

November 2011

Capital Expenditure Forecast (CEF11)

2011/12 - 2031/32

Corporate Controller Division
Finance & Administration



Foreword

The *Capital Expenditure Forecast* (CEF11) is a projection of Manitoba Hydro's capital expenditures for new and replacement facilities to meet the electricity and natural gas service requirements in the Province of Manitoba as well as expenditures required to meet firm sale commitments outside the province. Expenditures included in the Capital Expenditure Forecast will provide for an ongoing safe and reliable supply of energy in the most efficient and environmentally sensitive manner.

The *Capital Expenditure Forecast* is comprised of a number of specifically identified large projects or "major items" as well as numerous unspecified smaller projects referred to as "domestic items." Major items are normally over \$2 million in total cost and the construction period on each major item usually extends beyond one year. Domestic items typically represent the ongoing and recurring capital requirements to meet electricity and natural gas service replacements and expansions throughout the province. All major and domestic capital projects are subjected to a rigorous review and approval process before being included in the *Capital Expenditure Forecast*.

In constructing and maintaining its capital facilities, Manitoba Hydro adheres to the principles of sustainable development. For example, the Corporation is committed to reduce emissions from its own facilities and to contribute towards global emission reductions through the export of renewable electricity. Since 1991, the cumulative reduction is approximately 160 million tonnes of CO₂e. In 2010, total gross GHG emissions were 132 kilotonnes of carbon dioxide equivalent (CO₂e), which is 75 per cent below the target and far exceeds Manitoba Hydro's voluntary commitment of a 6 per cent reduction. Manitoba Hydro had a separate contractual commitment under its participation in the Chicago Climate Exchange (CCX). Participation entailed a commitment to progressively reduce its generation related emissions from Manitoba Hydro's historic baseline. Manitoba Hydro's emissions were lower than its target in every year of participation. 2010 was the final year of the CCX program.

Manitoba Hydro has one of the most aggressive Demand Side Management (DSM) programs in North America. The target to be achieved by 2026 is for electrical savings of 906 MW and 3,283 GWh, and natural gas savings of 153 million cubic meters. In total, Manitoba Hydro's DSM programs are expected to result in greenhouse gas emission reductions of nearly 2.5 million tonnes annually by 2026.

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Section 1

Overview

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1.0 Overview

Capital Expenditure Forecast Summary

This Consolidated Capital Expenditure Forecast (CEF11) totals \$19 389 million for the eleven year period to 2021/22. Expenditures for Major New Generation & Transmission total \$14 140 million, with the balance of \$5 249 million comprised of expenditures for infrastructure renewal, system safety and security, new and increasing load requirements, and ongoing efficiency improvements. Total spending to 2031/32 is forecasted at \$31 167 million, with Major New Generation & Transmission expenditures totaling \$19 579 million and base capital expenditures forecast at \$11 588 million.

Comparison to CEF10-2

The Capital Expenditure Forecast (CEF11) for the eleven year period to 2021/22 totals \$19 389 compared to \$20 375 for the same eleven year period included in last year's Capital Expenditure Forecast (CEF10-2).

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	11 Year Total
CEF10-2	1,098	1,195	1,615	1,843	2,166	2,213	2,492	1,998	2,214	1,802	1,739	20,375
Incr (Decr)	16	-	(65)	(142)	(143)	(136)	(59)	(330)	(300)	112	63	(985)
CEF11	1,114	1,195	1,550	1,700	2,023	2,077	2,433	1,668	1,914	1,914	1,802	19,389

The decrease of \$986 million in capital expenditures over the eleven year forecast period is comprised of the following:

	Total Projected Cost	Total Project Increase / (Decrease)	11 Year Increase (Decrease)	20 Year Increase (Decrease)
	(\$ Millions)			
Conawapa Generating Station	\$ 7,771	-	(\$690)	13
Wuskwatim Generating Station	1,375	99	99	99
Demand Side Management Electric	NA	(433)	(268)	(433)
Demand Side Management Gas	NA	(130)	(88)	(130)
Site Remediation	NA	(4)	(4)	(4)
Increase to Target Adjustment	NA	NA	(34)	(34)
			(\$985)	(\$489)

The decreases indicated in the above table for Demand Side Management (both Electric and Gas) reflect the adoption of International Financial Reporting Standards (IFRS) in 2012/13. Under IFRS, expenditures for Demand Side Management do not qualify for capitalization and, effective April 01, 2012 will be charged to operating expense in the year incurred. Similarly, upon adoption of IFRS in 2012/13 Site Remediation costs will no longer be capitalized.

Manitoba Hydro
Consolidated Capital Expenditure Forecast (CEF11)
 For the Years 2011/12 – 2021/22

CAPITAL EXPENDITURE FORECAST (CEF11)
 (in millions of dollars)

	Total Project Cost	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	11 Year Total
ELECTRIC													
Major New Generation & Transmission													
Wuskwatim - Generation	1,374.6	181.1	65.3	5.9	-	-	-	-	-	-	-	-	252.3
Wuskwatim - Transmission	297.4	31.6	-	-	-	-	-	-	-	-	-	-	31.6
Herblet Lake – The Pas 230 KV Transmission	74.9	6.4	0.7	-	-	-	-	-	-	-	-	-	7.2
Keeyask - Generation	5,636.9	115.6	163.4	196.2	401.1	662.9	895.6	1,041.0	786.3	716.4	189.2	45.4	5,215.1
Conawapa - Generation	7,770.8	104.4	105.2	66.1	67.2	188.1	235.4	296.8	322.6	764.7	1,229.5	1,222.9	4,603.0
Kelsey Improvements & Upgrades	301.7	34.4	24.8	20.2	0.4	-	-	-	-	-	-	-	79.7
Kettle Improvements & Upgrades	165.7	13.7	22.9	20.4	20.7	7.3	7.4	7.6	7.7	7.9	8.0	8.2	131.9
Pointe du Bois Spillway Replacement	398.2	41.1	113.6	100.4	77.1	13.0	-	-	-	-	-	-	345.2
Pointe du Bois - Transmission	85.9	14.5	11.1	13.2	16.4	-	-	-	-	-	-	-	60.2
Pointe du Bois Powerhouse Rebuild	1,482.7	-	-	-	-	-	-	-	-	-	-	-	0.5
Bipole III - Transmission Line	1,259.9	31.0	52.8	135.4	330.9	353.9	239.0	73.4	-	-	-	-	1,216.3
Bipole III - Converter Stations	1,828.5	50.7	141.6	315.4	330.6	353.5	356.3	163.2	58.8	-	-	-	1,770.0
Bipole III - Collector Lines	191.4	9.9	57.8	46.9	22.6	25.2	18.5	10.1	-	-	-	-	191.1
Riel 230/500 KV Station	267.6	74.8	67.7	47.5	-	-	-	-	-	-	-	-	190.0
Firm Import Upgrades	19.9	0.2	19.7	-	-	-	-	-	-	-	-	-	19.9
Dorsey - US Border New 500KV Transmission Line	204.8	0.1	0.8	0.4	2.0	3.6	34.0	84.0	79.0	-	-	-	203.9
St. Joseph Wind Transmission	11.2	2.3	-	-	-	-	-	-	-	-	-	-	2.3
Denand Side Management	31.8	31.8	-	-	-	-	-	-	-	-	-	-	31.8
Generating Station Improvements & Upgrades	536.3	-	-	-	-	-	-	-	-	-	45.0	32.2	77.3
Single Cycle Gas Turbines	8.4	-	-	-	-	-	-	-	-	-	-	-	-
Additional North South Transmission	318.2	-	-	-	-	-	-	-	-	-	-	-	-
Target Adjustment	(67.8)	(118.3)	729.0	1,060.0	(45.4)	(40.7)	(175.7)	277.0	(77.3)	(77.0)	(26.0)	(3.2)	(289.4)
	656.1				1,223.4	1,566.9	1,610.5	1,953.0	1,177.1	1,412.0	1,445.8	1,306.0	14,139.8

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CAPITAL EXPENDITURE FORECAST (CEF11)
 (in millions of dollars)

	Total Project Cost	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	11 Year Total
Power Supply													
Converter Transformer Bushing Replacement	5.9	0.4	1.0	0.5	-	-	-	-	-	-	-	-	1.9
HVDC Auxiliary Power Supply Upgrades	5.3	0.5	0.4	-	-	-	-	-	-	-	-	-	0.9
Dorsey Synchronous Condenser Refurbishment	76.3	4.6	5.3	5.1	7.7	11.7	11.4	8.3	-	-	-	-	54.2
HVDC System Transformer & Reactor Fire Protection & Prevention	10.4	0.5	0.3	0.3	0.1	-	-	-	-	-	-	-	1.2
HVDC Transformer Replacement Program	171.7	4.6	17.6	15.5	17.2	14.0	9.7	-	-	-	0.5	-	78.5
HVDC Transformer Replacement Program Extended	336.2	-	-	-	-	-	-	-	-	-	-	-	5.2
Dorsey 230 kV Relay Building Upgrade	82.2	1.6	2.2	17.7	35.1	12.5	3.1	-	-	-	-	-	72.2
HVDC Stations Ground Grid Refurbishment	4.3	0.4	0.4	0.4	0.3	0.5	-	-	-	-	-	-	2.1
HVDC Bipole 2 230 kV HLR Circuit Breaker Replacement	15.9	2.1	1.1	1.0	0.2	0.5	0.1	0.1	0.0	-	-	-	5.2
HVDC Bipole 1 Pole Differential Protection	3.3	-	-	1.1	2.2	-	-	-	-	-	-	-	3.3
HVDC Bipole 1 By-Pass Vacuum Switch Removal	20.4	0.4	2.3	11.1	6.0	-	-	-	-	-	-	-	19.8
HVDC Bipole 2 Refrigerant Condenser Replacement	11.0	-	0.2	2.7	2.4	5.6	-	-	-	-	-	-	11.0
HVDC Smoothing Reactor Replacements	39.3	20.6	1.8	0.7	-	-	-	-	-	-	-	-	23.1
HVDC - BP1 Converter Station, P1 & P2 Battery Bank Separation	3.2	0.4	1.2	1.5	-	-	-	-	-	-	-	-	3.2
HVDC Bipole 1 DCCCT Transductor Replacement	11.7	0.2	1.3	1.1	3.0	3.8	2.4	-	-	-	-	-	11.7
HVDC Bipole 1 & 2 DC Converter Transformer Bushing Replacements	8.7	0.6	1.0	1.7	5.3	0.0	-	-	-	-	-	-	8.7
HVDC Bipole 2 Valve Wall Bushing Replacements	19.2	0.1	-	3.3	4.8	4.0	4.2	2.3	-	-	-	-	18.7
HVDC Bipole 2 Upgrades & Replacements	444.2	-	-	-	-	-	-	-	-	-	12.3	-	65.0
HVDC Bipole 1 CQ Disconnect Replacement	5.2	0.3	0.9	1.5	1.0	1.1	0.3	-	-	-	-	-	5.2
HVDC Bipole 2 Thyristor Module Cooling Refurbishment	4.7	1.2	-	-	-	-	-	-	-	-	-	-	1.2
HVDC Bipole 1 Transformer Marshalling Kiosk Replacement	6.8	0.4	2.7	1.2	1.2	-	-	-	-	-	-	-	5.5
HVDC Gapped Arrestor Replacement	16.3	0.2	1.0	3.9	3.4	7.0	0.1	-	-	-	-	-	15.7
Winnipeg River Riverbank Protection Program	19.7	1.5	1.4	1.3	1.3	1.3	0.8	-	-	-	-	-	7.5
Power Supply Hydraulic Controls	20.5	1.0	0.7	1.3	-	-	-	2.1	2.6	0.9	-	-	8.6
Slave Falls GS Creek Spillway Rehab	11.1	0.0	1.0	1.9	8.1	-	-	-	-	-	-	-	11.1
Slave Falls Rehabilitation	230.2	9.0	2.6	4.3	31.7	40.6	45.8	42.0	11.3	-	-	-	187.3
Great Falls Unit 4 Major Overhaul	43.5	11.4	21.6	0.8	-	-	-	-	-	-	-	-	33.8
Great Falls Unit 5 Discharge Ring Replacement and Major Overhaul	24.8	-	-	-	2.2	17.1	5.4	-	-	-	-	-	24.8
Generation South Overhauls & Improvements	384.8	-	-	-	-	-	-	-	-	-	4.7	10.2	14.8
Pine Falls Rehabilitation	166.7	4.0	21.0	26.9	40.3	46.8	14.0	0.1	-	-	-	-	163.0
Generation South Transformer Refurbish & Spares	27.6	0.6	7.0	13.8	4.3	0.5	0.5	-	-	-	-	-	26.6

Manitoba Hydro
Consolidated Capital Expenditure Forecast (CEF11)
 For the Years 2011/12 – 2021/22

CAPITAL EXPENDITURE FORECAST (CEF11)
 (in millions of dollars)

	Total Project Cost	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	11 Year Total
Power Supply Continued													
Water Licenses & Renewals	54.6	5.2	5.6	6.2	6.3	6.5	6.5	3.9	-	-	-	-	40.2
Generation South PCB Regulation Compliance	4.7	0.5	0.4	0.4	0.2	2.7	-	-	-	-	-	-	4.1
Kettle Transformer Overhaul Program	35.6	9.1	7.1	7.9	0.7	-	-	-	-	-	-	-	24.8
Generation South Breaker Replacements	11.1	1.7	3.8	0.5	1.0	0.4	1.2	-	-	-	-	-	8.5
Seven Sisters Upgrades	14.4	4.4	1.6	0.6	-	-	-	-	-	-	-	-	6.6
Generation South Excitation Upgrades	18.3	1.3	1.5	2.3	1.9	2.5	1.0	0.7	6.9	0.2	-	-	18.3
Generation South Excitation Program Extended	14.0	-	-	-	-	-	-	-	-	-	4.4	-	9.4
Laurie River/CRD Communications and Annunciation Upgrades	4.8	2.1	1.9	-	-	-	-	-	-	-	-	-	4.0
Notigi Maine Vessel Replacement and Infrastructure Improvements	4.6	0.3	4.1	1.6	-	-	-	-	-	-	-	-	4.4
Limestone Stilling Basin Rehabilitation	2.0	0.0	0.4	-	-	-	-	-	-	-	-	-	2.0
Pointe Du Bois GS Safety Upgrades	50.0	6.3	19.8	19.5	4.4	-	-	-	-	-	-	-	49.9
Kettle Wicket Gates Lever Refurbishments	2.3	-	1.1	1.2	-	-	-	-	-	-	-	-	2.3
Limestone Governor Control Repl	2.5	-	0.3	1.3	0.9	-	-	-	-	-	-	-	2.5
Limestone GSC/ADA Replacement	5.3	-	0.4	1.3	0.8	0.9	0.4	1.5	-	-	-	-	5.3
Jenpeg Unit Overhauls	128.1	-	-	-	-	2.2	2.5	18.0	23.7	24.2	24.6	20.8	115.9
Power Supply Dam Safety Upgrades	64.5	7.4	10.6	5.0	-	-	-	-	-	-	-	-	23.1
Brandon Unit 5 License Review	16.7	0.2	0.2	2.6	10.4	-	-	-	-	-	-	-	13.4
Selkirk Enhancements	14.2	0.4	0.9	-	-	-	-	-	-	-	-	-	1.3
Fire Protection Projects - HMD	7.2	0.4	0.2	1.2	2.9	-	-	-	-	-	-	-	4.7
Halon Replacement Project	36.4	1.6	5.2	2.6	3.5	2.2	0.9	-	-	-	-	-	16.0
Oil Containment - Power Supply	19.1	0.7	0.5	0.7	0.4	0.6	0.3	-	-	-	-	-	3.1
Grand Rapids Townsite House Renovations	5.2	1.1	0.9	0.9	0.9	0.0	-	-	-	-	-	-	3.9
Grand Rapids Fish Hatchery	2.2	1.2	0.8	-	-	-	-	-	-	-	-	-	2.0
Generation Townsite Infrastructure	52.1	9.0	1.9	-	-	-	-	-	-	-	-	-	10.9
Site Remediation of Contaminated Corporate Facilities	31.7	1.6	-	-	-	-	-	-	-	-	-	-	1.6
High Voltage Test Facility	40.6	13.7	0.4	-	-	-	-	-	-	-	-	-	14.1
Power Supply Security Installations / Upgrades	43.2	5.6	7.9	9.7	4.7	-	-	-	-	-	-	-	27.8
Power Supply Sewer & Domestic Water System Install and Upgrade	37.9	6.4	2.9	1.0	2.4	1.6	2.4	3.1	0.1	-	-	-	19.9
Power Supply Domestic	479.9	19.7	20.1	20.5	21.0	21.4	21.8	22.7	22.7	23.1	23.6	24.1	240.3
Target Adjustment	(10.7)	(155.6)	(60.3)	(57.3)	(76.4)	(77.5)	(30.6)	(19.6)	(1.6)	0.5	0.8	(2.8)	(335.5)
			136.4	150.4	163.9	130.5	104.1	84.8	65.6	48.9	70.8	114.6	1,225.6

Manitoba Hydro
Consolidated Capital Expenditure Forecast (CEF11)
For the Years 2011/12 – 2021/22

CAPITAL EXPENDITURE FORECAST (CEF11)
(in millions of dollars)

	Total Project Cost	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	11 Year Total
Transmission													
Winnipeg - Brandon Transmission System Improvements	44.8	3.0	0.8	4.1	28.7	3.7	-	-	-	-	-	-	40.3
Transcona East 230 - 66 kV Station	33.1	24.1	-	-	-	-	-	-	-	-	-	-	24.1
Brandon Area Transmission Improvements	11.8	4.4	6.3	1.0	-	-	-	-	-	-	-	-	11.6
Neepawa 230 - 66 kV Station	30.0	14.1	8.0	4.5	-	-	-	-	-	-	-	-	26.6
Transmission Line Re-Rating	31.8	2.9	6.4	-	-	-	-	-	-	-	-	-	9.3
St Vital-Steinbach 230 kV Transmission	32.2	-	-	-	-	0.8	0.9	2.6	6.1	9.7	12.1	-	32.2
Transcona Station 66 kV Breaker Replacement	6.0	0.4	2.9	1.5	1.1	0.0	-	-	-	-	-	-	6.0
13.2kV Shunt Reactor Replacements	33.0	2.2	4.9	0.9	0.8	2.2	2.3	2.3	17.5	-	-	-	33.0
Lake Winnipeg East System Improvements	66.9	2.3	5.7	15.4	29.2	14.2	0.1	-	-	-	-	-	66.8
Canexus Load Addition	(0.2)	0.9	0.1	-	-	-	-	-	-	-	-	-	1.0
D602F 500KV VTL Footing Replacements	4.4	4.4	-	-	-	-	-	-	-	-	-	-	4.4
Stanley Station 230-66 kV Transformer Addition	21.1	0.0	1.8	7.3	7.9	4.0	-	-	-	-	-	-	21.1
Enbridge Pipelines: Clipper Project Load Addition Phase 2	7.5	1.8	1.9	0.0	-	-	-	-	-	-	-	-	3.7
Ashern Station Bank Addition	10.6	0.2	1.6	1.5	7.0	0.2	-	-	-	-	-	-	10.6
Ashern Station 230 kV Shunt Reactor Replacement	2.7	0.9	1.8	-	-	-	-	-	-	-	-	-	2.7
Tadoule Lake DGS Diesel Tank Farm Upgrade	1.1	(1.0)	0.7	-	-	-	-	-	-	-	-	-	(0.4)
Energy Management System (EMS) Upgrade	6.6	2.8	2.0	-	-	-	-	-	-	-	-	-	4.8
Transmission Line Protection & Teleprotection Replacement	21.1	3.1	3.4	2.8	2.8	2.9	2.4	-	-	-	-	-	17.5
Winnipeg Central Protection Wireline Replacement	10.5	0.4	-	-	-	-	-	-	-	-	-	-	0.4
Mobile Radio System Modernization	30.7	1.9	6.4	2.8	11.6	7.9	-	-	-	-	-	-	30.5
Site Remediation of Diesel Generating Stations	12.6	2.3	-	-	-	-	-	-	-	-	-	-	2.3
Oil Containment - Transmission	7.4	0.4	0.0	-	-	-	-	-	-	-	-	-	0.4
Station Battery Bank Capacity & System Reliability Increase	46.5	4.8	5.1	4.9	5.0	5.2	-	-	-	-	-	-	25.0
Waverley Service Centre Oil Tank Farm Replacement	3.0	0.5	0.4	0.7	-	-	-	-	-	-	-	-	1.6
115 kV Transmission Lines	264.1	-	-	-	-	-	-	-	-	-	10.3	16.1	26.4
230 kV Transmission Lines	151.2	-	-	-	-	-	-	-	-	-	5.9	9.2	15.1
Sub-Transmission	110.3	-	-	-	-	-	-	-	-	-	-	-	11.0
Communications	376.2	-	-	-	-	-	-	-	-	-	4.3	6.7	11.0
Transmission Domestic	743.4	-	-	-	-	-	-	-	-	-	14.7	23.0	37.6
Target Adjustment	(24.3)	30.6	31.2	31.8	32.5	33.1	33.8	34.5	35.1	35.9	36.6	37.3	372.3
		(13.4)	(13.4)	27.3	(38.2)	(13.6)	(0.1)	2.2	(14.6)	0.0	1.0	1.8	(71.9)
	83.1	78.0	106.5	106.5	88.6	60.7	39.3	41.6	44.1	45.6	84.8	94.1	766.3

CAPITAL EXPENDITURE FORECAST (CEF11)
 (in millions of dollars)

	Total Project Cost	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	11 Year Total
Customer Service & Distribution													
Winnipeg Distribution Infrastructure Requirements	24.5	2.3	2.3	2.9	-	-	-	-	-	-	-	-	7.5
Rover Substation Replace 4 kV Switchgear	12.7	0.0	0.1	1.7	2.5	2.8	0.5	-	-	-	-	-	7.5
Marlin New Outdoor Station	28.2	1.2	11.9	8.1	2.2	-	-	-	-	-	-	-	23.3
Probinsher Station Upgrade	14.4	0.5	1.0	-	-	-	-	-	-	-	-	-	1.5
Burrows New 66 kV/12 kV Station	28.6	12.1	6.7	-	-	-	-	-	-	-	-	-	18.9
Winnipeg Central 128.4kV Manhole Oil Switches	9.8	1.4	-	-	-	-	-	-	-	-	-	-	1.4
William New 66 kV/12 kV Station	10.3	0.5	2.2	2.9	3.2	1.1	-	-	-	-	-	-	10.0
Waverley West Sub-Division Supply - Stage 1	6.5	0.7	-	-	-	-	-	-	-	-	-	-	0.7
St James New Station & 24 kV Conversion	65.9	0.6	6.3	3.9	9.5	21.8	23.6	-	-	-	30.5	47.9	65.7
Distribution	784.1	-	-	-	-	-	-	-	-	-	-	-	78.4
York Station Bank & Switchgear Addition	6.0	1.4	-	-	-	-	-	-	-	-	-	-	1.4
Defective RINJ Cable Replacement	8.7	1.3	1.3	-	-	-	-	-	-	-	-	-	2.7
Health Sciences Centre Service Consolidation & Distribution Upgrade	15.8	2.0	5.0	3.6	4.0	0.6	-	-	-	-	-	-	15.2
Waverley South DSC Installation	3.9	2.7	-	-	-	-	-	-	-	-	-	-	2.7
Southdale DK732 Cable Replacement	2.6	0.9	1.2	-	-	-	-	-	-	-	-	-	2.1
Slambach Area 66kV Capacity Upgrade	6.3	5.9	0.3	-	-	-	-	-	-	-	-	-	6.2
Line 27 66 kV Extension and Aborig North Distribution Supply Centre	6.0	4.3	1.2	-	-	-	-	-	-	-	-	-	5.4
AECL Station Switchgear Replacement	2.4	0.8	-	-	-	-	-	-	-	-	-	-	0.8
Melrose DSC	3.5	3.5	-	-	-	-	-	-	-	-	-	-	3.5
Starbuck DSC	3.0	3.0	-	-	-	-	-	-	-	-	-	-	3.0
Enbridge Pipelines Clipper-66kV Supply I	0.9	2.1	-	-	-	-	-	-	-	-	-	-	2.1
Teulon East 66-12 kV Station	4.6	4.2	-	-	-	-	-	-	-	-	-	-	4.2
Waskada New 66-25kV Distrib'n Supply Ctr	3.9	3.9	-	-	-	-	-	-	-	-	-	-	3.9
Cromer North Station & Reston RE12-4.25kV Conversion	4.3	0.2	1.2	-	-	-	-	-	-	-	-	-	1.3
Brandon Crocus Plains 11.5-25 kV Bank Addition	6.3	0.0	0.0	0.0	6.2	-	-	-	-	-	-	-	6.2
Birtle South - Rossburn 66kV Line	4.9	-	-	0.1	0.3	4.5	-	-	-	-	-	-	4.9
TCPL Keystone Project	8.0	2.1	2.4	-	-	-	-	-	-	-	-	-	4.5
Line 98 Rebuild Meleto to Waskada	3.8	3.8	-	-	-	-	-	-	-	-	-	-	3.8
Customer Service & Distribution Domestic	3,119.4	127.9	130.5	133.2	136.3	139.0	141.8	144.7	147.5	150.5	153.5	156.6	1,581.5
Target Adjustment		(30.3)	(6.8)	(11.2)	(21.6)	(18.7)	(14.8)	(9.6)	(9.8)	(10.0)	(10.2)	(10.4)	(153.6)
		159.0	166.8	145.1	142.5	151.1	151.2	135.0	137.7	140.5	173.8	194.0	1,696.6
Customer Care & Marketing													
Advanced Metering Infrastructure	30.9	-	4.0	5.3	5.4	5.6	4.3	4.2	-	-	-	-	28.8
Customer Care & Marketing Domestic	85.8	3.0	3.0	3.1	3.8	3.9	4.0	4.1	4.1	4.2	4.3	4.4	42.0
Target Adjustment		3.6	1.0	(0.3)	(0.9)	(2.3)	(1.2)	(5.4)	(1.1)	(1.2)	(1.2)	(1.2)	(10.2)
		6.6	8.0	8.1	8.4	7.2	7.1	2.9	3.0	3.1	3.1	3.2	60.7
Finance & Administration													
Corporate Buildings	NA	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	88.0
EA/Phase 2	19.3	6.1	8.9	2.3	-	-	-	-	-	-	-	-	17.3
Workforce Management (Phase 1 to 4)	15.7	2.3	-	-	-	-	-	-	-	-	-	-	2.3
Fleet	NA	13.8	14.1	14.3	14.6	14.9	15.2	15.5	15.8	16.2	16.5	16.8	167.7
Finance & Administration Domestic	606.0	28.4	25.4	25.9	26.5	27.0	27.5	28.1	28.7	29.2	29.8	30.4	303.5
Target Adjustment		(8.4)	(8.9)	(2.3)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(19.8)
		46.7	47.5	45.3	49.1	49.9	50.7	51.6	52.5	53.3	54.3	55.2	559.0
ELECTRIC CAPITAL SUBTOTAL													
		1,107.1	1,165.6	1,518.2	1,675.9	1,966.2	1,962.9	2,268.9	1,480.0	1,703.3	1,832.6	1,767.1	18,447.9

Manitoba Hydro
Consolidated Capital Expenditure Forecast (CEF11)
 For the Years 2011/12 – 2021/22

CAPITAL EXPENDITURE FORECAST (CEF11)
 (in millions of dollars)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	11 Year Total
Total Project Cost												
GAS												
Customer Service & Distribution	1.2	0.9	-	-	-	-	-	-	-	-	-	1.2
Ille Des Chenes NG Transmission Network Upgrade	4.6	-	-	-	-	-	-	-	-	-	-	3.6
Gas SCADA Replacement	1.6	-	-	-	-	-	-	-	-	-	-	1.6
Bunclouby Natural Gas Crossing at Souris River	25.2	25.7	26.2	27.3	27.8	27.8	28.4	28.9	29.5	30.1	30.7	306.5
Customer Service & Distribution Domestic	(6.2)	(4.5)	(3.7)	(3.8)	(3.9)	(3.9)	(4.0)	(4.0)	(4.1)	(4.2)	(4.3)	(46.4)
Target Adjustment	24.6	22.1	22.5	23.0	23.4	23.9	24.4	24.9	25.4	25.9	26.4	266.5
Customer Care & Marketing	15.0	1.0	5.4	8.4	-	-	-	-	-	-	-	14.7
Advanced Metering Infrastructure	12.6	-	-	-	-	-	-	-	-	-	-	12.6
Demand Side Management	115.1	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5	5.7	5.8	57.7
Customer Care & Marketing Domestic	(1.5)	1.4	(1.2)	(11.9)	(2.9)	(2.9)	(2.1)	(2.7)	(2.8)	(2.3)	(2.3)	(31.1)
Target Adjustment	15.9	7.2	9.1	1.5	2.3	2.4	3.3	2.7	2.7	3.4	3.5	53.9
GAS CAPITAL SUBTOTAL	40.5	29.3	31.6	24.5	25.7	26.3	27.7	27.6	28.1	29.3	29.9	320.5
CONSOLIDATED CAPITAL	1,147.6	1,195.0	1,549.8	1,700.4	1,991.9	1,989.1	2,296.6	1,507.6	1,731.5	1,861.9	1,797.0	18,768.4
Target Adjustment	(33.6)	(0.0)	0.0	0.0	31.1	87.9	135.9	160.3	182.2	51.8	5.2	620.8
CEF11 TOTAL	1,114.1	1,195.0	1,549.8	1,700.4	2,022.9	2,077.0	2,432.5	1,667.9	1,913.6	1,913.7	1,802.1	19,389.2

Manitoba Hydro
Consolidated Capital Expenditure Forecast (CEF11)
 For the Years 2011/12 – 2021/22

CAPITAL EXPENDITURE FORECAST (CEF11)
 (in millions of dollars)

	Total Project Cost	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	21 Year Total
ELECTRIC												
Major New Generation & Transmission												
Wuskwaïm - Generation	1,374.6	-	-	-	-	-	-	-	-	-	-	252.3
Wuskwaïm - Transmission	297.4	-	-	-	-	-	-	-	-	-	-	31.6
Herblet Lake – The Pas 230 KV Transmission	74.9	-	-	-	-	-	-	-	-	-	-	7.2
Keejask- Generation	5,636.9	1,042.6	909.5	691.8	281.3	41.0	-	-	-	-	-	5,215.1
Conawapa - Generation	7,770.8	-	-	-	-	-	-	-	-	-	-	7,569.1
Kelsey Improvements & Upgrades	301.7	7.7	-	-	-	-	-	-	-	-	-	79.7
Kettle Improvements & Upgrades	165.7	-	-	-	-	-	-	-	-	-	-	139.6
Pointe du Bois Spillway Replacement	395.2	-	-	-	-	-	-	-	-	-	-	345.2
Pointe du Bois - Transmission	85.9	-	-	-	-	-	-	-	-	-	-	60.2
Pointe du Bois Powerhouse Rebuild	1,482.7	2.2	16.0	37.8	90.7	157.8	245.0	403.9	312.7	216.2	55.6	1,538.3
Bipote III - Transmission Line	1,259.9	-	-	-	-	-	-	-	-	-	-	1,216.3
Bipote III - Converter Stations	1,828.5	-	-	-	-	-	-	-	-	-	-	1,770.0
Bipote III - Collector Lines	191.4	-	-	-	-	-	-	-	-	-	-	191.1
Riel 230/500 kV Station	267.6	-	-	-	-	-	-	-	-	-	-	190.0
Firm Import Upgrades	19.9	-	-	-	-	-	-	-	-	-	-	19.9
Dorsey - US Border New 500kV Transmission Line	204.8	-	-	-	-	-	-	-	-	-	-	203.9
St. Joseph Wind Transmission	11.2	-	-	-	-	-	-	-	-	-	-	2.3
Demand Side Management	31.8	-	-	-	-	-	-	-	-	-	-	31.8
Generating Station Improvements & Upgrades	536.3	21.1	9.4	14.4	15.2	25.8	79.3	56.6	62.7	174.5	112.6	649.0
Single Cycle Gas Turbines	8.4	-	-	-	-	-	-	-	-	8.4	57.2	65.6
Additional North South Transmission	318.2	-	-	-	318.2	-	-	-	-	-	-	318.2
Target Adjustment		(1.8)	(1.7)	306.3	(319.8)	(0.5)	(0.5)	(0.5)	(0.5)	(8.9)	-	(317.2)
		1,071.8	933.3	1,050.2	365.6	224.1	323.8	460.0	374.9	390.2	225.5	19,579.2

Manitoba Hydro
Consolidated Capital Expenditure Forecast (CEF11)
 For the Years 2011/12 – 2021/22

CAPITAL EXPENDITURE FORECAST (CEF11)
 (in millions of dollars)

	Total Project Cost	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	21 Year Total
Power Supply Continued												
Water Licenses & Renewals	54.6	-	-	-	-	-	-	-	-	-	-	40.2
Generation South PCB Regulation Compliance	4.7	-	-	-	-	-	-	-	-	-	-	4.1
Kettle Transformer Overhaul Program	35.6	-	-	-	-	-	-	-	-	-	-	24.8
Generation South Breaker Replacements	11.1	-	-	-	-	-	-	-	-	-	-	8.5
Seven Sisters Upgrades	14.4	-	-	-	-	-	-	-	-	-	-	6.6
Generation South Excitation Upgrades	18.3	-	-	-	-	-	-	-	-	-	-	18.3
Generation South Excitation Program, Extended	14.0	3.4	1.2	-	-	-	-	-	-	-	-	14.0
Laurie River/CRD Communications and Annunciation Upgrades	4.8	-	-	-	-	-	-	-	-	-	-	4.0
Notigi Marine Vessel Replacement and Infrastructure Improvements	4.6	-	-	-	-	-	-	-	-	-	-	4.4
Limestone Stilling Basin Rehabilitation	2.0	-	-	-	-	-	-	-	-	-	-	2.0
Pointe Du Bois GS Safety Upgrades	50.0	-	-	-	-	-	-	-	-	-	-	49.9
Kettle Wicket Gates Lever Refurbishments	2.3	-	-	-	-	-	-	-	-	-	-	2.3
Limestone Governor Control Repl	2.5	-	-	-	-	-	-	-	-	-	-	2.5
Limestone GSCADA Replacement	5.3	-	-	-	-	-	-	-	-	-	-	5.3
Jenpeg Unit Overhauls	128.1	-	-	-	-	-	-	-	-	-	-	115.9
Power Supply Dam Safety Upgrades	64.5	-	-	-	-	-	-	-	-	-	-	23.1
Brandon Unit 5 License Review	18.7	-	-	-	-	-	-	-	-	-	-	13.4
Selkirk Enhancements	14.2	-	-	-	-	-	-	-	-	-	-	1.3
Fire Protection Projects - HVDC	7.2	-	-	-	-	-	-	-	-	-	-	4.7
Halon Replacement Project	36.4	-	-	-	-	-	-	-	-	-	-	16.0
Oil Containment – Power Supply	19.1	-	-	-	-	-	-	-	-	-	-	3.1
Grand Rapids Townsite House Renovations	5.2	-	-	-	-	-	-	-	-	-	-	3.9
Grand Rapids Fish Hatchery	2.2	-	-	-	-	-	-	-	-	-	-	2.0
Generation Townsite Infrastructure	52.1	-	-	-	-	-	-	-	-	-	-	10.9
Site Remediation of Contaminated Corporate Facilities	31.7	-	-	-	-	-	-	-	-	-	-	1.6
High Voltage Test Facility	40.6	-	-	-	-	-	-	-	-	-	-	14.1
Power Supply Security Installations / Upgrades	43.2	-	-	-	-	-	-	-	-	-	-	27.8
Power Supply Sewer & Domestic Water System Install and Upgrade	37.9	-	-	-	-	-	-	-	-	-	-	19.9
Power Supply Domestic	479.9	24.6	25.0	25.5	26.1	26.6	27.1	27.7	28.2	28.8	29.3	509.2
		(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(35.8)
Target Adjustment	132.0	152.6	178.9	165.0	166.4	170.0	132.4	158.7	170.0	68.1	142.9	2,692.5

Manitoba Hydro
Consolidated Capital Expenditure Forecast (CEF11)
 For the Years 2011/12 – 2021/22

CAPITAL EXPENDITURE FORECAST (CEF11)
 (in millions of dollars)

	Total Project Cost	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	21 Year Total
Transmission												
Winnipeg - Brandon Transmission System Improvements	44.8	-	-	-	-	-	-	-	-	-	-	40.3
Transcona East 230 - 66 kV Station	33.1	-	-	-	-	-	-	-	-	-	-	24.1
Brandon Area Transmission Improvements	11.8	-	-	-	-	-	-	-	-	-	-	11.6
Neepawa 230 - 66 kV Station	30.0	-	-	-	-	-	-	-	-	-	-	26.6
Transmission Line Re-Rating	31.8	-	-	-	-	-	-	-	-	-	-	9.3
St Vital-Sleinbach 230 kV Transmission	32.2	-	-	-	-	-	-	-	-	-	-	32.2
Transcona Station 66 kV Breaker Replacement	6.0	-	-	-	-	-	-	-	-	-	-	6.0
13.2kV Shunt Reactor Replacements	33.0	-	-	-	-	-	-	-	-	-	-	33.0
Lake Winnipeg East System Improvements	66.9	-	-	-	-	-	-	-	-	-	-	66.8
Canexus Load Addition	(0.2)	-	-	-	-	-	-	-	-	-	-	1.0
D602F 500kV/T/L Footing Replacements	4.4	-	-	-	-	-	-	-	-	-	-	4.4
Stanley Station 230-66 kV Transformer Addition	21.1	-	-	-	-	-	-	-	-	-	-	21.1
Enbridge Pipelines: Clipper Project Load Addition Phase 2	7.5	-	-	-	-	-	-	-	-	-	-	3.7
Ashern Station Bank Addition	10.6	-	-	-	-	-	-	-	-	-	-	10.6
Ashern Station 230 kV Shunt Reactor Replacement	2.7	-	-	-	-	-	-	-	-	-	-	2.7
Tadoule Lake DGS Diesel Tank Farm Upgrade	1.1	-	-	-	-	-	-	-	-	-	-	(0.4)
Energy Management System (EMS) Upgrade	6.6	-	-	-	-	-	-	-	-	-	-	4.8
Transmission Line Protection & Teleprotection Replacement	21.1	-	-	-	-	-	-	-	-	-	-	17.5
Winnipeg Central Protection Wireline Replacement	10.5	-	-	-	-	-	-	-	-	-	-	0.4
Mobile Radio System Modernization	30.7	-	-	-	-	-	-	-	-	-	-	30.5
Site Remediation of Diesel Generating Stations	12.6	-	-	-	-	-	-	-	-	-	-	2.3
Oil Containment - Transmission	7.4	-	-	-	-	-	-	-	-	-	-	0.4
Station Battery Bank Capacity & System Reliability Increase	46.5	-	-	-	-	-	-	-	-	-	-	25.0
Waverley Service Centre Oil Tank Farm Replacement	3.0	-	-	-	-	-	-	-	-	-	-	1.6
115 kV Transmission Lines	264.1	19.8	21.1	25.8	23.7	25.5	28.4	28.9	31.5	32.9	34.8	288.9
230 kV Transmission Lines	151.2	11.3	12.1	14.8	13.6	14.6	16.3	16.5	18.0	18.8	19.9	171.1
Sub-Transmission	110.3	8.3	8.8	10.8	9.9	10.6	11.9	12.1	13.1	13.7	14.5	124.8
Communications	376.2	28.2	30.0	36.8	33.8	36.3	40.5	41.2	44.8	46.9	49.6	425.8
Transmission Domestic	743.4	38.0	38.8	38.6	40.4	41.2	42.0	42.8	43.7	44.6	45.5	788.9
Target Adjustment		2.2	-2.3	-2.9	2.6	2.8	3.1	3.2	3.5	3.6	3.9	(41.6)
	107.8	113.2	124.1	130.7	124.1	131.1	142.2	144.7	154.7	160.6	168.3	2,143.5

CAPITAL EXPENDITURE FORECAST (CEF11)
 (in millions of dollars)

	Total Project Cost	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	21 Year Total
Customer Service & Distribution												
Winnipeg Distribution Infrastructure Requirements	24.5	-	-	-	-	-	-	-	-	-	-	7.5
Rover Substation Replace 4 kV Switchgear	12.7	-	-	-	-	-	-	-	-	-	-	7.5
Marlin New Outdoor Station	28.2	-	-	-	-	-	-	-	-	-	-	23.3
Probiner Station Upgrade	14.4	-	-	-	-	-	-	-	-	-	-	1.5
Burnows New 66 kV/12 kV Station	28.6	-	-	-	-	-	-	-	-	-	-	18.9
Winnipeg Central 12&4kV Manhole Oil Switches	9.8	-	-	-	-	-	-	-	-	-	-	1.4
William New 66 kV/12 kV Station	10.3	-	-	-	-	-	-	-	-	-	-	10.0
Waverley West Sub Division Supply - Stage 1	6.5	-	-	-	-	-	-	-	-	-	-	0.7
St. James New Station & 24 kV Conversion	65.9	-	-	-	-	-	-	-	-	-	-	65.7
Distribution	784.1	58.8	62.6	76.7	70.5	75.7	84.4	85.8	83.5	97.8	103.4	887.5
York Station Bank & Switchgear Addition	6.0	-	-	-	-	-	-	-	-	-	-	1.4
Defective RINJ Cable Replacement	8.7	-	-	-	-	-	-	-	-	-	-	2.7
Health Sciences Centre Service Consolidation & Distribution Upgrade	15.8	-	-	-	-	-	-	-	-	-	-	15.2
Waverley South DSC Installation	3.9	-	-	-	-	-	-	-	-	-	-	2.7
Southdale DK732 Cable Replacement	2.6	-	-	-	-	-	-	-	-	-	-	2.1
Steinbach Area 66kV Capacity Upgrade	6.3	-	-	-	-	-	-	-	-	-	-	6.2
Line 27 66 kV Extension and Arborg North Distribution Supply Centre	6.0	-	-	-	-	-	-	-	-	-	-	5.4
AECCL Station Switchgear Replacement	2.4	-	-	-	-	-	-	-	-	-	-	0.8
Meirose DSC	3.5	-	-	-	-	-	-	-	-	-	-	3.5
Starbuck DSC	3.0	-	-	-	-	-	-	-	-	-	-	3.0
Enbridge Pipelines Clippier-66kV Supply I	0.9	-	-	-	-	-	-	-	-	-	-	2.1
Toulon East 66-12 kV Station	4.6	-	-	-	-	-	-	-	-	-	-	4.2
Waskada New 66-25kV/Distribn Supply Ctr	3.9	-	-	-	-	-	-	-	-	-	-	3.9
Cromer North Station & Reston RE12-4.25kV Conversion	4.3	-	-	-	-	-	-	-	-	-	-	1.3
Brandon Crocus Plains 115-25 kV Bank Addition	6.3	-	-	-	-	-	-	-	-	-	-	6.2
Birtle South - Rossburn 66kV Line	4.9	-	-	-	-	-	-	-	-	-	-	4.9
TCPL Keystone Project	8.0	-	-	-	-	-	-	-	-	-	-	4.5
Line 98 Rebuild Melita to Waskada	3.8	-	-	-	-	-	-	-	-	-	-	3.8
Customer Service & Distribution Domestic	3,119.4	159.7	162.9	166.2	169.5	172.9	176.3	179.9	183.5	187.1	190.9	3,310.3
Target Adjustment		(10.6)	(10.9)	(11.1)	(11.3)	(11.5)	(11.8)	(12.0)	(12.2)	(12.5)	-	(257.5)
		207.8	214.7	231.8	228.7	237.0	249.0	253.6	264.7	272.4	294.2	4,150.6
Customer Care & Marketing												
Advanced Metering Infrastructure	30.9	-	-	-	-	-	-	-	-	-	-	28.8
Customer Care & Marketing Domestic	85.8	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.4	91.2
Target Adjustment		(1.2)	(1.3)	(1.3)	(1.3)	(1.3)	(1.4)	(1.4)	(1.4)	(1.5)	-	(22.3)
		3.3	3.3	3.4	3.5	3.5	3.6	3.7	3.7	3.8	5.4	97.8
Finance & Administration												
Corporate Buildings	NA	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	168.0
EAM Phase 2	19.3	-	-	-	-	-	-	-	-	-	-	17.3
Workforce Management (Phase 1 to 4)	15.7	-	-	-	-	-	-	-	-	-	-	2.3
Fleet	NA	17.1	17.5	17.8	18.2	18.6	19.9	19.3	19.7	20.1	20.5	355.4
Finance & Administration Domestic	606.0	31.0	31.6	32.3	32.9	33.6	34.2	34.9	35.6	36.3	37.1	643.1
Target Adjustment		(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	-	(20.2)
		56.1	57.1	58.1	59.1	60.1	61.1	62.2	63.3	64.4	65.5	1,165.9
ELECTRIC CAPITAL SUBTOTAL		1,578.8	1,474.1	1,653.0	965.9	822.2	912.2	1,082.9	1,031.2	959.5	901.7	29,829.4

CAPITAL EXPENDITURE FORECAST (CEF11)
 (in millions of dollars)

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	21 Year Total
GAS											
Customer Service & Distribution											
Ile Des Chenes NG Transmission Network Upgrade	1.2	-	-	-	-	-	-	-	-	-	1.2
Gas SCADA Replacement	4.6	-	-	-	-	-	-	-	-	-	3.6
Bunclouby Natural Gas Crossing at Souris River	1.6	-	-	-	-	-	-	-	-	-	1.6
Customer Service & Distribution Domestic	612.0	31.3	31.9	32.6	33.9	34.6	35.3	36.0	36.7	37.4	649.4
Target Adjustment	(4.4)	(4.5)	(4.6)	(4.6)	(4.7)	(4.8)	(4.9)	(5.0)	(5.1)	(5.2)	(94.4)
	26.9	27.5	28.0	28.6	29.2	29.7	30.3	30.9	31.6	32.2	561.5
Customer Care & Marketing											
Advanced Metering Infrastructure	15.0	-	-	-	-	-	-	-	-	-	14.7
Demand Side Management	12.6	-	-	-	-	-	-	-	-	-	12.6
Customer Care & Marketing Domestic	115.1	6.0	6.1	6.2	6.4	6.5	6.6	6.8	6.9	7.0	122.1
Target Adjustment	(2.4)	(1.8)	(1.9)	(2.0)	(2.1)	(2.1)	(2.2)	(2.2)	(2.3)	(2.4)	(62.5)
	3.5	4.2	4.2	4.3	4.3	4.4	4.5	4.5	4.5	4.6	4.7
GAS CAPITAL SUBTOTAL	30.4	31.6	32.3	32.8	33.5	34.1	34.8	35.5	36.2	36.9	658.5
CONSOLIDATED CAPITAL	1,609.2	1,505.7	1,685.3	998.8	855.6	946.3	1,117.7	1,066.7	995.7	938.6	30,487.9
Target Adjustment	5.3	5.4	5.5	5.6	5.8	5.9	6.0	6.1	6.3	6.4	679.0
CEF11 TOTAL	1,614.5	1,511.1	1,690.8	1,004.4	861.4	952.1	1,123.6	1,072.8	1,001.9	945.0	31,166.9



Section 2

Project Summaries

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ELECTRIC OPERATIONS:

MAJOR NEW GENERATION & TRANSMISSION:

Wuskwatim - Generation

Description:

Design and build the new Wuskwatim generating station with three generators and installed capacity of approximately 200 MW on the Burntwood River upstream of Thompson.

Justification:

This project increases generation for both export power purposes and domestic load requirements.

In-Service Date:

First power March 2012.

Revision:

Increased costs to reflect increases for general civil and electrical & mechanical system contracts and the first unit in-service deferral of six months from September 2011.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 1,274.6	\$ 130.3	\$ 16.2	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	100.0	50.9	49.1	5.9	-	-	-
Revised Forecast	\$ 1,374.6	\$ 181.1	\$ 65.3	\$ 5.9	\$ -	\$ -	\$ -

Wuskwatim - Transmission

Description:

Perform environmental assessments and route selection, design and construct transmission and terminal facilities necessary to integrate the Wuskwatim generating station into the Manitoba Hydro 230 kV transmission network as follows: *Transmission:* 230 kV lines from Wuskwatim switching station to Thompson Birchtree station, from Wuskwatim switching station to Herblet Lake station, and from Wuskwatim generating station to Wuskwatim switching station. *Terminations:* New 230 kV stations at Thompson Birchtree and Wuskwatim, new 230 kV 150 MVA static var compensator at Thompson Birchtree station, terminate lines into Herblet Lake and replace protection at Kelsey and Thompson Mystery Lake Road stations. *Communications:* system additions for protection of the new transmission lines and stations, including optical power ground wire on the Wuskwatim to Birchtree transmission line.

Justification:

The existing 230 kV transmission system in northern Manitoba does not have sufficient capacity to accommodate the additional output of the Wuskwatim generating station. This project will increase the ability of the transmission system to carry the full output of Wuskwatim to load anywhere in Manitoba.

In-Service Date:

March 2012.

Revision:

Revised cost flow and increase to interest capitalized during construction to account for the six month deferral of first unit in-service from September 2011.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 291.2	\$ 21.2	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	6.1	10.4	-	-	-	-	-
Revised Forecast	\$ 297.4	\$ 31.6	\$ -	\$ -	\$ -	\$ -	\$ -

Herblet Lake - The Pas 230 kV Transmission

Description:

Perform environmental assessments and route selection, design and construct transmission and terminal facilities to provide firm supply to Flin Flon Cliff Lake and The Pas Ralls Island as follows: *Transmission:* 230 kV line 160 km from Herblet Lake to The Pas Ralls Island. *Terminations:* Extend 230 kV facilities at Herblet Lake and The Pas Ralls Island stations. *Communications:* Upgrade and co-ordinate with existing Herblet Lake and The Pas facilities.

Justification:

The line is required to provide firm supply and voltage support for increasing Flin Flon and The Pas area loads. In addition, this line facilitates the transmission of power from the Wuskwatim generating station.

In-Service Date:

August 2011.

Revision:

Cost flow revision and in-service advanced one month from September 2011.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 74.9	\$ 6.0	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	0.4	0.7	-	-	-	-
Revised Forecast	\$ 74.9	\$ 6.4	\$ 0.7	\$ -	\$ -	\$ -	\$ -

Keeyask - Generation

Description:

Design and build the Keeyask generating station with seven generators and nominal capacity of 695 MW on the Nelson River downstream of the Kelsey generating station. Project costs include activities necessary to obtain approval and community support to proceed with the construction of the future generating station. The estimate is comprised of costs associated with extensive First Nations and other community consultations, pre-project training, joint venture business developments, environmental studies, impact statement preparations, submissions, regulatory review processes, detailed pre-engineering requirements, acquiring all necessary licensing, the design and construction of associated transmission facilities, and improvements to access roadways.

Justification:

This project increases generation for export power purposes and ultimately domestic load requirements.

In-Service Date:

First power November 2019.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 5,636.9	\$ 152.5	\$ 179.2	\$ 312.3	\$ 379.5	\$ 683.0	\$ 3,450.7
Increase (Decrease)	-	(36.9)	(15.8)	(114.0)	21.5	(20.1)	177.7
Revised Forecast	\$ 5,636.9	\$ 115.6	\$ 163.4	\$ 198.2	\$ 401.1	\$ 662.9	\$ 3,628.4

Conawapa - Generation

Description:

Design and build the Conawapa generating station with ten generators and nominal capacity of 1 485 MW on the Nelson River downstream of the Limestone generating station. Project costs include activities associated with extensive First Nations and other community consultations, pre-project training, environmental studies, impact statement preparations, submissions, regulatory review processes, acquiring all necessary licensing, improvements to access roadways, and detailed pre-engineering required to obtain a license and all necessary approvals to construct the Conawapa generating station.

Justification:

This project increases generation for both export power purposes and domestic load requirements.

In-Service Date:

First power May 2024.

Revision:

Cost flow revision, and first power in-service deferred one year from May 2023.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 7,770.8	\$ 104.4	\$ 105.2	\$ 83.3	\$ 166.4	\$ 288.6	\$ 3,411.2
Increase (Decrease)	-	-	-	(17.2)	(99.3)	(100.4)	(562.1)
Revised Forecast	\$ 7,770.8	\$ 104.4	\$ 105.2	\$ 66.1	\$ 67.2	\$ 188.1	\$ 2,849.1

Kelsey Improvements & Upgrades

Description:

Overhaul and uprate all seven Kelsey generating station units including the replacement of turbine runners, bottom rings, discharge rings or weld overlays, transformers, generator windings and exciters. Perform model testing to refine runner design, perform extensive intake gate rehabilitation, perform draft tube modifications, perform an 8 000 hour inspection, and upgrade rail spur and overhead crane. Upgrade transmission facilities necessary to integrate the additional Kelsey generation into the Manitoba Hydro system network.

Justification:

Rerunning presents the best economic solution for increasing efficiency at the Kelsey generating station and for adding system capacity without flooding or requiring a new water power license. Overhauling the units will improve the unit output by up to 11 MW per unit. The transmission upgrade of a portion of the Kelsey 138 and 230 kV buses and the revisions to the Northern AC Cross Trip scheme are required to accommodate the 77 MW of additional Kelsey output.

In-Service Date:

November 2013.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 301.7	\$ 34.7	\$ 28.5	\$ 12.5	\$ -	\$ -	\$ -
Increase (Decrease)	-	(0.3)	(3.8)	7.6	0.4	-	-
Revised Forecast	\$ 301.7	\$ 34.4	\$ 24.8	\$ 20.2	\$ 0.4	\$ -	\$ -

Kettle Improvements & Upgrades

Description:

Rewind stator for units 5-12 and install a new stator frame, core and winding for units 1-4. Perform rotor refurbishment, excitation upgrade replacements, control and protection system replacements, mechanical systems replacements, and intake gate and wicket gate work for units 1-4.

Justification:

The stator windings at Kettle are polyester bonded mica which is prone to internal degradation as a result of thermal and electrical stresses. There has been a much higher failure rate for stator coils at Kettle than in any of our other generators installed since 1960. Analysis of the internal conditions of the insulation system is ongoing. Re-wedging units at Kettle is an opportunity to repair isolated cases of severe slot discharge, necessary to avoid deterioration. Unit 4 requires repairs due to an incident that occurred in August 2006, where a top clamping finger on the unit broke off and fell into the air gap causing extensive damage to the windings and core.

In-Service Date:

October 2022.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 165.7	\$ 18.7	\$ 21.6	\$ 22.2	\$ 15.4	\$ 7.3	\$ 38.8
Increase (Decrease)	-	(5.0)	1.3	(1.9)	5.3	-	(0.2)
Revised Forecast	\$ 165.7	\$ 13.7	\$ 22.9	\$ 20.4	\$ 20.7	\$ 7.3	\$ 38.6

Pointe du Bois Spillway Replacement

Description:

Design and build a new spillway and new concrete and earth fill dams to replace the existing spillway structures. Includes engineering and environmental studies, community consultation, obtaining regulatory approval, and de-commissioning the existing spillway.

Justification:

Pointe du Bois does not currently meet dam safety guidelines with respect to spillway capacity. A new spillway is required to meet these guidelines.

In-Service Date:

November 2014.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 398.2	\$ 24.4	\$ 92.7	\$ 103.6	\$ 89.2	\$ 31.5	\$ 0.5
Increase (Decrease)	-	16.7	20.9	(3.2)	(12.1)	(18.5)	(0.5)
Revised Forecast	\$ 398.2	\$ 41.1	\$ 113.6	\$ 100.4	\$ 77.1	\$ 13.0	\$ -

Pointe du Bois - Transmission

Description:

Redevelop Stafford Terminal station (formerly Scotland station), replace Bank 7 at Pointe du Bois switchyard station, salvage 66 kV P lines between Pointe du Bois and Rover station, install a 115 kV transmission line between Rover and GT1 just east of Winnipeg Floodway, a 115 kV transmission line between GT1 just south of Lac Du Bonnet and Pointe du Bois, and install equipment at Rover station.

Justification:

The 66 kV lines P1, P2, P3, and P4 between Pointe du Bois and Rover stations have exceeded their expected serviceable life and pose threats to public and employee safety. The reliability of the transmission system in the Winnipeg Central area has been degraded due to the poor physical condition of these lines. In order to successfully operate the power system and continuously deliver high quality power to our customers and protect the public, the P Lines should be removed. The rebuild of Stafford station is required to address due diligence concerns, including Manitoba Hydro grounding and switching standards and public safety, and to increase Winnipeg Central capacity. This work involves converting the 138 kV system to 115 kV, so work at Pointe du Bois is also required.

In-Service Date:

September 2014.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 85.9	\$ 15.6	\$ 25.0	\$ 13.1	\$ 3.1	\$ -	\$ -
Increase (Decrease)	-	(1.1)	(14.0)	5.1	13.3	-	-
Revised Forecast	\$ 85.9	\$ 14.5	\$ 11.1	\$ 18.2	\$ 16.4	\$ -	\$ -

Bipole III - Transmission Line

Description:

Design and build a +/- 500 kV HVdc transmission line of approximately 1 384 km (west of Lakes Winnipegosis & Manitoba) from Riel converter station to Keewatinow converter station. Conduct environmental impact assessment, acquire property, and obtain licensing necessary for a +/- 500 kV dc transmission line and converter stations at Riel and Keewatinow.

Justification:

Provides increased reliability to the Manitoba Hydro system due to the critical risk to the Province and the Corporation of not mitigating an Interlake (Bipole 1 and 2) corridor outage or a Dorsey station common mode outage. In normal steady state operation, it will also provide an increase in southern power, due to decreased line losses (approximately 76 MW under full existing generation).

In-Service Date:

October 2017.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 1,259.9	\$ 24.8	\$ 59.9	\$ 162.0	\$ 298.9	\$ 318.5	\$ 355.1
Increase (Decrease)	-	6.2	(7.1)	(26.7)	31.9	35.5	(42.7)
Revised Forecast	\$ 1,259.9	\$ 31.0	\$ 52.8	\$ 135.4	\$ 330.9	\$ 353.9	\$ 312.4

Bipole III - Converter Stations

Description:

Design and build an HVdc converter station with a rating of 2 000 MW at the proposed Keewatinoow site, including property acquisition costs and the Keewatinoow 230 kV AC switch yard. Design and build an HVdc converter station with 2 000 MW of converters at Riel, including three synchronous compensators, property acquisition costs and the Riel 230 kV AC switch yard.

Justification:

Provides increased reliability to the Manitoba Hydro system due to the critical risk to the Province and the Corporation of not mitigating an Interlake (Bipole 1 and 2) corridor outage or a Dorsey station common mode outage.

In-Service Date:

October 2017.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 1,828.5	\$ 59.7	\$ 148.9	\$ 300.3	\$ 290.2	\$ 294.3	\$ 658.6
Increase (Decrease)	-	(9.0)	(7.3)	15.1	40.4	59.2	(80.3)
Revised Forecast	\$ 1,828.5	\$ 50.7	\$ 141.6	\$ 315.4	\$ 330.6	\$ 353.5	\$ 578.3

Bipole III - AC Collector Lines

Description:

Design and construct three permanent and two temporary 230kV collector lines for the Keewatinoow Converter Station. Construct power substation for the Keewatinoow Converter Station. Design and construct the Riel and Keewatinoow electrode lines, Sectionalize the 230kV transmission line R49R at Riel including the property acquisition and/or easements for the collector and electrode lines.

Justification:

Provides increased reliability to the Manitoba Hydro system due to the critical risk to the Province and the Corporation of not mitigating an Interlake (Bipole 1 and 2) corridor outage or a Dorsey station common mode outage.

In-Service Date:

October 2017.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 191.4	\$ 19.9	\$ 52.7	\$ 30.1	\$ 30.9	\$ 34.3	\$ 21.4
Increase (Decrease)	-	(10.0)	5.1	16.7	(8.4)	(9.0)	7.3
Revised Forecast	\$ 191.4	\$ 9.9	\$ 57.8	\$ 46.9	\$ 22.6	\$ 25.2	\$ 28.7

Riel 230/500 kV Station

Description:

Conduct environmental impact assessment and obtain licensing necessary for the Riel 230/500 kV station. Design and construct a 230/500 kV station at the Riel site including the installation of a 230 kV bus with a maximum of five Bays, the installation of a 500 kV ring bus, the installation of a 230/500 kV 1200 MVA transformer bank using two 230 kV and one 500 kV breaker, and the installation of 500 kV line reactors with relocating of a reactor phase from Dorsey. Install a second reactor phase from Dorsey as a spare at Riel after the Riel reactors are in-service and salvage the third reactor phase at Dorsey. Sectionalize two 230 kV transmission lines R32V and R33V into Riel station using eight 230 kV breakers and associated equipment resulting in two Riel-Ridgeway and two Riel-St. Vital transmission lines. Sectionalize 500 kV transmission line D602F into Riel station using two 500 kV breakers and associated equipment resulting in Dorsey-Riel and Riel-Forbes 500 kV circuits.

Justification:

The sectionalization of the 500 kV line allows power to be imported during a catastrophic Dorsey outage, as well as an alternate path for power export during a Dorsey transformer outage.

In-Service Date:

May 2014.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 267.6	\$ 66.8	\$ 29.4	\$ 28.9	\$ 41.3	\$ -	\$ -
Increase (Decrease)	-	8.1	38.3	18.6	(41.3)	-	-
Revised Forecast	\$ 267.6	\$ 74.8	\$ 67.7	\$ 47.5	\$ -	\$ -	\$ -

Ontario 100 MW Firm Import Upgrades

Description:

Reconductor and resag transmission lines SC25, WT34, and SM26, and replace risers and/or current transformers for stations at Whiteshell, Ridgeway, Transcona, and Parkdale.

Justification:

This project will increase to 100 MW Manitoba Hydro's firm import capability from Ontario. Increasing the transmission capability will permit greater volume of energy imports during periods when additional energy may be required.

In-Service Date:

November 2012.

Revision:

Increases for scope changes as determined by a more detailed facilities study completed by system planning. In-service advanced sixteen months from March 2014.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 4.8	\$ 0.6	\$ 2.2	\$ 1.9	\$ -	\$ -	\$ -
Increase (Decrease)	15.1	(0.4)	17.5	(1.9)	-	-	-
Revised Forecast	\$ 19.9	\$ 0.2	\$ 19.7	\$ -	\$ -	\$ -	\$ -

Dorsey - US Border New 500 kV Transmission Line

Description:

Design and build a 68 km 500 kV transmission line between Riel station and Dorsey station, and a 123 km 500 kV transmission line between Dorsey station and the U.S. border. Design and install two 500 kV breakers, one 150 MVAR 500 kV shunt reactor, one double-wye ungrounded 46 kV 73.4 MVAR shunt capacitor bank and associated communications and protection at Dorsey. Design and install two 500 kV breakers, one 230 kV breaker, two double-wye ungrounded 46 kV 73.4 MVAR shunt capacitor banks, a 1 200 MVA 230/500 kV autotransformer and associated communications and protection at Riel. Acquire property for right-of-way, conduct environmental impact assessment, conduct community consultations, obtain licensing and perform environmental monitoring for all facilities.

Justification:

Power sale term sheets have been negotiated with Minnesota Power (250 MW) and Wisconsin Public Service (500 MW). The existing tie line capacity is insufficient to accommodate the additional sales and therefore a new export line is needed. The proposed transmission facilities will increase the Manitoba to U.S. transfer capability for both export and import purposes.

In-Service Date:

May 2020.

Revision:

Cost flow revision and in-service deferred seven months from October 2019.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 204.8	\$ 0.1	\$ 0.9	\$ 1.9	\$ 2.4	\$ 11.7	\$ 186.9
Increase (Decrease)	-	0.1	(0.1)	(1.5)	(0.5)	(8.1)	10.1
Revised Forecast	\$ 204.8	\$ 0.1	\$ 0.8	\$ 0.4	\$ 2.0	\$ 3.6	\$ 197.0

St. Joseph Wind Transmission

Description:

Establish a 230 kV generation interconnection from Manitoba Hydro's Letellier station to the St. Joseph Wind Farm Inc.'s 138MW wind farm near St. Joseph, Manitoba. Include the upgrade of 230kV Line L2OD (Letellier Station to Drayton Station in North Dakota) and the upgrade of 230kV Line G37C.

Justification:

Manitoba Hydro and St. Joseph Windfarm Inc. signed an Interconnection & Operating Agreement (IOA) on March 18, 2010, for connection of 138 MW of generation from the St. Joseph Wind Farm. The IOA requires that Manitoba Hydro install or upgrade facilities in order to provide 138 MW of interconnection service.

In-Service Date:

November 2011.

Revision:

Scope revised to include upgrades to L2OD and G37C lines with a one year in-service deferral from November 2010 to accommodate the additional work.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 6.5	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	4.7	2.3	-	-	-	-	-
Revised Forecast	\$ 11.2	\$ 2.3	\$ -	\$ -	\$ -	\$ -	\$ -

Demand Side Management

Description:

Design, implement and deliver incentive based PowerSmart conservation programs to reduce electricity consumption in Manitoba.

Justification:

The electric Demand Side Management plan is cost effective as a resource option and is included in Manitoba Hydro's Power Resource Plan (PRP). The DSM plan provides customers with exceptional value through the implementation of cost-effective energy conservation programs that are designed to minimize the total cost of energy services to customers, position the Corporation as a national leader in implementing cost-effective energy conservation and alternative energy programs, protect the environment and promote sustainable energy supply and service.

In-Service Date:

Ongoing.

Revision:

The change in expenditures in 2012 is due to revisions to energy saving and expenditures for a number of programs to reflect current market information. Upon adoption of IFRS in 2012/13, the demand side management programs will no longer be capitalized.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	NA	\$ 38.0	\$ 39.1	\$ 38.6	\$ 36.2	\$ 29.5	\$ 109.9
Increase (Decrease)		(6.2)	(39.1)	(38.6)	(36.2)	(29.5)	(109.9)
Revised Forecast	NA	\$ 31.8	\$ -	\$ -	\$ -	\$ -	\$ -

POWER SUPPLY:

HVDC Converter Transformer Bushing Replacement

Description:

Replace converter transformer bushings with NGK bushings, and purchase spares as follows: at Dorsey replace six 230 kV AC, and six 25 kV tertiary bushings; and at Radisson / Henday replace five 138 kV, two 150 kV, four 230 kV, and three 15 kV tertiary bushings, and purchase two 300 kV and two 450 kV spares.

Justification:

The bushing replacement program was undertaken due to failure of a 230 kV bushing in Dorsey T21 A-phase converter transformer that resulted in costly repairs to the transformer, and loss of revenue due to the outage. Also during the repair of the Dorsey T31S converter transformer in Pauwel's Canada plant, two out of two 230 kV bushings that were tested failed at far below the full test voltage. The manufacturer's expected service life is 25 years. These bushings have all been in-service more than 20 years. Replacement cost is justified when compared to transformer damage due to an in-service failure.

In-Service Date:

October 2011.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 5.9	\$ 0.7	\$ 1.1	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	(0.3)	(0.1)	0.5	-	-	-
Revised Forecast	\$ 5.9	\$ 0.4	\$ 1.0	\$ 0.5	\$ -	\$ -	\$ -

HVDC Auxiliary Power Supply Upgrades

Description:

The review and upgrading of Bipole 1 and 2 auxiliary power supply at Dorsey, Radisson and Henday converter stations, including 12 battery banks and ten power centers. Scope increased to include the upgrade of Bipole 2 129 V dc battery systems for the converter buildings at Dorsey and Henday; and to build an addition to the Henday relay building to accommodate the battery system upgrade.

Justification:

Upgrading of the HVdc system auxiliary power supplies is necessary to obtain maintenance outages for them without additional system costs and to maintain reliability of the HVdc system. This will allow Manitoba Hydro to maintain/increase firm energy sales and keep spinning reserve requirements to a minimum.

In-Service Date:

October 2012.

Revision:

Cost flow revised and in-service deferred sixteen months from April 2011.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 5.3	\$ 0.2	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	0.3	0.4	-	-	-	-
Revised Forecast	\$ 5.3	\$ 0.5	\$ 0.4	\$ -	\$ -	\$ -	\$ -

Dorsey Synchronous Condenser Refurbishment

Description:

Major inspection, re-wedging and overhaul of synchronous condensers SC7Y, SC8Y, SC9Y, SC21Y, SC22Y and SC23Y. Replace coolers to restore original thermal performance on SC21Y, and SC23Y. Repair corrosion problems and replace GEM80 PLC on SC7Y, SC8Y and SC9Y. Modify the 600 V transfer scheme for SC8Y, SC7Y & SC9Y.

Justification:

Synchronous condensers are required for proper operation of the HVdc system, voltage regulation of the southern AC system and to provide reactive power for power export to the United States. A major inspection and overhaul of each machine is necessary to prevent catastrophic failure, involving the rotors and rotor bolts as indicated by the failures of SC12Y in 1987 and SC11Y in 1988. The cost of repairing a failure when combined with the inability to export power will well exceed the cost of major inspection and overhaul.

In-Service Date:

March 2018.

Revision:

The scope of this project was adjusted to include the major overhaul of Synchronous Condenser 22, and other components for the other synchronous condensers (7, 8, 9, 11, 12, 13, 21, & 23).

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 32.3	\$ 4.5	\$ 4.4	\$ 1.1	\$ -	\$ -	\$ -
Increase (Decrease)	46.0	0.2	0.9	4.0	7.7	11.7	19.8
Revised Forecast	\$ 78.3	\$ 4.6	\$ 5.3	\$ 5.1	\$ 7.7	\$ 11.7	\$ 19.8

HVDC System Transformer & Reactor Fire Protection & Prevention

Description:

The supply and installation of fire protection upgrades on 33 converter transformers and eight smoothing reactors. The re-design and replacement of the deluge system on the Dorsey converter building south wall and the Henday converter building north east wall, and the construction of a fire response building in a safe location at Dorsey converter station.

Justification:

To minimize the high risk of fire spread and catastrophic damage throughout the AC and DC switchyards, and a potential transformer and revenue loss of an estimated \$30 to \$50 million. To provide adequate fire protection for personnel in accordance with National Fire Protection Association (NFPA) Life Safety Code 101.

In-Service Date:

October 2012.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 10.4	\$ 0.6	\$ 0.2	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	-	0.1	0.3	0.1	-	-
Revised Forecast	\$ 10.4	\$ 0.5	\$ 0.3	\$ 0.3	\$ 0.1	\$ -	\$ -

HVDC Converter Transformer Inventory and Replacement Program

Description:

Maintain an inventory of eight spare converter transformers for use at Radisson, Henday and Dorsey converter stations. Plan for the proactive replacement of critical red-lined transformers as necessary.

Justification:

Maintenance of an inventory of spare converter transformers will limit outage durations and outage costs in the event of converter transformer failures.

In-Service Date:

October 2016.

Revision:

Replace Henday T42S (currently 500kV Spare #2) transformer with 500kV Spare #5 during the Spring of 2010, and return Henday 500kV spare #2 to inventory. Replace failed Henday T31S transformer with 500kV Spare #2 during emergency work completed in the fall of 2010. Purchase an additional six new converter transformers (three 375kV, two 450kV, and one 500kV). Replace two critical red-lined units (Radisson T11B, and Henday T42D) with inventoried spares. In-service date deferred two years from October 2014.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 105.7	\$ 1.1	\$ 4.9	\$ 8.1	\$ -	\$ -	\$ -
Increase (Decrease)	66.0	3.4	12.7	7.4	17.2	14.0	9.7
Revised Forecast	\$ 171.7	\$ 4.6	\$ 17.6	\$ 15.5	\$ 17.2	\$ 14.0	\$ 9.7

Dorsey 230 kV Relay Building Upgrade

Description:

Upgrade the 230 kV relay building at Dorsey and provide mobile protection and control trailers.

Justification:

Upgrades to the building will reduce the risk of damage from weather related perils and limit the consequence of a Bipole failure due to fire related perils. Mobile protection and control trailers will facilitate the quick restoration of service in the case of a catastrophic event to this or other relay buildings.

In-Service Date:

August 2016.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 82.2	\$ 3.7	\$ 3.4	\$ 17.5	\$ 35.4	\$ 12.3	\$ -
Increase (Decrease)	-	(2.1)	(1.2)	0.2	(0.3)	0.2	3.1
Revised Forecast	\$ 82.2	\$ 1.6	\$ 2.2	\$ 17.7	\$ 35.1	\$ 12.5	\$ 3.1

HVDC Stations Ground Grid Refurbishment

Description:

Upgrade the existing ground grid systems at Dorsey, Radisson and Henday stations.

Justification:

These upgrades improve the safety of employees and contractors working in and around the HVdc converter stations, by ensuring that touch and step potential are within safe levels.

In-Service Date:

October 2015.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 4.3	\$ 0.4	\$ 0.4	\$ 0.4	\$ 0.3	\$ 0.1	\$ -
Increase (Decrease)	-	-	-	-	-	0.4	-
Revised Forecast	\$ 4.3	\$ 0.4	\$ 0.4	\$ 0.4	\$ 0.3	\$ 0.5	\$ -

HVDC Bipole 2 230 kV HLR Circuit Breaker Replacement

Description:

Replace all 34 HLR operating mechanisms with new operating mechanisms and replace 45-600V hydraulic breaker overloads with electronic overloads.

Justification:

System reliability will be improved. A breaker failure results in a bus outage and single contingency of the 230 kV bus. There is a Bipole outage risk, if bus B1 or B2 at Dorsey is out of service for any reason.

In-Service Date:

March 2019.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 15.9	\$ 2.7	\$ 1.1	\$ 0.4	\$ 0.1	\$ 0.1	\$ 0.2
Increase (Decrease)	-	(0.6)	-	0.6	0.1	0.4	-
Revised Forecast	\$ 15.9	\$ 2.1	\$ 1.1	\$ 1.0	\$ 0.2	\$ 0.5	\$ 0.2

HVDC Bipole 1 Pole Differential Protection

Description:

Prepare an engineering report to determine all possible options, scope of work, cost analysis, and detailed cost estimate. Implement the preferred option at both Dorsey and Radisson stations.

Justification:

Upgrading Bipole 1 pole differential protection is necessary in order to prevent the blocking of healthy poles, thus reducing outages and increasing availability.

In-Service Date:

March 2015.

Revision:

Cost flow revision, and in-service deferred 12 months from March 2014.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 3.3	\$ -	\$ 1.1	\$ 2.2	\$ -	\$ -	\$ -
Increase (Decrease)	-	-	(1.1)	(1.1)	2.2	-	-
Revised Forecast	\$ 3.3	\$ -	\$ -	\$ 1.1	\$ 2.2	\$ -	\$ -

HVDC Bipole 1 By-Pass Vacuum Switch Removal

Description:

Remove the existing By-Pass Vacuum Switch (BPVS) and By-Pass Switch (BPS) and replace both with a single BPS at Dorsey and Radisson stations (Bipole 1 valve halls). In addition, Radisson will have its AC line switch (ACCO) removed.

Justification:

The equipment is nearing the end of its service life and requires substantial maintenance. By-pass vacuum switches were part of the replaced mercury arc valves switching scheme. The new thyristor valves may be more reliably served by other types of switches, thus reducing the forced outage rate.

In-Service Date:

March 2015.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 20.4	\$ 2.5	\$ 3.9	\$ 11.0	\$ 2.1	\$ -	\$ -
Increase (Decrease)	-	(2.1)	(1.6)	0.1	3.9	-	-
Revised Forecast	\$ 20.4	\$ 0.4	\$ 2.3	\$ 11.1	\$ 6.0	\$ -	\$ -

HVDC Bipole 2 Refrigerant Condenser Replacement

Description:

Remove and replace existing air conditioning systems in the Bipole 2 valve halls, maintenance blocks and administration areas at both Dorsey and Henday converter stations.

Justification:

The present systems are nearing the end of their service life. Maintenance is increasing, along with the likelihood of costly valve outages. In addition, the present systems contain R-22 (an ozone depleting substance).

In-Service Date:

February 2016.

Revision:

Cost flow revision, and in-service date deferred 12 months from February 2015.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 11.0	\$ -	\$ 2.9	\$ 2.4	\$ 5.7	\$ -	\$ -
Increase (Decrease)	-	-	(2.7)	0.4	(3.3)	5.6	-
Revised Forecast	\$ 11.0	\$ -	\$ 0.2	\$ 2.7	\$ 2.4	\$ 5.6	\$ -

HVDC Bipole 1 & 2 Smoothing Reactor Replacement

Description:

Replace all Bipole 1 oil-filled smoothing reactors at Dorsey and Radisson, and replace with new air core reactors. Replace four Bipole 2 oil-filled smoothing reactors with air core smoothing reactors at Dorsey and Henday.

Justification:

Existing oil-filled smoothing reactors are approaching the end of their service life. Replacement will ensure continued availability and reliable operation of the HVdc system, and will reduce the risk of oil spills and fires within the work place and reduce maintenance and protection systems requirements.

In-Service Date:

October 2013.

Revision:

Cost flow revision and in-service date advanced 5 months from March 2014.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 39.3	\$ 12.8	\$ 1.9	\$ 9.2	\$ -	\$ -	\$ -
Increase (Decrease)	-	7.8	(0.1)	(8.4)	-	-	-
Revised Forecast	\$ 39.3	\$ 20.6	\$ 1.8	\$ 0.7	\$ -	\$ -	\$ -

HVDC Bipole 1 P1 & P2 Battery Bank Separation

Description:

Separate Pole 1 & Pole 2 battery banks at Dorsey and Radisson converter stations. Upgrade the battery banks and charger ratings to comply with current Manitoba Hydro design criteria.

Justification:

Pole 1 & Pole 2 battery banks have to be physically separated in order to provide a reliable first grade supply to the HVdc controls and protection and communication system.

In-Service Date:

October 2013.

Revision:

Cost flow revision and in-service date deferred seven months from March 2013.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 3.2	\$ 0.9	\$ 2.2	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	(0.5)	(1.0)	1.5	-	-	-
Revised Forecast	\$ 3.2	\$ 0.4	\$ 1.2	\$ 1.5	\$ -	\$ -	\$ -

HVDC Bipole 1 DCCT Transductor Replacement

Description:

Replace existing oil-filled DC transductors with optical transductors at Dorsey and Radisson stations.

Justification:

Existing BP1 DCCT transductors are reaching the end of service life and spares are no longer available. Failure of a transductor to transmit a required signal to protective and controls equipment at Dorsey and Radisson stations can cause a lengthy pole outage. A fire in the existing oil-filled transductors could result in irreparable damage to adjacent equipment and a lengthy pole outage. Replacement will contribute to reliable operation of the HVdc system. Removal of the oil-filled transductors will reduce the risk of oil spills and fires within the workplace.

In-Service Date:

October 2016.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 11.7	\$ 0.5	\$ 1.6	\$ 1.1	\$ 3.0	\$ 3.1	\$ 2.3
Increase (Decrease)	-	(0.3)	(0.4)	-	(0.1)	0.7	0.1
Revised Forecast	\$ 11.7	\$ 0.2	\$ 1.3	\$ 1.1	\$ 3.0	\$ 3.8	\$ 2.4

HVDC Bipole 1 & 2 DC Converter Transformer Bushing Replacements

Description:

Remove and replace transformer bushings on all converter transformers over 25 years old.

Justification:

Bushings on converter transformers over 25 years old are reaching the end of their service life. A bushing failure while in-service would cause a costly valve group outage to repair or replace the bushing and could cause irreparable damage to a converter transformer.

In-Service Date:

October 2015.

Revision:

No change.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 8.7	\$ 0.6	\$ 1.0	\$ 1.7	\$ 5.4	\$ -	\$ -
Increase (Decrease)	-	-	-	-	-	-	-
Revised Forecast	\$ 8.7	\$ 0.6	\$ 1.0	\$ 1.7	\$ 5.3	\$ -	\$ -

HVDC Bipole 2 Valve Hall Wall Bushing Replacements

Description:

Replace all oil-filled wall bushings in the Bipole 2 valve halls with new solid core bushings or SF6 filled bushings.

Justification:

Existing wall bushings in the Bipole 2 valve halls are over 21 years old and are reaching the end of their service life. The risk of bushing failure and fire in a valve hall increases as the bushings age. Replacing the bushings will ensure reliable operation of the valve group well into the future, and provide a safer working environment for employees at the converter stations.

In-Service Date:

June 2017.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 19.2	\$ 0.1	\$ 0.2	\$ 3.4	\$ 4.4	\$ 4.1	\$ 6.1
Increase (Decrease)	-	0.0	(0.2)	(0.1)	0.4	(0.1)	0.3
Revised Forecast	\$ 19.2	\$ 0.1	\$ -	\$ 3.3	\$ 4.8	\$ 4.0	\$ 6.5

HVDC Bipole 1 CQ Disconnect Replacement

Description:

Replace the existing Radisson and Dorsey DC disconnects, and Dorsey AC disconnects with new disconnects.

Justification:

Major failures of CQ disconnects cause costly pole outages, and these disconnects are reaching the end of their service life. They have been in-service for 37 years, their failure rate is increasing, and spare parts are no longer available.

In-Service Date:

March 2017.

Revision:

No change.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 5.2	\$ 0.3	\$ 0.9	\$ 1.5	\$ 1.1	\$ 1.1	\$ 0.3
Increase (Decrease)	-	-	-	-	-	-	-
Revised Forecast	\$ 5.2	\$ 0.3	\$ 0.9	\$ 1.5	\$ 1.0	\$ 1.1	\$ 0.3

HVDC Bipole 2 Refurbish Thyristor Module Cooling Components

Description:

Refurbish 1,566 thyristor module cooling components in Bipole 2 by replacing the manifolds, connectors and cooling tubes.

Justification:

The cooling components are reaching the end of their life, and are starting to leak, resulting in forced outages. Refurbishing the module cooling components will improve the reliability of the cooling system and extend its life until the replacement of the Bipole 2 system equipment, which is in approximately 10 to 15 years.

In-Service Date:

March 2012.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 4.7	\$ 1.3	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	(0.1)	-	-	-	-	-
Revised Forecast	\$ 4.7	\$ 1.2	\$ -	\$ -	\$ -	\$ -	\$ -

HVDC Transformer Marshalling Kiosk Replacement

Description:

Replace nine Bipole 1 transformer marshalling kiosks with insulated Programmable Logic Controllers (PLC) monitoring marshalling kiosks, and upgrade 19 control boxes at the transformer with a quick disconnect system.

Justification:

The new control boxes will remove the 600V from the controls and monitoring section of the panel which will eliminate the present safety concerns that site workers face while performing maintenance or trouble shooting.

In-Service Date:

November 2014

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 6.8	\$ 1.8	\$ 2.0	\$ 1.2	\$ 0.7	\$ -	\$ -
Increase (Decrease)	-	(1.3)	0.7	-	0.4	-	-
Revised Forecast	\$ 6.8	\$ 0.4	\$ 2.7	\$ 1.2	\$ 1.2	\$ -	\$ -

HVDC Gapped Arrester Replacement

Description:

Replace the gapped surge arresters with polymer gapless Metal Oxide Varistor (MOV) arresters.

Justification:

The gapped surge arresters are over 31 years old and are experiencing frequent breakdowns. When a gapped surge arrester malfunctions there is potential for employee injury and / or equipment damage. The new MOV arresters will eliminate these issues.

In-Service Date:

November 2015.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 16.3	\$ 3.8	\$ 3.4	\$ 4.0	\$ 3.5	\$ 1.3	\$ 0.2
Increase (Decrease)	-	(3.5)	(2.4)	(0.1)	(0.1)	5.6	(0.1)
Revised Forecast	\$ 16.3	\$ 0.2	\$ 1.0	\$ 3.9	\$ 3.4	\$ 7.0	\$ 0.1

Pine Falls Rehabilitation

Description:

Rehabilitation, replacement of and addition to various electrical and mechanical equipment and systems such as spillway mechanical components, station service upgrade, station lighting, 11 kV cable replacement, spillway electrical distribution, water system, air system, transformer lightning arrestors, and station drawings. Replace unit 1 and 2 turbine runners with more efficient new design runners, rebuild existing servomotors for increased wicket gate opening allowing more discharge, and rewind the generator stators utilizing modern insulating materials. Conduct a model test and up-rate study. Replace potential transformers, synchronizers, annunciators, generator breakers, excitation and governor systems, step-up transformers and electrical back-up systems.

Justification:

Assessment of the electrical and mechanical systems has identified concerns in terms of obsolete equipment, safety, fire risk and adaptability to present day operating conditions and standards. Upgrading is necessary to ensure reliable safe and economical operation. Pine Falls consistently spills more water than the other Winnipeg River plants. Additional generation can be obtained (approximately 17%) with increased discharge capability. Tests have confirmed that the two stator windings are in danger of failure at any time.

In-Service Date:

April 2016.

Revision:

Increased estimate for addition of overhauls on Units 3 & 4, crane modernizations and increased scope changes to units 1 and 2. In-service date deferred six months from October 2015.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 56.2	\$ 5.8	\$ 15.8	\$ 1.2	\$ 4.6	\$ 6.8	\$ 9.0
Increase (Decrease)	111.0	(1.8)	5.2	25.7	35.6	39.9	5.1
Revised Forecast	\$ 166.7	\$ 4.0	\$ 21.0	\$ 26.9	\$ 40.3	\$ 46.8	\$ 14.1

Jenpeg Unit Overhauls

Description:

Major overhaul of all six generating units to inspect, repair, modify, and replace components of the turbine/generator. Areas of concern include journal bearings, thrust bearings, turbine seals, servo motors, wicket gate seals and bushings, waterhead and oil head, stator and rotor, and auxiliary systems.

Justification:

A complete overhaul is required to ensure reliable operation of the units when maximum power requirements on the system are essential.

In-Service Date:

December 2021.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 128.1	\$ -	\$ -	\$ -	\$ -	\$ 2.3	\$ 95.6
Increase (Decrease)	-	-	-	-	-	(0.1)	(2.7)
Revised Forecast	\$ 128.1	\$ -	\$ -	\$ -	\$ -	\$ 2.2	\$ 92.9

Power Supply Dam Safety Upgrades

Description:

Perform necessary engineering design and remedial construction to upgrade generating stations to present day dam safety standards: 1) Kettle generating station – upgrade main and saddle dams for freeboard; 2) Kelsey generating station – armour plating at spillway rollways, erection of heated hoist housing, insulating of spillway gates, upgrading of dikes, upgrading of spillway feeders and electrical systems at the spillway, and upgrading of the station service transformers due to increased loading; and 3) southern generating stations - capital works identified in the dam safety certification process or identified through observation and discussion with staff.

Justification:

Work is required to correct deficiencies to all the plants, in order to operate in a safe and reliable manner.

In-Service Date:

March 2016.

Revision:

Increased estimate for work on the 7 Bay Sluiceway reliability including, engineering, supply & installation of a second travelling gate hoist, stoplog travelling hoist and runway, upgrading the gate hoist superstructure, refurbishment of the existing travelling hoist and gate access safety improvements. Estimate increases for on-going work to complete projects within fiscal year 2012 at the southern generating stations.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 34.0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	31.0	7.4	10.6	5.0	-	-	-
Revised Forecast	\$ 64.5	\$ 7.4	\$ 10.6	\$ 5.0	\$ -	\$ -	\$ -

Winnipeg River Riverbank Protection Program

Description:

Placement of rock protection and construction of slope stabilization to reduce the erosion of riverbanks along the Winnipeg River. The work includes inspection, design, mapping, land acquisition, and remedial construction at priority locations along reaches of the Winnipeg River affected by Manitoba Hydro hydraulic operations.

Justification:

Provision of riverbank protection and stabilization work along the Winnipeg River between Seven Sisters forebay and Manitou rapids to protect private property from erosion partially due to hydraulic operations.

In-Service Date:

March 2017.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 19.7	\$ 1.2	\$ 1.3	\$ 1.3	\$ 1.3	\$ 1.3	\$ 1.4
Increase (Decrease)	-	0.2	0.2	-	-	-	(0.7)
Revised Forecast	\$ 19.7	\$ 1.5	\$ 1.4	\$ 1.3	\$ 1.3	\$ 1.3	\$ 0.8

Power Supply Hydraulic Controls

Description:

Install unit control and monitoring systems at Long Spruce, Seven Sisters, Jenpeg and McArthur Falls generating stations. This includes the installation of required automation, remote control, and protective devices for unmanned operation at Kettle.

Justification:

By increasing unit efficiency, the Corporation can reduce or delay the need for capital expenditures for new plant, increase export net revenues, improve financial strength, and protect the environment.

In-Service Date:

March 2020.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 20.5	\$ 1.5	\$ 0.5	\$ 1.3	\$ -	\$ -	\$ 5.6
Increase (Decrease)	-	(0.5)	0.2	-	-	-	-
Revised Forecast	\$ 20.5	\$ 1.0	\$ 0.7	\$ 1.3	\$ -	\$ -	\$ 5.6

Slave Falls GS Creek Spillway Rehab

Description:

Replacing or repairing the Slave Falls Creek Spillway to safely retain the forebay and meet the applicable Canadian Dam Association (CDA) guidelines.

Justification:

The repair or replacement of the creek spillway is recommended to prevent the failure of the structure to retain water. The most likely mode of failure for the creek spillway is the failure of one or more piers or gate sections resulting in an uncontrolled breach of water. A reduction in the powerhouse flow would maintain the forebay level during a breach; however a reservoir drawdown may be required for repair afterwards. Failure of the Creek Spillway would pose a risk to any recreational users and staff on the structure immediately upstream or downstream at the time of the breach. Failure of a dam component resulting in an uncontrolled flow would also reflect negatively on Manitoba Hydro's Dam Safety reputation. An additional risk due to the failure of the piers is the termination of operation connections due to the loss of control and protection cabling in the conduits on the decking supported by the piers.

In-Service Date:

November 2014.

Revision:

New item.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	11.1	0.0	1.0	1.9	8.1	-	-
Revised Forecast	\$ 11.1	\$ 0.0	\$ 1.0	\$ 1.9	\$ 8.1	\$ -	\$ -

Slave Falls Rehabilitation

Description:

Perform major overhaul for all eight units at Slave Falls generating station, including spillway improvements/replacements, excitation upgrades, the addition of a Unit Control and Monitoring System (UCMS) Framework, access road upgrades, and a new walkway across the spillway.

Justification:

Many safety, reliability, environmental, efficiency, operational & dam safety issues have been identified relating to the Slave Falls infrastructure. Extensive repairs, modifications and/or replacements will be required to ensure the serviceability of the plant and spillway infrastructure. Economics of this work may suggest that a new spillway be constructed to replace existing spill infrastructure. Current operating procedures include ice load reduction activities at the spilling structures to ensure structural stability. A dam safety concern has been identified with respect to the minimal remote spilling capability at Slave Falls.

In-Service Date:

March 2019.

Revision:

Added two more replacement exciters, Units 7 and 8, and deferred exciter installations until unit overhaul outages starting in fiscal year 2016.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 223.0	\$ 7.3	\$ 1.7	\$ 3.7	\$ 32.4	\$ 40.8	\$ 93.6
Increase (Decrease)	7.2	1.7	1.0	0.5	(0.7)	(0.2)	5.4
Revised Forecast	\$ 230.2	\$ 9.0	\$ 2.6	\$ 4.3	\$ 31.7	\$ 40.6	\$ 99.0

Great Falls Unit 4 Overhaul

Description:

Major overhaul to generating Unit 4 including generator rewind, turbine re-runnering, new water passage embedded components, one 3-phase unit transformer, and modernization of components.

Justification:

The re-runnering and major overhaul will provide an opportunity to upgrade/modernize the unit while taking advantage of an already planned outage for the intake gates. The re-runnering will add both capacity and efficiency. The existing transformer is in poor condition and water passage components are starting to fail. The overhaul will increase reliability and extend the asset life by 40 to 50 years.

In-Service Date:

December 2011.

Revision:

Increase in scope to include, scrollcase wall upgrades, new upper head cover, stator frame and core and a new transformer blast wall. As well, cost increases to reflect current market conditions.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 19.7	\$ 9.5	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	23.7	1.9	21.6	0.8	-	-	-
Revised Forecast	\$ 43.5	\$ 11.4	\$ 21.6	\$ 0.8	\$ -	\$ -	\$ -

Great Falls Unit 5 Discharge Ring Replacement and Major Overhaul

Description:

Replacement of Unit 5 discharge ring along with performing a major overhaul including generator rewind, turbine re-runnering, replacement/upgrade of the runner, wicket gates, governors and associated electrical equipment.

Justification:

In January 2008, numerous cracks were found in the Unit 5 draft tube liner, which were significant and in close proximity to each other, oriented in such a manner that if the cracking continued, a piece of the draft tube liner could potentially break free and impact the runner resulting in catastrophic damage to the runner and liner. The discharge ring and liner were subsequently repaired; however, the discharge ring which was installed in 1988 is in very poor condition and is not expected to maintain a service life extending beyond 10 years.

In-Service Date:

March 2017.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 24.8	\$ -	\$ -	\$ -	\$ 2.3	\$ 17.5	\$ 5.0
Increase (Decrease)	-	-	-	-	-	(0.4)	0.4
Revised Forecast	\$ 24.8	\$ -	\$ -	\$ -	\$ 2.2	\$ 17.1	\$ 5.4

Generation South Transformer Refurbish & Spares

Description:

Purchase a spare generator step-up transformer and refurbish the existing generator step-up transformers at Jenpeg GS; purchase a spare three phase generator step-up transformer at Pine Falls GS; purchase 12 generator step-up transformers at Grand Rapids GS; and purchase two 3-phase generator step-up transformers and install one in Bank 6 at Great Falls GS.

Justification:

To minimize the occurrence and duration of transformer-related forced outages, it is imperative that spare transformers are available.

In-Service Date:

November 2016.

Revision:

Removed estimate for the purchase of a spare three phase generator step-up transformer at Pine Falls GS and revised cost flow on remaining units.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 29.8	\$ 4.8	\$ 11.3	\$ 12.1	\$ 0.5	\$ 0.3	\$ 0.3
Increase (Decrease)	(2.2)	(4.2)	(4.3)	1.6	3.9	0.1	0.2
Revised Forecast	\$ 27.6	\$ 0.6	\$ 7.0	\$ 13.8	\$ 4.3	\$ 0.5	\$ 0.5

Water Licenses & Renewals

Description:

Conduct hydraulic studies, geotechnical assessments, property status and severance line determinations, mapping, license documentation, environmental reviews, and community informational sessions necessary to secure license finalization and/or renewals for the Corporation's hydraulic plants.

Justification:

All hydraulic generating facilities must be authorized under water power licenses and these licenses need to be clearly in force to significantly reduce risk exposure, maintain operating flexibility, maximize export revenues, and contribute to financial strength.

In-Service Date:

December 2017.

Revision:

Expand project to include: the addition of Wuskwatim Generating Station; increase in Pointe du Bois license requirements to reflect a renewal process; increase in the Lake Winnipeg Regulation license requirements to reflect LiDAR and Aerial Photography activities; add an additional year to the Coordinated Aquatic Monitoring Program component to support scheduled licensing activities; increase in the Aquatic Data Collection component to reflect monitoring commitments for Green House Gas activities and Southern Indian Lake Monitoring activities.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 40.8	\$ 6.0	\$ 6.2	\$ 6.8	\$ 6.6	\$ 0.7	\$ -
Increase (Decrease)	14.0	(0.8)	(1.0)	(0.5)	(0.3)	5.8	10.4
Revised Forecast	\$ 54.6	\$ 5.2	\$ 5.6	\$ 6.2	\$ 6.3	\$ 6.5	\$ 10.4

Generation South PCB Regulation Compliance

Description:

Replace equipment identified as containing polychlorinated biphenyl (PCB) content > 50 ppm at generation south generating stations.

Justification:

Required to comply with Federal legislation regarding the replacement of equipment in non-sensitive areas with PCB content > 50 ppm.

In-Service Date:

March 2016.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 4.7	\$ 0.5	\$ 0.4	\$ 0.4	\$ 0.2	\$ 2.4	\$ -
Increase (Decrease)	-	-	-	-	-	0.2	-
Revised Forecast	\$ 4.7	\$ 0.5	\$ 0.4	\$ 0.4	\$ 0.2	\$ 2.7	\$ -

Kettle Transformer Replacement Program

Description:

Refurbish one Kettle transformer to be used as a spare, purchase one universal spare transformer for the Long Spruce/Limestone generating stations and purchase 12 new generator step-up transformers for the Kettle generating station.

Justification:

Kettle step-up transformers have been in operation for 38 years, with a life expectancy of between 30 and 50 years. During this time frame there have been more transformer winding failures at the Kettle GS than anywhere else in Manitoba Hydro.

In-Service Date:

September 2014.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 35.6	\$ 7.0	\$ 7.2	\$ 8.0	\$ 3.9	\$ -	\$ -
Increase (Decrease)	-	2.1	(0.1)	(0.1)	(3.1)	-	-
Revised Forecast	\$ 35.6	\$ 9.1	\$ 7.1	\$ 7.9	\$ 0.7	\$ -	\$ -

Generation South Breaker Replacement Program

Description:

Remove the four existing 115 kV current transformers and breakers at McArthur Falls GS, and replace with new 115 kV breakers with internal current transformers, and replace the fourteen 115 kV breakers at the Pine Falls GS, including Breaker Failure Protection (BFP).

Justification:

The breakers at both stations require replacing as spare parts are no longer available. In addition, the breakers at both stations are PCB contaminated. Proposed federal PCB regulation currently states that all equipment with a concentration >50ppm must be removed from service by December 31, 2014.

In-Service Date:

September 2013.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 11.1	\$ 3.0	\$ 1.4	\$ 3.4	\$ -	\$ -	\$ -
Increase (Decrease)	-	(1.3)	2.4	(2.9)	1.0	0.4	1.2
Revised Forecast	\$ 11.1	\$ 1.7	\$ 3.8	\$ 0.5	\$ 1.0	\$ 0.4	\$ 1.2

Seven Sisters Upgrades

Description:

Rewind and rehabilitate Seven Sisters Unit 5 to maintain station MW output and prevent a high probability stator in-service failure through a planned generator rewind outage. Replace and upgrade generator and transformer protection on units 1, 2, 3, 4 and 6 to a redundant multifunction system with breaker fail protection, transient fault recording, and metering replacement.

Justification:

Seven Sisters Unit 5 stator winding has been identified as a candidate for potential failure through electrical condition assessment. The stator condition has deteriorated such that normal operation now contributes to accelerating the stator failure. In addition, transmission line events (115 kV faults) have been identified which would cause generator damage for the station. The existing protection system is incapable of detecting and interrupting these specific events, and is of a similar vintage to the replaced Kelsey electro-mechanical system, but with a longer operating history. Original electro-mechanical relay manufacturers no longer exist and replacement parts are currently salvaged from other recently upgraded generating stations.

In-Service Date:

September 2013.

Revision:

Increased estimate for change in scope on Unit 5 rewind to include system upgrades and other rehabilitation and the associated labour requirements.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 9.5	\$ 2.0	\$ 1.5	\$ 1.2	\$ -	\$ -	\$ -
Increase (Decrease)	5.0	2.4	0.1	(0.5)	-	-	-
Revised Forecast	\$ 14.4	\$ 4.4	\$ 1.6	\$ 0.6	\$ -	\$ -	\$ -

Generation South Excitation Program

Description:

Implement a generator excitation system replacement program to phase out unsupported and obsolete equipment at the Great Falls, Grand Rapids and McArthur Falls generating stations.

Justification:

Original excitation systems on the Winnipeg River have a frequent failure rate which has negative effects on export revenue. Spare parts for the excitation systems at these generating stations are no longer available, and the salvage inventory from Seven Sisters GS and Laurie River GS are exhausted. The current systems cannot be tuned due to physical wear and have failing rotating exciter insulation systems, which will render the generators inoperable in the event of an exciter failure.

In-Service Date:

March 2019.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 18.3	\$ 0.3	\$ 2.1	\$ 2.4	\$ 0.6	\$ 1.5	\$ 11.4
Increase (Decrease)	-	1.0	(0.6)	(0.1)	1.3	1.1	(2.7)
Revised Forecast	\$ 18.3	\$ 1.3	\$ 1.5	\$ 2.3	\$ 1.9	\$ 2.5	\$ 8.7

Brandon Unit 5 License Review

Description:

Renewal of Brandon generating station Unit 5 (Manitoba Environment Act license) is required for continuing operation. License renewal requires minor plant refurbishment. The timing and extent of additional future environmental regulatory changes is uncertain. The base case conservatively assumes that environmental controls must be installed. Should the need for additional controls be identified during the licensing process or subsequently thereafter, the economic viability of such controls will be assessed accordingly. Per the Manitoba Climate Change and Emissions Reductions Act (Bill 15), Manitoba Hydro must not use coal to generate power after December 31, 2009, except to support emergency operations.

Justification:

Unit 5 plays an important role in Manitoba Hydro's system, contributing economic generation and enhancing system reliability.

In-Service Date:

September 2014.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 18.7	\$ 0.1	\$ 1.6	\$ 2.7	\$ 9.2	\$ -	\$ -
Increase (Decrease)	-	-	(1.3)	(0.1)	1.2	-	-
Revised Forecast	\$ 18.7	\$ 0.2	\$ 0.2	\$ 2.6	\$ 10.4	\$ -	\$ -

Selkirk Enhancements

Description:

Perform environmental enhancements in accordance with the revised license terms and conditions approved by the Province of Manitoba on April 30, 2008. The approval was based on continuing operation of the once-through cooling system with modifications to the cooling water intake fish screen, lube oil cooling system and condenser re-tubing.

Justification:

Provides assurance that the station will be able to operate as planned with the addition of the cooling tower, and provides long-term southern system reliability benefits.

In-Service Date:

December 2012.

Revision:

Cost flow revision, and final in-service date deferred eighteen months from June 2011 for outstanding work on lube oil cooling system modifications.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 14.2	\$ 0.4	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	-	0.9	-	-	-	-
Revised Forecast	\$ 14.2	\$ 0.4	\$ 0.9	\$ -	\$ -	\$ -	\$ -

Laurie River/CRD Communications & Annunciation Upgrades

Description:

Upgrade the communications infrastructure and replace the annunciation systems with Programmable Logic Controller (PLC) based Unit Control Monitoring Systems (UCMS) at Laurie River, Missi Falls and Notigi.

Justification:

Updated communications infrastructure and annunciation systems will provide more accurate water level information from the Churchill River Diversion allowing Manitoba Hydro to optimize water flows through the lower Nelson River generating stations. In addition, the maintenance costs will be reduced significantly with the implementation of the new system.

In-Service Date:

March 2014.

Revision:

Cost flow revision and, in-service date deferred nineteen months from August 2012.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 4.8	\$ 3.1	\$ 0.7	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	(1.0)	1.3	-	-	-	-
Revised Forecast	\$ 4.8	\$ 2.1	\$ 1.9	\$ -	\$ -	\$ -	\$ -

Notigi Marine Vessel Replacement & Infrastructure Improvements

Description:

Replace the existing Notigi marine vessels with one self-propelled unit, refurbish the Dallas-Faye self-propelled barge, and upgrade the vessel tramway to prevent damaging vessels when removing them from the water.

Justification:

The marine vessels are over 31 years old and in need of numerous repairs and upgrades, including hull repairs which are very difficult to weld repair. In addition, changes in Canadian Coast Guard regulations will require stability tests, and it is expected that at least one of the vessels will not pass this test, and will be deemed unsuitable for operation.

In-Service Date:

September 2012.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 4.6	\$ 3.0	\$ 0.6	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	(2.7)	3.5	-	-	-	-
Revised Forecast	\$ 4.6	\$ 0.3	\$ 4.1	\$ -	\$ -	\$ -	\$ -

Pointe du Bois GS Safety Upgrades

Description:

Implement safety upgrades for the Pointe du Bois generating station including fire protection, mechanical hazards, electrical hazards, operational hazards, trips and fall hazards, and various other safety upgrades.

Justification:

To provide a high level of health and safety upgrades as well as improved reliability and control, along with a reduction in potential environmental impacts from catastrophic events such as fire or flooding.

In-Service Date:

March 2017.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 50.0	\$ 1.6	\$ 5.5	\$ 11.2	\$ 16.0	\$ 11.7	\$ 3.5
Increase (Decrease)	-	4.6	14.3	8.3	(11.6)	(11.7)	(3.5)
Revised Forecast	\$ 50.0	\$ 6.3	\$ 19.8	\$ 19.5	\$ 4.4	\$ -	\$ -

Fire Protection Projects - HVDC

Description:

The replacement of the existing Incipient Fire Detection (IFD) panels at all HVdc Stations with new Fenwal Fire Detection Systems, the replacement of the Radisson station building fire piping and fire pumps, the installation of a fire water backup system at Henday Station and removal of the ceiling, duct, and beam detectors, and installation of pull stations.

Justification:

More than half of the existing IFD panels have failed. They are costly to maintain and parts are difficult to obtain. The backup fire protection does not meet the fire code. The Radisson fire piping and pumps are inadequate and have no water left to fight fire spread should a transformer fail and deluge be activated. The current Henday fire water backup system is inadequate and runs dry up to 30 minutes prior to the fire department's arrival at site. New tanks will ensure fire containment and prevent spreading until the fire department's arrival.

In-Service Date:

October 2014.

Revision:

Cost increases to reflect additional scope and time requirements to complete the work.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 5.2	\$ 0.4	\$ 0.3	\$ 1.2	\$ 1.0	\$ -	\$ -
Increase (Decrease)	2.0	(0.1)	(0.1)	-	1.9	-	-
Revised Forecast	\$ 7.2	\$ 0.4	\$ 0.2	\$ 1.2	\$ 2.9	\$ -	\$ -

Limestone Stilling Basin Rehabilitation

Description:

Implement an in-water concrete placement solution, using divers and fabric formwork; evaluate the effectiveness of the in-water solution in delaying or eliminating more costly repairs.

Justification:

Cavitation damaged the stilling basin of the Limestone Generating Station spillway during original construction diversion. The concentration of flow in a few spillway bays caused damage to the baffle blocks, stilling basin floor, and the downstream spillway piers near the stoplog checks. Although concentrated flow in the spillway has been mitigated through gate operational guidelines, erosion will continue without rehabilitation, reducing the energy-dissipation effectiveness of the stilling basin. This could eventually result in the undermining of the spillway structure. This project will ensure the long-term safe and reliable operation of the Limestone GS spillway. Its completion will prevent further damage, reduce corporate risk, and maintain the value of the installed asset.

In-Service Date:

October 2013.

Revision:

New item.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	2.0	-	0.4	1.6	-	-	-
Revised Forecast	\$ 2.0	\$ -	\$ 0.4	\$ 1.6	\$ -		

Kettle Wicket Gates Lever Refurbishments

Description:

Refurbish levers for the wicket gate, and replace the existing upper guide bushing and thrust washer on units 5 & 7-11.

Justification:

The upper wicket gate assemblies at Kettle G.S. are displacing shims and thrust washers on multiple units. If this issue is not addressed, Kettle Generating station will be at risk of losing generating capacity due to inefficient wicket gate operation. To minimize outage cost, the wicket gate lever refurbishment project will be performed at the same time as the transformer replacements at Kettle.

In-Service Date:

October 2013.

Revision:

New item.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	2.3	-	1.1	1.2	-	-	-
Revised Forecast	\$ 2.3	\$ -	\$ 1.1	\$ 1.2	\$ -	\$ -	\$ -

Limestone GSCADA Replacement

Description:

Replacement of GSCADA with "UCMS" type system including, replacement of unit controllers with PLC based system; replacement of GSCADA system control with HMI/PLC based system; replace plant wide serial communication system with fiber optic based Ethernet; de-commission and integrate the existing UMS system into the new control system; de-commission and integrate the existing JVC system into the UCMS system; add shaft seal pressure and flow monitoring; spillway control; and convert bearing temperature monitoring/tripping to stand-alone system such as SEL 701 or a similar system.

Justification:

Current system is at or beyond end of life. The system has experienced multiple failures and has only partial vendor support. Portions of the system are maintainable with used parts which do not improve reliability. Interim implementation of the servers onto new hardware will allow us to plan and design the entire system replacement by reducing the risk of hardware failure.

In-Service Date:

March 2018.

Revision:

New item.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	5.3	-	0.4	1.3	0.8	0.9	1.9
Revised Forecast	\$ 5.3	\$ -	\$ 0.4	\$ 1.3	\$ 0.8	\$ 0.9	\$ 1.9

Limestone Governor Control Replacement

Description:

Replace the existing digital governor control systems at the Limestone G.S.

Justification:

Replacement of the governor controls at Limestone will ensure that the controls are reliable and maintainable. The current system has no manufacturer support and is not maintainable. Manitoba Hydro currently has minimal spares stock to support any future failures. The existing system has one of the highest maintenance costs and failure frequencies within Manitoba Hydro. Failure of the control system would cause a unit to be forced offline until repaired or replaced. Outage time could be several months or more depending on the nature of failure.

In-Service Date:

November 2014.

Revision:

New item.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	2.5	-	0.3	1.3	0.9	-	-
Revised Forecast	\$ 2.5	\$ -	\$ 0.3	\$ 1.3	\$ 0.9	\$ -	\$ -

Halon Replacement Project

Description:

Remove and replace the existing Halon fire protection systems with approved state-of-the-art alternative technologies such as water and gaseous based systems.

Justification:

Replacing the existing Halon fire protection systems with approved alternative technologies improves the HVdc, hydraulic, and diesel systems availability, minimizes the risk of extremely expensive outage and repair costs, and minimizes lost revenue. Halon replacement is becoming a mandatory requirement through Federal and Provincial environmental regulations and legislation. National Fire Protection Association (NFPA) Life Safety Code 101 requires the adequate provision of fire protection where, in addition to equipment, the human element is also involved.

In-Service Date:

April 2016.

Revision:

Cost flow revision and in-service date deferred 36 months from April 2013.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 36.4	\$ 5.5	\$ 6.8	\$ 2.7	\$ -	\$ -	\$ -
Increase (Decrease)	-	(3.9)	(1.6)	(0.1)	3.5	2.2	0.9
Revised Forecast	\$ 36.4	\$ 1.6	\$ 5.2	\$ 2.6	\$ 3.5	\$ 2.2	\$ 0.9

Oil Containment – Power Supply

Description:

Modifications and/or additions are required to prevent and contain oil spills: 1) *southern and northern hydraulic generating stations*: install oil/ water separators, modify drainage systems, and upgrade sump, fuel storage facilities and dyking systems; 2) *converter stations*: install an oil containment system to collect and recover any oil spilled within the station and encapsulate oil filled transformers/smoothing reactors at the three HVdc stations to stop gasket leaks.

Justification:

Previous experience with oil spills requires the Corporation to demonstrate due diligence with respect to containing and minimizing the potential for any further occurrences.

In-Service Date:

October 2016.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 19.1	\$ 0.6	\$ 0.5	\$ 0.7	\$ 0.4	\$ 0.5	\$ 0.5
Increase (Decrease)	-	-	-	-	-	-	(0.3)
Revised Forecast	\$ 19.1	\$ 0.7	\$ 0.5	\$ 0.7	\$ 0.4	\$ 0.6	\$ 0.3

Grand Rapids Townsite House Renovations

Description:

Renovate 26 homes within the Grand Rapids Hybord Townsite, over a five year construction period.

Justification:

Providing adequate and modern housing is critical to attracting employees to fill job vacancies at Grand Rapids.

In-Service Date:

March 2015.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 5.2	\$ 0.9	\$ 1.3	\$ 1.6	\$ 1.0	\$ -	\$ -
Increase (Decrease)	-	0.2	(0.3)	(0.7)	(0.1)	-	-
Revised Forecast	\$ 5.2	\$ 1.1	\$ 0.9	\$ 0.9	\$ 0.9	\$ -	\$ -

Grand Rapids Fish Hatchery

Description:

Rehabilitate the main hatchery building, the aeration building, the east and west pump houses, shops building, the exterior tanks and grounds, and replace the water meter.

Justification:

Provide for the benefits of environmental protection, employee safety and the modernization of obsolete and high maintenance assets.

In-Service Date:

March 2012.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 2.2	\$ 1.1	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	-	0.8	-	-	-	-
Revised Forecast	\$ 2.2	\$ 1.2	\$ 0.8	\$ -	\$ -	\$ -	\$ -

Generation Townsite Infrastructure

Description:

Gillam townsite: 1) interior and exterior retrofit of 66 corporate houses; 2) replace 40 doublewide trailers on basements with ready-to-move (RTM) homes and construct 32 new housing units over eight years; and 3) construct a new shopping centre (possibly in partnership).

Justification:

Gillam infrastructure evaluation lists the following as substandard: water quality, sewage treatment, water and sewer lines, asphalt repairs, recreation facility, trailer park improvements, and town office building renovations.

In-Service Date:

March 2013.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 52.1	\$ 8.0	\$ 1.8	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	1.0	0.2	-	-	-	-
Revised Forecast	\$ 52.1	\$ 9.0	\$ 1.9	\$ -	\$ -	\$ -	\$ -

Site Remediation of Contaminated Corporate Facilities

Description:

Conduct geotechnical investigation of the various contaminated corporate facilities and remediate contaminated areas to environmentally acceptable limits.

Justification:

Environmental concerns and/or regulations require that corporate facilities be investigated and remediated to restore them to a level which permits unrestricted use of the site.

In-Service Date:

March 2012.

Revision:

Upon adoption of IFRS in 2012/13, site remediation will no longer be capitalized.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 34.7	\$ 1.7	\$ 1.0	\$ 1.6	\$ -	\$ -	\$ -
Increase (Decrease)	(3.0)	(0.1)	(1.0)	(1.6)	-	-	-
Revised Forecast	\$ 31.7	\$ 1.6	\$ -	\$ -	\$ -	\$ -	\$ -

High Voltage Test Facility

Description:

Build a new high voltage test facility at 1840 Chevrier Boulevard, including a high voltage hall with rail access, supporting labs, shop, storage, and office and receiving space.

Justification:

This facility will enable Manitoba Hydro to adequately meet present industry standards (CAN/CSA C88.1-96, CAN3-C13-M83, CAN/CSA C225-00, and the recently adopted IEC 619361-1) for the testing of all bushings, instrument transformers and aerial lift devices, while improving the efficiency and safety of our insulation testing practices. Testing extra high voltage equipment to industry standards is the optimal way to avoid costly forced outages and life threatening and environmentally damaging failures, safeguard the reliability of our power supply, and enhance safety during live line work.

In-Service Date:

November 2011.

Revision:

The deferral of the Hopewell Development caused delays and revisions for access and site services to the HVTF, which in turn caused increased costs for construction services, consulting services and internal labour. There is also an increased cost for test equipment due to market condition changes involving less competition and escalation in prices. The in-service date is deferred three months from August 2011.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 26.9	\$ 5.6	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	14.0	8.1	0.4	-	-	-	-
Revised Forecast	\$ 40.6	\$ 13.7	\$ 0.4	\$ -	\$ -	\$ -	\$ -

Security Installations / Upgrades

Description:

Install, upgrade and enhance security systems, such as fencing, close circuit TV, and card access systems at Power Supply HVdc and generating stations. Implement of a comprehensive "Public Water Safety Around Dams" program, which is generally compliant with the draft Canadian Dam Association (CDA) 2007 technical bulletin for Public Safety and Security Around Dams.

Justification:

The scope of work is intended to raise the security standards of the stations to the levels outlined in the Security Readiness Report and to be compliant with NERC standards.

In-Service Date:

March 2015.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 43.2	\$ 11.4	\$ 8.3	\$ 3.2	\$ 1.3	\$ 1.1	\$ 0.7
Increase (Decrease)	-	(5.8)	(0.4)	6.5	3.4	(1.1)	(0.7)
Revised Forecast	\$ 43.2	\$ 5.6	\$ 7.9	\$ 9.7	\$ 4.7	\$ -	\$ -

Sewer & Domestic Water System Install and Upgrade

Description:

Upgrade or replace domestic water and waste water systems at northern and southern generation/HVDC facilities to ensure a continuing safe supply of drinking water and compliance with waste water regulations.

Justification:

Ensure safety and compliance with legislation. The lack of filtration systems result in organic and other matter reacting with chlorine treatment to create possible carcinogenic substances.

In-Service Date:

June 2018

Revision:

Additional funding due to the enhanced scope of work for each facility and to increase the scope of work to include additional domestic water and wastewater upgrades in Generation North. The significant new items are as follows, Kelsey Wastewater Treatment Plant Upgrade; Notigi Domestic Water Treatment System Upgrade; Notigi Wastewater System Upgrade; Missi Falls Domestic Water Treatment System Upgrade; and Missi Falls Wastewater System Upgrade. As well as to defer the last in-service date by eight years and three months from March 2010.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 26.9	\$ 4.9	\$ 3.2	\$ (0.1)	\$ -	\$ -	\$ -
Increase (Decrease)	11.0	1.5	(0.3)	1.1	2.4	1.6	5.6
Revised Forecast	\$ 37.9	\$ 6.4	\$ 2.9	\$ 1.0	\$ 2.4	\$ 1.6	\$ 5.6

Power Supply Domestic

Description:

This program consists of projects whose individual costs are of a relatively small amount. These projects are required to provide safe, reliable, efficient power supply, and to replace plant facilities which are at the end of their useful life.

Justification:

Enhancements or rehabilitation to the power supply facilities will ensure a safe, reliable and efficient source of energy.

In-Service Date:

Ongoing.

Revision:

No change.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	NA	\$ 19.7	\$ 20.1	\$ 20.5	\$ 20.9	\$ 21.4	\$ 113.4
Increase (Decrease)		-	-	-	-	-	-
Revised Forecast		\$ 19.7	\$ 20.1	\$ 20.5	\$ 21.0	\$ 21.4	\$ 113.5

TRANSMISSION:

Winnipeg - Brandon Transmission System Improvements

Description:

Perform environmental assessments and route selection, design and construct transmission and terminal facilities to provide firm supply to Portage South as follows: *Transmission:* 230 kV line 70 km Dorsey - Portage South, 230 kV double circuit line with only one side strung. *Terminations:* Extend 230 kV facilities at Dorsey and Portage South. Install three 10 MVAR, 66 kV capacitor banks at Portage South. Extend the 66 kV facilities with the addition of one breaker, one selector switch, three circuit switchers, three disconnect switches, and associated equipment. Replace one existing 66 kV breaker. Install a fourth 54 MVAR 115 kV capacitor at Brandon GS to match the existing installation of capacitors, including the associated circuit switcher and disconnects. *Communications:* Integrate with existing facilities at Dorsey and Portage South stations.

Justification:

By 2015, studies indicate that without voltage support in the western Manitoba 230 kV system, compliance with the transmission planning criteria would not be achieved on the 230 kV system in the Brandon and Portage areas during winter peak conditions for outages to line D12P.

A system planning study related to the restricted operation of Brandon Unit 5 determined that the system improvements identified in this capital project are required to avoid operating the Brandon combustion turbines and save in excess of \$1 million per year.

In-Service Date:

October 2014.

Revision:

Changes in estimate are attributed to the use of more current pricing for material, labour and construction costs.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 40.0	\$ 2.0	\$ 2.5	\$ 15.0	\$ 15.0	\$ -	\$ -
Increase (Decrease)	4.8	1.0	(1.7)	(10.9)	13.8	3.7	-
Revised Forecast	\$ 44.8	\$ 3.0	\$ 0.8	\$ 4.1	\$ 28.7	\$ 3.7	\$ -

Transcona East 230-66 kV Station

Description:

Design and build a new 230-66 kV station adjacent to 230 kV circuits R32V and R33V at a proposed site directly east of the existing Transcona station on the east side of the floodway. Tap 230 kV lines R32V & R33V; make provision for two 230-66 kV transformers, an eight breaker 230 kV ring bus, a six breaker 66 kV ring bus and associated equipment; complete with protection, control, metering and communication systems.

Justification:

This station is required to supply increased load to east Winnipeg, and to the 66 kV networked transmission system (supplied by the Ridgeway and existing Transcona stations), as well as part of the downtown area through an interconnection at Amy St. station.

In-Service Date:

December 2012.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 33.1	\$ 17.7	\$ 3.6	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	6.4	(3.6)	-	-	-	-
Revised Forecast	\$ 33.1	\$ 24.1	\$ -	\$ -	\$ -	\$ -	\$ -

Brandon Area Transmission Improvements

Description:

Install a 230/115kV 176MVA transformer (salvaged from Rosser Station) as a 4th bank at Cornwallis Station. Install a 230kV breaker and upgrade existing protection and controls at Cornwallis Station. Replace two breakers and upgrade the bus as well as protection and controls for bay 4 at Brandon GS. Build a new 115kV line (CB4) from Cornwallis to Brandon GS, reconductor 115kV line BE3 (Brandon GS to Brandon Victoria) and close 115kV line MR11 (Brandon – Raven Lake) at Raven Lake Station.

Justification:

Banks at Cornwallis Station will be loaded beyond firm capacity. Installing a 4th transformer bank at Cornwallis Station will reduce the loading on the transformer banks to acceptable levels. The 4th bank at Cornwallis also eliminates the chance of losing two 230kV lines due to breaker failure, as lines G37C and D54C become separated on the ring bus by this 4th bank (improving reliability). Upgrading and closing Line MR11 at the Raven Lake Station end will increase power supply from Raven Lake 230-115kV transformers to the Brandon 115kV system while reducing the power flow through Cornwallis transformers. The project also helps to maintain Cornwallis 230kV system voltage at acceptable levels.

In-Service Date:

May 2013.

Revision:

New item.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	11.8	4.4	6.3	1.0	-	-	-
Revised Forecast	\$ 11.8	\$ 4.4	\$ 6.3	\$ 1.0	\$ -	\$ -	\$ -

Neepawa 230-66 kV Station

Description:

Perform environmental assessments and route selection, design and construct terminal facilities to provide firm supply to Neepawa as follows: *Transmission:* Sectionalize 230 kV T/L D54C into Neepawa 230 kV station, creating Dorsey - Neepawa and Neepawa - Cornwallis 230 kV circuits. Build a 66 kV tie line between the new 66 kV terminal and the existing 115/66 kV station. *Terminations:* Establish Neepawa 230-66 kV station, including three 230 kV circuit breakers, a 50/66/83.3/93.3 MVA, a 230-66 kV LTC transformer, six 66 kV circuit breakers and associated equipment. Adjust line protection equipment at Dorsey and Cornwallis 230 kV stations. Terminate two 230 kV transmission lines to Dorsey and Cornwallis. *Communications:* Integrate with existing facilities at Neepawa, Dorsey, and Cornwallis 230 kV stations. *System Control:* automate control, protection, equipment communications and software programming.

Justification:

These facilities provide transmission improvements required to supply Neepawa and related western region future load growth.

In-Service Date:

December 2013.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 30.0	\$ 12.0	\$ 5.1	\$ 5.7	\$ 0.7	\$ -	\$ -
Increase (Decrease)	-	2.1	2.9	(1.0)	(0.7)	-	-
Revised Forecast	\$ 30.0	\$ 14.1	\$ 8.0	\$ 4.5	\$ -	\$ -	\$ -

Transmission Line Re-Rating

Description:

Over the past ten years Manitoba Hydro has conducted aerial surveys on the majority of its overhead transmission line system, using LiDAR aerial survey technology. Engineering analysis of the survey data identifies spans that have overhead clearance levels and/or lines that have thermal ratings which fall below the recommended limits as established by the Canadian Standards Association (CSA).

Justification:

The refurbishment program will increase line to ground clearances to allow higher conductor temperatures under all potential heavy current line loads. When under-rated lines are operated to the design temperatures recorded in Manitoba Hydro's equipment rating database, the deficient spans could result in a safety hazard to the general public. In addition, there is a risk that any contact with vegetation could put Manitoba Hydro in violation of the NERC standard.

In-Service Date:

December 2012.

Revision:

Increase estimates to incorporate the following additions to scope, upgrade seven 230kV transmission lines (DI4S, C28R, G37C, G9P, P58C, R7B and R25Y) to operate safely at 75°C; upgrade four 115kV transmission lines (CN9, CPI7, RP16 and YF1 1) to operate safely at 75°C; increase for the thermal rating studies on 180 transmission lines; and offset by decrease for the re-rating work to upgrade select spans on five 230kV lines and four 115kV lines, all of which is now complete.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 24.1	\$ 1.3	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	7.7	1.6	6.4	-	-	-	-
Revised Forecast	\$ 31.8	\$ 2.9	\$ 6.4	\$ -	\$ -	\$ -	\$ -

St Vital - Steinbach 230 kV Transmission

Description:

Perform environmental assessments and route selection, obtain licensing, acquire property, design and construct transmission and terminal facilities to provide 230 kV supply to Steinbach as follows: *Transmission:* Construct a 230 kV line 40 km between St. Vital and Steinbach stations. Salvage 23.5 km of 115 kV line between Ile Des Chenes and Randolph station. *Terminations:* Extend 230 kV facilities at St. Vital station. Construct a 230-66 kV station near Steinbach, including a 230-66 kV 95 MVA transformer. Install telecommunication facilities required for operation of the 230 kV line and Steinbach 230-66 kV station.

Justification:

Provides a 230 kV supply including transmission line, 230-66 kV station, and telecommunication facilities into the Steinbach area which will support load growth in south eastern Manitoba.

In-Service Date:

October 2020.

Revision:

No change.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 32.2	\$ -	\$ -	\$ -	\$ -	\$ 0.8	\$ 31.4
Increase (Decrease)	-	-	-	-	-	-	-
Revised Forecast	\$ 32.2	\$ -	\$ -	\$ -	\$ -	\$ 0.8	\$ 31.4

Transcona Station 66 kV Breaker Replacement

Description:

Replace nine 66 kV breakers and one disconnect at 115/66 kV Transcona station.

Justification:

The breakers are being replaced based on 3-phase fault levels that exceed 95% of the breaker manufacturer's interrupting rating. These breakers are old (35-38 years), were made by a company that is no longer in business (Canadian General Electric) and cannot be certified for a higher interrupting rating. Failure of one of these lines or bank breakers will cause a transformer or line outage and lost supply power to customers between 7.3 MW and 42.8 MW, which would affect more than 10 000 customers.

In-Service Date:

July 2015.

Revision:

No change.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 6.0	\$ 0.4	\$ 2.9	\$ 1.5	\$ 1.1	\$ -	\$ -
Increase (Decrease)	-	-	-	-	-	-	-
Revised Forecast	\$ 6.0	\$ 0.4	\$ 2.9	\$ 1.5	\$ 1.1	\$ -	\$ -

13.2kV Shunt Reactor Replacements

Description:

Purchase and install fifteen 13.2 kV, 20MVA oil-type shunt reactors to replace all of the Ferranti Packard reactors currently in the system.

Justification:

Ferranti Packard reactors are installed at six stations throughout Manitoba (Cornwallis, Rosser, Raven Lake, Overflow River, Mystery Lake and LaVerendrye). These reactors were manufactured in 1964 and are well past their estimated useful life of 30 years. If a unit were to fail, system operations would be affected, with no replacement system immediately available.

In-Service Date:

November 2018.

Revision:

Cost flow revision, and in-service date deferred one month from October 2018.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 33.0	\$ 4.0	\$ 4.1	\$ 4.2	\$ 4.3	\$ 4.4	\$ 12.0
Increase (Decrease)	-	(2.0)	0.8	(3.4)	(3.5)	(2.2)	10.1
Revised Forecast	\$ 33.0	\$ 2.2	\$ 4.9	\$ 0.9	\$ 0.8	\$ 2.2	\$ 22.0

Lake Winnipeg East System Improvements

Description:

Build a new 115-66kV Manigotagan Corner Station complete with two 60MVA transformers, a new 65km, 115kV transmission line from Pine Falls Station to Manigotagan Corner Station, the associated terminations and communications, and the salvage of approximately 75kms of 66kV Line L77.

Justification:

Pine Falls Station currently operates over firm transformation during winter peak. The absence of firm transformation would cause customer outages in the Lake Winnipeg East area during a Pine Falls transformer outage. The outage would last greater than a week until a spare transformer could be brought in from Winnipeg and connected. A transformer outage would affect more than 1,300 permanent customers and more than 13,000 seasonal (summer) customers. Deferral will place customers at risk of no supply. The new 115-66kV Manigotagan Corner Station and Pine Falls – Manigotagan Corner 115kV Transmission Line will provide firm capacity for area load for the next 20 years, as well as enable the Bloodvein SVC to control effectively the voltage at Bloodvein, Little Grand Rapids, Beren's River and Poplar River for the next 20 years. It also reduces the loading on Pine Falls 115-66kV accommodating load growth in the Victoria Beach, Grand Beach and Bissett areas.

In-Service Date:

November 2015.

Revision:

New item.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	66.9	2.0	5.7	15.4	29.2	14.2	0.1
Revised Forecast	\$ 66.9	\$ 2.3	\$ 5.7	\$ 15.4	\$ 29.2	\$ 14.2	\$ 0.1

Canexus Load Addition

Description:

Build a 115 kV transmission line from the Brandon generating station to 65th Street East station with associated terminations, and reconductor 115kV Line BK41 to satisfy the Canexus Chemicals Canada LP load addition.

Justification:

A construction agreement between Canexus and Manitoba Hydro was signed in December 2009, which provides for upgrades to increase firm load from 174 MVA to 223 MVA, to accommodate consolidated operations and increased production in Brandon. The cost of the project is fully recoverable, with the payment schedule specifying contributions ahead of expenditures, resulting in a negative project cost.

In-Service Date:

September 2012.

Revision:

Cost flow revisions and in-service deferred seven months from February 2012.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ (0.2)	\$ 2.0	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	(1.1)	0.1	-	-	-	-
Revised Forecast	\$ (0.2)	\$ 0.9	\$ 0.1	\$ -	\$ -	\$ -	\$ -

D602F 500kV T/L Footing Replacements

Description:

Replacement of 112 footings on D602F with a helical pile or spread footing steel foundation. Includes geotechnical testing and proof loading of piles; design of new steel frame and spread footing; procurement of all piles; spread footings and structural steel; construction of winter roads to allow access during construction; installation of piles and frames to include transfer of the towers onto the new foundations; and inspection of the work.

Justification:

Replacement of the foundations is required given the state of deterioration and the large financial consequence of a downed tower. It is estimated that if we do not proceed there is a 50% chance of a failure resulting in a tower collapse in the next ten years. A failed tower would result in restoration costs estimated at \$420,000 per incident and would likely result in a five day outage. The lost export sales that would occur during the five-day outage are estimated to range from \$3,600,000 (assuming an export price of \$30 per MWhr and the average daily export of 1000MW) to \$10,620,000 (assuming \$60 per MWhr and the full line capacity of 1475MW).

In-Service Date:

March 2012.

Revision:

New item.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	4.0	4.0	-	-	-	-	-
Revised Forecast	\$ 4.4	\$ 4.4	\$ -	\$ -	\$ -	\$ -	\$ -

Stanley Station 230-66 kV Permanent Transformer Addition

Description:

Permanently install the 230-66 kV transformer (previously positioned as a hot-standby) and associated equipment for the Stanley station. Relocate 230 kV towers for line S60L outside of the station to allow for the desired 230 kV bus ring configuration, and re-terminate three lines (S60L, Line 3 and Line 51). Install communications equipment for the new bank including SCADA/RTU.

Justification:

The absence of firm transformation capacity at Stanley station requires the station's load to be transferred to St. Leon, Portage South, and Morden Corner stations following a Stanley transformer outage. This load transfer creates unacceptably low sub-transmission and distribution voltages, which negatively impacts customer equipment and automated processes in Morden, Winkler and the surrounding areas.

In-Service Date:

October 2015.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 21.1	\$ -	\$ 1.7	\$ 8.1	\$ 7.5	\$ 3.8	\$ -
Increase (Decrease)	-	-	0.1	(0.8)	0.5	0.2	-
Revised Forecast	\$ 21.1	\$ -	\$ 1.8	\$ 7.3	\$ 7.9	\$ 4.0	\$ -

Enbridge Pipelines: Clipper Project Load Addition Phase 2

Description:

Purchase and install a 230-66kV 57/76/95 MVA transformer as a hot standby with an OLTC range and a de-energized tap changer range compatible with existing banks 3 and 4 at Letellier Station. Install a 66kV breaker and associated equipment for termination of the transformer. Also includes replacement of the existing RTU with a cooper RTU.

Justification:

The absence of firm transformation at Letellier station could cause customer outages in the area during a transformer outage. The outage would last from three to six weeks until a spare transformer could be brought in.

In-Service Date:

October 2012.

Revision:

New item.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	7.5	1.8	1.9	-	-	-	-
Revised Forecast	\$ 7.5	\$ 1.8	\$ 1.9	\$ -	\$ -	\$ -	\$ -

Ashern Station Bank Addition

Description:

Install a third 230-66 kV transformer bank rated 57/76/95 MVA with an On Load Tap Changer (OLTC) and create a 66 kV four-breaker ring bus at Ashern station, complete with equipment to facilitate protection of the new bank and ring bus. Relocate 66 kV lines L39 and L49 to terminate into the new ring bus.

Justification:

The existing annual load growth and the addition of future Lake Manitoba Narrows Cottage Development load necessitate a capacity increase. The recommended capacity increase will keep Ashern station below its winter firm limit for the next 20 years.

In-Service Date:

November 2014.

Revision:

Cost flow revised and in-service date deferred six months from May 2014.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 10.6	\$ 0.4	\$ 3.5	\$ 5.6	\$ 1.0	\$ -	\$ -
Increase (Decrease)	-	(0.2)	(1.8)	(4.2)	6.1	0.2	-
Revised Forecast	\$ 10.6	\$ 0.2	\$ 1.6	\$ 1.5	\$ 7.0	\$ 0.2	\$ -

Ashern Station 230 kV Shunt Reactor Replacement

Description:

Purchase a 230 kV, 50MVAR shunt reactor to replace the existing Ashern station reactor.

Justification:

The Ashern reactor was installed in 1972 and has now reached the end of useful life, and is now considered a risk to the area's transmission and distribution system. When this reactor is down, one unit at Grand Rapids has to be switched from generator to synchronous condenser for the duration of the outage. Additionally, Manitoba Hydro currently does not have a system spare reactor that will support the 230 kV class.

In-Service Date:

August 2012.

Revision:

Cost flow revised and in-service date advanced four months from December 2012.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 2.7	\$ 0.0	\$ 2.7	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	1.0	(1.0)	-	-	-	-
Revised Forecast	\$ 2.7	\$ 0.9	\$ 1.8	\$ -	\$ -	\$ -	\$ -

Tadoule Lake DGS Tank Farm Upgrade

Description:

Design and install four 500 000 litre single wall above ground vertical diesel fuel tanks and associated piping, spill containment dyke modifications to accommodate the new tanks, and a fuel tank level monitoring system. Project also includes salvaging the existing 30 above ground horizontal diesel fuel tanks.

Justification:

The current permit to operate a petroleum storage facility at Tadoule Lake will expire on December 31, 2011. Of the 30 tanks, 11 are not built to Underwriters Laboratories of Canada S601 standards, and must be withdrawn from service. Additionally, the remaining 19 tanks require replacement to be compliant with Canadian Council of Ministers of the Environment PN 1326. The cost reflects contributions from Indian and Northern Affairs Canada at a rate of 75% based on preliminary negotiations, to be paid upon in-service.

In-Service Date:

December 2013.

Revision:

Cost flow revision, and in-service date deferred two years from December 2011.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 1.1	\$ (4.3)	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	3.3	0.7	-	-	-	-
Revised Forecast	\$ 1.1	\$ (1.0)	\$ 0.7	\$ -	\$ -	\$ -	\$ -

Energy Management System (EMS) Upgrade

Description:

Upgrade the Control Centre Energy Management System including incorporating Manitoba Hydro EMS customizations into AREVA EMS standard product.

Justification:

The core of Manitoba Hydro's EMS is based on version 2.1 software. Version 2.1 is at end of life and no longer supported by the vendor. Lack of vendor support represents an unacceptable operational risk. Future operational requirements and enhancements are constrained by obsolete technology.

In-Service Date:

June 2012.

Revision:

New item.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	6.6	2.8	2.0	-	-	-	-
Revised Forecast	\$ 6.6	\$ 2.8	\$ 2.0	\$ -	\$ -	\$ -	\$ -

Transmission Line Protection & Teleprotection Replacement

Description:

Replace obsolete protection and associated communications equipment for 30 transmission lines with phase comparison protection schemes. The new protection will provide "A" and "B" redundant relay schemes, and all communication signals will provide "A" and "B" teleprotection units with redundant channels.

Justification:

These protection systems must be replaced due to the history of false operations, degraded performance of the back-up protection, slower back-up fault clearing which can impact the Dorsey HVdc system, and unreliability of schemes using ATH-2 relays. Repairing and restoring failed equipment has proven very difficult. There is concern that the remaining spare parts, which are the same vintage as the failing in-service equipment, may not be functional, and cannot be repaired. Loss of the teleprotection equipment means the loss of the high-speed primary protection for these important lines. The backup protection for these lines has been identified as too slow by system performance. The availability of these lines has a direct impact on how much power Manitoba Hydro is able to import or export.

In-Service Date:

March 2017.

Revision:

Cost flow revision, and in-service date deferred 12 months from March 2016.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 21.1	\$ 2.7	\$ 3.8	\$ 4.3	\$ 3.4	\$ 2.6	\$ 0.1
Increase (Decrease)	-	0.4	(0.3)	(1.6)	(0.5)	0.3	2.3
Revised Forecast	\$ 21.1	\$ 3.1	\$ 3.4	\$ 2.8	\$ 2.8	\$ 2.9	\$ 2.4

Winnipeg Central Protection Wireline Replacement

Description:

Migrate the former Winnipeg Hydro area communications from metallic wireline to optical fibre cables. Install a Remote Terminal Unit (RTU) at four stations (Keewatin, Strathcona, Cambridge, and Empress) along with the transfer of 69 kV points from the supervisory to the new RTU at these four stations, and a GPS satellite clock for 15 Winnipeg Central stations to ensure all protective relays have the same time base for fault analysis.

Justification:

Wireline communications cables are unsuitable for most modern power system control and protection equipment applications; and therefore, retention of such cables has little future value. This project also minimizes or eliminates the need for hazardous work adjacent to high voltage cables.

In-Service Date:

June 2013.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 10.5	\$ 0.4	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	0.1	-	-	-	-	-
Revised Forecast	\$ 10.5	\$ 0.4	\$ -	\$ -	\$ -	\$ -	\$ -

Mobile Radio System Modernization

Description:

Replace the VHF mobile radio system with a modern digital system of increased capability.

Justification:

This system is becoming obsolete due to regulatory changes taking place in both Canada and the United States. Manitoba Hydro requires a very dependable mobile radio communication system under its own control and independent of any public system, as public systems cannot guarantee service under adverse conditions and are affected by peak public traffic which can overload the public system.

In-Service Date:

December 2015.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 30.7	\$ 2.5	\$ 6.1	\$ 2.9	\$ 11.7	\$ 7.1	\$ -
Increase (Decrease)	-	(0.6)	0.3	(0.1)	(0.2)	0.9	-
Revised Forecast	\$ 30.7	\$ 1.9	\$ 6.4	\$ 2.8	\$ 11.6	\$ 7.9	\$ -

Site Remediation of Diesel Generating Stations

Description:

For each of the former diesel generating stations in Beren's River, Brochet, Churchill, Cormorant, Cranberry Portage, Little Grand Rapids, Manigotogan, Moose Lake, Norway House, Shamattawa, The Pas and Wanless, conduct geotechnical investigation, prepare a report with cleanup recommendations, remediate any contaminated areas identified, and issue a final report confirming the facility and surrounding area were remediated and all areas of the work were left in accordance with applicable environmental regulations.

Justification:

Due to environmental concerns and regulations applicable to unrestricted use of abandoned former diesel sites, these sites must be restored to the equivalency of the surrounding area. The estimate reflects cost-sharing arrangements with Indian and Northern Affairs Canada for work required at Beren's River (22.3%), Little Grand Rapids (22.3%), Moose Lake (44%), Norway House (22.3%) and Shamattawa (50%).

In-Service Date:

March 2012.

Revision:

Upon adoption of IFRS in 2012/13, site remediation will no longer be capitalized.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 13.3	\$ 1.9	\$ 0.3	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	(1.0)	0.4	(0.3)	-	-	-	-
Revised Forecast	\$ 12.6	\$ 2.3	\$ -	\$ -	\$ -	\$ -	\$ -

Oil Containment - Transmission

Description:

Design and construct systems to contain oil spills from apparatus in switchyards.

Justification:

Minimize environmental impact of oil spills.

In-Service Date:

May 2012.

Revision:

Cost flow revised and in-service date advanced 10 months from March 2013.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 7.4	\$ 0.2	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	0.1	-	-	-	-	-
Revised Forecast	\$ 7.4	\$ 0.4	\$ -	\$ -	\$ -	\$ -	\$ -

Station Battery Bank Capacity & System Reliability Increase

Description:

Conduct individual studies, and replace and/or upgrade battery bank capacity and chargers in 156 transmission and distribution stations and seven stand-alone communications sites, in order to meet the NERC requirements to have a workable system restoration plan. Includes AC service upgrades and building upgrades or extensions.

Justification:

Present battery banks were designed to an eight hour standard (normal DC loads), and there are concerns many may no longer meet the standard, due to additional DC loads and age related deterioration. Current corporate simulations indicate that, with the current battery sizing, system restoration will be inhibited if a black start situation should occur. Stations with a restoration plan will require 12 hours and dual battery systems with multiple chargers where practical. Stations without a restoration plan require capacity for a 16 hour duration.

In-Service Date:

March 2016.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 46.5	\$ 5.7	\$ 4.8	\$ 5.8	\$ 4.5	\$ 4.4	\$ -
Increase (Decrease)	-	(0.9)	0.3	(0.9)	0.5	0.8	-
Revised Forecast	\$ 46.5	\$ 4.8	\$ 5.1	\$ 4.9	\$ 5.0	\$ 5.2	\$ -

Waverley Service Centre Oil Tank Farm Replacement

Description:

Replacement of all remaining single wall oil tanks at the Waverley Service Centre Oil Tank Farm.

Justification:

The tanks at this tank farm have reached their end of life and must be removed from service to ensure compliance with all environmental regulations. The tanks cannot be repaired due to the standard imposed by the Province of Manitoba. Failure to replace the tanks will significantly restrict the ability to provide clean processed oil for maintenance requirements.

In-Service Date:

December 2013.

Revision:

No change.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 3.0	\$ 0.5	\$ 0.4	\$ 0.7	\$ -	\$ -	\$ -
Increase (Decrease)	-	-	-	-	-	-	-
Revised Forecast	\$ 3.0	\$ 0.5	\$ 0.4	\$ 0.7	\$ -	\$ -	\$ -

Transmission Domestic

Description:

This program consists of projects whose individual costs are of a relatively small amount. The majority of projects consist of additions, improvements and maintenance of transmission lines; replacement, development and upgrades to communication systems; additions and replacement of field maintenance equipment; as well as station upgrades.

Justification:

This program ensures the reliability of transmission with respect to load, outages, and import/export requirements; as well as addresses safety issues and provides the necessary support for the operation and maintenance of the transmission system.

In-Service Date:

Ongoing.

Revision:

No change.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	NA	\$ 30.6	\$ 31.2	\$ 31.8	\$ 32.4	\$ 33.1	\$ 175.6
Increase (Decrease)		-	-	-	-	-	-
Revised Forecast		\$ 30.6	\$ 31.2	\$ 31.8	\$ 32.5	\$ 33.1	\$ 175.8

CUSTOMER SERVICE & DISTRIBUTION:

Winnipeg Distribution Infrastructure Requirements

Description:

Complete assessment and emergency replacement as required of distribution underground equipment in the City of Winnipeg, including plant previously associated with Winnipeg Hydro.

Justification:

As the Underground Assessment (UGA) project progresses throughout Winnipeg, the number of failures caused by transformers has decreased. Other benefits of the UGA project include: decreased potential for employee accidents, decreased potential for public contact, extending transformer life, decreased outage duration, and increased customer satisfaction.

In-Service Date:

March 2014.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 24.5	\$ 2.3	\$ 2.3	\$ 2.3	\$ -	\$ -	\$ -
Increase (Decrease)	-	(0.1)	0.1	0.6	-	-	-
Revised Forecast	\$ 24.5	\$ 2.2	\$ 2.4	\$ 2.9	\$ -	\$ -	\$ -

Defective RINJ Cable Replacement

Description:

Replace approximately 62,500 metres of underground distribution 5 kV and 15 kV copper rubber insulated neoprene jacketed (RINJ) concentric neutral cable (also known as or "Red Jacket" cable) installed in the Winnipeg area between 1955 and 1965.

Justification:

RINJ underground cable installed between 1955 and 1965 failed at a rate of 9.6 failures per 100 kilometers, which was three times higher than the failure rate at which cable replacement is recommended by the CEA. Replacement of the cable reduces the number of underground cable failures and the negative impacts on customer reliability.

In-Service Date:

March 2013.

Revision:

Cost flow revision, and in-service date deferred one year from March 2012.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 8.7	\$ 2.1	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	(0.8)	1.3	-	-	-	-
Revised Forecast	\$ 8.7	\$ 1.3	\$ 1.3	\$ -	\$ -	\$ -	\$ -

Rover 4 kV Station Salvage & Feeder Conversion

Description:

Remove existing 4 kV switchgear and supervisory protection equipment and replace with new equipment capable of withstanding fault levels at this site. Install a current limiting reactor. Modify one feeder and relocate two others. Build a new substation building, replace three 66-4 kV transformer banks, extend the distribution ductline system and feeders to the new building, salvage the carpenter shop building, and the 4 kV building and its transformer banks.

Justification:

This equipment has been in-service since 1950 and its safe operation requires inefficient procedures and fault levels exceed its rating. Protective relaying, local control and metering functions are provided via electro-mechanical relays, manual switches, and analog meters located in a separate building, and provide decreasing reliability due to mechanical deterioration.

In-Service Date:

March 2017.

Revision:

Cost flow revision, and in-service date deferred 48 months from March 2013.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 12.7	\$ 3.1	\$ 4.3	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	(3.1)	(4.3)	1.7	2.5	2.8	0.5
Revised Forecast	\$ 12.7	\$ -	\$ 0.1	\$ 1.7	\$ 2.5	\$ 2.8	\$ 0.5

Martin New 66-4 kV Station

Description:

Install a new three bank outdoor station complete with 18 feeder positions and protection to replace the existing Martin station.

Justification:

Martin station is a 51 year old, two bank 12.47/4.16 kV station that has exceeded firm capacity. It is supplied from Rover station which is also being upgraded. Neither bank can be relied on as backup for the other, and there is no mobile backup available or external tie to neighbouring stations. Without improvements, 7 500 customers including residential, apartment blocks, heavy industry, and commercial businesses could be without power for an unacceptable period (48 hours minimum) in the event of an emergency, such as a transformer failure at Rover.

In-Service Date:

March 2014.

Revision:

Cost flow revision, and in-service date advance one year from March 2015.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 28.2	\$ 5.1	\$ 6.9	\$ 9.0	\$ 1.8	\$ -	\$ -
Increase (Decrease)	-	(3.9)	5.1	(1.0)	0.4	-	-
Revised Forecast	\$ 28.2	\$ 1.2	\$ 11.9	\$ 8.1	\$ 2.2	\$ -	\$ -

Frobisher Station Upgrade

Description:

Replace both 7.5/10 MVA transformer banks with 18/24/30 MVA banks complete with 66 kV and 12.47 kV breakers, including eight new 12 kV feeder positions and two 4.5 MVAR capacitor banks. Upgrade six existing feeder automatic circuit re-closers (ACRs). Salvage banks 1 and 2 - 7.5/10 MVA transformers. Construct a new building, install a Remote Terminal Unit (RTU), communications, security system and fire protection.

Justification:

Two fully utilized 12 kV stations serving the south St Vital area were loaded to a combined 8.1 MVA over firm capacity in the summer of 2003. Load has grown an average of 2.25 MVA per year for the last ten years, and is projected to grow another 46.3 MVA over the next 16 years. Land acquisition problems prevented building a new station north of the perimeter highway.

In-Service Date:

September 2012.

Revision:

Cost flow revision, and in-service date deferred twenty three months from October 2010.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 14.4	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	0.5	1.0	-	-	-	-
Revised Forecast	\$ 14.4	\$ 0.5	\$ 1.0	\$ -	\$ -	\$ -	\$ -

Burrows New 66-12 kV Station

Description:

Build a new two bank 66 kV-12 kV indoor station, complete with 12 feeder positions and protection to replace the Alfred and Charles stations.

Justification:

Most of the equipment in this part of Winnipeg has been in service for 76 years. Alfred Station (which supplies Charles Station) lacks access to a satisfactory alternate supply in the event of a 12 kV interruption out of Rover Station. Remedial action was recommended for both stations in the Due Diligence Report. It indicated the 4 kV switchgear lineups at Alfred and Charles Stations lack arc-resistance and at Alfred Station are sometimes underrated for the available fault current during normal operating conditions. It also had concerns that neither station has an appropriate battery room, all station transformers have patched leaks, they contain asbestos materials, and that spare parts are in short supply.

In-Service Date:

March 2013.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 28.6	\$ 12.2	\$ 6.4	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	-	0.3	-	-	-	-
Revised Forecast	\$ 28.6	\$ 12.2	\$ 6.7	\$ -	\$ -	\$ -	\$ -

Winnipeg Central Oil Switch Project

Description:

Remove the remaining 26 oil switches located in various manhole sites throughout Winnipeg Central District. Install pad-mount switchgear and/or pad-mount transformers, and reroute existing primary feeder and customer service cables as required.

Justification:

The oil switches are corroding and are not rated for the maximum available fault current on the system. If a failure occurs or the oil must be replaced, a lengthy shutdown will be required. Replacement will alleviate the risks associated with switching primary feeders in confined spaces. Pad-mount equipment allows adequate clearances and efficiency for switching, maintaining, and upgrading for future customer load additions.

In-Service Date:

March 2012.

Revision:

Increased costs as a result of higher than anticipated secondary contracting costs, the need for customized equipment and increased material. In-service date deferred twelve months from March 2011.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 7.1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	2.7	1.4	-	-	-	-	-
Revised Forecast	\$ 9.8	\$ 1.4	\$ -	\$ -	\$ -	\$ -	\$ -

William New 66-12 kV Station

Description:

Build a new two bank 66-12 kV indoor station, on Manitoba Hydro owned property, with protection and communication capability to the Central District Control Centre (CDCC) and the System Control Centre (SCC) for ten feeder positions.

Justification:

This project will allow for load transfers from King station, which will alleviate overloading as a result of operating limits imposed by cooling problems. Load transfers from Sherbrook station will allow for redundant feeds from different stations to supply critical services reducing the implication of a contingency equipment failure. Improvements in service reliability and accommodation for future distribution automation can be realized from new equipment. Manitoba Hydro already owns land at the south east corner of William Avenue and Tecumseh Street for a new station.

In-Service Date:

October 2015.

Revision:

Cost flow revision and in-service deferred thirty six months from October 2012.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 10.3	\$ 0.4	\$ 9.3	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	0.1	(7.1)	2.9	3.2	1.1	-
Revised Forecast	\$ 10.3	\$ 0.5	\$ 2.2	\$ 2.9	\$ 3.2	\$ 1.1	\$ -

Waverley West Sub Division Supply

Description:

Install 20MVA capacity complete with pad mounted voltage regulators, 24 kV-2400 kVAR capacitor banks, S&C automated switching cubicles and fibre optic communication link.

Justification:

Waverley West subdivision is a new development in an area predominantly supplied by 12 and 24 kV feeders. The 12 kV feeders cannot support more load. The nearest viable 24 kV feeder does not allow standard distribution equipment to be used due to high available fault currents. In addition, by using the 24 kV feeders, reliability to existing customers is reduced. This project is required to ensure the Waverley West subdivision customers have reliable service.

In-Service Date:

October 2011.

Revision:

Cost flow revision, and in-service date deferred six months from March 2011.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 6.5	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	0.7	-	-	-	-	-
Revised Forecast	\$ 6.5	\$ 0.7	\$ -	\$ -	\$ -	\$ -	\$ -

St. James New Station & 24 kV Conversion

Description:

Build a new 115-24 kV St. James Station, new and upgraded feeders, and conversion of St. James, Ness, Berry and King Edward station feeders from 4 kV to 24 kV.

Justification:

This project is required to ensure firm supply and a reliable system in the St. James area.

In-Service Date:

March 2017.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 65.9	\$ 2.6	\$ 5.9	\$ 6.8	\$ 10.4	\$ 21.2	\$ 18.8
Increase (Decrease)	-	(2.0)	0.4	(3.0)	(0.8)	0.6	4.8
Revised Forecast	\$ 65.9	\$ 0.6	\$ 6.3	\$ 3.9	\$ 9.5	\$ 21.8	\$ 23.6

York Station Bank & Switchgear Addition

Description:

Add a transformer bank and switchgear for nine feeder positions.

Justification:

Increasing capacity at York station alleviates loading problems at King station and interim relief at Sherbrook, and provides for future new loads that cannot be adequately supplied by existing King, Edmonton, and York capacity.

In-Service Date:

November 2011.

Revision:

Costs increased due to manufacturer delays for switchgear delivery, switchgear price, additional floor reinforcement at the station and complexity of switchgear installation, and in-service date deferred eight months from March 2011.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 4.0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	2.0	1.4	-	-	-	-	-
Revised Forecast	\$ 6.0	\$ 1.4	\$ -	\$ -	\$ -	\$ -	\$ -

Health Sciences Centre Service Consolidation and Distribution Upgrade

Description:

Salvage the existing distribution network at the Health Sciences Centre (HSC) complex, comprised of 32 service points, and re-build using a modular, dual radial-feed distribution system consisting of five service points.

Justification:

Much of the equipment within the existing HSC complex is over 75 years old and reaching its expected end of life. Due to the age of most of the existing vault transformers, replacement parts are not obtainable and a new method of servicing will be required in the event of equipment failure. Given the age of the existing underground cables, the likelihood of cable faults is now increased. Many of the vault transformers are sub-grade, difficult to access and do not meet limits of approach restrictions.

The design of the modular dual radial distribution system introduces levels of redundancy into the HSCs current distribution structure increasing service reliability and safety. It is expected that within the next thirty years, the HSC and the University of Manitoba (UM) will require additional services which will draw an anticipated 20MVA of new load. The existence of 32 metering points for these two customers causes a great many difficulties for business representatives. By consolidating their electrical services, they will both be eligible for the General Service Large rate, significantly decreasing their service costs.

In-Service Date:

December 2015.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 15.8	\$ 3.6	\$ 3.1	\$ 2.2	\$ 3.2	\$ 0.1	\$ -
Increase (Decrease)	-	(1.6)	1.9	1.4	0.8	0.5	-
Revised Forecast	\$ 15.8	\$ 2.0	\$ 5.0	\$ 3.6	\$ 4.0	\$ 0.6	\$ -

Waverley South DSC Installation

Description:

Install two 10 MVA, 66-12.47 kV Distribution Supply Centres (DSCs), two three phase 12 kV, 585A padmounted regulators, two 25 kV 600A Vista Gear four way switching cubicles complete with controllers, three 3 phase 600A reclosers, and one 50 kVA single-phase padmounted transformer.

Justification:

This station supplies both the south Fort Garry and La Salle communities (both fast growing) and provides a back-up supply to the St. Norbert single bank station. This option addresses the non-firm capacity issues at a significantly lower cost than the initial plan, provides superior system reliability and its automatic load transfer feature offers recovery in minutes versus hours when a transformer fails.

In-Service Date:

March 2012.

Revision:

Cost flow revision and in-service date deferred twelve months from March 2011.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 3.9	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	2.7	-	-	-	-	-
Revised Forecast	\$ 3.9	\$ 2.7	\$ -	\$ -	\$ -	\$ -	\$ -

Southdale DK732 Cable Replacement

Description:

Direct replacement of 35 year old 15kV insulated underground cable that is at the end of its service life with 25kV Al TR-XLPE cable in preparation for 24kV conversion that is planned for in the next 10 years. Directly replace a Manitoba Hydro modified Distribution Centre (DC) located on Shamrock Drive with standard DC that comes with fused compartments.

Justification:

Dakota Station and St. Vital Stations are loaded beyond firm capacity limits. Feeders at Dakota Station are loaded beyond feeder tie limits. Distribution Engineering is planning to transfer load from Dakota Station to address these issues. When DK732 is transferred to St. Vital Station infrastructure must be rated for 24kV. This project will partially prepare the area for 24kV conversion. When the transfer is complete DK732 feeder ties will be re-established creating greater system operating flexibility. A mitigation solution to the high number of faults is required for Southdale. Replacing this failure prone cable type with new 25kV insulated cable is expected to improve the reliability of the distribution system by reducing the frequency of interruptions to less than 0.3 per year that are directly related to the underground cables. Also this new cable will prepare Southdale for 24kV voltage conversion.

In-Service Date:

September 2012.

Revision:

New item.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	2.6	0.9	1.2	-	-	-	-
Revised Forecast	\$ 2.6	\$ 0.9	\$ 1.2	\$ -	\$ -	\$ -	\$ -

Steinbach Area 66kV Capacity Upgrade

Description:

Construct a new 32km 66kV 336 ASC line from Richer South Station to existing 66kV Line L20 outside of Hanover Station, termination of the new line at Richer South Station, and re-conductoring of 4km of Line L20 into Hanover Station with 336 ASC.

Justification:

The overload of line L14 caused by load transfers during a Hanover transformer outage will cause customer outages until the transformer at Hanover is replaced. It is anticipated that rotating outages would occur for two weeks or longer. A new 66kV line from Richer South Station to line L20 outside of Hanover Station will prevent line overloads during a single contingency Hanover transformer outage.

In-Service Date:

October 2011.

Revision:

New item.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	6.3	5.9	0.3	-	-	-	-
Revised Forecast	\$ 6.3	\$ 5.9	\$ 0.3	\$ -	\$ -	\$ -	\$ -

Line 27 66kV Extension and Arborg North DSC

Description:

Build 27.4 km of 66 kV line with 266A conductor from Riverton station to Arborg West station to improve supply reliability to Arborg West and Riverton stations and install a 10MVA 66-12.47/7.2kV Distribution Supply Centre (DSC) 11.3 km directly north of the town of Arborg to supply the northern reaches of Feeders AW12-4, AW12-6 and RN12-4.

Justification:

Manitoba Hydro and CSA standards for voltage have been exceeded due to load currents on Arborg West Feeders AW12-4 and AW12-6. In addition, the plant cannot be adequately protected as load currents have become significant compared to system strength in the area.

In-Service Date:

October 2012.

Revision:

Cost flow revision and in-service date deferred thirteen months from September 2011.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 6.0	\$ 5.4	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	(1.1)	1.2	-	-	-	-
Revised Forecast	\$ 6.0	\$ 4.3	\$ 1.2	\$ -	\$ -	\$ -	\$ -

AECL Station Switchgear Replacement

Description:

Salvage the 4kV switchgear and install four ACRs (Automatic Circuit Reclosers) to supply four feeders via cable to a new POD (Point of Delivery) at the Atomic Energy of Canada Limited (AECL) customer-owned switchgear located outside of the station fence.

Justification:

Manitoba Hydro was notified in 2009 by AECL that service will be required for another 30-40 years. The 4kV switchgear at AECL is at end of life and must be replaced. There are no spare parts available and the arc chutes have asbestos. The building housing the switchgear is 47 years old and does not meet today's clearances and safety standards. The battery banks are 31 years old and are due for replacement.

In-Service Date:

August 2011.

Revision:

Cost flow revision and in-service date deferred one month from July 2011.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 2.4	\$ 1.1	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	(0.2)	-	-	-	-	-
Revised Forecast	\$ 2.4	\$ 0.8	\$ -	\$ -	\$ -	\$ -	\$ -

Teulon East 66-12 kV Station

Description:

Build a new 66-12.47/7.2 kV traditional wood pole station to replace the existing Teulon Station, and salvage the existing station.

Justification:

Project required as there have been several prolonged outages over the past two years caused by fuses dropping open and the misalignment of 66 kV switches due to the structure leaning from frost heave. Rebuilding the station at the existing location would address the drainage issue and resulting safety issues, however due to the small size of the site the operational difficulties would still exist in the station.

In-Service Date:

October 2011.

Revision:

Cost flow revision and in-service date deferred twelve months from October 2010.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 4.6	\$ 0.1	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	4.1	-	-	-	-	-
Revised Forecast	\$ 4.6	\$ 4.2	\$ -	\$ -	\$ -	\$ -	\$ -

Enbridge Pipelines: Clipper Project Load Addition Phase 1

Description:

Build a new 32.7 km, 66 kV line using 336 ACSR conductor that will become Line 22 between Letellier station and the Enbridge Gretna pumping site. Terminate the new Line 22 with the installation of a 66 kV breaker and associated equipment at Letellier station. Reconductor 7.2 km of 66 kV Line 51 using 266.8 ACSR conductor from St. Leon station to the Enbridge Manitou pumping site, reconductor 500 metres of 66 kV using 336 ACSR conductor on Line 43 between Glenboro South station and the Enbridge Glenboro pumping site, and reconductor 120 metres of 66 kV using 336 ACSR conductor on the Line 94 tap to the Enbridge Cromer pumping site.

Justification:

To provide electrical supply to four pumping stations owned by Enbridge Pipelines Inc., as specified in the Construction Agreements signed between Manitoba Hydro and Enbridge Pipelines Inc. This project forms an integral component of Enbridge Pipelines Inc.'s business plan to ship oil from Alberta to the southern United States for processing. Failure to meet the customer's in-service date may result in financial loss to the customer. Approximately 83% of project costs are recoverable, with the payment schedule requiring contributions be paid in 2010.

In-Service Date:

October 2010.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 0.9	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	2.1	-	-	-	-	-
Revised Forecast	\$ 0.9	\$ 2.1	\$ -	\$ -	\$ -	\$ -	\$ -

Melrose DSC

Description:

Install a 10MVA, 115kV-12kV Distribution Supply Centre (DSC) located approximately 3.2km southwest of Garson Station at Melrose.

Justification:

Installing a 10MVA 115-12kV DSC will provide adequate capacity for approximately 12 years in the Melrose area. After this time, a second 10 MVA 115-12kV transformer will be added to the Melrose DSC site will provide enough capacity for an additional 15 years. This DSC will transfer load from Carson Station, thereby reducing load on 33kV Line 13. This will also alleviate capacity concerns at Parkdale Station. Supplying the Melrose DSC from the 115kV system also supports the long term goal of salvaging the 33kV system between Parkdale and Whiteshell terminals. This option also will help existing voltage issues on the 33kV system.

In-Service Date:

October 2011.

Revision:

New item.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	3.5	3.5	-	-	-	-	-
Revised Forecast	\$ 3.5	\$ 3.5	\$ -	\$ -	\$ -	\$ -	\$ -

Starbuck DSC

Description:

Extend 66kV Line 2 for 8 km towards the community of Starbuck along Hwy #2 and install one 66-12.47 7.2kV, 10MVA Distribution Supply Centre (DSC) 1.6km east of Starbuck.

Justification:

A 10MVA 66-12.47kV DSC located near Starbuck will provide the additional capacity needed to meet future demand increases and increase the electrical strength of the line. The DSC would supply Cabot Station Feeder CT12-1. This DSC will also allow the feeder length to be shortened and increase the available fault current, thereby increasing the electrical strength of the line and allowing the feeder protection to function properly.

In-Service Date:

October 2011.

Revision:

New item.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	3.0	3.0	-	-	-	-	-
Revised Forecast	\$ 3.0	\$ 3.0	\$ -	\$ -	\$ -	\$ -	\$ -

Cromer North Station & Reston RE12-4 25 kV Conversion

Description:

Convert the westerly portion of Reston Feeder RE12-4 from 12 kV to 25 kV by November 2009, and install one 66-25 kV transformer in Cromer North station by September 2011.

Justification:

A new five mile feeder and 25 kV feeder conversion is required at Reston to address the increased demand due to oilfield exploration.

In-Service Date:

September 2011.

Revision:

Cost flow revision only.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 4.3	\$ 1.3	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	(1.1)	1.2	-	-	-	-
Revised Forecast	\$ 4.3	\$ 0.2	\$ 1.2	\$ -	\$ -	\$ -	\$ -

Brandon Crocus Plains 115-25 kV Bank Addition

Description:

Install two 15/20/25 MVA OLTC 115-25 kV transformers. Install one 115 kV breaker to connect the transformers to line BF52. Install 3 x 25 kV breakers, four reclosers and associated equipment to connect the transformers, and provide four additional 25 kV feeders into the industrial park.

Justification:

To supply the load growth and the industrial loads in the south Brandon area.

In-Service Date:

October 2014.

Revision:

Cost flow revision, and in-service date deferred two years from October 2012.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 6.3	\$ -	\$ 6.2	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	-	(6.2)	-	6.2	-	-
Revised Forecast	\$ 6.3	\$ -	\$ -	\$ -	\$ 6.2	\$ -	\$ -

Birtle South - Rossburn 66 kV Line

Description:

Build a new 66 kV line from the 66 kV Birtle Queen station to Rossburn station. The new line will be terminated at Birtle South station with a new 66 kV breaker.

Justification:

This new transmission line will increase reliability for the Birtle South 230-66 kV station area by reducing the occurrence of line outages. In addition, voltage levels on the Birtle South 66 kV system will become adequate to maintain acceptable voltage levels at regulated distribution stations.

In-Service Date:

October 2015.

Revision:

No change.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 4.9	\$ -	\$ -	\$ 0.1	\$ 0.3	\$ 4.5	\$ -
Increase (Decrease)	-	-	-	-	-	-	-
Revised Forecast	\$ 4.9	\$ -	\$ -	\$ 0.1	\$ 0.3	\$ 4.5	\$ -

TCPL Keystone Project

Description:

Establish 66 kV primary supplies to six pumping stations (Rapid City, Portage, Carman, Haskett, Wellwood and Crandall) owned by TransCanada Pipelines (TCPL). Install a 66 kV capacitor bank near Manitoba Hydro's Elm Creek station.

Justification:

TCPL requires an electrical supply to six new crude oil pumping stations located in Manitoba for their Keystone project. Construction Agreements were signed with Manitoba Hydro in August 2008 (for the first four pumping stations) and in June 2009 (for the last two pumping stations) for this work. The agreements specify that TCPL will pay contributions totaling \$8.4 million for the provision of these supplies, most of which are due in 2010. The 66 kV capacitor bank near Elm Creek is required in order to maintain adequate voltage to the TCPL Carman pumping station and to existing Manitoba Hydro distribution stations in the area.

In-Service Date:

October 2012

Revision:

Cost flow revision and in-service date deferred two months from August 2012.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 8.0	\$ 1.9	\$ 1.6	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	0.3	0.8	-	-	-	-
Revised Forecast	\$ 8.0	\$ 2.1	\$ 2.4	\$ -	\$ -	\$ -	\$ -

Waskada DSC

Description:

Build a DSC site with a 10 MVA 66-24.9 kV transformer and three feeders. Convert the WK12-2 area to 25kV.

Justification:

Oil companies in the Waskada area are adding 8 MVA of load by the fall of 2011. These new loads will include battery sites which utilize large motors, up to 400hp, and require large service sizes, up to 1500kVA transformers. The request for service for the Goodlands Booster site will have its capacity limited from 1500kVA to 500kVA because of protection coordination issues and motor starting limitations on the 12kV feeder. The Goodlands Booster is expected to be in service by February 2011. Conversion to 25kV is required to allow the customer to operate at full load. The existing Waskada station is currently loaded to 4.8 MVA and will surpass its 10 MVA loading limit with this new oilfield load. The existing 12kV system cannot accommodate the large motors and transformers being installed. A higher supply voltage of 25kV is required to supply these large battery sites. Installing a new DSC and converting the WK12-2 area to 25kV will resolve all problems outlined and provide capacity for future oilfield growth.

In-Service Date:

October 2011

Revision:

New item.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	3.9	3.9	-	-	-	-	-
Revised Forecast	\$ 3.9	\$ 3.9	\$ -	\$ -	\$ -	\$ -	\$ -

Line 98 Rebuild Melita to Waskada

Description:

Re-conductor 31KM of overhead 66kV line (Line 98) from Melita to Waskada using 336.4 ASC and remove existing 2/OACSR conductor.

Justification:

The re-conductoring of the line section will improve the voltage support in the Waskada area; allowing the customers to expand oil extraction and processing operations as planned. Otherwise customers' ISDs will be impacted and load curtailment will be necessary. Due to the intense expected load growth and once the line is re-conducted the voltage levels in the area will remain under 63kv. However, the secondary voltages will be boosted through tap changers and regulators to acceptable levels.

In-Service Date:

September 2011

Revision:

New item.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	3.8	3.8	-	-	-	-	-
Revised Forecast	\$ 3.8	\$ 3.8	\$ -	\$ -	\$ -	\$ -	\$ -

Customer Service & Distribution Domestic

Description:

This program consists of projects whose individual costs are of a relatively small amount. These projects are required to extend sub-transmission, distribution, and transformation facilities to supply service to residential, farm, commercial and industrial customers, and to replace plant facilities whose useful life has been exceeded. Specific types of expenditures that make up electric domestic items include station and line additions, modifications and rebuilds, bank additions, breaker replacements, defective cable replacement, highway changes, field maintenance equipment, and ice melting requirements. These costs are spread over many facility locations throughout the Province.

Justification:

The residential, farm, commercial and industrial loads are expected to grow at an average rate in excess of 1.5% per annum and will require a program of additions to the system to accommodate these anticipated loads.

In-Service Date:

Ongoing.

Revision:

In the past several years, Distribution Engineering's work has grown due to a rapid increase in Customer Service related work (Underground Residential Development, Commercial and Industrial Customer Service, Highways Projects and Streetlighting). During this same time, material costs have increased significantly. Further, spending has also increased in order to maintain our existing load and to support the existing customer base due to our aging system and shrinking available capacity. Also, for the supply of electric meters to comply with Measurement Canada's recently completed new compliance sampling specification, *S-S-06 - Sampling Plans for the Inspection of Isolated Lots of In-service Meters*.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	NA	\$ 119.9	\$ 122.3	\$ 124.7	\$ 127.2	\$ 129.8	\$ 688.8
Increase (Decrease)		8.0	8.0	8.0	9.0	9.0	47.0
Revised Forecast		\$ 127.9	\$ 130.5	\$ 133.2	\$ 136.4	\$ 138.5	\$ 735.3

CUSTOMER CARE & MARKETING:

Advanced Metering Infrastructure

Description:

Purchase and install an automated metering infrastructure (AMI) communication network to remotely read and electronically disseminate electric meter readings and other relevant customer information to appropriate departments and divisions.

Justification:

Satisfies the ongoing need for routine, periodic meter readings in customer billing as well as provides 'on demand' readings to respond to customer inquiries. Other benefits include: increased customer satisfaction due to greater billing accuracy; better detection of theft of service, meter tampering and defective meters; greater flexibility in the timing and consolidation of billings; and improved detection of customer and system power outages with shortened restoration times.

In-Service Date:

March 2019.

Revision:

Cost flow revision, and in-service deferred three years from March 2016.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 30.9	\$ 4.0	\$ 5.3	\$ 5.4	\$ 5.6	\$ 4.3	\$ 4.2
Increase (Decrease)	-	(4.0)	(1.4)	(0.1)	(0.2)	1.3	4.3
Revised Forecast	\$ 30.9	\$ -	\$ 4.0	\$ 5.3	\$ 5.4	\$ 5.6	\$ 8.6

Customer Care & Marketing Domestic

Description:

This program covers the additions and replacements of electric meters.

Justification:

As required for the connection of new customers to the system, as well as replacement of existing time expired or faulty meters.

In-Service Date:

Ongoing.

Revision:

Increased domestic budget for the supply of electric meters to comply with Measurement Canada's recently completed new compliance sampling specification, *S-S-06 - Sampling Plans for the Inspection of Isolated Lots of In-service Meters*.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	NA	\$ 2.6	\$ 2.7	\$ 2.7	\$ 2.8	\$ 2.8	\$ 15.0
Increase (Decrease)		0.4	0.4	0.4	1.1	1.1	5.7
Revised Forecast		\$ 3.0	\$ 3.0	\$ 3.1	\$ 3.8	\$ 3.9	\$ 20.8

FINANCE & ADMINISTRATION:

Corporate Buildings Program

Description:

Refurbishments and/or replacement of corporate administrative facilities throughout the Province.

Justification:

Enables a safe, efficient, and productive environment for staff and customers.

In-Service Date:

Ongoing.

Revision:

No change.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	NA	\$ 8.0	\$ 8.0	\$ 8.0	\$ 8.0	\$ 8.0	\$ 40.0
Increase (Decrease)		-	-	-	-	-	-
Revised Forecast		\$ 8.0	\$ 8.0	\$ 8.0	\$ 8.0	\$ 8.0	\$ 40.0

EAM Phase 2

Description:

Replace the computerized maintenance management system known as AMPS (Applied Maintenance Planning System) with an EAM (Enterprise Asset Management).

Justification:

The most significant financial benefit from implementation of EAM is derived from avoiding a future decrease in availability. This is achieved by ensuring all required operations and maintenance work is completed in an optimal fashion, and equipment condition information, maintenance tactics, and work processes are supported to maximize availability. Significant opportunity for improvement was noted by a quantitative analysis completed in conjunction with Synterprise Global Consulting in May, 2005, and confirmed by the work completed by the EAM Data Integrity team and Power Supply process measures.

In-Service Date:

November 2012.

Revision:

New item.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	19.3	6.1	8.9	2.3	-	-	-
Revised Forecast	\$ 19.3	\$ 6.1	\$ 8.9	\$ 2.3	\$ -	\$ -	\$ -

Fleet Acquisitions

Description:

Procurement, refurbishment and/or replacement of corporate fleet vehicles and equipment.

Justification:

To provide a fleet of safe, reliable and efficient corporate vehicles and equipment.

In-Service Date:

Ongoing.

Revision:

No change.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	NA	\$ 13.8	\$ 14.1	\$ 14.3	\$ 14.6	\$ 14.9	\$ 79.2
Increase (Decrease)		-	-	-	-	-	-
Revised Forecast		\$ 13.8	\$ 14.1	\$ 14.3	\$ 14.6	\$ 14.9	\$ 79.2

Finance & Administration Domestic

Description:

The programs consist primarily of information technology hardware, software, application development, and associated services to the corporation. In addition, there are programs to provide for property easements and to a lesser degree equipment for fleet, property and materials management.

Justification:

Computer system enhancements are required throughout the corporation to achieve ongoing improvements in resource productivity and reliability. Property easements and equipment purchases are required for supporting the appropriate areas of the corporation.

In-Service Date:

Ongoing.

Revision:

No change.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	NA	\$ 24.9	\$ 25.4	\$ 25.9	\$ 26.4	\$ 27.0	\$ 143.2
Increase (Decrease)		-	-	-	-	-	-
Revised Forecast		\$ 24.9	\$ 25.4	\$ 25.9	\$ 26.5	\$ 27.0	\$ 143.3

GAS OPERATIONS:

CUSTOMER SERVICE & DISTRIBUTION:

Ile Des Chenes NG Transmission Network Upgrade

Description:

Upgrade the Ile Des Chenes natural gas transmission network by installing 220 meters of NPS 12 steel natural gas transmission pipeline, two 16" isolation valve assemblies, and abandoning approximately 10 meters of NPS 16 steel natural gas transmission pipeline and one NPS 12 plug valve.

Justification:

The upgrades will increase the reliability of gas supply to the city of Winnipeg and communities north and east of Winnipeg. The current configuration of the Ile Des Chenes transmission system at the Red River Floodway crossing does not allow for isolation of the NPS 16 pipeline in the event of damage, which could negatively impact approximately 203,000 natural gas customers.

In-Service Date:

October 2012.

Revision:

The project schedule has been revised for summer 2012 construction to avoid system risks with fall 2011 construction, and in-service deferred twelve months from October 2011.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 1.2	\$ 0.4	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	(0.1)	0.9	-	-	-	-
Revised Forecast	\$ 1.2	\$ 0.3	\$ 0.9	\$ -	\$ -	\$ -	\$ -

Gas SCADA Replacement

Description:

Replace the current Gas Supervisory Control and Data Acquisition (SCADA) system with a vendor-supported SCADA system.

Justification:

Replacement of the current gas SCADA system is required as product support is being discontinued by the vendor, and vendor alternative product does not meet the complete system requirements for Manitoba Hydro.

In-Service Date:

February 2012.

Revision:

Cost flow revision, and in-service date deferred five months from September 2011.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 4.6	\$ 2.6	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	-	1.1	-	-	-	-	-
Revised Forecast	\$ 4.6	\$ 3.6	\$ -	\$ -	\$ -	\$ -	\$ -

Bunclody Natural Gas Crossing at Souris River

Description:

Install approximately 400m of 6" steel transmission pressure pipeline to replace the existing crossing exposed by a failed riverbank.

Justification:

The existing temporary bypass must be replaced on an emergency basis to provide a continued reliable source of natural gas to 1025 customers as the higher loads of colder temperatures approach. Leaving the temporary bypass in place is not acceptable for several reasons. The bypass currently runs over Bunclody Bridge which is a temporary, emergency route and was never intended as a permanent solution, and because of time constraints and material availability. The installed temporary line has a pressure restriction due to the materials that were used, which limits the system capacity to a gas load corresponding with a temperature of 0°C. This means the pipe will not be rated for pressures corresponding to gas loading during winter temperatures.

In-Service Date:

October 2011.

Revision:

New item.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Increase (Decrease)	1.6	1.6	-	-	-	-	-
Revised Forecast	\$ 1.6	\$ 1.6	\$ -	\$ -	\$ -	\$ -	\$ -

Customer Service & Distribution Domestic

Description:

This program consists of projects whose individual costs are of a relatively small amount. These projects are required to extend, rebuild or upgrade: transmission pipelines, distribution pipelines, regulating stations, and customer service lines.

Justification:

Required to provide ongoing safe and reliable supply of natural gas to customers.

In-Service Date:

Ongoing.

Revision:

Increased domestic budget for the supply of gas meters to comply with Measurement Canada's recently completed new compliance sampling specification, *S-S-06 - Sampling Plans for the Inspection of Isolated Lots of In-service Meters*.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	NA	\$ 21.7	\$ 22.1	\$ 22.5	\$ 23.0	\$ 23.4	\$ 124.5
Increase (Decrease)		3.8	4.0	4.0	4.0	4.0	20.0
Revised Forecast		\$ 25.4	\$ 25.7	\$ 26.2	\$ 26.7	\$ 27.3	\$ 144.7

CUSTOMER CARE & MARKETING:

Advanced Metering Infrastructure

Description:

Purchase and install an automated metering infrastructure (AMI) communication network to remotely read and electronically disseminate gas meter readings and other relevant customer information to appropriate departments and divisions.

Justification:

Satisfies the ongoing need for routine, periodic meter readings in customer billing as well as provides 'on demand' readings to respond to customer inquiries. Other benefits include: increased customer satisfaction due to greater billing accuracy; better detection of theft of service, meter tampering, defective meters and leaks; and greater flexibility in the timing and consolidation of billings.

In-Service Date:

March 2019.

Revision:

Cost flow revision and in-service date deferred three years from March 2016.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	\$ 15.0	\$ 1.0	\$ 5.4	\$ 8.4	\$ -	\$ -	\$ -
Increase (Decrease)	-	(1.0)	(4.4)	(3.0)	8.4	-	-
Revised Forecast	\$ 15.0	\$ -	\$ 1.0	\$ 5.4	\$ 8.4	\$ -	\$ -

Demand Side Management

Description:

Design, implement and deliver incentive based PowerSmart conservation programs to reduce gas consumption and greenhouse gas emissions in Manitoba. When combined with savings realized to-date, total natural gas savings of 149 million cubic meters are expected to be achieved by 2025.

Justification:

The natural gas Demand Side Management plan provides customers with exceptional value through the implementation of cost-effective energy conservation programs that are designed to minimize the total cost of energy services to customers, position the Corporation as a national leader in implementing cost-effective energy conservation and alternative energy programs, protect the environment and promote sustainable energy supply and service.

In-Service Date:

Ongoing.

Revision:

The change in expenditures in 2011/12 is due to revisions to energy saving and expenditures for a number of programs based on current and updated market information. Upon adoption of IFRS in 2012/13, the demand side management programs will no longer be capitalized.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	NA	\$ 12.0	\$ 12.4	\$ 10.4	\$ 10.4	\$ 10.0	\$ 32.4
Increase (Decrease)		0.6	(12.4)	(10.4)	(10.4)	(10.0)	(32.4)
Revised Forecast		\$ 12.6	\$ -	\$ -	\$ -	\$ -	\$ -

Customer Care & Marketing Domestic

Description:

This program covers the additions and replacements of gas meters.

Justification:

As required for the connection of new customers to the system, as well as replacement of existing time expired or faulty meters.

In-Service Date:

Ongoing.

Revision:

Increased domestic budget for the supply of gas meters to comply with Measurement Canada's recently completed new compliance sampling specification, *S-S-06 - Sampling Plans for the Inspection of Isolated Lots of In-service Meters*.

	Total	2012	2013	2014	2015	2016	2017-21
Previously Approved	NA	\$ 2.9	\$ 2.9	\$ 3.0	\$ 3.0	\$ 3.1	\$ 16.5
Increase (Decrease)		2.1	1.9	1.9	2.0	2.0	10.8
Revised Forecast		\$ 5.0	\$ 4.8	\$ 4.9	\$ 5.0	\$ 5.1	\$ 27.2