

**NEEDS FOR AND ALTERNATIVES TO (NFAT)****Manitoba Hydro Undertaking #36**

**Manitoba Hydro to file, along with the information on capital costs, the three (3) most current CPJs for the three (3) largest capital expenditure projects: Keeyask, Conawapa, and Bipole III.**

**Response:**

Please see the most current CPJs for Keeyask and Conawapa Generating Stations as follows:

- Keeyask CPJ Addendum #3
- Conawapa CPJ Addendum #6

The Bipole III CPJ has not been provided as this project is not in scope in accordance with the NFAT Terms of Reference. However as noted on page 1698 of the transcript, there has been no updated cost estimate for BiPole III since the CPJ was filed in the 2010/11 & 2011/12 GRA.

**APPROVED BY EXECUTIVE COMMITTEE  
 MINUTE # 1418.04**

DATE: 2012 10 30  
 Financial Planning

**CAPITAL PROJECT JUSTIFICATION  
 FOR**

**Keyask Generating Station**

**Addendum #3**

**REVIEWED BY:**  
 (Owning Dept Manager)



**NOTED BY:**  
 (if applicable)

Coordinating Division:

Constructing Division:



Financial Department:  
 (if over \$1 million)

**RECOMMENDED FOR IMPLEMENTATION:**

Owning Div. Manager:

Business Unit V.P.:



<b>PREV. APPROVED BUDGET \$:</b> (Use \$ value from approved CPJ or last approved CPJ Addendum)	\$5,636,949,000
<b>REVISED BUDGET \$:</b> (Total Net Cost)	\$6,220,088,000
<b>START DATE:</b> (1 <sup>st</sup> Cost Flow)	2002 04
<b>PREV. APPROVED ISD:</b> (Use In-service Date from approved CPJ or last approved CPJ Addendum)	2020 08
<b>REVISED ISD:</b> (Last Major In-service Date)	2020 12
<b>RISK MATRIX/ BUSINESS CASE TIER:</b>	n/a
<b>INVESTMENT REASON:</b>	CL04 Future Power Generation

**OWNING DIVISION:** New Generation Construction  
**I.M. NODE NUMBER:** 1.5.1.6  
 P:05866/P:14539/P:14621/  
 P:14622/P:15264/P:15955/P:16021/  
 P:16022/P:16895/P:18568/P:14625/  
 P:14703/P:16892/P:16897/P:17448

**MAJOR ITEM**  **DOMESTIC ITEM**

**PREPARED BY:** G.P.F Schick

**DATE PREPARED:** 2012 09 06

**REPORT NUMBER:**

**FILE NUMBER (Optional):**

ADDENDUM NUMBER	DATE (yyyy mm dd)	REVISION	REVISED BY	APPROVED BY
2	2010 09 15	Re-estimate	G.P.F. Schick	E.C. Minute 1324.05
1	2009 03 06	Revision to budget	C. Michaluk/D. Magnusson	Board Minute # 797-09 06
	2008 10 15	CPJ	C. Michaluk	Board Minute # 796-08 04

**MANITOBA HYDRO**  
**CAPITAL PROJECT JUSTIFICATION ADDENDUM**

**Project Name** (This section is required for all Addendums).

Keeyask Generating Station

**Recommendation** (This section is required for all Addendums).

That the project estimate be increased by \$583 million to a revised total of \$6,220 million.

**Project Scope** (This section is be filled out only if there is a change to the scope).

No Change

**Background** (This section is be filled out only if there is information relevant to the recommendation).

The last detailed project estimate was completed in 2009 with a detailed sensitivity analysis conducted in the Summer of 2012. This review incorporated up-to-date experiences and recent market information. The results of the review showed the need to adjust estimate to better address uncertainty related to future costs. As such, the recommended budget is based on a P50 estimate that includes all base costs and contingency at a 50% confidence level and management reserves for labour and escalation risks.

**P50 Estimate:**

Since the last estimate was developed in 2009 it was necessary to bring the estimate to 2012\$ and several items in the point estimate had to be adjusted to match the increased level of detail that has been identified within the current scope. This resulted in the following changes to the P50 Estimate:

- \$187M increase for actual escalation that has occurred to bring the estimate to 2012\$.
- \$34M increase to Planning & Licensing for additional adverse affects, regulatory and environmental costs related to Sturgeon activities, First Nation Activities and EIS preparation
- \$60M increase to Transmission costs due to increased detail of scope to include tower type and numbers, additional lines from GS to Switching Stn, additional bank addition and breaker replacments
- \$17M increase to infrastructure costs to upgrade camp for labour attraction and retention

**Reserves:**

A Management Reserve has been established to address significant risks related to labour (\$384M) & escalation (\$116M). See Risk Analysis section.

**In-Service Costs:**

The overall increase to the in-service cost of the project is \$583M (10%). This increase to the in-service cost is due to the addition of the Management Reserve and base estimate increases offset by reduced interest costs from reduced forecasted interest rates (\$215M).

**JUSTIFICATION—BUSINESS CASE ANALYSIS (SUMMARY):**

**Justification and Link to Corporate/Business Unit Goals** (This section is be filled out only if there is a change to some aspect of the recommended alternative).

An additional dependable energy source is required in 2019/20 to meet forecast Manitoba loads and export commitments consistent with the recommended development plan of the 2012/13 Power Resource Plan.

**ANALYSIS OF ALTERNATIVES:** (This section is be filled out only if there is a change to which alternative is being recommended).

<b>Economic Analysis</b>		
<b>Discount Rate</b>	% For current corporate rates see G911	For clarification on hurdle rates, contact Economic Analysis Department

<b>Recommended Option</b>	<b>NPV Benefits/(Costs)</b>

<b>Other Alternatives Considered</b>	<b>NPV Benefits/(Costs)</b>

**Risk Analysis -** (This section is be filled out only if there is a change to the project risk).

Keeyask risks related to labour productivity & escalation are addressed through use of management reserves due to the magnitude of the cost variation they may cause. Keeyask estimates include both a labour reserve and an escalation reserve:

The labour reserve represents the potential additional costs associated with labour productivity and cumulative impacts. The labour reserve is derived by applying outcomes of the Wuskwatim process reviews to the labour components of the Keeyask estimates including:

- Increases to the number of labour hours required per work activity and the resulting number of workers due to reduced labour productivity;
- Additional costs for extended construction duration due to lower productivity;
- Increases to collective agreement wages to attract and retain workers; Increases to the size of the camp to accommodate the additional workers required due to lower productivity;
- Increases to the service contracts to accommodate the additional workers required;
- Increases to project management costs related to additional supervisory staff to monitor less experienced and less productive workers; and
- Additional costs for 7-12 work schedule (7 days per week, 12 hours per day).

The Corporation expects to utilize the labour reserve if there are restrictions in our ability to address the current and expected state of the Canadian construction labour market (demand/supply), specifically labour availability and productivity. Examples include (a) restrictions on the ability to modify wage rates, hours

**Risk Analysis** - (This section is be filled out only if there is a change to the project risk).

of work per day, and turnaround schedules in the Burntwood Nelson Agreement, and (b) constraints on the project using labour outside of Manitoba and Canada.

The escalation reserve represents the potential additional costs to the project associated with cost escalation greater than Canadian CPI. The escalation reserve is derived by projecting the total project capital costs utilizing rates of inflation comprised of components directly related to major hydro project construction, such as copper, cement, concrete reinforcing bar, and diesel fuel price increases, rather than the broadly defined components comprising Canadian CPI. The Corporation expects that it will utilize the escalation reserve.

Considering the uncertainties in heavy construction escalation, labour productivity and project construction conditions, there is a greater likelihood that the actual costs to construct Keeyask will be less than the updated cost estimates than more. This is provided that the in-service dates, interest rates, escalation and major scope items are consistent with the estimate assumptions.

**RESOURCE REQUIREMENTS AND CAPITAL BUDGET ESTIMATE:**

**Resource Requirements** (This section is be filled out only if there is a change to the resource requirements).

No changes to the resource requirements.

**Total Budget** - (This section is required for all Addendums).

The impact on annual budget requirements is as follows (in thousands of dollars):

Fiscal Year	Prev. Approved CPJ/Addendum	Proposed CPJ Addendum	Increase (Decrease)
Prev. Actuals	\$365,409	\$365,409	\$0
2010/11	\$71,140	\$56,434	(\$14,706)
2011/12	\$152,465	\$80,229	(\$72,236)
2012/13	\$179,137	\$201,778	\$22,641
2013/14	\$316,097	\$339,036	\$22,939
2014/15	\$381,566	\$405,137	\$23,571
2015/16	\$684,346	\$636,463	(\$47,883)
2016/17	\$750,677	\$883,863	\$133,186
2017/18	\$1,082,934	\$1,132,127	\$49,193
2018/19	\$813,264	\$955,395	\$142,131
2019/20	\$631,995	\$804,135	\$172,140
2020/21	\$207,919	\$288,155	\$80,236
2021/22		\$71,926	\$71,926
<b>Total</b>	<b>\$5,636,949</b>	<b>\$6,220,088</b>	<b>\$583,139</b>

**Proposed Schedule** (This section is be filled out only if there is a change to the project schedule).

The PR 280 Upgrades started in October 2010 as outlined in CPJA#2

The Infrastructure started in December 2011 which is 6 months later than the date outline in CPJA#2

The first unit In-Service-Date is November of 2019 (unchanged from CPJA#2) and the last unit In-Service Date is December of 2020 (4 months later than CPJA#2).

**Related Projects** (This section is be filled out only if changed).

Conawapa Generating Station

Transmission Lines related to Export Sales to Minnesota Power and Wisconsin Public Service

Bipole III Transmission and Converters

**Reference Documents** (This section is be filled out only if changed).

2012 Keeyask & Conawapa Recommended Budgets

2012 Keeyask & Conawapa Sensitivity Analysis Summary

2012 EC Recommendation – Keeyask Budget Basis - August 28, 2012 Minute 1409.02

2012 Power Resource Plan Report

**APPROVED BY EXECUTIVE COMMITTEE  
 MINUTE # 1453.03**

**DATE: 2013 08 20**  
 Financial Planning

**CAPITAL PROJECT JUSTIFICATION  
 FOR**

**CONAWAPA GENERATING STATION  
 Addendum Number 6**

**REVIEWED BY:**  
 (Owning Dept Manager)

**NOTED BY:**  
 (if applicable)

Coordinating Division: *Paul Turner 13 Aug 2013*

Constructing Division: *[Signature]*

Financial Department:  
 (if over \$1 million)

*J. Branch for D. Perry Aug 13/2013*  
**RECOMMENDED FOR IMPLEMENTATION:**

Owning Div. Manager:

Business Unit V.P.: *[Signature]*  
 13 08 13

<b>PREV. APPROVED BUDGET \$:</b> (Use \$ value from approved CPJ or last approved CPJ Addendum)	\$10,192,432,000
<b>REVISED BUDGET \$:</b> (Total Net Cost)	\$10,491,532,000
<b>START DATE:</b> (1 <sup>st</sup> Cost Flow)	2003 04
<b>PREV. APPROVED ISD:</b> (Use In-service Date from approved CPJ or last approved CPJ Addendum)	2027 04
<b>REVISED ISD:</b> (Last Major In-service Date)	2028 04
<b>RISK MATRIX/ BUSINESS CASE TIER:</b>	N/A
<b>INVESTMENT REASON:</b>	C1.04 Future Power – Generation

**OWNING DIVISION:** New Generation Construction

**I.M. NODE NUMBER:** 1.5.1.7

**W.B.S. NUMBERS:** P:06879 / P:13216 / P:14540 / P:17690 / P:18571

**MAJOR ITEM**  **DOMESTIC ITEM**

**PREPARED BY:**

**DATE PREPARED:** 2013 07 05

**REPORT NUMBER:**

**FILE NUMBER (Optional):**

6	2013 07 05	Revision to budget and delay of ISD by one year	P. Turner	
5	2012 08 31	Revision to budget and delay of ISD by two years	D. Bowen/T. Armstrong	EC 1418.04
4	2010 09 09	Revision to budget	W.J. Muzyczka	EC 1324.05
3	2009 04 02	Revision to budget and delay ISD by one year	C. Michaluk	Board Minute # 797-09-06
2	2006 11 09	Revision to budget and advance ISD by three years	G. N. Cook	EC 1154.03
1	2005 08 10	Revision to budget	G. N. Cook	EC 1090.06
<b>ADDENDUM NUMBER</b>	<b>DATE</b> (yyyy mm dd)	<b>REVISION</b>	<b>REVISED BY</b>	<b>APPROVED BY</b>

**MANITOBA HYDRO**  
**CAPITAL PROJECT JUSTIFICATION ADDENDUM**

**Project Name**

Conawapa Generating Station

**Recommendation**

That the first unit in-service date of the Conawapa Generating Station change from 2025 to 2026 and the project budget be increased by \$299.1 million to a revised total of \$10,492 million.

**Project Scope**

The project scope consists of ten generating units with a rated capacity 1485 MW.

**Background**

Changes from CPJ Addendum # 5 are as follows:

Conawapa G.S. 2026/27 is considered the earliest in-service date. In the 2013/14 Power Resource Plan, Conawapa 2026/27 is included as one of the resources in the Preferred Development Plan required to meet forecast Manitoba load and to pursue a new US interconnection and facilitate export sales agreements.

**Interest/Escalation:** The estimate and the contingency were brought from 2012 dollars to current day 2013 dollars, resulting in a \$90.7M increase for actual escalation. As well, the ISD deferral to 2026 resulted in additional interest and escalation costs of \$155.3M.

**PST Increase:** The PST increase from 7% to 8% caused an increase of \$32.8M.

**Licensing:** Licensing costs have increased by \$20.3M which is largely attributed to additional work to support environmental assessment and EIS submission as well as additional support for a 1 year deferral.

**Transmission:** There are no costs related to the Generation Outlet Transmission lines or North-South AC Transmission Line Upgrades included in this CPJ. The only transmission costs that have been included in the Conawapa GS CPJ are related to the construction power station. A separate item for Additional North/South Transmission is included in the CEF.



## JUSTIFICATION—BUSINESS CASE ANALYSIS (SUMMARY):

### Justification and Link to Corporate/Business Unit Goals

The 2013/14 Power Resource Plan indicates that an additional dependable energy source is required in 2026/27 to meet forecast Manitoba loads.

## ANALYSIS OF ALTERNATIVES

### Economic Analysis

<b>Discount Rate</b>	For current corporate rates see G911 %	For clarification on hurdle rates, contact Economic Analysis Department
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<b>Recommended Option</b>	<b>NPV (= PV of BENEFITS - PV of COSTS)</b>
No change.	
<b>Other Alternatives Considered</b>	<b>NPV (= PV of BENEFITS - PV of COSTS)</b>

### Risk Analysis

The estimate is based on key assumptions which include current scope, market conditions and trends, interest rates, escalation rates, project agreement structure, environmental license, and current in-service date. Changes to these assumptions will impact the budget.

Overall there are two distinct types of risk on the project. There are manageable project risks within the ability of the project team to manage and control through the use of contingency. There are also those risks that fall outside of the project teams control which cause substantial impacts to project cost. Those risks, specifically labour & escalation, are addressed through management reserve funds. As such, the inclusion of labour & escalation management reserve allows for effective risk management on Conawapa.

**Total Budget**

The impact on annual budget requirements is as follows (in thousands of dollars):

<u>Fiscal Year</u>	<u>Prev. Approved CPJ/Addendum</u>	<u>Proposed CPJ Addendum</u>	<u>Increase (Decrease)</u>
Prev. Actuals	\$229,967	\$229,967	\$0
2012/13	\$55,977	\$30,733	(\$25,244)
2013/14	\$72,023	\$69,765	(\$2,258)
2014/15	\$66,288	\$70,092	\$3,805
2015/16	\$118,886	\$125,922	\$7,036
2016/17	\$245,342	\$99,364	(\$145,978)
2017/18	\$305,088	\$240,608	(\$64,480)
2018/19	\$381,401	\$308,066	(\$73,336)
2019/20	\$420,475	\$387,530	(\$32,945)
2020/21	\$1,046,756	\$432,477	(\$614,279)
2021/22	\$1,685,446	\$1,061,620	(\$623,827)
2022/23	\$1,663,635	\$1,722,068	\$58,433
2023/24	\$1,395,254	\$1,700,232	\$304,978
2024/25	\$1,192,135	\$1,428,688	\$236,553
2025/26	\$893,865	\$1,228,135	\$334,270
2026/27	\$359,483	\$920,067	\$560,585
2027/28	\$60,411	\$371,206	\$310,795
2028/29	\$0	\$64,994	\$64,994
<b>Total</b>	<b>\$10,192,432</b>	<b>\$10,491,532</b>	<b>\$299,100</b>

**Proposed Schedule**

This budget is for a 2026 first unit in-service date which assumes licensing is complete by November 2017. The first unit in-service date is May 2026; the last unit in-service date is April 2028.

**Related Projects**

Keyask Generating Station  
 Transmission Lines related to Export Sales to Minnesota Power and Wisconsin Public Service  
 Bipole III Transmission and Converters  
 Additional North/South Transmission

**Reference Documents**

2013 Keyask & Conawapa Recommended Budgets  
 2013 Power Resource Plan Report