

Economic Displacement Impacts and Effects on Consumer Spending

Global Canadian and Provincial Electricity Rates

Manitobans (as of 2013) have one of the lowest residential electricity rates in Canada, and correspondingly, Canada has one of the lowest residential rates in the world (2009). In the literature reviewed, continued pressure to increase rates throughout Canada is evident and is expected to continue into the next decades.

Review of Increased Energy Costs on Consumers

Literature suggests that the displacement effects of rate increases predominantly affect the poor and those with low income or fixed incomes. The middle and upper class are not as affected as such costs are absorbed through greater disposable income.

Energy Efficiency and Reduction Initiatives

The literature also suggests that best means of mitigating such affects on those most affected will be to aggressively pursue energy efficiency and reduction initiatives. While MH is known for such programs, continued emphasis on such programs is suggested, along with on-going monitoring, in light of the proposed rate increases.

Optimizing demand side management (DSM) will be critical moving forward to manage impacts to ratepayers.

Socio-economic Impact of Key Alternative Scenarios

Evaluation of Alternative Plans

The use of Multiple Account Benefit Cost Analysis (MA-BCA) to ascertain socio-economic benefits focuses on the identification of net benefits from a broader social perspective. It also enables comparisons of the distributional advantages and disadvantages of various plans over the stated life cycle of the plan. MA-BCA is a methodology utilized to evaluate options and used to assist in program and policy decision-making.

The MA-BCA assesses the preferred and three alternative resource development plans, and include:

- the Preferred Development Plan;
- the Smaller Interconnection Plan (K19/Gas 24/250MW Interconnection);
- Keeyask with No Interconnection (K2/Gas); and
- Gas Thermal with on new Interconnection (all Gas).

The MA-BCA was based on the reference scenarios assuming a 78-year net present value metric. It is noted that while sensitivity analysis was undertaken for all of the alternatives, there still remains key assumptions within the economic, financial and sensitivity analysis (future load forecasting, the effect of demand side management, drought exposure, export sales and provincial revenues etc.), that would materially affect the outcome of this review.

Market Valuation

The key assumption effecting results is the discount rate utilized. The discount rate is a critical parameter in cost benefit analysis especially when costs and benefits differ in distribution over time. This is especially important when they occur over a long period of time. The 6% real discount rate chosen for the PDP, based on a social cost of capital, is reasonable based on literature reviewed.

The results are correspondingly reasonable.

Manitoba Hydro Customer Account

Pressure on rate increases is expected to continue globally and throughout Canada, and residential users should expect to pay for increasing rates. While the PDP has the greatest rate annual projected rate increases proposed in all plans, it will require residents of Manitoba to pay higher rates in the short term (until year 2031). The cumulative rate increases of all plans are not substantially different, with the benefits of the PDP incurring over the longer term as inflationary costs are reduced with the PDP limiting rate increases over the longer term. The key observation is pay now, benefit later regarding rates. Flexibility regarding MH objective to achieving the 20-year 75:25 debt/equity ratio is one means of dealing with rate issues.

Further discussion regarding the short to medium term rate increases associated with the MH plans should be clearly outlined and understood by the people of Manitoba as part of this process.

From a system reliability perspective, the PDP is preferred; however all of the development plans can handle load requirements under the majority of adverse conditions.

Manitoba Government Account

This account focuses on the net benefits to government over the term of the PDP. The results are based on identifying only direct incremental taxes and fees paid by Manitoba Hydro, net of incremental Government cost or risks. The key driver for revenues to the Provincial government in this account is represented by the capital taxes and water rentals. The account also assumes a "wash" for various taxes, such as coal tax and carbon charges taxes, discussed in the environmental review of the NFAT, and the debt guarantee fund, while substantial, is balanced between what MH owes and what the government of Manitoba secures. The approach the MA-CBA takes regarding the other total charges to government, such as the provincial debt guarantee is reasonable.

Manitoba Economy Account

The Manitoba account is specific to the employment and wages generated by the project in each plan, and estimates the potential incremental income that employment (wages) offers for Manitobans. The assumptions regarding proportioning the net economic rent (the additional wages earned net of) that would be derived, is based on project location and the employment/unemployment characteristics in that region. Northern regions with greater unemployment would result in greater net benefits, and the PDP is preferred. The assumptions made are reasonable.

Social Account

The societal benefit of hydroelectric projects outlined in the PDP should be considered in context to the $1 billion dollars in sunk costs incurred for the Keeyask Generating Project, and the $300 million in sunk costs for the Conawapa Generating Project, during project development. Such costs are not considered in the evaluation undertaken to justify the PDP. From a socio-economic perspective, while the investment of the $1 billion invested for KGP as sunk costs, is substantial, the corresponding socio-economic benefits derived from some of the sunk cost expenditures, such as the Joint Keeyask Development Agreement and related project benefits as well as Keeyask Infrastructure Project support the optimization of socio-economic benefits for First Nations and northern communities.

The MA-BCA is a reasonable approach to ascertain socio-economic benefits, and based on the reference scenarios provides insight into the distributional benefits of the alternative plans studied. Considerable risk and uncertainty remains. To address such issues the concept of pathways is introduced.

The Significance of Pathways

To deal with risk and uncertainty over the period of the plan, the concept of pathways were identified in the PDP. The decision pathways enable MH the flexibility to modify the PDP to address risk and uncertainty and the ever-changing market characteristics over the longer term of the plan. From a socio-economic perspective the critical decision point within the pathways, if the PDP is pursued, is decision specific to the construction of Conawapa, which does not have to be made until 2018.

Between 2014-2018, the risk and uncertainty factors should be studied in detail and reported back to the PUB prior to the decision date, to enable the government of Manitoba to make an informed decision regarding its future energy policy decisions. The Government of Manitoba should provide the PUB direction enabling the PUB to work directly with MH as such risk and uncertainty is addressed.

High-level review of approaches to optimizing Provincial economic benefits of large-scale resource projects

The utilities benchmarked (Québec Hydro and Nalcor) have benefited from lessons learned from previous hydroelectric developments and incorporated initiatives to optimize local and regional benefits, specifically for northern and indigenous populations. Provincial and Canadian wide benefits are driven for the most part from construction benefits (employment) and a lesser extent operational employment jobs which are local. Such economic impacts are derived from IOM's. Provincial revenues are secured from export sales and on-going government tax revenues from water rentals etc.

Legal or quasi-legal agreements with First Nations have been secured in all jurisdictions. Cooperation with other Federal and local agencies involved in employment training and social services has also been pursued and resulted in successful economic optimization strategies. Equity ownership and management and administrative assistance also help in building capacity within the organization, as outlined in the MH example via the Joint Keeyask Development Agreement.

Manitoba Hydro's approach to optimizing provincial economic benefits reflects industry practices. On-going monitoring of the success of all of the related socio-economic optimization strategies should be pursued; lessons learned identified and implemented going forward.

Summary

From a socio-economic perspective, the approach assumptions and findings MH has presented are reasonable. Overall the PDP exhibits the greatest socio-economic benefits to the people of Manitoba, northern communities and First Nations compared to other plans based on the reference plans evaluated.

Use of the Statistics Canada Interprovincial IOM utilized in this review suggests that, based on MH assumptions that the Manitoba related economic impact benefits may have been understated while the rest of Canada benefits overstated, making the PDP more attractive to Manitobans as greater benefits are derived. The Statistics Canada Interprovincial model confirms the overall benefits derived from the PDP are reasonable.

Planned investments are significant over the next decade (as outlined in the proposed PDP), placing increased pressure on the provincial debt and rates, in the short and medium term. The PDP is intended to contribute to the growth of the Manitoba economy, strengthen relationships with First Nations and create a lasting legacy for future generations. By doing so the PDP supports Manitoba Hydro's Corporate Strategic Plan (MCSP) 2012-13 and

goals of the corporation, with two corporate goals in the MCSP being highlighted, supporting Aboriginal people and Provincial economic development.[69]

Throughout the short/medium term the Keeyask Generating Project would generate significant socio-economic benefits for the people of Manitoba, First Nations and northern communities and if not pursued such benefits would be forgone, inclusive of the sunk costs already allocated to the Keeyask Generating Project.

Over the longer term considerable uncertainty and risk remains and the introduction of pathways in the decision making process enables such risk and uncertainty to be studied prior to a decision being made on Conawapa.

Both Keeyask and Conawapa are capital intensive projects, creating significant employment throughout construction, and operational benefits. Monitoring issues related to access, health, education and the cultural implications of project development, while identified, should be monitored aggressively, and lessons learned implemented on an annual basis to ensure sustainable capacity building within First Nations and northern communities.

[69] Needs for and Alternatives to: Appendix H - Corporate Strategic Plan 2012-2013

8 NON MANITOBA HYDRO REFERENCES

Canadian Electricity Association, Power for the Future; Electricity's Role in a Canadian Energy Strategy (2012).

International Renewable Energy Association, Renewable Power Generation Costs in 2012: An Overview (2012).

Life Cycle Inventories of Hydroelectric Power Generation ESU Fair Consulting in Sustainability (Karin Flury, Rolf Frischknecht).

NALCOR Energy (http://www.nalcorenergy.com/churchill-falls.asp).

Pan-African Investment and Research Services the Impact of Electricity Price Increase and Eskom's Six-Year Capital Investment Programme on the South African Economy (May 2011).

Québec Hydro, Eastmain-1A/Sacelle Rupert Project (http://www.hydroQuébec.com/rupert/en/).

APPENDIX A

Key Manitoba Hydro and NFAT Reports Referenced in this Review

Executive Summary

Chapter 1: Introduction

Chapter 2: Manitoba Hydro's Preferred Development Plan

Chapter 7: Screening of Manitoba Resource Options

Chapter 8: Determination and Description of development plans

Chapter 12: Economic Evaluations - 2013 Update on Selected Development Plans

Chapter 13: Integrated Comparison of Development Plans - Multiple Account Analysis

Chapter 14: Conclusions

Chapter 15: Implementation and Risk Management Plan for Preferred Development Plan

Appendix F: Economic Outlook 2012-2023

Appendix G: Economic Outlook 2013-2034

Appendix H: Corporate Strategic Plan

Appendix J: Sustainable Development Plan

Appendix 2.2: Joint Kayaks Development Agreement

Appendix 2.3: Economic Impact Assessment

Appendix 2.4: Developing the Keeyask and Conawapa Capital Cost Estimates

Appendix 4.3: Demand Side Management Potential Study

Appendix 9.1: High Level Development Plan Comparison Table

Appendix 11.5: Enlarged Figures 11.1-11.7

Appendix 15.1: Keeyask Aboriginal Partnership Business Risks

Keeyask Generation Project; Environmental Impact Statement Supporting Volume Socio-economic Environment Resource Use and Heritage Resources: Section 3; Economy

Keeyask Generation Project; Environmental Impact Statement Supporting Volume Socio-economic Environment Resource Use and Heritage Resources; Section 4; Population, Infrastructure and Services

Keeyask Generation Project; Environmental Impact Statement Supporting Volume Socio-economic Environment Resource Use and Heritage Resources; Section 5; Personal, Family and Community Life

APPENDIX B

What Economic Impact Models Measure

What Input Output Models Measure

An input output model (IOM) is a way of understanding and estimating how economic changes in one industry can affect other industries. For example, changes in lumber sales will have immediate (direct) effects on the sawmill industry, but also less immediate (indirect) effects on the logging industry, the transportation industry, and any other industries which provide inputs to the sawmill industry.[70] IOMs can be used to predict how an increase or a decrease in demand for the products of one industry will have an impact on other industries and therefore on the entire economy. An input-output analysis is based on:

- identifying a basket of goods and services used by a specific project and then; and
- tracking through all of the steps involved in producing those goods and services, to identify the total extent to which the provincial economy will be affected by project expenditures.

The results of IOM are presented based on three different types of impacts:

- The **direct supplier industry impact** measures the impact on provincial industries supplying goods and services directly used by the project;
- The **indirect supplier industry impact** measures the impact on provincial industries that are further back in the supply chain. The indirect impact is cumulative, and includes transactions going all the way back to the beginning of the supply chain; and
- The **induced impact** measures the effect that spending by workers (those employed by the project, or by direct and indirect supplier industries) has on the economy.

Output, GDP, employment, and tax revenues are the key measures used to assess the economic impacts associated with a project. In order to properly interpret the results of an analysis, some background information about what these measures represent and how they are calculated is presented.[71]

- Output is simply a measure of the total value of production associated with a project. In an industry-based analysis, output is equal to the value of goods and services produced by the provincial industry or industries that are affected by a specific project. In an expenditure-based analysis, it can be measured as the total dollar amount of all spending on goods and services produced in province. It should be noted that purchases of goods and services produced outside the province do not directly affect in- province businesses, so these expenditures are explicitly excluded from the analysis (allocation of expenditures to input output categories). This is usually the main reason why the direct impact on provincial industries is less than initial project expenditures.
- Gross Domestic Product (GDP) is a measure of the value added (the unduplicated total value of goods and services) to the provincial economy by current productive activities

[70] IOM's are derived from inter-provincial input-output tables developed by Statistics Canada. These tables provide a snapshot view of the economy in a given year, and include details on commodities, industries, and "Final demand" categories. The information in the tables is combined with a set of computer algorithms and used to estimate the economic impact associated with specific projects.

[71] BC Stats

attributable to the project. It includes household income (wages, salaries and benefits, as well as income earned by proprietors of unincorporated businesses) from current productive activities as well as profits and other income earned by corporations. Only activities that occur within the province are included in GDP.[72]

- Employment estimates generated by models are derived from estimated wage costs using information on average annual wages in an industry. They are not full-time equivalent (FTE) measures. Instead, they reflect the wages paid and hours spent on the job by a typical worker in an industry. For an industry where most employees work full time, the numbers will be very similar to FTE counts. However, in an industry where part-time work is more common, the job counts will be quite different from FTEs. Some models also provide FTE estimates.
- Government tax revenue estimates generated by input-output models include commodity taxes paid to federal, provincial and local governments. Some models also provide estimates of federal and provincial personal and corporate income taxes. Commodity taxes include PST, GST and other taxes such as gas taxes, liquor and lottery taxes and profits, air transportation taxes, duties and excise taxes.
- *Municipal tax revenues* include property taxes and other taxes such as accommodation taxes levied in some communities. Property tax revenues are included in the supplier industry impacts calculated by the model. Property taxes paid by the project are only reported if they have been explicitly included as an expenditure item in project expenditures.

[72] GDP is calculated by subtracting the cost of purchased goods, services and energy from the total value of an industry's output. As a result, the value of the work done by a producing industry is only counted once. In the case of a construction project, the direct GDP impact would only include the value of the work done by the construction firm. The indirect impact on the sawmill industry would only include the value of the work done to transform the logs into lumber, and the indirect impact on the logging industry would be a measure of the value of the work done by the loggers. There is no double counting in GDP measures.

It should be noted that the relationship between GDP and output is a useful analytical measure since it shows the extent to which industries rely on labour and capital as opposed to material and service inputs in production. The analysis of economic impacts relies on this relationship, since output is more easily and directly measured than GDP. In fact, the starting point for most input-output analyses is a measure of the direct output associated with a project. From this, known relationships between output and other indicators such as GDP and employment can be used to estimate the economic impact associated with a specific project (BC Stats).

APPENDIX C

Statistics Canada Interprovincial Input-Output Model 2009: Impact of Keeyask Generating Station

Simulation options selected by the user:

Table 1.1a Summary of original shock
(Thousands $)

			Quebec	Ontario	Manitoba	Saskatchew	Alberta	British Colu	Total
Commodities (Detailed level)									
45	ENE221100	Electricity	0	0	34,488	0	0	0	34,488
116	MPG321102	Softwood lumber	0	0	11,496	0	0	0	11,496
119	MPG321201	Veneer and plywood	0	0	22,771	0	0	0	22,771
140	ENE324111	Gasoline	0	0	1,326	0	0	0	1,326
141	ENE324112	Diesel fuel	0	0	124,689	0	0	0	124,689
147	MPG3241B0	Lubricants and other petroleum and coal products	0	0	2,432	0	0	0	2,432
159	MPG325500	Paints, coatings and adhesive products	0	0	5,306	0	0	0	5,306
162	MPG325900	Chemical products not elsewhere classified	0	0	10,391	0	0	0	10,391
175	MPG327301	Cement	0	0	46,206	0	0	0	46,206
177	MPG327303	Concrete products	0	0	4,643	0	0	0	4,643
182	MPG327A09	Non-metallic mineral products, not elsewhere classified	0	0	6,190	0	0	0	6,190
183	MPG331100	Iron and steel basic shapes and ferro-alloy products	0	0	2,874	0	0	0	2,874
184	MPG331201	Iron and steel pipes and tubes (except castings)	0	0	19,234	0	0	0	19,234
185	MPG331202	Rolled and drawn steel products including wire	0	0	28,961	0	0	0	28,961
192	MPG331502	Non-ferrous metal castings	0	0	6,411	0	0	0	6,411
196	MPG332301	Prefabricated metal building and components	0	0	63,008	0	0	0	63,008
197	MPG332302	Fabricated steel plates and other fabricated structural metal	0	0	167,358	0	0	0	167,358
199	MPG332309	Other ornamental and architectural metal products	0	0	884	0	0	0	884
213	MPG333200	Other industry-specific machinery	0	0	177,085	0	0	0	177,085
217	MPG333500	Metalworking machinery	0	0	5,306	0	0	0	5,306
220	MPG333901	Pumps and compressors	0	0	10,391	0	0	0	10,391
221	MPG333902	Material handling equipment	0	0	68,535	0	0	0	68,535
222	MPG333909	Other miscellaneous general-purpose machinery	0	0	442	0	0	0	442
232	MPG334409	Other electronic components	0	0	15,697	0	0	0	15,697
237	MPG335301	Transformers	0	0	26,530	0	0	0	26,530
238	MPG335302	Electric motors and generators	0	0	222,406	0	0	0	222,406
239	MPG335303	Switchgear, switchboard, relays and industrial control apparatus	0	0	32,499	0	0	0	32,499
246	MPG336120	Medium and heavy-duty trucks and chassis	0	0	76,494	0	0	0	76,494
248	MPG336202	Motor vehicle bodies and special purpose motor vehicles	0	0	1,105	0	0	0	1,105
287	MPS481001	Air passenger transportation services	0	0	30,288	0	0	0	30,288
291	MPS482002	Rail freight transportation services	0	0	47,090	0	0	0	47,090
293	MPS483002	Water freight transportation services	0	0	9,949	0	0	0	9,949
295	MPS484002	General freight truck transportation services	0	0	21,666	0	0	0	21,666
385	MPS541909	Other professional, scientific and technical services	0	0	181,507	0	0	0	181,507
423	MPS722001	Prepared meals	0	0	20,560	0	0	0	20,560
439	FIC130000	Office supplies	0	0	2,653	0	0	0	2,653
467	PRM500000	Wages and salaries	0	0	702,150	0	0	0	702,150
Total			0	0	2,211,021	0	0	0	2,211,021

Simulation options selected by the user:

Table 1.2 Impact on GDP
(Thousands $)

	Quebec	Ontario	Manitoba	Saskatchew	Alberta	British Colu	Total	
Total impact, open model								
Expenditure-based								
Final domestic expenditures on commodities	0	0	2,211,021	0	0	0	2,211,021	0
International imports (intermediate inputs)	-13,182	-34,697	-627,855	-5,524	-23,145	-10,628	-717,883	-90,028
Interprovincial imports (intermediate inputs)	-7,582	-18,941	-513,879	-18,340	-30,104	-11,834	-606,456	-92,577
Inventories and other commodity leakages	-3,116	-4,177	-12,372	-710	-8,015	-1,939	-31,263	-18,891
Interprovincial exports	56,670	179,438	4,138	65,683	207,086	75,115	606,456	602,319
Total	32,790	121,623	1,061,054	41,108	145,823	50,714	1,461,875	400,821
Income-based								
GDP at market prices	32,790	121,623	1,061,054	41,108	145,823	50,714	1,461,875	400,821
Taxes on products (intermediate inputs)	468	2,454	75,805	1,457	1,040	1,620	82,974	7,169
Taxes on products (import duties)	34	89	1,688	15	64	38	1,933	244
Subsidies on products	-639	-1,083	-3,085	-228	-455	-1,012	-6,666	-3,581
GDP at basic prices	32,926	120,163	986,645	39,866	145,173	50,069	1,383,634	396,989
Subsidies on production	-214	-76	-136	-19	-17	-33	-508	-372
Taxes on production	1,189	4,433	10,425	921	4,135	1,603	22,958	12,533
Wages and Salaries	17,140	66,541	846,843	11,264	64,080	27,780	1,038,880	192,037
Supplementary labour income	2,739	10,729	18,554	1,883	8,653	4,684	47,810	29,255
Mixed income	980	4,166	8,594	448	1,269	1,704	17,276	8,681
Other operating surplus	11,092	34,372	102,364	25,369	67,052	14,331	257,219	154,855
Total impact, closed model								
Expenditure-based								
Final domestic expenditures on commodities	21,870	79,414	2,892,920	12,432	59,675	32,284	3,104,594	211,674
International imports (final expenditures)	-3,014	-10,602	-98,501	-1,766	-8,754	-4,313	-127,660	-29,159
International imports (intermediate inputs)	-20,251	-53,239	-647,448	-7,587	-29,567	-14,126	-776,400	-128,953
Interprovincial imports (final expenditures)	-2,059	-4,973	-114,708	-2,314	-7,590	-3,366	-136,180	-21,472
Interprovincial imports (intermediate inputs)	-13,326	-30,630	-567,213	-24,833	-41,314	-16,749	-701,903	-134,690
Inventories and other commodity leakages	-3,799	-5,636	-16,113	-1,339	-9,944	-2,434	-40,362	-24,249
Interprovincial exports	89,530	265,687	7,925	87,605	264,950	96,703	838,083	830,158
Total	68,950	240,019	1,456,863	62,199	227,456	87,999	2,160,172	703,309
Income-based								
GDP at market prices	68,950	240,019	1,456,863	62,199	227,456	87,999	2,160,172	703,309
Taxes on products (final expenditures)	2,105	6,404	62,616	1,072	3,983	2,530	79,315	16,699
Taxes on products (intermediate inputs)	966	4,562	81,685	1,897	1,606	2,359	93,324	11,639
Taxes on products (import duties)	125	361	3,692	59	271	129	4,660	968
Subsidies on products	-1,741	-2,085	-7,370	-694	-1,188	-1,503	-14,873	-7,503
GDP at basic prices	67,494	230,778	1,316,239	59,866	222,784	84,484	1,997,745	681,506
Subsidies on production	-451	-177	-228	-40	-26	-68	-1,015	-787
Taxes on production	3,445	11,197	36,847	1,930	7,551	3,339	64,892	28,045
Wages and Salaries	31,575	116,535	962,670	17,879	95,227	42,625	1,274,938	312,267
Supplementary labour income	4,995	18,085	33,905	2,729	11,919	6,625	79,257	45,352
Mixed income	2,042	8,121	16,909	892	2,502	2,727	33,468	16,558
Other operating surplus	25,888	77,016	266,137	36,476	105,611	29,236	546,206	280,069
Total supply	0	0	2,211,021	0	0	0	0	-2,211,021
Total interprovincial imports	7,582	18,941	513,879	18,340	30,104	11,834	0	-513,879
International imports	13,182	34,697	627,855	5,524	23,145	10,628	0	-627,855
Total supply	42,710	133,533	3,838,875	47,260	178,803	55,233	606,456	-3,232,419
Manitoba	595	2,647	3,206,243	1,457	2,120	982	7,925	-3,198,319
Total interprovincial imports	15,386	35,604	681,920	27,146	48,904	20,115	0	-681,920
International imports	23,265	63,842	745,949	9,353	38,321	18,438	0	-745,949
Total supply	97,299	302,771	4,634,113	77,955	294,939	109,198	838,083	-3,796,030
Manitoba	595	2,647	3,206,243	1,457	2,120	982	7,925	-3,198,319
Total interprovincial imports	15,386	35,604	681,920	27,146	48,904	20,115	0	-681,920
International imports	23,265	63,842	745,949	9,353	38,321	18,438	0	-745,949
Total supply	97,299	302,771	4,634,113	77,955	294,939	109,198	838,083	-3,796,030
Jobs								
Total	0	0	12,792	0	0	0	12,792	0
Total	415	1,436	17,137	242	968	633	20,962	3,826
Total	828	2,735	21,152	467	1,673	1,089	28,175	7,023
Industry output								0
Total	75,500	255,156	2,688,908	88,368	324,626	105,948	3,560,683	871,775
Total	144,380	463,375	3,198,055	127,722	462,721	164,913	4,597,181	1,399,125

Provincial Input-Output Multipliers, 2009
Industry Accounts Division / Statistics Canada

Manitoba

Multipliers and ratios per $1 of exogenous industry output shock
Jobs effects per million dollars of output

Industries (Detailed level) No.	Code	Title	Direct effect: Within province: Output	GDP basic price	Labour income	Jobs	International imports	Export shares	Simple multipliers (direct and indirect): Within province: Output	GDP basic price	Labour income	Jobs	International imports	All provinces: Output	GDP basic price	Labour income	Jobs	International imports
22	BS221100	Electric power generation, transmission and distribution	1.000	0.758	0.349	3.6	0.030	0.235	1.189	0.870	0.428	5.1	0.041	1.315	0.940	0.470	5.7	0.051
26	BS23B000	Non-residential building construction	1.000	0.335	0.282	5.1	0.143	0.000	1.337	0.515	0.401	7.4	0.166	1.775	0.735	0.544	9.6	0.212
27	BS23C100	Transportation engineering construction	1.000	0.498	0.415	8.0	0.076	0.000	1.241	0.626	0.493	9.5	0.091	1.668	0.828	0.601	11.1	0.127
28	BS23C200	Oil and gas engineering construction	1.000	0.297	0.154	2.3	0.162	0.000	1.242	0.436	0.244	4.0	0.178	1.808	0.700	0.460	7.1	0.245
29	BS23C300	Electric power engineering construction	1.000	0.553	0.303	5.5	0.104	0.000	1.214	0.668	0.383	6.9	0.118	1.513	0.815	0.480	8.4	0.151
31	BS23C500	Other engineering construction	1.000	0.434	0.338	6.3	0.075	0.000	1.283	0.588	0.443	8.2	0.094	1.742	0.831	0.597	10.5	0.137
75	BS332300	Architectural and structural metals manufacturing	1.000	0.403	0.321	6.4	0.132	0.157	1.250	0.530	0.401	7.9	0.156	1.730	0.728	0.535	9.9	0.240

Total multipliers (direct, indirect and induced): Within province: Output	GDP basic price	Labour income	Jobs	International imports	All provinces: Output	GDP basic price	Labour income	Jobs	International imports
1.387	0.999	0.482	6.317	0.088	1.681	1.157	0.570	7.873	0.118
1.529	0.640	0.453	8.558	0.212	2.212	0.994	0.664	12.099	0.292
1.487	0.785	0.560	11.035	0.149	2.167	1.124	0.737	14.027	0.219
1.350	0.505	0.273	4.630	0.203	2.161	0.909	0.557	9.100	0.309
1.432	0.809	0.442	8.296	0.170	1.957	1.077	0.601	10.962	0.232
1.509	0.735	0.505	9.603	0.147	2.249	1.131	0.736	13.474	0.230
1.458	0.665	0.458	9.190	0.205	2.185	0.997	0.659	12.533	0.323

Jobs per million dollars of output in:	Direct: Manitoba	Direct, indirect & induced: Manitoba	Rest of Canada	All provinces
Provincial Input-Output Multipliers, 2009 (Statistics Canada)				
Electric power engineering construction	5.5	8.3	2.7	11.0
Other engineering construction	6.3	9.6	3.9	13.5
Keeyask Construction				
Total construction expenditures ($million):	2,285			
Jobs	2,436	8,347	16,144	24,491
Jobs per million dollars of expenditure	1.1	3.7	7.1	10.7
Conawapa Construction				
Total construction expenditures ($million):	3,396			
Jobs	3,238	9,303	20,964	30,267
Jobs per million dollars of expenditure	1.0	2.7	6.2	8.9
North-South Upgrades				
Total construction expenditures ($million):	142			
Jobs	171	586	605	1191
Jobs per million dollars of expenditure	1.2	4.1	4.3	8.4
750 MW Interconnection				
Total construction expenditures ($million):				
Jobs	119	498	588	
Jobs per million dollars of expenditure	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Construction

	Keeyask			Conawapa			N-S Upgrades			750 MW Interconnection		
Keeyask	Manitoba	ROC	Total	Manitoba	ROC	Total	Manitoba	ROC	Total	Manitoba	ROC	Total
Employment												
Project Direct	2,436	2,532	4,967	3,238	3,915	7,154	171	0	171	119	0	119
Other Direct	2,175	3,198	5,374	1,831	3,448	5,279	164	219	383	124	144	268
Indirect and Induced	3,736	10,414	14,151	4,234	13,601	17,835	251	386	637	255	444	700
Total Employment	8,347	16,144	24,491	9,303	20,964	30,267	586	605	1,191	498	588	1,086
Labour income	635,169	1,021,350	1,656,519	761,233	1,402,932	2,164,166	48,627	30,606	79,233	35,195	24,977	60,173
GDP ($millions)	843,908	1,440,223	2,284,131	983,334	1,997,461	2,980,795	67,189	54,676	121,865	50,209	39,642	89,851
Tax Revenues ($million)	204,340	251,927	456,268	256,096	342,663	598,759	13,954	7,546	21,501	16,069	7,146	23,215
Provincial	40,915	66,289	107,204	45,807	90,164	135,972	2,186	1,986	4,172	2,478	1,880	4,358
Local	161,059	307,444	468,502	195,872	426,252	622,124	12,538	10,935	23,474	10,714	12,437	23,151
Federal	406,314	625,660	1,031,974	497,776	859,080	1,356,855	28,679	20,467	49,146	29,261	21,463	50,724

Keeyask Generating Station, Comparison of Results

	MBS Results			Statistics Canada Closed Model			% Difference		
Employment	Manitoba	ROC	Total	Manitoba	ROC	Total	Manitoba	ROC	Total
Project Direct	2,014	2,463	4,477	12,792	0	12,792	-535.1	100.0	-185.7
Other Direct	1,887	2,644	4,531	4,345	3,826	8,171	-130.2	-44.7	-80.3
Indirect and Induced	3,089	9,047	12,136	8,360	7,023	15,383	-170.6	22.4	-26.8
Total Employment	6,990	14,153	21,144	21,152	7,023	28,175	-202.6	50.4	-33.3
Labour income	532,748	925,178	1,457,926	996,575	357,620	1,354,195	-87.1	61.3	7.1
GDP ($millions)	706,393	1,285,069	1,991,462	1,456,863	703,309	2,160,172	-106.2	45.3	-8.5
Tax Revenues ($million)*	171,154	225,519	396,673	147,993	29,306	177,299	13.5	87.0	55.3
Provincial	34,745	59,340	94,085	107,375	18,090	125,465	-209.0	69.5	-33.4
Local	135,280	272,249	407,529	955	72	1,027	99.3	100.0	99.7
Federal	341,180	557,108	898,288	39,663	11,144	50,807	88.4	98.0	94.3
Average wage (calculated)	76,216	65,370	68,952	47,115	50,924	48,064			
Total Employment, estimated using average wage assumed by MBS	6,990	14,153	21,144	13,076	5,471	19,640	87.1	-61.3	-7.1

*Statistics Canada tax revenues only include commodity taxes

Employment									
Project Direct	39	0	39	42	0	42	1	0	1
Other Direct	2	1	3	2	1	4	0	0	0
Indirect and Induced	29	16	45	33	18	50	1	1	1
Total Employment	70	17	87	77	19	96	2	1	2
Labour income	5921	648	6569	6597	734	7331	123	23	145
GDP ($millions)	6872	1054	7926	7676	1184	8860	149	37	186
Tax Revenues ($million)	831	117	948	931	132	1063	22	5	27
Provincial	162	31	193	182	35	217	5	1	7
Local	988	128	1116	1099	144	1243	23	5	29
Federal	1981	276	2257	2212	311	2523	51	12	63