November 2008

Manitoba Hydro

Capital Expenditure Forecast
(CEF08-1)

Corporate Controller Division
Finance & Administration



2008/09 - 2018/19

Manitoba Hydro

Foreword

The *Capital Expenditure Forecast* (CEF08-1) 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 the net emissions from its own facilities and to contribute towards global emission reductions through the export of renewable electricity. Manitoba Hydro exceeded its past voluntary commitment to reduce its average net greenhouse gas (GHG) emissions from 1991 to 2007 to 6% below 1990 levels. Manitoba Hydro also has a separate contractual commitment under its participation in the Chicago Climate Exchange (CCX) to progressively reduce its generation related emissions until 2010. The Corporation is in full compliance with the CCX target.

Manitoba Hydro has one of the most aggressive Demand Side Management (DSM) programs in North America. The target to be achieved by 2018 is for electrical savings of 807 MW and 2,759 GWh, and natural gas savings of 152 million cubic meters. In total, Manitoba Hydro's DSM programs are expected to result in greenhouse gas emission reductions of nearly 2 million tonnes annually by 2018.

Table of Contents



Section 1

Overview

Capital Expenditure Forecast Summary
Comparison to CEF-07
Capital Expenditure Forecast Summary Table

1.0 Overview

Capital Expenditure Forecast Summary

This Consolidated Capital Expenditure Forecast (CEF08-1) totals $16 414 million for the 11 year period to 2018/19. Expenditures for Major New Generation & Transmission and the New Head Office total $11 591 million, with the balance of $4 823 million comprised of expenditures for infrastructure renewal, system safety and security, new and increasing load requirements, and efficiency improvements.

Comparison to CEF07

As indicated in the table below, the Capital Expenditure Forecast (CEF08) for the ten year period to 2017/18 totals $14 476 million compared to $10 898 million for the same ten year period included in last year's Capital Expenditure Forecast (CEF07).

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	10 Year Total
CEF07	1 056	999	912	812	827	1 259	1 166	1 336	1 395	1 136	10 898
Increase (Decrease)	-	249	215	79	31	(63)	698	927	788	654	3 578
CEF08	1 056	1 248	1 127	891	858	1 196	1 864	2 263	2 183	1 790	14 476

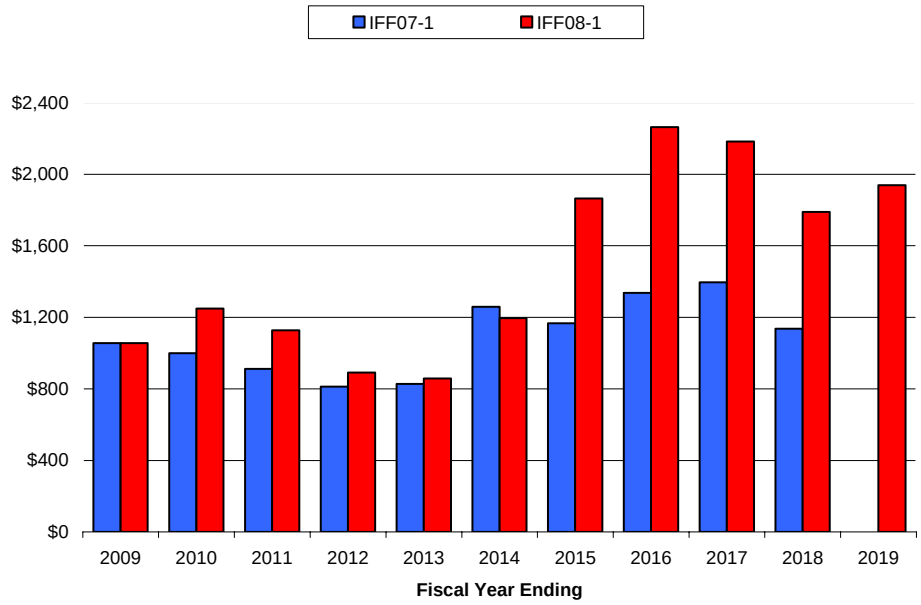
The increase of $3 578 million in capital expenditures over the ten year forecast period is comprised of the following:

	10 year Increase
Keeyask Generating Station	$ 2,701
Dorsey US Border - New 500 kV Transmission Line	201
Riel 230/500 kV Station	160
Dorsey 230 kV Relay Building Upgrade	65
Kettle Transformer Overhaul Program	36
Power Supply Security Installations / Upgrades	26
New Head Office	25
Stanley Station 230-66 kV Transformer Addition	21
Generation Townsite Infrastructure	20
Generation South Transformer Refurbish & Spares	18
Wuskwatim Transmission	17
Slave Falls Generating Station Rehabilitation	15
Conawapa Generating Station	(204)
System Refurbishment and Other Projects	477
	$ 3,578

New energy resources are required to meet forecasted domestic requirements by 2020/21. Some of the key assumptions underlying future spending on new generation and transmission include:

- The in-service date (ISD) of the Wuskwatim Generating Station will be September 2011.
- Pointe du Bois generating station to be rebuilt to a capacity of 120 MW with an in-service date of July 2016.
- Kelsey generating station to be upgraded by 77 MW by 2011/12.
- Bipole 3 is assumed to follow a route west of the Interlake and this route will require 2 000 MW of converters to operate, with an in-service date of October 2017.
- Manitoba Hydro has signed term sheets with Northern States Power (NSP) for 375/500 MW starting in 2015, Wisconsin Public Service (WPS) for 500 MW starting in 2018, and Minnesota Power (MP) for 250 MW starting in 2022 (for firm power).
- Keeyask and Conawapa are necessary to meet domestic load requirements and export sales commitments and have first power in-service dates of December 2018 and May 2022, respectively.

Projected Consolidated Capital Expenditures
millions of dollars



The following table provides a listing of each capital project with a forecast of expenditures for each year to 2018/19. The subsequent section provides high-level descriptions of each capital project with brief justifications and comparisons to the previously approved capital expenditure forecast.

CAPITAL EXPENDITURE FORECAST SUMMARY TABLE (CEF08)

(in millions of dollars)

	Total Project Cost	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	11 Year Total
ELECTRIC													
Major New Generation & Transmission													
Wuskwatim Generation	1,274.6	200.6	326.9	256.4	126.8	20.8	-	-	-	-	-	-	931.5
Wuskwatim Transmission	316.0	117.4	52.5	32.2	15.5	0.9	-	-	-	-	-	-	218.6
Herblet Lake - The Pas 230 kV Transmission	93.2	16.1	39.3	29.0	4.2	-	-	-	-	-	-	-	88.6
Keeyask Generating Station	3,700.4	56.6	25.9	33.1	36.1	64.3	220.3	430.6	687.9	704.1	504.9	444.8	3,208.7
Conawapa Generating Station	4,978.4	58.9	60.5	60.7	57.7	62.3	67.7	261.8	356.3	330.7	609.4	1,044.6	2,970.5
Kelsey Generating Station Improvements & Upgrades	189.6	43.4	45.8	7.4	0.3	-	-	-	-	-	-	-	96.9
Kettle Generating Station Improvements & Upgrades	75.6	0.4	7.0	7.3	6.4	6.0	3.8	3.7	6.1	6.4	4.0	3.8	54.8
Pointe du Bois Rebuild	818.0	13.0	13.8	14.8	15.5	91.5	141.1	310.7	105.0	94.8	4.0	-	804.3
Pointe du Bois & Slave Falls Transmission	85.9	7.9	19.1	12.5	13.2	16.4	13.0	2.8	-	-	-	-	84.9
Planning Study Costs	NA	5.7	5.9	4.7	-	-	-	-	-	-	-	-	16.3
Bipole 3 Western Route	2,247.8	9.2	16.6	21.4	36.7	113.4	266.5	420.2	627.7	557.9	168.6	-	2,238.3
Riel 230/ 500 kV Station	267.6	4.2	30.7	68.8	75.7	43.5	36.4	4.7	-	-	-	-	264.0
Firm Import Upgrades	4.8	0.1	0.4	2.1	2.1	-	-	-	-	-	-	-	4.8
Dorsey - US Border New 500 kV Transmission Line	204.8	-	-	-	0.8	1.8	10.7	11.8	56.7	58.5	61.0	3.4	204.8
Demand Side Management - Electric	NA	42.7	34.6	33.3	31.8	29.4	26.0	26.6	25.4	25.2	24.8	20.3	320.2
		576.3	679.1	583.6	422.9	450.2	785.6	1,472.9	1,865.2	1,777.6	1,376.7	1,516.9	11,507.1
New Head Office													
New Head Office	278.1	84.1	-	-	-	-	-	-	-	-	-	-	84.1
Corporate Relations													
Waterways Management Program	NA	5.2	5.3	5.5	-	-	-	-	-	-	-	-	16.0

CAPITAL EXPENDITURE FORECAST SUMMARY TABLE (CEF08)

(in millions of dollars)

	Total Project Cost	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	11 Year Total
Power Supply													
Converter Transformer Bushing Replacement	5.9	0.1	1.3	1.0	-	-	-	-	-	-	-	-	2.4
Bipole 1 & 2 Electrode Line Monitoring	1.7	0.1	1.5	0.1	-	-	-	-	-	-	-	-	1.7
HVDC Auxiliary Power Supply Upgrades	3.7	0.1	-	-	-	-	-	-	-	-	-	-	0.1
Dorsey Synchronous Condenser Refurbishment	32.3	2.7	4.5	2.8	3.8	2.6	2.7	3.4	-	-	-	-	22.4
Dorsey ASEA Synchronous Condenser Cooler Upgrade	3.5	0.5	-	-	-	-	-	-	-	-	-	-	0.5
HVDC Bipole 1 Roof Replacement	5.9	0.4	0.7	-	-	-	-	-	-	-	-	-	1.0
HVDC System Transformer & Reactor Fire Protection & Prevention	10.4	1.1	1.1	0.6	-	-	-	-	-	-	-	-	2.8
HVDC AC Filter PCB Capacitor Replacement	34.5	5.3	3.0	4.7	-	-	-	-	-	-	-	-	13.0
HVDC Transformer Replacement Program	105.7	0.8	4.5	10.0	(0.2)	0.3	-	-	-	-	-	-	15.3
Dorsey 230 kV Relay Building Upgrade	73.8	0.6	2.8	3.5	1.7	15.8	32.9	12.2	3.6	-	-	-	73.0
HVDC Stations Ground Grid Refurbishment	4.3	0.9	0.4	0.3	0.4	0.5	-	-	-	-	-	-	2.4
HVDC Bipole 2 230 kV HLR Circuit Breaker Replacement	9.4	2.9	1.3	0.8	0.3	-	-	-	-	-	-	-	5.3
HVDC Bipole 1 Pole Differential Protection	3.3	-	3.3	-	-	-	-	-	-	-	-	-	3.3
HVDC Bipole 1 By-Pass Vacuum Switch Removal	20.4	0.2	4.7	5.4	4.4	5.8	-	-	-	-	-	-	20.4
HVDC Bipole 2 Refrigerant Condenser Replacement	11.0	-	-	2.9	7.2	0.9	-	-	-	-	-	-	11.0
HVDC Bipole 1 Smoothing Reactor Replacement	31.8	0.3	3.1	10.5	12.8	5.1	-	-	-	-	-	-	31.8
HVDC - BP1 Converter Station, P1 & P2 Battery Bank Separation	3.2	0.0	0.0	1.0	2.2	-	-	-	-	-	-	-	3.2
HVDC Bipole 1 DCCT Transductor Replacement	11.7	0.8	2.5	1.2	3.5	1.3	1.8	0.7	-	-	-	-	11.7
HVDC BP1 & BP2 DC Converter Transformer Bushing Replacements	8.7	-	0.5	1.0	1.6	5.1	0.5	-	-	-	-	-	8.7
HVDC Bipole 2 Valve Wall Bushing Replacements	19.2	-	3.4	4.6	4.7	4.8	1.8	-	-	-	-	-	19.2
HVDC Bipole 1 CQ Disconnect Replacement	5.2	-	0.0	1.2	1.6	0.9	1.1	0.3	-	-	-	-	5.2
HVDC - Bipole 2 Thyristor Module Cooling Refurbishment	4.7	0.4	1.8	1.8	0.8	-	-	-	-	-	-	-	4.7
HVDC BP2 Smoothing Reactor Replacement	17.1	-	-	-	7.0	6.5	3.0	0.5	0.1	-	-	-	17.1
Great Falls Generating Station Rehabilitation	31.1	0.2	-	-	-	-	-	-	-	-	-	-	0.2
Pine Falls Generating Station Rehabilitation	56.2	2.3	4.6	24.5	5.2	3.8	3.2	5.9	0.7	-	-	-	50.3
Laurie River GS Phase 2 & 3 Rehabilitation	7.7	-	-	1.0	0.8	1.2	-	-	-	-	-	-	3.0
Jenpeg Generating Station Unit Overhauls	128.1	0.1	-	-	-	-	-	-	2.4	2.6	19.1	25.1	49.3
Power Supply Dam Safety Upgrades	34.0	2.1	3.5	1.2	1.2	1.2	1.3	1.3	1.9	-	-	-	13.7
Winnipeg River Control System	10.4	0.7	-	-	-	-	-	-	-	-	-	-	0.7
Winnipeg River Riverbank Protection Program	19.7	1.3	1.1	1.2	1.2	1.2	1.2	1.3	1.3	1.5	-	-	11.3
Power Supply Hydraulic Controls	16.0	5.1	1.8	0.9	2.5	2.4	0.9	1.0	-	-	-	-	14.5
Slave Falls Generating Station Rehabilitation	198.3	10.2	13.7	10.4	8.9	23.6	29.9	29.7	20.6	25.9	20.3	-	193.1
Generating Station Roof Replacements	9.2	3.9	-	-	-	-	-	-	-	-	-	-	3.9
Great Falls Generating Station Unit 4 Overhaul	19.7	1.4	4.1	8.1	5.4	-	-	-	-	-	-	-	19.0
Great Falls 115 kV Indoor Station Safety Improvements	11.6	2.6	0.9	-	-	-	-	-	-	-	-	-	3.5
Generation South Transformer Refurbish & Spares	21.0	0.9	2.9	5.3	4.5	3.1	2.6	1.6	-	-	-	-	20.9
Water Licenses & Renewals	40.8	3.5	5.1	5.6	4.9	4.8	4.6	4.9	4.6	-	-	-	38.0
Generation South PCB Regulation Compliance	4.7	0.0	2.0	1.6	0.4	0.4	0.2	-	-	-	-	-	4.7
Kettle Transformer Overhaul Program	35.6	1.0	3.3	3.8	4.6	4.9	5.7	5.7	5.9	0.8	-	-	35.6
Generation South Breaker Replacements	9.4	1.6	2.5	0.9	2.8	1.6	-	-	-	-	-	-	9.4
Seven Sisters Generating Station Upgrades	9.5	1.3	3.5	2.5	1.2	1.0	-	-	-	-	-	-	9.5
Generation South Excitation Upgrades	18.3	-	-	2.0	3.2	3.9	3.3	3.2	2.7	0.1	-	-	18.3
Brandon Generating Station Unit 5 License Review	18.7	0.3	6.2	7.7	-	-	-	-	-	-	-	-	14.3
Selkirk Generating Station Enhancements	14.2	5.1	4.9	2.8	-	-	-	-	-	-	-	-	12.7
Fire Protection Projects - HVDC	5.2	2.0	2.5	-	-	-	-	-	-	-	-	-	4.5
Halon Replacement Project	42.5	11.0	19.2	11.0	0.4	-	-	-	-	-	-	-	41.6
Power Supply Fall Protection Program	13.5	2.6	-	-	-	-	-	-	-	-	-	-	2.6
Oil Containment - Power Supply	19.1	7.5	2.1	0.5	0.1	0.1	0.3	0.1	0.2	0.0	-	-	11.0
Generation Townsite Infrastructure	52.1	5.7	9.6	5.3	4.5	-	-	-	-	-	-	-	25.2
Site Remediation of Contaminated Corporate Facilities	30.9	1.4	0.7	0.5	0.4	0.3	-	-	-	-	-	-	3.4
High Voltage Test Facility	26.9	3.4	15.9	5.7	-	-	-	-	-	-	-	-	24.9
Power Supply Security Installations / Upgrades	36.3	6.1	21.4	7.4	-	-	-	-	-	-	-	-	35.0
Power Supply Sewer & Domestic Water System Install and Upgrade	15.1	6.2	4.1	1.6	1.3	-	-	-	-	-	-	-	13.2
Domestic Item - Power Supply	NA	20.4	19.4	19.8	20.2	20.6	21.0	21.4	21.8	22.3	22.7	23.2	232.6
		126.9	195.3	184.7	125.3	123.7	117.8	93.2	65.8	53.2	62.1	48.3	1,196.3

CAPITAL EXPENDITURE FORECAST SUMMARY TABLE (CEF08)

(in millions of dollars)

	Total Project Cost	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	11 Year Total
Transmission & Distribution													
Winnipeg - Brandon Transmission Improvements	40.0	2.3	1.4	1.6	3.6	3.7	5.2	22.0	-	-	-	-	39.8
Transcona New 230 - 66 kV Station	31.0	0.7	8.6	11.9	9.4	-	-	-	-	-	-	-	30.7
Neepawa 230 - 66 kV Station	30.0	0.2	5.8	11.3	12.8	-	-	-	-	-	-	-	30.0
Pine Falls - Bloodvein 115 kV Transmission Line	34.1	-	-	0.3	0.9	4.5	21.2	7.1	-	-	-	-	34.1
Transmission Line Re-Rating	24.1	4.4	0.4	0.4	-	-	-	-	-	-	-	-	5.2
Dorsey 230 kV Bus Enhancement	24.0	0.7	-	-	-	-	-	-	-	-	-	-	0.7
St Vital-Steinbach 230 kV Transmission	32.2	-	-	-	-	-	-	-	0.9	1.0	2.6	5.1	9.5
Rosser Station 230 - 115 kV Bank 3 Replacement	5.8	2.9	2.4	-	-	-	-	-	-	-	-	-	5.3
Rosser - Inkster 115 kV Transmission	5.1	2.8	2.2	-	-	-	-	-	-	-	-	-	5.0
Transcona Station 66 kV Breaker Replacement	6.0	0.1	1.0	2.9	1.7	0.3	0.0	-	-	-	-	-	6.0
Transcona & Ridgeway Stations 66 kV Bus Upgrades	2.8	1.0	1.5	0.3	-	-	-	-	-	-	-	-	2.8
Dorsey 500 kV R502 Breaker Replacement	2.6	2.3	0.4	-	-	-	-	-	-	-	-	-	2.6
Birtle South-Rossburn 66 kV Line	4.9	-	-	-	-	-	0.1	0.3	4.5	-	-	-	4.9
Perimeter South Station Distribution Supply Centre Installation	2.4	0.1	0.3	2.0	-	-	-	-	-	-	-	-	2.4
Winnipeg Central District 66 kV Breaker Replacements	6.1	0.4	-	-	-	-	-	-	-	-	-	-	0.4
Stanley Station 230-66 kV Transformer Addition	21.1	-	-	-	-	1.9	8.4	7.9	2.9	-	-	-	21.1
Stanley Station 230-66 kV Hot Standby Installation	6.2	1.5	3.8	0.8	0.1	-	-	-	-	-	-	-	6.2
Defective RINJ Cable Replacement	8.7	1.1	1.1	1.0	-	-	-	-	-	-	-	-	3.1
Brereton Lake Station Area	9.0	1.0	0.2	-	-	-	-	-	-	-	-	-	1.2
Stony Mountain New 115 - 12 kV Station	5.0	1.2	-	-	-	-	-	-	-	-	-	-	1.2
Mobile Transformer	3.5	0.0	-	-	-	-	-	-	-	-	-	-	0.0
Rover Substation Replace 4 kV Switchgear	12.7	0.2	5.9	1.1	0.4	-	-	-	-	-	-	-	7.5
Martin New Outdoor Station	28.2	0.1	12.6	9.0	5.4	-	-	-	-	-	-	-	27.1
Frobisher Station Upgrade	14.4	7.6	2.9	0.0	-	-	-	-	-	-	-	-	10.5
Burrows New 66 kV/ 12 kV Station	28.6	4.6	10.7	10.2	2.4	-	-	-	-	-	-	-	27.9
Winnipeg Central District Oil Switch Project	7.1	2.8	0.5	-	-	-	-	-	-	-	-	-	3.3
William New 66 kV/ 12 kV Station	10.3	0.0	2.8	3.9	3.3	-	-	-	-	-	-	-	10.1
Waverley West Sub Division Supply - Stage 1	6.5	3.2	1.4	-	-	-	-	-	-	-	-	-	4.6
St. James 24 kV System Refurbishment	65.9	0.7	19.1	11.1	22.5	12.5	-	-	-	-	-	-	65.9
Transcona Area Distribution Conversion	4.4	0.7	-	-	-	-	-	-	-	-	-	-	0.7
Shoal Lake New 33 - 12.47 kV DSC	3.6	0.2	3.2	-	-	-	-	-	-	-	-	-	3.4
York Station	4.0	0.2	1.1	2.7	-	-	-	-	-	-	-	-	4.0
Brandon Crocus Plains 115 - 25 kV Bank Addition	6.3	0.1	0.8	3.1	1.8	0.4	-	-	-	-	-	-	6.3
Winkler Market Feeder M25-13 Conversion	2.9	2.9	-	-	-	-	-	-	-	-	-	-	2.9
Neepawa North Feeder NN12-2 & Line 57 Rebuild	1.9	0.0	1.9	-	-	-	-	-	-	-	-	-	1.9
Interlake Digital Microwave Replacement	19.7	7.4	3.9	-	-	-	-	-	-	-	-	-	11.3
Communication System - Southern MB (Great Plains)	21.9	4.0	1.6	-	-	-	-	-	-	-	-	-	5.6
Communications Upgrade Winnipeg Area	7.4	1.1	0.8	-	-	-	-	-	-	-	-	-	1.9
Pilot Wire Replacement	9.6	1.5	0.4	1.1	0.9	-	-	-	-	-	-	-	3.9
Transmission Line Protection & Teleprotection Replacement	21.1	1.9	2.0	5.7	6.4	2.4	1.2	0.3	-	-	-	-	19.8
Winnipeg Central Protection Wireline Replacement	9.3	2.5	2.4	1.2	-	-	-	-	-	-	-	-	6.1
Mobile Radio System Modernization	30.7	0.1	0.5	13.9	16.2	-	-	-	-	-	-	-	30.7
Gas SCADA Replacement	4.6	0.4	1.1	3.1	-	-	-	-	-	-	-	-	4.6
Cyber Security Systems	10.1	4.0	2.8	0.6	-	-	-	-	-	-	-	-	7.4
Site Remediation	13.3	1.0	3.1	2.0	0.3	-	-	-	-	-	-	-	6.5
Oil Containment	7.4	1.8	1.3	-	-	-	-	-	-	-	-	-	3.1
Station Battery Bank Capacity & System Reliability Increase	46.5	4.9	6.9	7.0	6.7	6.7	3.9	3.6	-	-	-	-	39.6
Red River Floodway Expansion Project	1.8	0.5	-	-	-	-	-	-	-	-	-	-	0.5
Fleet	NA	13.0	13.3	13.5	13.8	14.1	14.3	14.6	14.9	15.2	15.5	15.8	158.1
Domestic Item - Transmission & Distribution - Electric	NA	88.9	90.7	92.6	94.4	96.3	98.2	100.2	102.2	104.2	106.3	108.4	1,082.5
		178.9	222.8	214.2	203.0	142.7	152.6	155.9	125.3	120.4	124.5	129.4	1,769.8

CAPITAL EXPENDITURE FORECAST SUMMARY TABLE (CEF08)

(in millions of dollars)

	Total Project Cost	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	11 Year Total
Customer Service & Marketing													
Automatic Meter Reading - Electric	30.9	-	3.9	4.0	4.0	4.1	4.3	4.3	4.5	-	-	-	29.1
Distribution PCB Testing & Transformer Replacement	19.6	0.4	-	-	-	-	-	-	-	-	-	-	0.4
Winnipeg Distribution Infrastructure Requirements	14.9	2.0	1.8	-	-	-	-	-	-	-	-	-	3.8
Winnipeg Central District Underground Network Asbestos Removal	3.0	0.8	0.8	-	-	-	-	-	-	-	-	-	1.5
Domestic Item - Customer Service & Marketing - Electric	NA	60.2	61.4	62.6	63.9	65.2	66.5	67.8	69.1	70.5	71.9	73.4	732.5
		63.3	67.9	66.6	67.9	69.2	70.7	72.1	73.6	70.5	71.9	73.4	767.3
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
Enterprise GIS Project	21.9	0.4	-	-	-	-	-	-	-	-	-	-	0.4
Workforce Management (Phase 1 to 4)	11.3	6.7	-	-	-	-	-	-	-	-	-	-	6.7
WorkSmart	5.4	0.9	-	-	-	-	-	-	-	-	-	-	0.9
Domestic Item - Finance & Administration	NA	22.3	22.7	23.2	23.7	24.1	24.6	25.1	25.6	26.1	26.6	27.2	271.2
		38.3	30.7	31.2	31.7	32.1	32.6	33.1	33.6	34.1	34.6	35.2	367.2
Capital Increase Provision		-	-	-	-	-	-	-	63.1	90.4	82.8	97.3	333.6
ELECTRIC CAPITAL SUBTOTAL		**1,073.2**	**1,201.2**	**1,085.8**	**850.7**	**817.9**	**1,159.4**	**1,827.2**	**2,226.6**	**2,146.2**	**1,752.7**	**1,900.4**	**16,041.4**
GAS													
Transmission & Distribution													
Southloop Capacity Upgrade - Winkler	4.3	3.6	-	-	-	-	-	-	-	-	-	-	3.6
Gas Riser Rehabilitation Program	16.5	2.0	-	-	-	-	-	-	-	-	-	-	2.0
Natural Gas Pipeline Replacement - Red River at North Perimeter	1.7	1.6	-	-	-	-	-	-	-	-	-	-	1.6
Brandon Unodourised Natural Gas Pipeline Improvement	5.5	0.3	5.2	-	-	-	-	-	-	-	-	-	5.5
Domestic Item - Transmission & Distribution - Gas	NA	15.2	17.2	17.5	17.9	18.3	18.6	19.0	19.4	19.8	20.2	20.6	203.5
		22.8	22.4	17.5	17.9	18.3	18.6	19.0	19.4	19.8	20.2	20.6	216.3
Customer Service & Marketing													
Automatic Meter Reading - Gas	15.0	-	3.7	3.7	3.5	3.8	-	-	-	-	-	-	14.7
Demand Side Management - Gas	NA	13.5	14.2	13.3	12.4	11.5	10.7	10.1	9.5	9.1	7.0	4.5	115.8
Domestic Item - Customer Service & Marketing - Gas	NA	6.7	6.9	6.7	6.8	7.0	7.1	7.3	7.4	7.6	7.7	7.9	79.0
		20.2	24.7	23.7	22.8	22.3	17.8	17.4	16.9	16.7	14.7	12.4	209.5
Capital Increase Provision		-	-	-	-	-	-	-	-	-	2.3	4.9	7.1
GAS CAPITAL SUBTOTAL		**42.9**	**47.2**	**41.2**	**40.7**	**40.5**	**36.5**	**36.4**	**36.3**	**36.4**	**37.1**	**37.8**	**433.0**
CONSOLIDATED CAPITAL		**1,116.1**	**1,248.4**	**1,127.0**	**891.4**	**858.4**	**1,195.8**	**1,863.6**	**2,262.9**	**2,182.6**	**1,789.8**	**1,938.2**	**16,474.3**
CONSOLIDATED CAPITAL COST FLOW ADJUSTMENT		(60.1)											(60.1)
		1,056.0	**1,248.4**	**1,127.0**	**891.4**	**858.4**	**1,195.8**	**1,863.6**	**2,262.9**	**2,182.6**	**1,789.8**	**1,938.2**	**16,414.2**



Section 2

Project Summaries

MAJOR NEW GENERATION & TRANSMISSION:

Wuskwatim Generation

Description:
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 export power purposes and ultimately domestic load requirements.

In-Service Date:
September 2011.

Revision:
Cost flow revisions and first power in-service date deferred one month to September 2011.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 1,274.6	$ 287.4	$ 293.9	$ 214.5	$ 128.1	$ 9.4	$ -
Increase or (Decrease)	-	(86.8)	33.0	41.9	(1.3)	11.4	-
Revised	$ 1,274.6	$ 200.6	$ 326.9	$ 256.4	$ 126.8	$ 20.8	$ -

Wuskwatim Transmission

Description:
Provides the required transmission facilities necessary to integrate the Wuskwatim Generating Station into the Manitoba Hydro 230 kV transmission network.

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:
September 2011.

Revision:
Reduction in interest expense reflects cost flow revisions and lower interest rates. First power in-service date deferred one month to September 2011.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 319.8	$ 107.9	$ 47.1	$ 31.3	$ 14.5	$ -	$ -
Increase or (Decrease)	(3.8)	9.5	5.4	0.9	1.0	0.9	-
Revised	$ 316.0	$ 117.4	$ 52.5	$ 32.2	$ 15.5	$ 0.9	$ -

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 Herblet Lake - 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:
September 2011.

Revision:
Reduction in interest expense reflects cost flow revisions and a one month in-service date deferral.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 95.2	$ 10.2	$ 39.2	$ 30.3	$ 11.4	$ -	$ -
Increase or (Decrease)	(2.0)	5.9	0.1	(1.3)	(7.2)	-	-
Revised	$ 93.2	$ 16.1	$ 39.3	$ 29.0	$ 4.2	$ -	$ -

Keeyask Generating Station

Description:
Design and construct the Keeyask Generating Station with seven generators and installed capacity of approximately 630 MW on the Nelson River downstream of Thompson. 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, and detailed pre-engineering requirements.

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

In-Service Date:
December 2018.

Revision:
Estimate updated to include the design and construction costs associated with the Keeyask Generating Station.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 325.3	$ 63.4	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	3,375.1	(6.8)	25.9	33.1	36.1	64.3	2,992.6
Revised	$ 3,700.4	$ 56.6	$ 25.9	$ 33.1	$ 36.1	$ 64.3	$ 2,992.6

Conawapa Generating Station

Description:
Design and construct the Conawapa Generating Station with ten generators and installed capacity of approximately 1,300 MW on the Nelson River downstream from Thompson. 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, 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 export power purposes and ultimately domestic load requirements.

In-Service Date:

May 2022.

Revision:
Cost flow revisions and first power in-service date advanced 11 months to May 2022.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 4,978.4	$ 57.8	$ 54.7	$ 72.6	$ 42.0	$ 74.4	$ 2,556.7
Increase or (Decrease)	-	1.1	5.8	(11.9)	15.7	(12.1)	113.8
Revised	$ 4,978.4	$ 58.9	$ 60.5	$ 60.7	$ 57.7	$ 62.3	$ 2,670.5

Kelsey Generating Station Improvements & Upgrades

Description:
Overhaul and uprate all Kelsey Generating Station units (1-7) including model testing and replacement of generator windings, runners, intake gates, bottom rings, discharge rings, transformers, and exciters, and upgrade the overhead crane.

Justification:
Rerunnering 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. The unit 2 gate inspection in 1997 established that the aforementioned work is required to ensure that the intake gates function as designed. Unit 5 stator winding has significant insulation damage. Overhauling the units will improve the unit output by up to 11 MW per unit.

In-Service Date:
March 2012.

Revision:
Estimate increase for upgrades to existing transmission facilities that are necessary to integrate the additional Kelsey generation into the Manitoba Hydro system network; as well as a four month in-service date deferral.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 183.9	$ 30.6	$ 28.4	$ 27.0	$ 0.9	$ -	$ -
Increase or (Decrease)	5.7	12.8	17.4	(19.6)	(0.6)	-	-
Revised	$ 189.6	$ 43.4	$ 45.8	$ 7.4	$ 0.3	$ -	$ -

Kettle Generating Station Improvements & Upgrades

Description:
Re-wedge generating unit 1, 2, 6 & 9 coils. Replace stator core and winding on generators in units 1-4 and stator rewind in units 5 - 12.

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. Replacing stators as well is under investigation to include a single turn roebel bar winding with Class 'f' insulation.

In-Service Date:
October 2022.

Revision:
Estimate increase reflects current market costs associated with replacing the core and winding for Generator Unit 4.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 61.0	$ -	$ -	$ -	$ 6.8	$ 6.4	$ 30.2
Increase or (Decrease)	14.6	0.4	7.0	7.3	(0.4)	(0.4)	(2.4)
Revised	$ 75.6	$ 0.4	$ 7.0	$ 7.3	$ 6.4	$ 6.0	$ 27.8

Pointe du Bois Rebuild

Description:
Construct a new four unit powerhouse, spillway, and earthfill dams to replace existing facilities. Includes engineering and environmental studies, community consultation, obtaining regulatory approval, construction, commissioning of the new facilities, and de-commissioning the existing facilities.

Justification:
Pointe du Bois has a history of age related maintenance problems (first power 1911) and unit outages due to misalignment of turbine generator units (believed to be caused by concrete growth). The *Pointe du Bois Long-Term Planning Options Report #PP&D-05/01* recommends the rebuild option. Rebuilding satisfies economic criteria, is the preferred technical alternative, and provides favorable net environmental and socio-economic benefits.

In-Service Date:
October 2017.

Revision:
Cost flow revisions, along with a 19 month in-service date deferral.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 818.0	$ 13.4	$ 14.3	$ 27.6	$ 93.5	$ 142.9	$ 510.9
Increase or (Decrease)	-	(0.4)	(0.5)	(12.8)	(78.0)	(51.4)	144.7
Revised	$ 818.0	$ 13.0	$ 13.8	$ 14.8	$ 15.5	$ 91.5	$ 655.6

Pointe du Bois & Slave Falls Transmission

Description:
Install a single circuit 115 kV transmission line with 795 ACSR conductor from Rover to the intersection of transmission lines (T/L) GT1/ ST2 & T/L right of way near the floodway (17 km), and from Pointe du Bois (Pointe) to GT1/ ST2 T/L south of Lac du Bonnet (43 km) on salvaged corridor. Salvage 2 double circuit 66 kV tower lines between Pointe & Rover Station (124 km). Salvage Scotland Station and rebuild, installing new 66 & 115 kV structures, two 115-66 kV 75/100/125 MVA transformers, three 66 kV 40 MVA grounding transformers, seven 115 kV & eight 66 kV breakers, and a masonry wall. Salvage power line terminations & four 66 kV breakers at Rover Station and rebuild, installing one 115-66 kV 75/100/125 MVA transformer, one 66 kV 40 MVA grounding transformer, one 115 kV and one 66 kV breaker. Salvage ten 66 kV breakers at Pointe Switchyard Station and rebuild, installing eight 115 kV breakers and rebuilding bus to 115 kV insulation. Install a second communications link from Pointe and Slave to the System Control Center.

Justification:
To address aging infrastructure concerns with the existing 66 kV P Lines, provide adequate outlet Transmission for future Pointe du Bois generating station expansion, and to integrate the Winnipeg Central System into the Manitoba Hydro System.

In-Service Date:
May 2014.

Revision:
Estimate increase reflects change in scope involving the creation of a YH33 & HS5 Harrow Bypass to replace the previous plan of upgrading the 115 kV Harrow Ring Bus and reconductoring Line HS5. In-service date deferred two years to May 2014.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 82.5	$ 9.9	$ 20.8	$ 16.4	$ 26.7	$ 6.1	$ -
Increase or (Decrease)	3.4	(2.0)	(1.7)	(3.9)	(13.5)	10.3	15.8
Revised	$ 85.9	$ 7.9	$ 19.1	$ 12.5	$ 13.2	$ 16.4	$ 15.8

Planning Study Costs

Description:
Carry out assessments, conceptual designs, and planning studies of potential supply options and associated transmission. Areas of study include establishment of design parameters, structure layouts, support facilities, hydraulic model testing, exploration, data collection, environmental assessments and public input, schedules, and cost estimates.

Justification:
In order to plan the development of the Province's resource potential and related projects, office studies, environmental assessments, and field exploration have to be carried out. The results and technical designs are required to support the planning process.

In-Service Date:
Ongoing.

Revision:
Ongoing.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	NA	$ 1.6	$ 1.7	$ 1.5	$ 1.9	$ 0.7	$ 6.4
Increase or (Decrease)		4.1	4.2	3.2	(1.9)	(0.7)	(6.4)
Revised		$ 5.7	$ 5.9	$ 4.7	$ -	$ -	$ -

Bipole 3 Western Route

Description:
Applying a western route transmission line concept (west of Lakes Winnipegosis & Manitoba), conduct environmental impact assessment, select route, acquire property for right of way, and obtain licensing for Riel Station, a +/- 500 kV DC transmission line from proposed line paralleling site near Radisson and proposed Riel Station, and a 230 kV AC line from Riel Station to Dorsey Station (normally operated at +/- 500 kV DC). Design and construct an HVDC transmission line from Riel Converter Station (CS) to Conawapa CS, a converter station at Conawapa (2,000 MW), six AC transmission lines from Conawapa CS to Henday CS (approximately 30 km) and a converter station at Riel (2,000 MW), including 3 synchronous compensators.

Justification:
This transmission project provides increased reliability to the Manitoba Hydro system. In normal steady state operation, it will also provide an increase in southern power at full load, due to decreased line losses (approximately 78 MW).

In-Service Date:
October 2017.

Revision:
Cost flow revisions only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 2,247.8	$ 2.9	$ 9.3	$ 13.0	$ 25.1	$ 172.5	$ 2,015.6
Increase or (Decrease)	-	6.3	7.3	8.4	11.6	(59.1)	25.3
Revised	$ 2,247.8	$ 9.2	$ 16.6	$ 21.4	$ 36.7	$ 113.4	$ 2,040.9

Riel 230 / 500 kV Station

Description:
Sectionalize Dorsey to the United States 500 kV transmission line D602F at Riel (on the southeast side of Winnipeg), and establish a station including a 230 and 500 kV ring bus, the installation of a 230/ 500 kV transformer bank, and line reactors salvaged from Dorsey 500 kV Station.

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:
Estimate increase reflects project scope change to include increasing the Riel site area by a factor of 1.3, adding converter facilities, and reconfiguring the yard to accommodate a new transfer bus scheme. In addition, current market prices have increased the cost for both labour and materials. In-service date deferred two months to May 2014.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 105.4	$ 1.8	$ 5.3	$ 16.9	$ 29.2	$ 28.3	$ 22.0
Increase or (Decrease)	162.2	2.4	25.4	51.9	46.5	15.2	19.1
Revised	$ 267.6	$ 4.2	$ 30.7	$ 68.8	$ 75.7	$ 43.5	$ 41.1

Firm Import Upgrades

Description:
Reconductor and resag transmission lines R23R, WT34, HS5 and SM26, and replace risers and current transformers for stations at Rosser, Ridgeway, Great Falls, Transcona, Mercy St., and Parkdale.

Justification:
This project will improve Manitoba Hydro's firm import capability during periods when we are expected to be energy deficient.

In-Service Date:
March 2012.

Revision:
New item.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	4.8	0.1	0.4	2.1	2.1	-	-
Revised	$ 4.8	$ 0.1	$ 0.4	$ 2.1	$ 2.1	$ -	$ -

Dorsey - US Border New 500 kV Transmission Line

Description:
Design and construct a 500 kV transmission interconnection line to the U.S. border.

Justification:
Manitoba Hydro has received transmission service requests for more than 750 MW of new import and export service between the U.S. and Manitoba. Term sheets have been signed for a potential 500 MW power sale to Wisconsin and a 250 MW power sale to Minnesota. These additional power sales require the construction of a new high voltage tieline between Manitoba and the U.S.

In-Service Date:
May 2018.

Revision:
New item.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	204.8	-	-	-	0.8	1.8	202.1
Revised	$ 204.8	$ -	$ -	$ -	$ 0.8	$ 1.8	$ 202.1

Demand Side Management - Electric

Description:
Manitoba Hydro's Demand Side Management (PowerSmart) activities reflect the Corporation's commitment to be proactive in protecting the environment and to be a leading utility in promoting sustainable energy supply and service. When combined with savings realized to date, total electrical savings of 807 MW and 2,759 GWh are expected to be achieved through Manitoba Hydro's Power Smart initiative by 2017/18.

Justification:
The electricity Demand Side Management plan is cost effective as a resource option and is included in Manitoba Hydro's *Power Resource Plan*.

In-Service Date:
Ongoing.

Revision:
Refine existing programs, add new programs and eliminate a number of programs to target savings of 2,759 GWh by 2017/18. New programs added include: Water & Energy Saver Package, Commercial Kitchens, Commercial Clothes Washers, Network Energy Manager and Power Smart Shops.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	NA	$ 43.1	$ 34.2	$ 32.4	$ 32.2	$ 29.2	$ 126.8
Increase or (Decrease)		(0.4)	0.4	0.9	(0.4)	0.2	21.6
Revised		$ 42.7	$ 34.6	$ 33.3	$ 31.8	$ 29.4	$ 148.4

NEW HEAD OFFICE:

Description:
Construction of a 695,742 square foot 22 storey Head Office in downtown Winnipeg.

Justification:
A new Head Office location is required to consolidate approximately 2,000 staff including management and administrative functions of Manitoba Hydro in a modern, centralized location.

In-Service Date:
May 2008.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 278.1	$ 58.7	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	25.4	-	-	-	-	-
Revised	$ 278.1	$ 84.1	$ -	$ -	$ -	$ -	$ -

WATERWAYS MANAGEMENT PROGRAM:

Description:
Waterways management at Grand Rapids and Lake Winnipeg Regulation / Churchill River Diversion.

Justification:
The Waterways Management Program (WMP) includes activities related to boat patrols, debris clearing, and supplementary works and is required to ensure ongoing safety and environmental management of waterways.

In-Service Date:
Ongoing.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	NA	$ 4.8	$ 4.9	$ 4.2	$ -	$ -	$ -
Increase or (Decrease)		0.4	0.4	1.3	-	-	-
Revised		$ 5.2	$ 5.3	$ 5.5	$ -	$ -	$ -

POWER SUPPLY:

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 17 years. Replacement cost is justified when compared to transformer damage due to an in-service failure.

In-Service Date:
October 2010.

Revision:
Cost flow revision, and defer in-service date one year to October 2010.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 5.9	$ 1.3	$ 1.1	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	(1.2)	0.2	1.0	-	-	-
Revised	$ 5.9	$ 0.1	$ 1.3	$ 1.0	$ -	$ -	$ -

Bipole 1 & 2 Electrode Line Monitoring

Description:
Install a Siemens pulse-echo electrode line fault detection system on Dorsey Bipole 1 and 2, Radisson Bipole 1, and Henday Bipole 2 Electrode lines.

Justification:
There is a need for detection of open circuit, faulted, or partially down electrode line conductors based on public safety concerns, possible damage to equipment, and the security of Bipole 1 and 2.

In-Service Date:
September 2010.

Revision:
Cost flow revision, and defer in-service date one year to September 2010.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 1.7	$ 1.5	$ 0.1	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	(1.4)	1.4	0.1	-	-	-
Revised	$ 1.7	$ 0.1	$ 1.5	$ 0.1	$ -	$ -	$ -

HVDC Auxiliary Power Supply Upgrades

Description:
The review and upgrading of twelve battery banks and ten power centres at Dorsey, Radisson, and Henday Converter stations. Replacement of +/- 25 VDC & 60 VDC battery chargers and the 129 VDC/ 60 VDC inverters in Bipole 2 at Dorsey and Henday.

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:
March 2009.

Revision:
Cost flow revision, and defer in-service date one year to March 2009.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 3.7	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	0.1	-	-	-	-	-
Revised	$ 3.7	$ 0.1	$ -	$ -	$ -	$ -	$ -

Dorsey Synchronous Condenser Refurbishment

Description:
Major inspection, re-wedging and overhaul of synchronous condensers SC7Y, SC8Y, SC9Y, SC21Y, 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 2015.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 32.3	$ 2.0	$ 4.0	$ 3.0	$ 4.0	$ 2.7	$ 5.8
Increase or (Decrease)	-	0.7	0.5	(0.2)	(0.2)	(0.1)	0.3
Revised	$ 32.3	$ 2.7	$ 4.5	$ 2.8	$ 3.8	$ 2.6	$ 6.1

Dorsey ASEA Synchronous Condenser Cooler Upgrade

Description:
Replace 36 glycol coolers and 72 fans on ASEA synchronous condensers SC21, SC22 and SC23 with new coolers capable of 10% greater glycol cooling capability. Upgrade six glycol pumps to match the flow requirements of the new coolers and upgrade the motor electrical equipment to meet the power requirements of the new fans.

Justification:
This project will safeguard the reliability of the Pole 2 synchronous condenser system, which is critical for the proper operation of HVDC system conversion equipment, voltage regulation of the southern AC system, and to provide reactive power for export sales to the United States. The existing glycol coolers are 30 years old and glycol leaks have required the coolers to be removed from service for repair. Replacement of the coolers supports protection of the environment by reducing the probability of reportable glycol leaks from developing.

In-Service Date:
June 2008.

Revision:
In-service date advanced four months to June 2008.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 3.5	$ 0.5	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	-	-	-	-	-	-
Revised	$ 3.5	$ 0.5	$ -	$ -	$ -	$ -	$ -

HVDC Bipole 1 Roof Replacement

Description:
Remove existing roofs over Bipole 1, valve groups 11, 12, 13, 21, 22, and 23 at Dorsey and Radisson Stations. Design, supply, install and test replacement roofs, simultaneously, and during pre-planned outages. The new roofs are to be two-ply modified bitumen membrane with R20 insulating values, and meeting FM Global fire spread and wind uplift requirements.

Justification:
The existing asphalt roofs were installed in 1970 (38 years old), and with maintenance have exceeded their life expectancy of 15 years. Damage to equipment due to water leaks, fire spread within a roof system, or high wind uplift and/or possible lost export sales could be very costly. Each of the six valve halls contains equipment valued at $7.0 M.

In-Service Date:
October 2009.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 5.9	$ 0.3	$ 0.7	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	0.1	-	-	-	-	-
Revised	$ 5.9	$ 0.4	$ 0.7	$ -	$ -	$ -	$ -

HVDC System Transformer & Reactor Fire Protection & Prevention

Description:
The supply and installation of fire protection upgrades on 33 converter transformers and 8 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 2010.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 10.4	$ 0.9	$ 1.0	$ 0.8	$ -	$ -	$ -
Increase or (Decrease)	-	0.2	0.1	(0.2)	-	-	-
Revised	$ 10.4	$ 1.1	$ 1.1	$ 0.6	$ -	$ -	$ -

HVDC AC Filter PCB Capacitor Replacement

Description:
The replacement of all Bipole 1 & 2 AC PCB filled high power capacitors at the Dorsey, Radisson, and Henday Converter Stations, with non-PCB replacement capacitors.

Justification:
Numerous PCB filled capacitor failures at HVDC Converter Stations have resulted in requests for outages via the System Control Center to allow for repairs. The catastrophic failure of a capacitor in an AC filter bank of B2 would result in a Pole outage. Manitoba Hydro is committed to being PCB free as outlined in corporate policy statement CP486B. The capacitors will be 25 years old and are approaching the end of their usable life.

In-Service Date:
May 2009.

Revision:
Estimate decrease reflects lower costs for the purchase and installation of capacitor banks, and a reduction in the scope to exclude the cost of: developing a Corporate Polychlorinated Biphenyls (PCB) reporting system; detailed labeling of the equipment that is being destroyed; and a reduction in the level of activities required to cleanup soil that is contaminated with oil, due to a change in the Federal Government requirements.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 44.3	$ 5.9	$ 5.3	$ 9.9	$ -	$ -	$ -
Increase or (Decrease)	(9.8)	(0.6)	(2.3)	(5.2)	-	-	-
Revised	$ 34.5	$ 5.3	$ 3.0	$ 4.7	$ -	$ -	$ -

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HVDC Transformer Replacement Program

Description:
Replace Dorsey transformers T21B, T41D, T22A, and T22C; Henday T41S, T42S, and T32S; and Radisson T12B, T12C, T22A, and T11A converter transformers with spare converter transformers. Maintain an inventory of eight converter spare transformers, Fortify the roadways/ access corridor rail line at Dorsey, and upgrade the rail spur at Radisson to facilitate transformer moves.

Justification:
The replacement of these transformers will improve reliability, reduce potential outage costs, reduce risk from catastrophic failure, and allow assessment for possible further mitigative measures. Roadway/ rail upgrades will reduce the safety risk and the risk of an extended outage due to losing a transformer, having an oil spill, or from damage to other equipment.

In-Service Date:
March 2012.

Revision:
Estimate increase reflects the cost to replace a spare 500 kV converter transformer, which was transferred to Dorsey's T31S, and a 17 month in-service date deferral to March 2012.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 97.4	$ 2.5	$ 4.3	$ 1.7	$ -	$ -	$ -
Increase or (Decrease)	8.3	(1.7)	0.2	8.3	(0.2)	0.3	-
Revised	$ 105.7	$ 0.8	$ 4.5	$ 10.0	$ (0.2)	$ 0.3	$ -

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 2015.

Revision:
Estimate increase reflects the cost to separate the existing 230 kV switchyard and relay building into three separate zones, with each served by its own zone relay building. These buildings will withstand the worst credible wind event and be equipped with reliable fire detection and fire fighting systems. In-service date deferred 22 months to August 2015.

	Total Project	Prior	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 9.1	$ 1.2	$ 2.8	$ 3.6	$ 1.5	$ -	$ -	$ -
Increase or (Decrease)	64.7	(0.4)	(2.2)	(0.8)	2.0	1.7	15.8	48.6
Revised	$ 73.8	$ 0.8	$ 0.6	$ 2.8	$ 3.5	$ 1.7	$ 15.8	$ 48.6

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:
March 2013.

Revision:
Cost flow revision and in-service date deferred 29 months to March 2013 to accommodate outage scheduling and resource constraints.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 4.3	$ 1.5	$ 0.3	$ 0.4	$ -	$ -	$ -
Increase or (Decrease)	-	(0.6)	0.1	(0.1)	0.4	0.5	-
Revised	$ 4.3	$ 0.9	$ 0.4	$ 0.3	$ 0.4	$ 0.5	$ -

HVDC Bipole 2 230 kV HLR Circuit Breaker Replacement

Description:
Replace existing BLG352C breaker operating mechanisms on 16 – 230 kV circuit breakers at Dorsey and Henday Stations with new BLG1002A operating mechanisms.

Justification:
BLG1002A breaker operating mechanisms are designed to handle the frequent switching experienced by these 16 breakers, reduce repair and maintenance frequency, and reduce the risk of failure. 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. System reliability will be improved.

In-Service Date:
December 2013.

Revision:
Cost flow revision and in-service date deferred nine months to December 2013.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 9.4	$ 1.7	$ 1.3	$ 1.0	$ 0.9	$ 0.3	$ -
Increase or (Decrease)	-	1.2	(0.0)	(0.2)	(0.6)	(0.3)	-
Revised	$ 9.4	$ 2.9	$ 1.3	$ 0.8	$ 0.3	$ -	$ -

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 to eliminate healthy pole blocks, thus reducing outages and increasing availability. This project supports the goal of transmission reliability.

In-Service Date:
December 2009.

Revision:
No revision.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 3.3	$ -	$ 3.3	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	-	-	-	-	-	-
Revised	$ 3.3	$ -	$ 3.3	$ -	$ -	$ -	$ -

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 By-Pass Switch at Dorsey and Radisson Stations (Bipole 1 valve halls). In addition, Radisson will have its AC line switch (ACCQ) 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 2013.

Revision:
Estimate increase reflects higher costs for 12 specially designed bypass switches, four spare switches, and associated equipment. In addition, the in-service date has been deferred 17 months to March 2013.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 15.1	$ 3.7	$ 5.5	$ 3.1	$ 2.7	$ -	$ -
Increase or (Decrease)	5.4	(3.5)	(0.8)	2.3	1.7	5.8	-
Revised	$ 20.4	$ 0.2	$ 4.7	$ 5.4	$ 4.4	$ 5.8	$ -

HVDC Bipole 2 Refrigerant Condenser Replacement

Description:
Remove existing air conditioning systems at Dorsey and Henday, in the Bipole 2 valve halls, maintenance blocks and administration areas. Replace with well water supplied air conditioning systems.

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:
April 2012.

Revision:
Cost flow revision and in-service date deferred one year to April 2012.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 11.0	$ -	$ 2.8	$ 7.1	$ 1.1	$ -	$ -
Increase or (Decrease)	-	-	(2.8)	(4.2)	6.1	0.9	-
Revised	$ 11.0	$ -	$ -	$ 2.9	$ 7.2	$ 0.9	$ -

HVDC Bipole 1 Smoothing Reactor Replacement

Description:
Remove existing oil-filled Bipole 1 smoothing reactors (four each) at Dorsey and Radisson, and replace with new air core reactors.

Justification:
Existing Bipole 1 smoothing reactors are nearing the end of their service life. Replacement will ensure continued availability and reliable operation of the HVDC system. Removal of oil–filled reactors will reduce the risk of oil spills and fires within the workplace.

In-Service Date:
October 2012.

Revision:
Cost flow revision and in-service date deferred one year to October 2012.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 31.8	$ 2.7	$ 11.1	$ 12.6	$ 5.4	$ -	$ -
Increase or (Decrease)	-	(2.4)	(8.0)	(2.1)	7.4	5.1	-
Revised	$ 31.8	$ 0.3	$ 3.1	$ 10.5	$ 12.8	$ 5.1	$ -

HVDC - BP1 Converter Station, 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 rating to comply with current Manitoba Hydro design criteria.

Justification:
P1& P2 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:
February 2012.

Revision:
Cost flow revision and in-service date deferred two years to February 2012 to accommodate the delay in selecting a location for the battery banks at both Dorsey and Radisson and resource constraints.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 3.2	$ 1.0	$ 2.2	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	(1.0)	(2.2)	1.0	2.2	-	-
Revised	$ 3.2	$ -	$ -	$ 1.0	$ 2.2	$ -	$ -

HVDC Bipole 1 DCCT Transductor Replacement

Description:
Replace twenty-four oil-filled DC transductors at Dorsey and Radisson stations with new optical transductors including four spares.

Justification:
The existing oil-filled equipment is over 30 years old and spares are no longer available. These devices provide signals to the HVDC protection controls, and outage costs for a single failed device would exceed $3 million. Replacement with optical devices mitigates environmental and safety concerns associated with oil-filled electrical equipment, especially fire related risks.

In-Service Date:
October 2014.

Revision:
Cost flow revision and in-service date deferred two years to October 2014.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 11.7	$ 0.8	$ 4.2	$ 1.8	$ 3.6	$ 1.3	$ -
Increase or (Decrease)	-	-	(1.7)	(0.6)	(0.1)	-	2.5
Revised	$ 11.7	$ 0.8	$ 2.5	$ 1.2	$ 3.5	$ 1.3	$ 2.5

HVDC PB1 & BP2 DC Converter Transformer Bushing Replacements

Description:
Replace 67 old converter transformer bushings at Dorsey, Radisson and Henday.

Justification:
The transformer bushings in Bipole 1 are 35 years old and as much as 29 years old on Bipole 2. Insulation tests indicate that the performance is becoming marginal and there are limited spares remaining in the event of a failure. The cost of a forced outage to replace a failed unit is $950,000 (BP2) and $300,000 (BP1), assuming the converter transformer is not damaged during the incident, in which case could add $4,000,000 to the cost of the bushing replacement ($100,000).

In-Service Date:
September 2013.

Revision:
No revision.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 8.7	$ -	$ 0.5	$ 1.0	$ 1.6	$ 5.1	$ 0.5
Increase or (Decrease)	-	-	-	-	-	-	-
Revised	$ 8.7	$ -	$ 0.5	$ 1.0	$ 1.6	$ 5.1	$ 0.5

HVDC Bipole 2 Valve 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 20 years old and are reaching the end of their 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 2013.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 19.2	$ -	$ 3.5	$ 4.7	$ 4.8	$ 4.9	$ 1.4
Increase or (Decrease)	-	-	(0.1)	(0.1)	(0.1)	(0.1)	0.4
Revised	$ 19.2	$ -	$ 3.4	$ 4.6	$ 4.7	$ 4.8	$ 1.8

HVDC Bipole 1 CQ Disconnect Replacement

Description:
Replace existing Radisson and Dorsey DC disconnects, and Dorsey AC disconnects with new replacement units.

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 34 years, their failure rate is increasing, and spare parts are no longer available.

In-Service Date:
April 2014.

Revision:
Cost flow revision and in-service date deferred one year to April 2014.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 5.2	$ 0.4	$ 0.5	$ 1.0	$ 1.6	$ 1.0	$ 0.7
Increase or (Decrease)	-	(0.4)	(0.5)	0.2	0.0	(0.1)	0.7
Revised	$ 5.2	$ -	$ 0.0	$ 1.2	$ 1.6	$ 0.9	$ 1.4

HVDC - Bipole 2 Thyristor Module Cooling Refurbishment

Description:
Refurbish 1,566 thyristor module cooling 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 by 10 - 15 years, the end of life cycle of Bipole 2 system equipment.

In-Service Date:
March 2012.

Revision:
Cost flow revision and in-service date deferred one year to March 2012.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 4.7	$ 1.8	$ 1.8	$ 0.8	$ -	$ -	$ -
Increase or (Decrease)	-	(1.4)	-	1.0	0.8	-	-
Revised	$ 4.7	$ 0.4	$ 1.8	$ 1.8	$ 0.8	$ -	$ -

HVDC BP2 Smoothing Reactor Replacement

Description:
Replace the four existing oil-filled BP2 smoothing reactors with air core smoothing reactors at Dorsey and Henday.

Justification:
The smoothing reactors have already exceeded their designed life. Each DC line fault and AC system fault in the southern AC system results in sudden current surges in the smoothing reactors resulting in physical shaking and contraction of the windings. As a result, the blockings in the winding become loose and have to be retightened. The reactors have been subject to these faults for many years. When the reactors do eventually fail, the units will be replaced with air core reactors. Replacing them with an air core reactor now will alleviate the environmental and fire concerns. It will also give a reliable system for the future and reduce maintenance and protection systems requirements.

In-Service Date:
September 2014.

Revision:
Cost flow revision and in-service date deferred one year to September 2014.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 17.1	$ -	$ -	$ 6.9	$ 6.6	$ 3.0	$ 0.5
Increase or (Decrease)	-	-	-	(6.9)	0.4	3.5	3.1
Revised	$ 17.1	$ -	$ -	$ -	$ 7.0	$ 6.5	$ 3.6

Great Falls Generating Station Rehabilitation

Description:
Overhaul the intake gates including major roller train modifications, new bulkhead gate sections, new balancing valve, and upgrade hoists and controls for emergency closure. Replace main water passage components (bottom ring, discharge ring and draft tube liner), install new propeller type runner, rewind generator, replace synchronization equipment & add ground protection to all units, provide new transformer & replace station service high side transformers, modify servomotors, install a high pressure oil lift system, and modernize to present standards.

Justification:
The existing intake gates and hoists cannot provide reliable emergency closure functions as they have the potential to malfunction during an emergency. In addition, the draft tube liner is failing and is in urgent need of replacement. The outage will be used to replace the seventy year old runner with a larger, more efficient unit. While the generator was rewound forty years ago, many of the electrical components are original equipment from the 1920s.

In-Service Date:
May 2007.

Revision:
Cost flow revision and in-service date advanced one month to May 2007.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 31.1	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	0.2	-	-	-	-	-
Revised	$ 31.1	$ 0.2	$ -	$ -	$ -	$ -	$ -

Pine Falls Generating Station 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 2 stator windings are in danger of failure at any time.

In-Service Date:
March 2015.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 56.2	$ 6.0	$ 13.0	$ 10.2	$ 5.3	$ 3.9	$ 9.2
Increase or (Decrease)	-	(3.7)	(8.4)	14.3	(0.1)	(0.1)	0.6
Revised	$ 56.2	$ 2.3	$ 4.6	$ 24.5	$ 5.2	$ 3.8	$ 9.8

Laurie River GS Phase 2 & 3 Rehabilitation

Description:
Rehabilitation, replacement of and addition to various civil works, electrical and mechanical equipment and systems such as concrete and structures, supervisory control system, vehicle storage building, bailey bridge, road, airstrip, rail line access, electrical/ mechanical systems upgrade, 2.3 kV breakers, and installation of heated frost walls on two structures.

Justification:
Assessment of the civil, electrical and mechanical systems has identified concerns in terms of deterioration, obsolete equipment, safety, and fire risk. Upgrading is necessary to ensure reliable safe and economical operation.

In-Service Date:
March 2013.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 7.7	$ -	$ -	$ 0.9	$ 0.1	$ 0.1	$ -
Increase or (Decrease)	-	-	-	0.1	0.7	1.1	-
Revised	$ 7.7	$ -	$ -	$ 1.0	$ 0.8	$ 1.2	$ -

Jenpeg Generating Station Unit Overhauls

Description:
Major overhaul of all generating units (1-6) 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:
Estimate increase reflects current market pricing for the project. In-service date deferred to December 2021, as a result of the recent repairs, leaving the units in reasonable operating condition.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 35.3	$ 0.2	$ 4.3	$ 0.2	$ 4.3	$ 0.3	$ 13.5
Increase or (Decrease)	92.8	(0.1)	(4.3)	(0.2)	(4.3)	(0.3)	35.7
Revised	$ 128.1	$ 0.1	$ -	$ -	$ -	$ -	$ 49.2

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, to operate in a safe and reliable manner.

In-Service Date:
March 2016.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 34.0	$ 3.8	$ 1.5	$ 1.3	$ 1.2	$ 1.3	$ 3.8
Increase or (Decrease)	-	(1.7)	2.0	(0.1)	-	(0.1)	0.7
Revised	$ 34.0	$ 2.1	$ 3.5	$ 1.2	$ 1.2	$ 1.2	$ 4.5

Winnipeg River Control System

Description:
Upgrading or replacement of, and additions to, various items of electrical and mechanical systems and equipment. Items included are: *Great Falls Generating Station* - DC distribution, and unit control, metering and relaying. *Seven Sisters Generating Station* - Units 4-6 Automatic Voltage Regulation replacement, and unit control, metering and relaying. *Pine Falls Generating Station* – 250 VDC distribution, and station control. *McArthur Falls Generating Station* – upgrades to station annunciator, 250 VDC distribution, and station control.

Justification:
Engineering assessment of the electrical and mechanical systems in these stations has identified obsolete equipment, safety and fire risk, adaptability to present day operating conditions and standards, and the requirement for upgrading work. Generation South has identified the need for an integrated system for control of all the Winnipeg River stations. This project encompasses the design and installation of the various systems and System Control Centre's requirement for data acquisition.

In-Service Date:
November 2008.

Revision:
Cost flow revision and in-service date advanced ten months to November 2008.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 10.4	$ 0.5	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	0.2	-	-	-	-	-
Revised	$ 10.4	$ 0.7	$ -	$ -	$ -	$ -	$ -

Winnipeg River Riverbank Protection Program

Description:
Placement of rock protection and construction of slope stabilization to reduce the erosion of riverbank along the Winnipeg River. The work includes inspection, design, mapping, land acquisition, and remedial construction at Pine Falls and McArthur Falls.

Justification:
Provision of riverbank protection and stabilization work along the Winnipeg River and tributaries between Seven Sisters forebay and Manitou Rapids from erosion partially due to hydraulic operations.

In-Service Date:
March 2017.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 19.7	$ 1.1	$ 1.2	$ 1.2	$ 1.2	$ 1.2	$ 5.2
Increase or (Decrease)	-	0.2	(0.1)	-	-	-	0.1
Revised	$ 19.7	$ 1.3	$ 1.1	$ 1.2	$ 1.2	$ 1.2	$ 5.3

Power Supply Hydraulic Controls

Description:
Install an optimization system to run all 39 units at Kelsey, Kettle, Long Spruce, and Limestone at their most efficient gate opening. Install a Decision Support System (DSS) to provide accurate short-term Hydro scheduling (water resource management) and feedback information. Install required automation, remote control, and protective devices for unmanned operation.

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. Automation and remote control will reduce the the need for shift work and staff requirements to support that need.

In-Service Date:
December 2014.

Revision:
Estimate increase reflects costs for control upgrades for Seven Sisters, Jenpeg and McArthur Falls. Operational efficiencies will be achieved through standardization of control systems, and will also result in providing more information to maintenance staff. Technicians at a Winnipeg River station will be able to examine alarms and information from every station on the Winnipeg River which will improve maintenance support. In-service date deferred to December 2014.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 8.4	$ 4.3	$ 1.5	$ -	$ -	$ -	$ -
Increase or (Decrease)	7.6	0.8	0.3	0.9	2.5	2.4	1.9
Revised	$ 16.0	$ 5.1	$ 1.8	$ 0.9	$ 2.5	$ 2.4	$ 1.9

Slave Falls Generating Station Rehabilitation

Description:
Construction of an access road at Slave Falls Generating Station. Overhaul or replacement of all generating units and associated equipment, rehabilitation of all spillway infrastructure. Upgrades and replacements of electrical station accessory equipment.

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 serviceablitly of the plant and spillway infrasturcture. Economics of this work may suggest that a new spillway be constructed to replace existing spill infrastructure. Current operating procedures include ice load reduction activites at the spilling strcutures 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:
December 2017.

Revision:
Estimate increase reflects cost to extend the proposed road to the Slave Falls Powerhouse, increased construction costs, and additional requirements for environmental studies and internal project management. In-service date advanced six months to December 2017.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 192.4	$ 8.6	$ 11.6	$ 19.0	$ 24.4	$ 24.5	$ 90.3
Increase or (Decrease)	5.9	1.6	2.1	(8.6)	(15.5)	(0.9)	36.0
Revised	$ 198.3	$ 10.2	$ 13.7	$ 10.4	$ 8.9	$ 23.6	$ 126.3

Generating Station Roof Replacements

Description:
Remove the existing roofing & deluge systems at Kettle, Long Spruce (excluding the SF_6 building), and Limestone; and design, supply, install, provide supervision and roof testing, replacement of deluge system, and installation of fall arrest systems.

Justification:
The Kettle, Long Spruce (excluding the SF_6 building), and Limestone roofs were installed in 1970, 1975 and 1988 respectively. Regular maintenance and minor repairs are becoming cost prohibitive. On several occasions there have been roof leaks on or near live electrical equipment. Replacement is required to provide a reliable and dependable source of power.

In-Service Date:
October 2008.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 9.2	$ 3.6	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	0.3	-	-	-	-	-
Revised	$ 9.2	$ 3.9	$ -	$ -	$ -	$ -	$ -

Great Falls Generating Station Unit 4 Major Overhaul

Description:
Major overhaul to generating Unit 4 including generator rewind, turbine runner replacement, new water passage embedded components, new single phase unit transformer, and modernization of components.

Justification:
The re-runnering and major overhaul 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 40 to 50 years.

In-Service Date:
December 2011.

Revision:
Estimate increased to reflect scope increase for additional hydraulic model tests, and in-service date deferred 19 months to December 2011.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 17.6	$ 4.2	$ 9.1	$ 1.4	$ -	$ -	$ -
Increase or (Decrease)	2.1	(2.8)	(5.0)	6.7	5.4	-	-
Revised	$ 19.7	$ 1.4	$ 4.1	$ 8.1	$ 5.4	$ -	$ -

Great Falls 115 kV Indoor Station Safety Improvements

Description:
Improve electrical safety clearance in the 115 kV switching gallery by replacing the air blast breakers with separate current transformers (CTs) with smaller dead tank SF_6 breakers with integral CTs, raise potential transformer (PT) equipment, install Lexan insulating panels to improve the separation between buses, improve grounding provisions, and add safety screens around disconnects.

Justification:
The indoor switching gallery has many instances of electrical clearances that are less than the absolute minimum limit of approach, and do not meet the minimum standard outlined in the Manitoba Hydro safety book.

In-Service Date:
November 2009.

Revision:
Cost flow revision and in-service date deferred 11 months to November 2009.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 11.6	$ 3.4	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	(0.8)	0.9	-	-	-	-
Revised	$ 11.6	$ 2.6	$ 0.9	$ -	$ -	$ -	$ -

Generation South Transformer Refurbish & Spares

Description:
Purchase a spare generator step-up transformer and refurbish the existing generator step-up transformers at Jenpeg GS, refurbish ten of the 13 existing generator transformers (three step-up transformers/ unit and one spare) at Grand Rapids GS, purchase a spare three phase generator step-up transformer at Pine Falls GS, and two 3 phase generator step-up transformers for Great Falls GS, one to go into service immediately and one to remain as a spare.

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

In-Service Date:
March 2015.

Revision:
Estimate increase reflects the cost to purchase one 3 phase generator step up transformer for the Pine Falls GS, and two 3 phase generator step up transformers for the Great Falls GS. In-service date deferred two years to March 2015.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 14.7	$ 2.1	$ 3.9	$ 2.8	$ 2.8	$ 1.6	$ -
Increase or (Decrease)	6.3	(1.2)	(1.0)	2.5	1.7	1.5	4.2
Revised	$ 21.0	$ 0.9	$ 2.9	$ 5.3	$ 4.5	$ 3.1	$ 4.2

Water Licenses & Renewals

Description:
Conduct any 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 of 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:
March 2016.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 40.8	$ 4.5	$ 5.2	$ 4.7	$ 4.8	$ 4.4	$ 13.1
Increase or (Decrease)	-	(1.0)	(0.1)	0.9	0.1	0.4	1.1
Revised	$ 40.8	$ 3.5	$ 5.1	$ 5.6	$ 4.9	$ 4.8	$ 14.2

Generation South PCB Regulation Compliance

Description:
Remove all PCB contaminated equipment that meets the proposed federal regulations from Generation South generation stations before the year 2014 deadline.

Justification:
Required to comply with Federal legislation.

In-Service Date:
December 2014.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 4.7	$ 0.1	$ 3.3	$ 0.3	$ 0.3	$ 0.3	$ 0.3
Increase or (Decrease)	-	(0.1)	(1.3)	1.3	0.1	0.1	(0.1)
Revised	$ 4.7	$ 0.0	$ 2.0	$ 1.6	$ 0.4	$ 0.4	$ 0.2

Kettle Transformer Overhaul Program

Description:
Purchase two spare transformers, one for the Kettle Generating Station and one for the Long Spruce/ Limestone Generating Stations. Subsequent to receiving the new transformers, the remaining 12 step-up transformers will be overhauled.

Justification:
Kettle step-up transformers have been in operation for 36 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 Generating Station than anywhere else in Manitoba Hydro.

In-Service Date:
April 2016.

Revision:
New item.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	35.6	1.0	3.3	3.8	4.6	4.9	18.1
Revised	$ 35.6	$ 1.0	$ 3.3	$ 3.8	$ 4.6	$ 4.9	$ 18.1

Generation South Breaker Replacements

Description:
Remove the four existing 115 kV current transformers and breakers at the McArthur Falls Generating Station, and replace with new 115 kV breakers with internal current transformers. Replace 14 115 kV breakers at the Pine Falls Generating Station.

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:
March 2013.

Revision:
New item.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	9.4	1.6	2.5	0.9	2.8	1.6	-
Revised	$ 9.4	$ 1.6	$ 2.5	$ 0.9	$ 2.8	$ 1.6	$ -

Seven Sisters Generating Station 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:
August 2012.

Revision:
New item.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	9.5	1.3	3.5	2.5	1.2	1.0	-
Revised	$ 9.5	$ 1.3	$ 3.5	$ 2.5	$ 1.2	$ 1.0	$ -

Generation South Excitation Upgrades

Description:
Implement a generator excitation system replacement program to phase out unsupported and obsolete equipment at 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 Great Falls, Grand Rapids and McArthur Falls are no longer available, and the salvage inventory from Seven Sisters and Laurie River Generating Stations 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:
April 2016.

Revision:
New item.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	18.3	-	-	2.0	3.2	3.9	9.3
Revised	$ 18.3	$ -	$ -	$ 2.0	$ 3.2	$ 3.9	$ 9.3

Brandon Generating Station Unit 5 License Review

Description:
Renewal of Brandon Generating Station Unit 5 (Manitoba Environment Act license) is required for continuing operation. Executive approved the project as part of the approval of the 1999 power resource plan. 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.

Justification:
Unit 5 plays an important role in Manitoba Hydro's system, contributing economic generation and enhancing system reliability. Continued operation is necessary to meet domestic load and export commitments beyond 2006.

In-Service Date:
March 2011.

Revision:
Cost flow revision and in-service date deferred four months to March 2011.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 18.7	$ 1.9	$ 8.4	$ 3.7	$ -	$ -	$ -
Increase or (Decrease)	-	(1.6)	(2.2)	4.0	-	-	-
Revised	$ 18.7	$ 0.3	$ 6.2	$ 7.7	$ -	$ -	$ -

Selkirk Generating Station Enhancements

Description:
The project includes the acquisition of the license and the possible installation of a cooling tower. This project is considered to be the second phase of the conversion of the Selkirk Generating Station from operation on coal to operation on natural gas in 2002. The first phase was completed assuming that Selkirk's operating license would be renewed. The benefits of phase 1 (fuel switching) and this project are strongly dependent on obtaining a new license for operation. The licensing process will determine if a cooling tower is a requirement for operation. If it is, the economics of operation will be reviewed and re-evaluated.

Justification:
Provides assurance that the station will be able to operate as planned (with the addition of the cooling tower). Yields an Internal Rate of Return of more than 10% and provides long-term southern system reliability benefits.

In-Service Date:
August 2010.

Revision:
Cost flow revision and in-service date deferred one year to August 2010.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 14.2	$ 7.9	$ 2.7	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	(2.8)	2.2	2.8	-	-	-
Revised	$ 14.2	$ 5.1	$ 4.9	$ 2.8	$ -	$ -	$ -

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, and the installation of a fire water backup system at Henday Station.

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 we can contain a fire and help prevent it from spreading until the fire department's arrival.

In-Service Date:
November 2010.

Revision:
Cost flow revision and in-service date deferred eight months to November 2010.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 5.2	$ 1.8	$ 2.4	$ (0.3)	$ -	$ -	$ -
Increase or (Decrease)	0.0	0.2	0.1	0.3	-	-	-
Revised	$ 5.2	$ 2.0	$ 2.5	$ -	$ -	$ -	$ -

Halon Replacement Project

Description:
Phase-out of CFC and Halon uses, and dispose of all corporate Halon systems. Replace 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:
June 2010.

Revision:
Cost flow revision and in-service date advanced six months to June 2010.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 42.5	$ 13.8	$ 15.7	$ 9.4	$ -	$ -	$ -
Increase or (Decrease)	-	(2.8)	3.5	1.6	0.4	-	-
Revised	$ 42.5	$ 11.0	$ 19.2	$ 11.0	$ 0.4	$ -	$ -

Power Supply Fall Protection Program

Description:
Implement fall protection for Power Supply stations (excludes switchyards, includes four diesel sites), in compliance with Provincial Regulation 189/85 under Workplace Safety and Health Act W210.

Justification:
Provincial regulation requires employers to establish fall protection systems for work performed where there is danger of falling more than 2.5 meters into unprotected operating machinery or in/ onto hazardous substances and objects.

In-Service Date:
March 2009.

Revision:
Estimate increase reflects the costs for more complex and numerous solutions required for Thermal Stations; as well as, additional "water passage" scaffolding items at Grand Rapids and Jenpeg Generating Stations.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 11.3	$ 1.5	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	2.2	1.1	-	-	-	-	-
Revised	$ 13.5	$ 2.6	$ -	$ -	$ -	$ -	$ -

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 occurances. In addition, any plant outage as a result of a spill represents a minimum loss of $5,000 per hour.

In-Service Date:
May 2016.

Revision:
Estimate decrease reflects the advancement of in-service dates for Radisson and Henday Phase 2 to November 2008, and a price reduction for contractor services.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 20.8	$ 5.1	$ 5.3	$ 1.1	$ 0.4	$ 0.1	$ 0.6
Increase or (Decrease)	(1.7)	2.4	(3.2)	(0.6)	(0.3)	(0.0)	(0.0)
Revised	$ 19.1	$ 7.5	$ 2.1	$ 0.5	$ 0.1	$ 0.1	$ 0.6

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 2012.

Revision:
Estimate increase reflects increased construction costs; an increase in the scope for the Gillam Housing program to replace 40 double wide trailers on basements, with new site-built houses reusing existing foundations rather than purchasing lower cost RTM homes, as they cannot be moved to Gillam due to narrow bridges; and provide an additional 12 houses to the Town of Gillam.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 34.4	$ 5.1	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	17.7	0.6	9.6	5.3	4.5	-	-
Revised	$ 52.1	$ 5.7	$ 9.6	$ 5.3	$ 4.5	$ -	$ -

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 2013.

Revision:
Estimate increase reflects additional costs to complete the clean-up of sub-surface contaminated soil and surface construction debris scattered along the length of Eight-Mile Channel. In-service date advanced one year to March 2013.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 25.0	$ 1.1	$ 0.1	$ 0.1	$ 0.1	$ 0.1	$ 0.1
Increase or (Decrease)	5.9	0.3	0.6	0.4	0.3	0.2	(0.1)
Revised	$ 30.9	$ 1.4	$ 0.7	$ 0.5	$ 0.4	$ 0.3	$ -

High Voltage Test Facility

Description:
Construction and outfitting of a 3,470 sq. meter high voltage test facility at the Waverley Service Centre, including a HV hall with rail access, supporting labs, shop, storage, office and receiving space.

Justification:
This facility will enable Manitoba Hydro to meet present industry standards (CAN/CSA C88.1-96, CAN3-C13-M83, CAN/CSA C225-00, and the recently adopted IEC 619361-1) for testing of all bushings, instrument transformers, and aerial lift devices. It will also improve the efficiency and safety of our insulation testing practices through the elimination of unnecessary travel and set-up time associated with our current use of the Pine Falls Generating Station and ABB's leased facilities. Testing to industry standards is expected to reduce the occurrence of costly and dangerous in-service failures, safeguard the reliability of our power supply, and enhance safety during live line work.

In-Service Date:
March 2011.

Revision:
Estimate increase reflects costs associated with redesigning the project to accommodate a new site, better suited to testing large power transformers.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 25.6	$ 2.8	$ 15.1	$ 5.8	$ -	$ -	$ -
Increase or (Decrease)	1.3	0.6	0.8	(0.1)	-	-	-
Revised	$ 26.9	$ 3.4	$ 15.9	$ 5.7	$ -	$ -	$ -

Power Supply Security Installations / Upgrades

Description:
As part of the Power Supply Security Upgrades program, install, upgrade and enhance security systems, such as fencing, close circuit TV, and card access systems at Power Supply HVDC and generating stations.

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 by 2009. Non-compliance may result in penalties and fines and could jeopardize export revenues.

In-Service Date:
January 2011.

Revision:
Estimate increase reflects project scope change to include additional costs associated with upgrading facility security to anticipated NERC regulatory standards CIP-002-1 through CIP-009-1, including the installation of crash rated gates at main entrances to facilities, installing gates and barriers to restrict access onto dams and dykes, and upgrading card access systems at perimeter entry points into all facilities, rooms and cabinets housing critical cyber assets. In-service date advanced 14 months to January 2011, in order to achieve NERC deadlines for the Corporation achieving "auditably compliant" security data, documents, documentation, logs and records.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 11.6	$ 3.7	$ 3.7	$ 1.5	$ 0.7	$ -	$ -
Increase or (Decrease)	24.7	2.5	17.8	5.9	(0.7)	-	-
Revised	$ 36.3	$ 6.1	$ 21.4	$ 7.4	$ -	$ -	$ -

Power Supply Sewer & Domestic Water System Install and Upgrade

Description:
Upgrade or replace domestic water and waste water systems at southern plants, northern plants, and converter stations.

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. Some facilities have recently been issued boiled water notices for non-compliance.

In-Service Date:
March 2012.

Revision:
Estimate increase reflects costs associated with changes made by the municipality of Rosser whereby they will be extending their water distribution main, including a line that will run past the Dorsey station. Connecting to the new water distribution main removes the need to drill wells but still requires extensive work to remove the existing system and additional costs for the installation of a storage and transfer system. This approach will also provide environmental benefit by eliminating the negative environmental impacts of using salt to soften Dorsey's water supply, and disposal to the aquifer.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 13.9	$ 1.9	$ 2.2	$ 1.7	$ 1.6	$ -	$ -
Increase or (Decrease)	1.2	4.3	1.9	(0.1)	(0.3)	-	-
Revised	$ 15.1	$ 6.2	$ 4.1	$ 1.6	$ 1.3	$ -	$ -

Domestic Item – Power Supply

Description:
This program consists of several hundred projects which are not identified as Major Items and whose individual cost is of a relatively small amount. The majority of projects are required to provide safe reliable and efficient power supply and HVDC facilities, and to replace plant facilities whose useful life has been exceeded.

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 revision.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	NA	$ 20.4	$ 19.4	$ 19.8	$ 20.2	$ 20.6	$ 132.3
Increase or (Decrease)		-	-	-	-	-	-
Revised		$ 20.4	$ 19.4	$ 19.8	$ 20.2	$ 20.6	$ 132.3

TRANSMISSION & DISTRIBUTION:

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 the Brandon Generating Station 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:
These facilities provide improvements required to supply Western Manitoba area future load growth.

In-Service Date:
October 2014.

Revision:
No revision.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 40.0	$ 2.3	$ 1.4	$ 1.6	$ 3.6	$ 3.7	$ 27.2
Increase or (Decrease)	-	-	-	-	-	-	-
Revised	$ 40.0	$ 2.3	$ 1.4	$ 1.6	$ 3.6	$ 3.7	$ 27.2

Transcona New 230 - 66 kV Station

Description:
Design and construct a new 230 - 66 kV station adjacent to the existing Transcona station. Make provision for a second bank and ring buses.

Justification:
This station is required in 2010 to supply increased East Winnipeg load.

In-Service Date:
March 2012.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 31.0	$ 2.9	$ 7.7	$ 13.1	$ 7.0	$ 0.1	$ -
Increase or (Decrease)	-	(2.2)	0.9	(1.2)	2.4	(0.1)	-
Revised	$ 31.0	$ 0.7	$ 8.6	$ 11.9	$ 9.4	$ -	$ -

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, 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.

Justification:
These facilities provide transmission improvements required by 2011 to supply Neepawa and related Western Region future load growth.

In-Service Date:
October 2011.

Revision:
Estimate increase reflects project scope change to include: system control automation (control, protection, and equipment communications and software programming); as well as, current market pricing for serialized equipment including power transformer, labour and materials.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 20.9	$ -	$ 1.1	$ 8.6	$ 11.1	$ -	$ -
Increase or (Decrease)	9.1	0.2	4.7	2.7	1.7	-	-
Revised	$ 30.0	$ 0.2	$ 5.8	$ 11.3	$ 12.8	$ -	$ -

Pine Falls – Bloodvein 115 kV Transmission Line

Description:
Perform environmental assessments and route selection, design and construct transmission and terminal facilities to provide 115 kV supply to Bloodvein station as follows: *Transmission*: Construct 115 kV line 80 km Pine Falls - L48 to L5 Tap near Manigotagan. Disconnect L48 from L5 at tap location and connect L48 to new line, converting L48 from 66 kV to 115 kV operation up to Bloodvein. *Terminations*: Extend 115 kV facilities at Pine Falls. Replace 66 KV transformers at Loon Straits with 2 - 115 - 7.2 kV 500 kVA transformers, and modify station for 115 kV supply. Construct 115 - 66 kV station at Bloodvein, including 2 - 115 - 66 kV 28 MVA transformers.

Justification:
This project provides increased transmission capacity required to supply Lake Winnipeg East area load increases.

In-Service Date:
October 2014.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 34.1	$ -	$ -	$ 0.3	$ 0.9	$ 4.6	$ 28.2
Increase or (Decrease)	-	-	-	-	-	(0.1)	0.1
Revised	$ 34.1	$ -	$ -	$ 0.3	$ 0.9	$ 4.5	$ 28.3

Transmission Line Re-Rating

Description:
Refurbish 292.6 km of double circuit and 120.7 km of single circuit 230 and 110 kV transmission lines in the Winnipeg area. Refurbish 16.9 km of double circuit and 49.2 km of single circuit 63.5 kV subtransmission lines in the Winnipeg area. Upgrade the Winnipeg River transmission line system to 100 °C. The refurbishment will correct insufficient ground clearances of line conductors. Using resagging, reconductoring, and tower extensions where required, the lines are to be upgraded to maintain safe ground clearances under thermal conductor loading.

Justification:
Lines in the Winnipeg area built pre-1970 cannot accommodate thermal conductor loading without violating required ground clearances. The refurbishment program will increase line to ground clearances to allow higher conductor temperatures under all potential heavy current line loads.

In-Service Date:
March 2011.

Revision:
Estimate increase reflects costs for project scope increase to address all high risk, all medium risk and certain low risk spans of four 115 kV and five 230 kV transmission lines, in order to minimize public safety concerns associated with line sag violations.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 19.9	$ 0.3	$ 0.3	$ 0.3	$ -	$ -	$ -
Increase or (Decrease)	4.2	4.1	0.1	0.1	-	-	-
Revised	$ 24.1	$ 4.4	$ 0.4	$ 0.4	$ -	$ -	$ -

Dorsey 230 kV Bus Enhancement

Description:
Sectionalize Dorsey A and B busses with breaker and interconnecting bus. Installation will include 4 – 230 kV breakers, an interconnecting bus, plus associated equipment. Relocate and build a security entrance complete with building (12' x 20'), washroom, security arms, paved roadway, and security cameras.

Justification:
Sectionalizing Dorsey bus will minimize the chances of a complete Dorsey shutdown, and allow more thorough and convenient bus maintenance. Relocation of the original security entrance is a consequence of this work, and at the same time the Dorsey Security Report is highlighting the need for enhancing the security level.

In-Service Date:
June 2008.

Revision:
Estimate increase reflects costs associated with a seven month in-service date deferral to June 2008, due to outage restrictions.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 23.0	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	1.0	0.7	-	-	-	-	-
Revised	$ 24.0	$ 0.7	$ -	$ -	$ -	$ -	$ -

St Vital-Steinbach 230 kV Transmission

Description:
Construct a new 230 kV line between St. Vital and Steinbach Stations.

Justification:
Provided a 230 kV supply into the Steinbach area which will support load growth in south eastern Manitoba.

In-Service Date:
October 2020.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 32.2	$ -	$ -	$ -	$ -	$ -	$ 10.6
Increase or (Decrease)	-	-	-	-	-	-	(1.0)
Revised	$ 32.2	$ -	$ -	$ -	$ -	$ -	$ 9.6

Rosser Station 230 - 115 kV Bank 3 Replacement

Description:
Replace Rosser bank 3 with a 150/200/250 MVA transformer similar to bank 1. Replace the 13.8 kV tertiary reactor supply circuit breaker and if necessary the bus. Upgrade protection as required.

Justification:
With continued load growth on the North Winnipeg and Selkirk 115 kV systems, summer peak loads, low water conditions on the Winnipeg River and exports to Ontario, additional capacity will be required. In addition, this replacement will prevent equipment overloads in the event of a failure to bank 1 at Rosser station, maintain exports, and also to defer the Ridgeway - Selkirk 230 kV transmission project ($27 million for 3 years to 2012).

In-Service Date:
June 2009.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 5.8	$ 3.1	$ 2.2	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	(0.2)	0.2	-	-	-	-
Revised	$ 5.8	$ 2.9	$ 2.4	$ -	$ -	$ -	$ -

Rosser - Inkster 115 kV Transmission

Description:
Construct a second 8.2 km 115 kV line between Rosser and Inkster stations.

Justification:
A second line between Rosser and Inkster stations will alleviate contingency overloading issues on the St. James to Tylehurst 115 kV underground cable, in the event of the failure of the existing Rosser – Inkster circuit.

In-Service Date:
March 2010.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 5.1	$ 2.3	$ 2.5	$ 0.1	$ -	$ -	$ -
Increase or (Decrease)	-	0.5	(0.3)	(0.1)	-	-	-
Revised	$ 5.1	$ 2.8	$ 2.2	$ -	$ -	$ -	$ -

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 fault levels that exceed 95% of the breaker interrupting rating. These breakers are old (33-36 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:
November 2012.

Revision:
New item.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	6.0	0.1	1.0	2.9	1.7	0.3	0.0
Revised	$ 6.0	$ 0.1	$ 1.0	$ 2.9	$ 1.7	$ 0.3	$ 0.0

Transcona & Ridgeway Stations - 66 kV Bus Upgrades

Description:
Upgrade the full length of existing 66 kV buses at 115-66 kV Transcona Station, and upgrade sections of the 66 kV ring bus and replace two breakers and associated disconnects at 230-66 kV Ridgeway Station.

Justification:
A study was undertaken to identify overloads of sections of the 66 kV bus at 115-66 kV Transcona Station and 66 kV ring bus at 230-66 kV Ridgeway Station. These studies concluded that under normal supply conditions, the Transcona bus will be overloaded to 105%, and the Ridgeway 66 kV breakers R24 and R28 and associated disconnects will be overloaded by 107.9%.

In-Service Date:
May 2010.

Revision:
New item.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	2.8	1.0	1.5	0.3	-	-	-
Revised	$ 2.8	$ 1.0	$ 1.5	$ 0.3	$ -	$ -	$ -

Dorsey 500 kV R502 Breaker Replacement

Description:
Replace the Dorsey 500 kV R502 breaker, with a new 500 kV SF6 filled breaker complete with pre-insertion resistors, remove the GE ATB-80 air blast circuit breaker and remove the 3000 PSI compressor system, and purchase a spare breaker pole to be used if one phase fails, as replacement parts can take up to a year to obtain.

Justification:
The R502 breaker is now operating beyond its expected useful life cycle, without an option to rebuild. Two 3000 PSI compressors work simultaneously to supply the breaker with compressed air, and are now at the end of their useful life and need to be replaced. Without replacement, breaker failure could result in cleanup, outage and damage costs that would exceed $1.0 million. Additionally, should another breaker fail while this breaker was being replaced, there would be a large reduction in power exports.

In-Service Date:
April 2009.

Revision:
New item.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	2.6	2.3	0.4	-	-	-	-
Revised	$ 2.6	$ 2.3	$ 0.4	$ -	$ -	$ -	$ -

Birtle South-Rossburn 66 kV Line

Description:
Construct 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 revision.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 4.9	$ -	$ -	$ -	$ -	$ -	$ 4.9
Increase or (Decrease)	-	-	-	-	-	-	-
Revised	$ 4.9	$ -	$ -	$ -	$ -	$ -	$ 4.9

Perimeter South Station Distribution Supply Centre Installation

Description:
Install 1-10 MVA, 66 - 12 kV distribution supply centre, 3 - 7.2 kV, single-phase 585 A padmount regulators, 1 - 15 kV three-phase padmount recloser, 1 - 15 kV S&C automated Vistagear switching cubicle, motorized bank 12 kV switches B10 & B20, MOV lightning arresters on 66 kV sides of banks 1 & 2, the distribution supply centre, and all 12 kV feeders. Salvage existing manual 12 kV bank switches and gap-type lightning arresters.

Justification:
This station supplies south Fort Garry and LaSalle area (both fast growing communities) and provides a back-up supply to 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:
October 2010.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 2.4	$ -	$ 0.4	$ 2.0	$ -	$ -	$ -
Increase or (Decrease)	-	0.1	(0.1)	-	-	-	-
Revised	$ 2.4	$ 0.1	$ 0.3	$ 2.0	$ -	$ -	$ -

Winnipeg Central District 66 kV Circuit Breaker Replacements

Description:
Replace eight 66 kV circuit breakers at Logan Station with eight breakers from stock. Purchase and install twenty 72 kV circuit breakers as follows: McPhillips (5), Amy (4), Edmonton (1), Rover (7), and Jessie (3).

Justification:
A total of 28 circuit breakers in the Winnipeg Central district are under-rated for expected fault interruption and need to be replaced.

In-Service Date:
March 2009.

Revision:
Cost flow revision and in-service date deferred three months to March 2009.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 6.1	$ 1.5	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	(1.1)	-	-	-	-	-
Revised	$ 6.1	$ 0.4	$ -	$ -	$ -	$ -	$ -

Stanley Station 230-66 kV Transformer Addition

Description:
Purchase and install a 230-66 kV transformer and associated equipment for the Stanley Station, install transformer protection equipment, 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, Line3 and Line 51).

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. 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. This project is high risk as customer service to more than 15,000 customers could be affected.

In-Service Date:
October 2015.

Revision:
New item.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	21.1	-	-	-	-	1.9	19.2
Revised	$ 21.1	$ -	$ -	$ -	$ -	$ 1.9	$ 19.2

Stanley Station 230-66 kV Hot Standby Installation

Description:
Install an 84/112/140 MVA, 230-66 kV transformer and associated equipment at Stanley Station as a hot standby, along with transformer protection equipment.

Justification:
The low sub-transmission and distribution voltages created by transferring Stanley Station load will negatively impact customer equipment and their automated processes in the towns of Morden and Winkler and the surrounding areas, potentially affecting customer service to greater than 15,000 customers. Deferral will place quality of supply to local customers at risk. Customer equipment and product will be damaged, and automated (voltage sensitive) processes will be halted. In addition, one of Manitoba Hydro's major customers will be adding significant new load in 2009, also necessitating this installation.

In-Service Date:
October 2010.

Revision:
New item.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	6.2	1.5	3.8	0.8	0.1	-	-
Revised	$ 6.2	$ 1.5	$ 3.8	$ 0.8	$ 0.1	$ -	$ -

Defective RINJ Cable Replacement

Description:
Replace approximately 62,500 metres of RINJ (red Jacket) cable within the city of Winnipeg.

Justification:
The failure rate of RINJ underground cable installed in the City of Winnipeg during the 1960s is three times the rate at which CSA recommends cable replacement.

In-Service Date:
March 2011.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 8.7	$ 0.8	$ 0.8	$ 0.8	$ -	$ -	$ -
Increase or (Decrease)	-	0.3	0.3	0.2	-	-	-
Revised	$ 8.7	$ 1.1	$ 1.1	$ 1.0	$ -	$ -	$ -

Brereton Lake Station Area

Description:
Construct: a new 124 - 12/25 kV steel station c/w two 7.5/10 MVA 124-12/25 kV LTC transformers and two 560A WVE 12 kV OCRs; 0.5 km 266.8 MCM ACSR single circuit two 124 kV line taps (consisting of steel tap-off and dead end structures) between line SK1 and the new Brereton Lake Station; and two feeder exits from the new Station to PR307. Convert 33 kV line 29 and underbuilt circuit to be operated at 12 kV. Salvage 33 kV line 29 from Rennie to Elma Tap and convert 8 km to 7.2 kV single phase.

Justification:
The existing 33 kV line from SW 293 to White Lake Station, Rennie Station and SW 1810 is at the end of its life expectancy. There are also deficiencies associated with White Lake and Rennie stations. A new station complete with a rebuilt distribution system will provide more acceptable customer service reliability, and fewer disruptions to Ontario Hydro.

In-Service Date:
April 2009.

Revision:
Estimate increase reflects project scope change to replace 90% of the poles, rather than the previously estimated 30%, and change water crossings to underground instead of overhead, to minimize the potential for future maintenance complications. In-service date deferred one year to April 2009.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 7.7	$ 0.1	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	1.3	0.9	0.2	-	-	-	-
Revised	$ 9.0	$ 1.0	$ 0.2	$ -	$ -	$ -	$ -

Stony Mountain New 115 - 12 kV Station

Description:
Construct a new Stony Mountain Station, and 1.5 miles of line to supply Bristol. Salvage existing Stony Mountain and Rockwood Stations, 33 kV lines 15 and 35, and 33 kV breakers 150 & 350 at Parkdale Station.

Justification:
The station equipment and supply lines are in a deteriorated condition and must be replaced. The 115-66-33 kV transformers that supply these stations from Parkdale are 50+ years old and reaching the end of their life expectancy. Load forecasts indicate Stony Mountain will also require a capacity increase and the only other 33 kV feed from Parkdale Station, Garson Station will require 115 kV supply by 2013. It is not economically viable to maintain a 33 kV source to only supply Stony Mountain and Rockwood Stations.

In-Service Date:
March 2009.

Revision:
Cost flow revision and final in-service date deferred 17 months to March 2009 for the new sub-station.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 5.0	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	1.2	-	-	-	-	-
Revised	$ 5.0	$ 1.2	$ -	$ -	$ -	$ -	$ -

Mobile Transformer

Description:
Purchase a 35 MVA 115 x 66-12.47 x 24.9 kV mobile transformer and associated equipment and modify Parkdale Station to accommodate the mobile unit.

Justification:
Parkdale Station peak load will exceed non-firm station capacity of 16.3 MVA by 2005. The existing mobile unit will not be able to completely back up the station if the bank fails during peak load. A 35 MVA mobile transformer will enable the supply of reliable power, defer a station capacity increase until 2025, provide a second contingency to other stations including Atwood, Augier, Inkster, Stonewall and Steinbach, and extend the non-firm capacity limits (deferring bank additions) of three new stations at St Vital South, Ravelstone and Bird's Hill from 23 MVA to 32.4 MVA.

In-Service Date:
December 2008.

Revision:
Cost flow revision and in-service date deferred 15 months to December 2008.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 3.5	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	0.0	-	-	-	-	-
Revised	$ 3.5	$ 0.0	$ -	$ -	$ -	$ -	$ -

Rover Substation Replace 4 kV Switchgear

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 and relocate two feeders. Construct 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 old 4 kV building and its transformer banks.

Justification:
This project was identified during "Due Diligence of Winnipeg Hydro Purchase" based on achieving an acceptable level of employee safety and customer reliability. This equipment has been in service since 1950, 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. During removal of the existing concrete surfacing (after removal of the first section of switchgear), it was determined that the floor could not withstand the stresses and no further floor repair can be undertaken.

In-Service Date:
September 2011.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 12.7	$ 4.0	$ 1.8	$ 1.1	$ 0.2	$ -	$ -
Increase or (Decrease)	-	(3.8)	4.1	-	0.2	-	-
Revised	$ 12.7	$ 0.2	$ 5.9	$ 1.1	$ 0.4	$ -	$ -

Martin New Outdoor Station

Description:
Install a new 3 bank outdoor station complete with 18 feeder positions and protection to replace the existing Martin Station.

Justification:
Martin Station is a 50 year old 2 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 to the other, there is no mobile backup available and there is no external tie to neighboring stations. Without improvement 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 2012.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 28.2	$ 5.2	$ 8.0	$ 9.1	$ 4.8	$ -	$ -
Increase or (Decrease)	-	(5.1)	4.6	(0.1)	0.6	-	-
Revised	$ 28.2	$ 0.1	$ 12.6	$ 9.0	$ 5.4	$ -	$ -

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 & 2 - 7.5/ 10 MVA transformers. Construct a new building, install a Remote Terminal Unit (RTU), communications, 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 10 years, and is projected to grow another 46.3 MVA over the next 18 years. Land acquisition problems prevented building a new station north of the perimeter highway. This is the next most economical option.

In-Service Date:
March 2010.

Revision:
Estimate increase reflects project scope change to include a station security system, re-termination of 66 kV Line 8, and current market pricing for labour and materials.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 10.1	$ 4.9	$ 1.3	$ -	$ -	$ -	$ -
Increase or (Decrease)	4.3	2.7	1.6	0.0	-	-	-
Revised	$ 14.4	$ 7.6	$ 2.9	$ 0.0	$ -	$ -	$ -

Burrows New 66 kV/ 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 75 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:
December 2011.

Revision:
Estimate increase reflects higher costs for the installation of the 66 kV line as a result of current market conditions, project scope change to include the purchase of additional property as the existing site did not have sufficient room to install a new control building, and a transfer of scope from the Rover (3) 4 kV Station Salvage & Feeder Conversion project for the installation of the third line-up of C-class, 3000A, 15 kV class indoor switchgear and associated equipment for four feeder positions.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 22.7	$ 9.7	$ 5.8	$ 4.4	$ 1.9	$ -	$ -
Increase or (Decrease)	5.8	(5.1)	4.9	5.8	0.5	-	-
Revised	$ 28.6	$ 4.6	$ 10.7	$ 10.2	$ 2.4	$ -	$ -

Winnipeg Central District 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:
June 2009.

Revision:
Estimate increase reflects unanticipated complexity with the 26 oil switch replacements associated with this project. As design progressed, it was realized that the complexity of the individual replacements greatly varied with location (residential vs. downtown, proximity of new switching equipment to old, available land for new above-ground equipment, etc.), and adjustments to the initial estimate per oil switch were required. In-service date deferred 15 months to June 2009.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 3.3	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	3.8	2.8	0.5	-	-	-	-
Revised	$ 7.1	$ 2.8	$ 0.5	$ -	$ -	$ -	$ -

William New 66 kV/ 12 kV Station

Description:
Construct a new 2-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 10 feeder positions. Costs associated with the potential installation of new 12 kV feeders to the new William Station are not included.

Justification:
Allows for some load transfer from King and Sherbrook Stations. King Station has no room for additional equipment, already serves a large portion of downtown Winnipeg, and is experiencing summer overloading due to cooling problems which this will alleviate. Sherbrook Station will operate at firm capacity in the summer of 2005, a load transfer will improve this and also supply capability in the event of a major equipment failure. Load growth associated with proposed projects in the area cannot be adequately handled by the present stations. Service reliability will be improved and accommodation for future automation can be realized from new equipment.

In-Service Date:
December 2011.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 10.3	$ 0.9	$ 2.0	$ 4.0	$ 3.0	$ -	$ -
Increase or (Decrease)	-	(0.9)	0.8	(0.1)	0.3	-	-
Revised	$ 10.3	$ 0.0	$ 2.8	$ 3.9	$ 3.3	$ -	$ -

Waverley West Sub Division Supply - Stage 1

Description:
Construct a new 24 kV feeder from Mohawk Station to Waverley West sub-division.

Justification:
A temporary 24 kV supply from Mohawk will enable the MHRC development to proceed by September 2007.

In-Service Date:
October 2009.

Revision:
Cost flow revision and in-service date deferred 14 months to October 2009.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 6.5	$ 4.0	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	(0.8)	1.4	-	-	-	-
Revised	$ 6.5	$ 3.2	$ 1.4	$ -	$ -	$ -	$ -

St. James 24 kV System Refurbishment

Description:
Terminate a new 24 kV Feeder (J54) at the St. James Station to supply the Winnipeg Airport Authority load expansion. Install a gang operated switch between feeders J25 and J54 at the Ferry Road and Ness Avenue Stations, and transfer 3.7 MVA of load from J25 to J54. Convert Berry Station BY612, 4 kV customers to 24 kV along Ferry Road. Construct 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, and that the Winnipeg Airport will continue to experience reliable service following a planned load expansion at the facility.

In-Service Date:
March 2013.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 65.9	$ 10.5	$ 8.5	$ 11.1	$ 22.5	$ 10.8	$ -
Increase or (Decrease)	-	(9.8)	10.6	-	-	1.7	-
Revised	$ 65.9	$ 0.7	$ 19.1	$ 11.1	$ 22.5	$ 12.5	$ -

Transcona Area Distribution Conversion

Description:
Convert Kildonan Place Shopping Centre retail outlets from Crossroads Station, Eastwinds and Rougeau Plaza, as well as the Transcona CNR Yards, Freshwater Fisheries Ltd and Palliser Furniture to 24 kV by extending the Plessis Road Station feeder P85 and Dawson Road Station feeder D43 by installing a new 25 kV breaker and feeder at Plessis Road Station.

Justification:
Partial conversion of the distribution in the Transcona area to 24 kV will allow Manitoba Hydro to defer building Ravelston Station for approximately seven years.

In-Service Date:
October 2008.

Revision:
Cost flow revision and in-service date deferred five months to October 2008.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 4.4	$ 0.5	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	0.2	-	-	-	-	-
Revised	$ 4.4	$ 0.7	$ -	$ -	$ -	$ -	$ -

Shoal Lake New 33 - 12.47 kV DSC

Description:
Construct a two bank distribution supply centre (DSC) and rebuild and convert the town distribution system.

Justification:
The existing station is 46 years old and requires re-building. The distribution system has voltage drop problems. This item represents the least cost alternative for the restoration of reliable, quality service in the foreseeable future.

In-Service Date:
September 2009.

Revision:
Cost flow revision and in-service date deferred one year to September 2009.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 3.6	$ 2.5	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	(2.3)	3.2	-	-	-	-
Revised	$ 3.6	$ 0.2	$ 3.2	$ -	$ -	$ -	$ -

York Station

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 provide for future new loads that cannot be adequately supplied by existing King, Edmonton, and York capacity.

In-Service Date:
September 2010.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 4.0	$ 0.3	$ 1.1	$ 2.6	$ -	$ -	$ -
Increase or (Decrease)	-	(0.1)	-	0.1	-	-	-
Revised	$ 4.0	$ 0.2	$ 1.1	$ 2.7	$ -	$ -	$ -

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. Salvage a bypass jumper.

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

In-Service Date:
October 2011.

Revision:
Estimate decrease reflects project scope reduction to include the installation of a single 15/20/25/28 MVA, 115-24.9 kV transformer with LTC, rather than the two which were originally planned. The change is a result of an recent analysis of the current loading levels and potential for load growth for Brandon's Industrial Park.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 9.4	$ -	$ 1.1	$ 5.2	$ 3.0	$ 0.1	$ -
Increase or (Decrease)	(3.1)	0.1	(0.3)	(2.1)	(1.2)	0.3	-
Revised	$ 6.3	$ 0.1	$ 0.8	$ 3.1	$ 1.8	$ 0.4	$ -

Winkler Market Feeder M25-13 Conversion

Description:
Rebuild the 8 kV portion of Winkler Market Feeder WM25-13 (WM08-13) to 25 kV standards, salvage Hochfeld 25-8 kV interchange bank and re-energize feeder at 25 kV.

Justification:
The load growth in the Winkler area is above Manitoba's average, and is experiencing a five year average load growth rate of 6%. This feeder is supplied by a 25 kV feeder and stepped down to 8 kV at Hochfeld. The 8 kV portion of this feeder is over 55 years old and has reached end of life.

In-Service Date:
October 2008.

Revision:
New item.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	2.9	2.9	-	-	-	-	-
Revised	$ 2.9	$ 2.9	$ -	$ -	$ -	$ -	$ -

Neepawa North Feeder NN12-2 & Line 57 Rebuild

Description:
Rebuild the main portion of Feeder NN12-2 and a 16 km section of Line 57.

Justification:
The poles have reached the end of their useful life and pole replacements must now be made or the entire line must be rebuilt. A section of Line 57 that contains feeders NN12-4 and NN12-2 was built in 1953 and is over 54 years old. A field report indicates that 75% of the line is in poor condition. Larger underbuild wire on feeder NN12-2 is required to improve voltage and losses, and a larger 66 kV wire is recommended to improve voltage fluctuations and losses.

In-Service Date:
October 2009.

Revision:
New item.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	1.9	0.0	1.9	-	-	-	-
Revised	$ 1.9	$ 0.0	$ 1.9	$ -	$ -	$ -	$ -

Interlake Digital Microwave Replacement

Description:
Construction of a modern communications system between the Dorsey Transmission Station and the Lower Nelson River. The existing Interlake Digital Microwave System is one of two communications systems used to operate the DC power system, it is a 28 year old system, older than most microwave systems of its kind, and it requires a replacement by a modern, highly dependable communications system.

Justification:
A replacement communications system is required for dependable communications to operate the DC power system, and to provide for the continued supply of reliable power to Manitoba Hydro's domestic and export customers.

In-Service Date:
December 2009.

Revision:
Cost flow revision and in-service date deferred 13 months to December 2009, due to internal resource constraints.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 19.7	$ 11.6	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	(4.2)	3.9	-	-	-	-
Revised	$ 19.7	$ 7.4	$ 3.9	$ -	$ -	$ -	$ -

Communication System - Southern MB (Great Plains)

Description:
Replace part of the Great Plains Microwave System with an optical Fiber Cable Communication System (FOTS). The route includes Letellier TS, Stanley TS and Crocus Plains TS as well as the existing Great Plains Microwave Stations of St. Leon TS and Glenboro TS. The system will carry the Reston TS and Virden TS traffic as far as the Brandon South microwave site.

Justification:
Required to provide the continued supply of reliable power to Manitoba Hydro customers inside and outside the province.

In-Service Date:
November 2009.

Revision:
Estimate decrease reflects lower than expected construction costs and fewer high-cost construction activities through the Glenboro desert and Brandon Hills areas. Weather and site soil conditions were also more favourable than anticipated.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 24.6	$ 3.6	$ 1.6	$ -	$ -	$ -	$ -
Increase or (Decrease)	(2.7)	0.4	-	-	-	-	-
Revised	$ 21.9	$ 4.0	$ 1.6	$ -	$ -	$ -	$ -

Communications Upgrade Winnipeg Area

Description:
Replace part of the Winnipeg Area system with optical fiber cable and electronics in order to provide increased communication capacity to carry rural power system and administrative data traffic from the Winnipeg perimeter terminal stations to Dovercourt SCC and to 820 Taylor, and to carry increased local Winnipeg area traffic between stations.

Justification:
This communications capacity is required to carry modern high speed data traffic on Manitoba Hydro's Wide Area Network (WAN), as required by modern corporate operations. This project will provide more secure communications and also replace cable that does not have much dependable life remaining.

In-Service Date:
March 2010.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 7.4	$ 1.0	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	0.1	0.8	-	-	-	-
Revised	$ 7.4	$ 1.1	$ 0.8	$ -	$ -	$ -	$ -

Pilot Wire Replacement

Description:
Replace existing Pilot Wire protection schemes to provide redundancy to major industrial and residential customers that are either running without protection or must be subject to an outage because of repairs on Pilot Wire schemes that generally have no alternative routes.

Justification:
The current equipment is no longer manufactured or supported by vendors.

In-Service Date:
August 2011.

Revision:
Estimate decrease reflects lower actual costs for the pilot wire replacement for Des Meurons (DB2 & DB4); as well as, project scope reduction for the Harrow and Scotland (HS5) as this work will be completed under the Pointe du Bois & Slave Falls Transmission project.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 11.6	$ 1.4	$ 0.4	$ 1.1	$ 1.4	$ -	$ -
Increase or (Decrease)	(2.0)	0.1	-	-	(0.5)	-	-
Revised	$ 9.6	$ 1.5	$ 0.4	$ 1.1	$ 0.9	$ -	$ -

Transmission Line Protection & Teleprotection Replacement

Description:
Replace obsolete protection and associated communications equipment for 30 transmission line 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 and shall have redundant channels.

Justification:
Difficulty in repairing and restoring failed teleproction equipment. 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 we are able to import or export.

In-Service Date:
August 2014.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 21.1	$ 2.0	$ 2.9	$ 4.7	$ 6.4	$ 2.4	$ 1.7
Increase or (Decrease)	-	(0.1)	(0.9)	1.0	-	-	(0.2)
Revised	$ 21.1	$ 1.9	$ 2.0	$ 5.7	$ 6.4	$ 2.4	$ 1.5

Winnipeg Central Protection Wireline Replacement

Description:
Migrate the former Winnipeg Hydro area communications from metallic wireline to optical fibre cables.

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:
September 2011.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 9.3	$ 1.9	$ 2.0	$ 2.0	$ 0.1	$ -	$ -
Increase or (Decrease)	-	0.6	0.4	(0.8)	(0.1)	-	-
Revised	$ 9.3	$ 2.5	$ 2.4	$ 1.2	$ -	$ -	$ -

Mobile Radio System Modernization

Description:
Replace the VHF Mobile Radio System with a modern digital system of increased capability.

Justification:
Manitoba Hydro will continue, into the foreseeable future, to require a very dependable mobile radio communication system, under its own control and independent of any public system. Any public system cannot guarantee service under the conditions required of Manitoba Hydro, due to the lack of dependably under adverse conditions and the susceptibility of public peak traffic to overload the system. Lack of a communications is certain to extend any power outage.

In-Service Date:
March 2012.

Revision:
Estimate increase reflects project deferral from December 2010 to March 2012, due to resource constraints.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 29.6	$ 0.1	$ 0.5	$ 11.8	$ 17.2	$ -	$ -
Increase or (Decrease)	1.1	-	-	2.1	(1.0)	-	-
Revised	$ 30.7	$ 0.1	$ 0.5	$ 13.9	$ 16.2	$ -	$ -

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:
March 2011.

Revision:
New item.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	4.6	0.4	1.1	3.1	-	-	-
Revised	$ 4.6	$ 0.4	$ 1.1	$ 3.1	$ -	$ -	$ -

Cyber Security Systems

Description:
Installation or upgrade of security and network systems for secure remote access, industrial data network installations, and compliance to NERC standards CIP-002-1 to CIP-009-1.

Justification:
The Cyber Security Standards CIP-002-1 are part of NERC Reliability Standards, which Manitoba Hydro is obligated, as per contractual arrangements with MISO, to comply with or be subject to penalties or sanctions.

In-Service Date:
March 2012.

Revision:
Cost flow revision and in-service date deferral to March 2012.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 10.1	$ 3.4	$ 1.7	$ 0.7	$ 0.3	$ -	$ -
Increase or (Decrease)	-	0.6	1.1	(0.1)	(0.3)	-	-
Revised	$ 10.1	$ 4.0	$ 2.8	$ 0.6	$ -	$ -	$ -

Site Remediation

Description:
Conduct geotechnical investigations and remediate any hydrocarbon contaminated sites at the remaining former isolated diesel generating stations in Little Grand Rapids, Manigotogan, The Pas, Moose Lake, Norway House, Wanless, Cormorant, Cranberry Portage, Shamattawa, Berens River, and Churchill. Conduct geotechnical investigation for the various contaminated corporate facilities, 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 concerns, and in compliance with current environmental regulations and standards applicable to unrestricted use of abandoned former diesel sites, the sites must be investigated, remediated, and restored to equivalency of the surrounding area. Various existing corporate contaminated facilities should be brought into compliance with current environmental regulations and standards.

In-Service Date:
March 2011.

Revision:
Estimate increase reflects project scope change to incorporate soil remediation work required at the former Shamattawa Diesel Generating Station (DGS). In-service date advanced one year to March 2011.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 11.4	$ 0.3	$ 2.5	$ 0.6	$ 0.4	$ -	
Increase or (Decrease)	1.9	0.7	0.6	1.4	(0.1)	-	-
Revised	$ 13.3	$ 1.0	$ 3.1	$ 2.0	$ 0.3	$ -	$ -

Oil Containment

Description:
Design and construct oil containment systems to collect and recover any oil spilled within the system.

Justification:
Minimize environmental impact of oil spills.

In-Service Date:
March 2010.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 7.4	$ 1.3	$ 1.4	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	0.5	(0.1)	-	-	-	-
Revised	$ 7.4	$ 1.8	$ 1.3	$ -	$ -	$ -	$ -

Station Battery Bank Capacity & System Reliability Increase

Description:
Conduct individual studies, replace and/or upgrade battery bank capacity and chargers in 156 transmission and distribution stations (over the next ten years) and 7 stand alone communications sites to meet the North American Electric Reliability Council's (NERC) battery bank sizing criteria. Includes AC service upgrades and building extension costs required to complete this project.

Justification:
Present battery banks were designed to an 8 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 system restoration will be inhibited if a black start situation should occur. NERC's requirements are to have a workable system restoration plan, with 12 hours capacity, dual battery systems and multiple chargers where practical, or without a restoration plan capacity for 16-hours duration. This project provides the battery bank systems for a workable system restoration plan into the future, and offers a coordinated means of changing the banks as they reach their end-of-life.

In-Service Date:
March 2015.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 46.5	$ 3.0	$ 3.0	$ 6.7	$ 6.8	$ 7.0	$ 14.3
Increase or (Decrease)	-	1.9	3.9	0.3	(0.1)	(0.3)	(6.8)
Revised	$ 46.5	$ 4.9	$ 6.9	$ 7.0	$ 6.7	$ 6.7	$ 7.5

Red River Floodway Expansion Project

Description:
Complete communications, distribution, and transmission utility crossing work required along the Red River Floodway to accommodate the Manitoba Floodway Authority's floodway expansion. The project budget of $1.808 million represents 50% of the total estimated costs, with the other 50% to be received in contributions from the Manitoba Floodway Authority.

Justification:
Cost sharing in accordance with agreement with the Province of Manitoba. This arrangement would apply to all construction costs as well as all planning and design, project management, and any other associated costs required to complete the changes required to electricity and supporting communication equipment as a result of the floodway expansion project.

In-Service Date:
August 2008.

Revision:
Cost flow revision and in-service date deferred 13 months to August 2008.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 1.8	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	0.5	-	-	-	-	-
Revised	$ 1.8	$ 0.5	$ -	$ -	$ -	$ -	$ -

Fleet

Description:
The annual replacement of Fleet vehicles and equipment, as well as the purchase of such additional equipment, as requested and justified by various user Divisions.

Justification:
The replacement cycles and requested replacement funding for the Manitoba Hydro Fleet is at or below utility norms.

In-Service Date:
Ongoing.

Revision:
No revision.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	NA	$ 13.0	$ 13.3	$ 13.5	$ 13.8	$ 14.1	$ 90.5
Increase or (Decrease)		-	-	-	-	-	-
Revised		$ 13.0	$ 13.3	$ 13.5	$ 13.8	$ 14.1	$ 90.5

Domestic Item - Transmission & Distribution - Electric

Description:
This program consists of several hundred projects that are not identified as Major Items and whose individual cost is of a relatively small amount. The majority of projects are required to extend subtransmission, 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 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:
No revision.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	NA	$ 88.9	$ 90.7	$ 92.6	$ 94.4	$ 96.3	$ 619.6
Increase or (Decrease)		-	-	-	-	-	-
Revised		$ 88.9	$ 90.7	$ 92.6	$ 94.4	$ 96.3	$ 619.6

CUSTOMER SERVICE & MARKETING:

Automatic Meter Reading – Electric

Description:
Purchase and installation of an automatic meter reading (AMR) communication network to remotely read and electronically disseminate readings and other relevant customer information to the appropriate department or division.

Justification:
AMR will satisfy the ongoing need for meter readings in support of billings as well as providing 'on demand' readings to respond to customer inquiries. Other benefits include power outage alarms, defective meter/ theft of service, flexible timing, and consolidation of billings.

In-Service Date:
March 2016.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 30.9	$ -	$ 3.9	$ 4.0	$ 4.8	$ 4.1	$ 12.9
Increase or (Decrease)	-	-	0.0	(0.0)	(0.8)	(0.0)	0.1
Revised	$ 30.9	$ -	$ 3.9	$ 4.0	$ 4.0	$ 4.1	$ 13.0

Distribution PCB Testing & Transformer Replacement

Description:
Testing and removal of all Polychlorinated Biphenyl (PCB) material (>50 ppm) from distribution pole and pad mount transformers, including the 9,514 units in the former Winnipeg Hydro system.

Justification:
In accordance with PCB removal program.

In-Service Date:
March 2009.

Revision:
Cost flow revision and in-service date deferred one year to March 2009.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 19.6	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	0.4	-	-	-	-	-
Revised	$ 19.6	$ 0.4	$ -	$ -	$ -	$ -	$ -

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:
Due to the ageing condition of this distribution underground equipment, maintenance check completions have dropped to 35% and required repairs to 27% as per Policy 343. It is anticipated a significant number of capital work requirements will be identified for management review and approval.

In-Service Date:
March 2010.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 14.9	$ 2.0	$ 2.1	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	-	(0.3)	-	-	-	-
Revised	$ 14.9	$ 2.0	$ 1.8	$ -	$ -	$ -	$ -

Winnipeg Central District Underground Network Asbestos Removal

Description:
Remove or encapsulate the asbestos wrap on existing high voltage cables, in approximately 1,800 manholes within the central Winnipeg area.

Justification:
Asbestos must be in a condition that does not pose a health risk to anyone in the workplace. The current exposure control plan requires that asbestos be properly sealed with a sealant, encapsulated or removed to eliminate the risk of exposure.

In-Service Date:
March 2010.

Revision:
Cost flow revision and in-service date deferred one year to March 2010.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 3.0	$ 1.3	$ -		$ -	$ -	$ -
Increase or (Decrease)	-	(0.6)	0.8	-	-	-	-
Revised	$ 3.0	$ 0.8	$ 0.8	$ -	$ -	$ -	$ -

Domestic Item - Customer Service & Marketing - Electric

Description:
This program consists of minor projects that are not identified as Major Items and whose individual cost is of a relatively small amount. The majority of projects are required to supply service to residential, farm, commercial and industrial customers, and to replace plant facilities whose useful life has been exceeded.

Justification:
The residential, farm, commercial and industrial loads are expected to grow at an average rate of 1.5% per annum and will require a program of additions and replacements at the customer service point to accommodate these anticipated changes.

In-Service Date:
Ongoing.

Revision:
No revision.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	NA	$ 60.2	$ 61.4	$ 62.6	$ 63.9	$ 65.2	$ 419.2
Increase or (Decrease)		-	-	-	-	-	-
Revised		$ 60.2	$ 61.4	$ 62.6	$ 63.9	$ 65.2	$ 419.2

FINANCE & ADMINISTRATION:

Corporate Buildings

Description:
Capital requirements for refurbishing and/or replacing corporate facilities throughout the Province.

Justification:
Replacements, renovations and additions to corporate facilities are required to enable a safe, efficient, and productive environment for staff and customers.

In-Service Date:
Ongoing.

Revision:
No revision.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	NA	$ 8.0	$ 8.0	$ 8.0	$ 8.0	$ 8.0	$ 48.0
Increase or (Decrease)		-	-	-	-	-	-
Revised		$ 8.0	$ 8.0	$ 8.0	$ 8.0	$ 8.0	$ 48.0

Enterprise GIS Project

Description:
Implement T&D and CS&M GE Smallworld common electric and gas Graphical Information System (GIS) for current accurate maps of Manitoba Hydro System and conduct Power Supply GIS needs assessment.

Justification:
The enterprise GIS will allow support of a seamless, integrated, and current computer model of the complete electric and gas distribution systems. This model will be used to safely and efficiently manage the system, and facilitate the consolidation of process and operations between the electric and gas lines of business.

In-Service Date:
March 2009.

Revision:
Cost flow revision and in-service date deferred 21 months to March 2009.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 21.9	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	0.4	-	-	-	-	-
Revised	$ 21.9	$ 0.4	$ -	$ -	$ -	$ -	$ -

Workforce Management (Phase 1 to 4)

Description:
Implement a Workforce Management solution to integrate and automate the Customer Service & Marketing planning and dispatch functions, as well as provide for in-truck computing.

Justification:
The Workforce Management solution will generate a net present value saving of $56.8 M to the corporation over a 10 year period. The payback period is 3.4 years with an Internal Rate of Return of 111%. The hard benefits associated with the implementation include reducing administrative activities, allowing for an overall reduction of the workforce by 24 EFTs which results in an $8.7 M department operating budget savings over 10 years.

In-Service Date:
March 2009.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 11.3	$ 2.9	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	3.8	-	-	-	-	-
Revised	$ 11.3	$ 6.7	$ -	$ -	$ -	$ -	$ -

WorkSmart

Description:
This project will focus on the increased use of technology to further improve corporate efficiency and effectiveness with respect to the management of its documents and records. It will encompass the complete range of document handling and process; from inception, to storage, to retrieval, and to disposal. Emphasis will be placed on taking advantage of technology to minimize and to a large extent, eliminate paper handling within the corporation. The project will have particular relevance to the efficiency of work processes in Manitoba Hydro's new downtown office building at 360 Portage Avenue.

Justification:
Three primary benefits of implementing the WorkSmart project: 1) reduction of information to be transported to the new Head Office; 2) reduction in the number of devices implemented in the new Head Office; and 3) utilizing current technology to improve productivity and the management of information. The capital cost to implement this proposal is $5.4 M. The project will generate a net present value savings of $43.9 M to the corporation over a 10 year period, with a payback period of only one year.

In-Service Date:
November 2008.

Revision:
Cost flow revision and in-service date deferred two months to November 2008.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 5.4	$ 1.4	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	(0.5)	-	-	-	-	-
Revised	$ 5.4	$ 0.9	$ -	$ -	$ -	$ -	$ -

Domestic Item – Finance & Administration

Description:
To provide information technology hardware, software, application development, and other related services to the corporation.

Justification:
Computer system enhancements are required throughout the corporation to achieve ongoing improvements in resource productivity and reliability.

In-Service Date:
Ongoing.

Revision:
No revision.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	NA	$ 22.3	$ 22.7	$ 23.2	$ 23.7	$ 24.1	$ 155.2
Increase or (Decrease)		-	-	-	-	-	-
Revised		$ 22.3	$ 22.7	$ 23.2	$ 23.7	$ 24.1	$ 155.2

TRANSMISSION & DISTRIBUTION - GAS:

Southloop Capacity Upgrade – Winkler

Description:
Install transmission gas line looping from the Town of Carman south with tie-in at the Winkler Station.

Justification:
The Winkler District has been growing rapidly and is expected to continue to grow for the next number of years. Due to this growth, certain town border stations along the transmission line have experienced low inlet pressures and without looping, the system will become even more unstable. This project has the benefit of offering a secure 10 year supply of natural gas to all customers within the area.

In-Service Date:
September 2008.

Revision:
No revision.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 4.3	$ 3.6	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	-	-	-	-	-	-
Revised	$ 4.3	$ 3.6	$ -	$ -	$ -	$ -	$ -

Gas Riser Rehabilitation Program

Description:
Five year program to rehabilitate approximately 15,000 remaining service riser assemblies that are assessed to be a high or medium priority.

Justification:
An increasing gas riser failure history indicates the need to review and rehabilitate those installations showing sufficient evidence of stress.

In-Service Date:
March 2009.

Revision:
No revision.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 16.5	$ 2.0	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	-	-	-	-	-	-	-
Revised	$ 16.5	$ 2.0	$ -	$ -	$ -	$ -	$ -

Natural Gas Pipeline Replacement - Red River at North Perimeter

Description:
Replace the nominal pipe size (NPS) 8 natural gas pipeline crossing the Red River at the North Perimeter bridge and Henderson Highway.

Justification:
The current pipeline crossing does not meet CSAZ662-03 standard due to insufficient cover, as approximately 22 metres of pipe is currently exposed along the riverbed, which places the pipeline at risk to damage. Replacing the pipeline will restore the pipeline to an adequate operating condition and meet current standards.

In-Service Date:
September 2008.

Revision:
New item.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	1.7	1.6	-	-	-	-	-
Revised	$ 1.7	$ 1.6	$ -	$ -	$ -	$ -	$ -

Brandon Unodourized Natural Gas Pipeline Improvement

Description:
Install 11,400 meters of 12" steel transmission pressure pipeline to assist in supplying the Brandon Thermal Generating Station natural gas turbines and KOCH Fertilizer Canada Ltd. (KOCH).

Justification:
In order to meet Manitoba Hydro's contractual obligation to KOCH, as well as the firm service agreement with the Brandon Thermal Generating Station, it is necessary to construct an additional 11,400 meters of 12" pipeline for supply to the Brandon Thermal Generating Station natural gas turbines.

In-Service Date:
October 2009.

Revision:
New item.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Increase or (Decrease)	5.5	0.3	5.2	-	-	-	-
Revised	$ 5.5	$ 0.3	$ 5.2	$ -	$ -	$ -	$ -

Domestic Item – Transmission & Distribution - Gas

Description:
This program consists of many small projects which are not identified as Major Items and whose individual cost is of a relatively small amount. The majority of projects are required for distribution and transmission facilities betterment and growth. Specifically, distribution system upgrades, regulator stations, system looping, cathodic protection, strained riser replacements, and new business.

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

In-Service Date:
Ongoing.

Revision:
No revision.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	NA	$ 15.2	$ 17.2	$ 17.5	$ 17.9	$ 18.3	$ 117.4
Increase or (Decrease)		-	-	-	-	-	-
Revised		$ 15.2	$ 17.2	$ 17.5	$ 17.9	$ 18.3	$ 117.4

CUSTOMER SERVICE & MARKETING - GAS:

Automatic Meter Reading – Gas

Description:
Purchase and installation of an automatic meter reading (AMR) communication network to remotely read and electronically disseminate readings and other relevant customer information to the appropriate department or division.

Justification:
AMR will satisfy the ongoing need for meter readings in support of billings as well as providing 'on demand' readings to respond to customer inquiries. Other benefits include power outage alarms, defective meter/ theft of service, and the flexible timing and consolidation of billings.

In-Service Date:
March 2013.

Revision:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	$ 15.0	$ -	$ 3.7	$ 3.7	$ 3.8	$ 3.5	$ -
Increase or (Decrease)	-	-	-	-	(0.3)	0.3	-
Revised	$ 15.0	$ -	$ 3.7	$ 3.7	$ 3.5	$ 3.8	$ -

Demand Side Management – Gas

Description:
Design, implement and deliver incentive based Power Smart conservation programs, to reduce gas consumption and greenhouse gas emissions in Manitoba. These programs would complement similar efforts being undertaken with electricity DSM programs, and deliver natural gas savings of 152 million cubic meters by 2017/18.

Justification:
Energy conservation is economically efficient and environmentally beneficial. The incentive based programs in the Natural Gas Power Smart Plan (NGPSP) are cost effective, with a Total Resource Cost test (the primary economic indicator) ratio of 1.3. The Rate Impact Measure (the secondary economic indicator) is 0.7. The NGPSP aligns the Corporation's conservation efforts with our stated goals, the interests of the provincial government and many stakeholders, and leading North American utilities and agencies that offer natural gas conservation programs.

In-Service Date:
Ongoing.

Revision:
Addition of three new programs, namely: Water & Energy Saver Package, Commercial Kitchens, and Commercial Clothes Washers.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	NA	$ 12.6	$ 12.9	$ 13.4	$ 12.4	$ 11.9	$ 49.6
Increase or (Decrease)		0.9	1.3	(0.1)	0.0	(0.4)	1.3
Revised		$ 13.5	$ 14.2	$ 13.3	$ 12.4	$ 11.5	$ 50.9

Domestic Item – Customer Service & Marketing - Gas

Description:
Covers the additions and replacements of gas meters, and gas system improvements.

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:
Cost flow revision only.

	Total Project	08/09	09/10	10/11	11/12	12/13	13-19
Previously Approved	NA	$ 6.7	$ 6.9	$ 7.0	$ 7.1	$ 7.3	$ 46.7
Increase or (Decrease)		-	-	(0.3)	(0.3)	(0.3)	(1.8)
Revised		$ 6.7	$ 6.9	$ 6.7	$ 6.8	$ 7.0	$ 44.9