

RESPONSE TO DIRECTIVE #15 – BOARD ORDER 73/15

15. *Manitoba Hydro shall identify and provide details of individual capital projects with a value greater than \$1 million in future Capital Expenditure Forecasts.*

Capital Expenditure Forecast (CEF15) - Appendix A provides a listing of Base Capital projects by business unit with a total project cost of greater than \$1 million. Projected cash flows for each project are provided for fiscal years 2015/16 through to 2017/18. Specific projects have been approved in these years through risk assessment and prioritization and have completed a detailed evaluation of scope, cost and benefit. Annual forecasts have been cumulated in future years as the majority of requirements beyond the 3 year period are preliminary and require further assessment based on risk, asset condition and other factors in order to determine future corporate priorities.

Capital Expenditure Forecast (CEF15) - Appendix B provides additional details for each project listed in Appendix A, including total project cost, description and projected in-service date.

CAPITAL EXPENDITURE FORECAST (CEF15)

APPENDIX A

(in 000's)

	Total Project Cost	2016	2017	2018	2019 to 2025	2026 to 2035
Generation Operations Base Capital Target		95,781	77,957	66,708	706,161	1,445,653
Target to be Allocated & Projects less than \$1 million		13,317	246	9,128	637,086	1,445,653
Generation North Security Installations/Upgrades	8,673	286	2,203	657	-	-
Generation South Security Installations/Upgrades	10,662	1,840	2,008	19	-	-
Generation Operations NERC Cyber Security Upgrades	5,944	226	2,488	335	-	-
Public Water Safety/Security	18,257	1,814	2,629	2,913	4,485	-
Generation North Sewer & Domestic Water System Install/Upgrades	29,803	1,402	7,724	2,948	9,945	-
Generation South Sewer & Domestic Water System Install/Upgrades	26,561	4,407	209	-	-	-
Seven Sisters Townsite	4,578	885	-	-	-	-
Generation South - Winnipeg Riverbank Protection	21,457	1,191	1,268	-	-	-
Generation South Roof Replacement Program	6,316	1,858	2,686	1,748	-	-
Kettle G.S. Petroleum Storage Facility Tank	3,533	462	-	-	-	-
Generation South - Hydraulic Controls	7,435	43	2,415	3,432	1,505	-
Generation Operations Remote Control & Monitoring	12,840	1,807	207	3,539	-	-
Slave Falls G.S. Creek Spillway Rehabilitation	26,026	1,928	12,871	10,827	-	-
Slave Falls Spillway Rehabilitation	28,889	1	1	140	28,737	-
Jenpeg Transformer Refurbishment/Spare	3,455	275	292	2,603	13	-
Grand Rapids Unit Transformer Replacement	20,989	5,755	5,661	829	-	-
Great Falls Transformer Spares	3,167	876	72	1,076	-	-
Jenpeg Accommodation Facility	5,122	3,738	67	-	-	-
Generation South PCB Regulation Compliance	4,506	510	252	176	1,863	-
Kettle Transformer Replacement Program	45,602	1,130	165	-	-	-
McArthur Falls/Pine Falls Breaker Replacement Program	15,045	2,162	36	-	-	-
Seven Sisters Protection Upgrades	7,271	907	-	-	-	-
Grand Rapids Excitation Program	14,760	2,444	2,722	2,759	64	-
Laurie River & CRD Communications	7,360	262	2,344	730	-	-
Notigi Marine Vessel Replacement & Infrastructure Improvement	7,024	1,896	804	-	-	-
Limestone Stilling Basin Rehabilitation	2,103	1,730	-	-	-	-
Kettle Wicket Gates Lever Refurbishments	2,137	439	-	-	-	-
Limestone Governor Replacements	4,325	1,058	690	818	-	-
Limestone Generating Station Control and Data Acquisition (GSCADA) Replacement	5,143	79	1,328	697	2,629	-
Jenpeg Unit 4 Partial Overhaul	8,672	1,803	-	-	-	-

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(in 000's)

	Total Project Cost	2016	2017	2018	2019 to 2025	2026 to 2035
Jenpeg Unit 1 Fire Rehabilitation	11,090	10,192	2,289	-	-	-
Generation South - Slave Falls Seven Bay Sluiceway	16,469	1,341	238	2,276	717	-
Brandon Unit 5 License Review	10,314	125	625	4,067	-	-
Selkirk Environmental Enhancements	14,693	158	-	-	-	-
Long Spruce Fire Protection System Replacement	7,274	1,983	3,976	1,314	-	-
Kettle Fire Protection System Replacement	2,670	-	1,414	1,256	-	-
Halon Replacement Project	25,566	573	-	-	-	-
Grand Rapids Housing	12,585	79	1,372	1,403	2,893	-
Grand Rapids Fish Hatchery Project	4,908	575	-	-	-	-
Gillam Housing Retrofit Program	10,703	677	607	-	-	-
Gillam Redevelopment & Expansion Phase 1A	24,116	175	103	-	-	-
Great Falls Stator Frame Spare	5,750	963	3,396	1,391	-	-
Water Licenses & Renewals	89,297	12,105	10,592	9,225	16,226	-
Kettle G.S. - Units 5 - 10 & 12 Surface Area Cooler (SAC) Replacement	1,550	344	-	-	-	-
Kettle Compressed Air System Replacement	1,190	1,014	-	-	-	-
Laurie River Switchyard Bank 2 Replacement	1,864	1,453	401	-	-	-
Laurie River Access Road Upgrade	1,657	1,655	-	-	-	-
Winnipeg River Governor Pumps Replace Valve & ACC Tank	2,924	790	314	-	-	-
Generation South Portable Emergency Station Service Diesel Generator	2,842	258	-	-	-	-
Brandon Unit 5 High Pressure Loop Piping Replacement	2,249	730	-	-	-	-
Generation South Fall Protection Program	3,416	940	634	-	-	-
Slave Falls Washroom, Lunchroom and Office Renovation	1,691	109	-	-	-	-
McArthur Falls Sluiceway Anchoring	1,320	1,306	-	-	-	-
McArthur Falls Battery Bank and Inverter Upgrade	1,233	456	-	-	-	-
Slave Falls Roof Replacement	1,897	343	-	-	-	-
Slave Falls 129VDC System Upgrade	1,298	289	609	400	-	-
Jenpeg Staffhouse Flood Renovation	1,663	616	-	-	-	-

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Transmission Base Capital Target	943,564	97,808	103,553	86,917	506,990	1,708,813
Target to be Allocated & Projects less than \$1 million		1,121	25,123	804	242,246	1,644,969
Station Battery Bank Capacity & System Reliability Increase	46,328	2,938	1,547	1,141	4,795	-
Waverley Service Centre Oil Tank Farm Replacement	3,933	145	-	-	-	-
Brandon Area Transmission Improvements	12,314	357	568	8	-	-
V38R 230kV Transmission Line ROW in Riding Mountain National Park	2,303	1,389	385	-	-	-
Whiteshell Bank 1 Replacement	3,035	33	1,822	1,125	18	-
Neepawa New 230 - 66kV Station	31,304	3,778	-	-	-	-
13.2kV Shunt Reactor Replacements	15,414	2,072	2,130	2,208	3,055	-
Laverendrye-St. Vital 230kV Line & Breaker Replacement	32,898	3,247	3,949	1,540	17,898	-
Breaker Fail Protection Implementation	7,302	881	-	-	-	-
Southwest Winnipeg 115kV Transmission Improvements	41,050	7,315	4,339	1,187	29,069	-
Brandon Victoria Ave Breaker Replacement	4,280	56	1,105	1,053	1,991	-
Transmission Breaker Sustainment Capital Program	14,924	928	887	-	584	12,082
Transmission Transformer Sustainment Capital Program	67,612	-	-	-	18,058	49,554
Transmission Line Wood Pole Structure Replacement Program	14,172	535	764	1,117	9,643	-
Transmission Line Wood Pole Spar Arm Replacement Program	10,334	1,353	1,392	1,214	3,344	-
Bi-Pole I & II Spacer Damper Replacements (Phase 2)	30,908	8,157	10,707	5,615	-	-
Southern AC System Breaker Replacements	14,728	7,892	4,335	139	-	-
Winnipeg-Brandon Transmission System Improvements	43,141	1,003	266	6,638	26,076	-
Stanley Station 230-66kV Transformer Addition	16,689	561	126	9,584	4,789	-
Ashern Station Bank Addition	10,421	269	236	1,564	4,947	-
Souris East Transformer Capacity Enhancement	11,217	4	389	6,348	4,404	-
Shamattawa Capacity Increase	1,113	133	-	-	-	-
Tadoule Lake Diesel G.S. Tank Farm Upgrade	1,446	184	-	-	-	-
Transmission Line Protection & Teleprotection Replacement	26,978	1,677	1,815	2,708	403	-
Mobile Radio System Modernization	24,190	6,182	4,439	3,483	-	-
HVDC Fire Protection Projects	6,990	8	189	3,866	-	-
HVDC Transformer Bushing Draw Rod & Cap Replacement	3,476	508	383	133	-	-
HVDC Auxiliary Power Supply Upgrades	5,737	122	367	208	-	-
HVDC Domestic Water System Installations/Upgrade	2,435	17	145	108	734	-
HVDC System Transformer & Reactor Fire Protection Upgrades	10,738	167	265	-	-	-
HVDC Transformer Replacement Program	178,400	25,030	12,809	7,199	31,757	2,209
HVDC Site Upgrades for Transformer Moves	3,079	-	-	54	3,025	-

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HVDC Stations Ground Grid Refurbishment	4,147	84	358	861	429	-
HVDC Circuit Breaker Operating Mechanism Replacement	14,046	195	174	756	270	-
BP1 Pole Differential Protection	3,345	-	293	677	2,375	-
HVDC BP1 By-Pass Switch Replacement	12,181	4,867	580	-	-	-
HVDC BP2 Refrigerant Condenser Replacement	13,021	-	-	-	13,021	-
HVDC BP2 Smoothing Reactor Replacement	21,027	42	852	720	-	-
HVDC BP1 P1 & P2 Battery Bank Separation	3,325	126	1,262	1,861	-	-
HVDC BP1 Direct Current - Current Transformer (DCCT) Transductor Replacement	11,307	26	1,136	4,149	5,777	-
BP1 & 2 DC Converter Transformer Bushing Replacement	8,560	0	106	1,828	6,621	-
HVDC BP2 Valve Hall Wall Bushing Replacement	19,071	-	-	-	18,503	-
HVDC BP1 CQ Disconnect Replacement	5,204	31	171	1,304	3,682	-
HVDC BP2 Thyristor Module Cooling Refurbishment	7,563	152	329	200	287	-
HVDC Transformer Marshalling Kiosk Replacement	6,555	110	2,224	981	892	-
HVDC - Gapped Arrester Replacement	16,253	306	3,263	4,289	6,248	-
Dorsey AC 500 kV Transformer Refurbishment	5,341	131	-	-	-	-
NERC Critical Infrastructure Protection (CIP) V5 Implementation - Transmission Sites	4,178	1,231	2,947	-	-	-
NERC Critical Infrastructure Protection (CIP) V5 Implementation - HVDC Sites	2,164	2,142	21	-	-	-
Reston Station New 230kV Ring Breaker	2,661	-	-	121	2,540	-
La Verendrye Station 230-66kV Bank Addition	12,895	-	-	-	12,895	-
New 230kV Supply to Enbridge	3,615	207	2,005	1,189	-	-
Mobile Substation Replacement	3,970	149	3,780	-	-	-
Stanley Area 115kV to 230kV Migration	25,901	152	439	6,808	18,503	-
Diesel Upgrades - Brochet Diesel G.S.	3,851	297	629	658	2,267	-
Diesel Upgrades - Lac Brochet Diesel G.S.	7,977	579	1,300	1,332	4,808	-
Dorsey-Riel South Loop ROW Property Acquisition	1,882	1,214	-	-	-	-
Second Communications Link to U.S.	3,054	474	-	-	-	-
Communication Sites Standby Power Upgrades	2,092	1,234	-	-	-	-
Interlake Microwave (ILMW) Diesel Controllers & Switches Replacement	1,250	1,141	-	-	-	-
MTS Fibre Exchange-Neepawa to Roblin	1,385	974	411	-	-	-
Sherridon Station-Diesel Back-Up	2,371	1,338	37	-	-	-
HVDC Stations BP1 - 1000 PSI Air Dryer Replacement	1,234	165	-	-	-	-
HVDC Transformer Tapchanger Refurbishment	6,577	621	-	-	-	-
HVDC BP1 Pole Interlocking Relay Replacement	1,036	-	-	-	1,036	-
HVDC BP1 Transformer Neutral Bushing Replacement	1,165	476	200	-	-	-
Dorsey Synchronous Building Roof Rehabilitation	1,041	318	553	141	-	-
HVDC BP2 Voltage Divider Replacement	2,389	473	-	-	-	-
HVDC Deluge Valve Trim Kit Replacement	1,042	491	-	-	-	-

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Customer Service & Distribution Base Capital Target		172,189	201,916	184,116	1,488,947	2,917,604
Target to be Allocated & Projects less than \$1 million		78,259	126,258	136,613	1,447,891	2,917,604
Winnipeg Area 66kV Line Upgrades	2,031	1,160	455	60	245	-
Birtle South Line 97 66kV Upgrades	2,268	116	-	-	-	-
Neepawa Area 66kV System Improvement	7,377	3,962	982	-	-	-
Whiteshell 33 kV System Improvements	3,520	320	3,100	100	-	-
Interlake 66kV System Improvement Work	6,644	431	3,490	760	1,950	-
Winnipeg Distribution Infrastructure Requirement	24,527	1,500	2,628	-	-	-
Rover 4kV Station Salvage & Feeder Conversion	12,752	51	3,801	3,562	-	-
Martin Station-New 66-4/12kV Station	31,853	4,071	-	-	-	-
William Avenue - New Ductline	15,382	6,689	7,999	-	-	-
Health Science Centre Service Consolidation & Distribution Upgrade	10,216	5,187	-	-	-	-
Harrow Station - Bank & Feeder Addition	25,100	177	1,104	3,567	19,679	-
Waverley West Supply-Stage 2 (Distribution Supply Centres)	6,619	4,355	-	-	-	-
Mohawk Station - Bank & Feeder Addition	19,701	1,165	3,349	9,101	5,229	-
New McPhillips Station - 115kV to 24kV	47,228	2,586	18,760	18,848	6,769	-
Property Acquisition-N Downtown Station Site	4,000	231	-	-	-	-
York Station-Bank 1,3,5 & SwitchGear Addition	18,481	11,246	6,779	-	-	-
Tyndall Distribution Supply Centre	5,700	1,066	1,319	-	-	-
Lockport Distribution Supply Centre	5,000	1,934	-	-	-	-
Steinbach Keating/Steinbach Biscayne Distribution Supply Centres	7,394	4,000	1,400	-	-	-
McTavish Distribution Supply Centre & Feeder Conversion	4,054	540	-	-	-	-
Kleefeld Distribution Supply Centre	2,869	320	-	-	-	-
Mystery Lake Station Switchgear Replacment & Bank Addition	8,500	1,245	-	-	-	-
Gimli West Station GW08-11 & -09 25kV Conversion	2,994	600	-	-	-	-
Hochfeld Distribution Supply Centre	4,716	2,800	-	-	-	-
Winkler West Distribution Supply Centre	5,210	4,000	-	-	-	-
Norway House Station Bank Addition	3,990	90	2,900	1,000	-	-
Ste Agathe Station Bank Addition	2,348	210	90	1,752	-	-
Brandon West 4kV - 12kV Conversion	4,652	2,322	1,968	-	-	-
Glenboro Town 8-25kV Conversion and 8kV Station Salvage	1,681	1,599	-	-	-	-
Brandon Crocus Plains 115-25kV Bank Addtion	5,887	4	4	32	5,783	-
Relocation L17 Semple Station to Kingsbury	1,764	478	-	-	-	-
Enbridge Gretna Capacitor Bank Addition	2,500	50	384	2,066	-	-
Portage South 66kV L54 & L84 Upgrade	4,400	-	-	3,000	1,400	-

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Norcraft Distribution Supply Centre Site Bank Addition	3,150	500	1,950	610	-	-
Anola Distribution Supply Centre	4,000	2,680	-	-	-	-
Outlets of Seasons Development Expansion	3,268	1,250	1,950	-	-	-
Victoria Beach Distribution Supply Centre	3,600	400	3,200	-	-	-
Notre Dame de Lourdes Distribution Supply Centre	3,518	3,000	500	-	-	-
Elie Station Bank Replacement	2,421	10	200	2,202	-	-
Gimli West GW08-5 & GW08-8 Conversion	2,004	100	1,900	-	-	-
Alexander 66-25kV Distribution Supply Centre & Conversion	6,291	-	5,447	844	-	-
Ste. Rose Distribution Supply Centre	1,700	1,016	-	-	-	-
Dallas Station Bank Addition	1,616	504	-	-	-	-
66kV L14 Upgrade Saltel Tap to Blumenort	1,857	1,387	-	-	-	-
Eleanor Lake Distribution Supply Centre & Land Purchase	1,907	985	-	-	-	-
Morris Feeder MS08-8 Conversion	1,100	1,098	-	-	-	-
Teulon 12kV Area System Improvement	1,620	1,617	-	-	-	-
Wilkes Station New Feeders W61,W66,W67,W72	1,820	1,728	-	-	-	-
GP12-09 Reconductor Single Phase Taps	1,600	319	-	-	-	-
Waterford Green Sub division Feeders	1,997	1,965	-	-	-	-
Convert Feeder BWS12-07 & 12-09 4kV to 12kV	1,950	1,388	(0)	(2)	2	-
Convert Feeder BWS 12-03 From 4kV to 12kV	1,950	1,896	-	-	-	-
Convert Feeder BWS 12-05 From 4kV to 12kV	1,950	1,839	-	-	-	-
Extend Plessis Station 24kV Feeder P86	1,762	1,451	-	-	-	-
St. John's Ravenscourt 24kV Fdr Extension	1,235	217	-	-	-	-
Reconductor H56 Replacement	1,412	1,364	-	-	-	-
Star Lake STL12-2 Extension (Falcon Estates)	1,250	1,250	-	-	-	-
Waverley Service Centre 10MVA 66-24KV Distribution Supply Centre	1,834	208	-	-	-	-
AR721 Feeder Extension	1,297	1,253	-	-	-	-

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Human Resources & Corporate Services Base Capital Target		75,000	65,100	55,000	396,222	664,916
Target to be Allocated & Projects less than \$1 million		45,004	53,120	45,581	388,998	664,916
Fleet Services Relocation to Rosser Station	12,894	-	-	5,001	7,224	-
Ashern District Office	8,037	4,905	-	-	-	-
Neepawa District Office	9,653	5,661	-	-	-	-
Rural Consolidation	10,148	4,700	3,260	-	-	-
Enterprise Asset Management (EAM) Phase 2	35,186	5,904	5,220	2,918	-	-
Station Transformer Trailer Replacement	3,000	500	2,500	-	-	-
Rosser Site Development	3,500	1,000	1,000	1,500	-	-
Chevrier Land Purchase	3,500	3,500	-	-	-	-
Centralized Security Management System	1,739	1,257	-	-	-	-
Travel and Expense Management	2,807	235	-	-	-	-
Outage Mgmt System (Phase 1)	1,474	654	-	-	-	-
Environmental Health & Safety Management	1,873	1,679	-	-	-	-

**CAPITAL EXPENDITURE FORECAST (CEF15)
APPENDIX B**

	Total Project Cost (in 000's)	Description	In-Service Date (ISD)
Generation Operations			
Generation North Security Installations/Upgrades	8,673	Upgrade physical security systems at northern generating stations into a comprehensive, layered plan to increase security. Also, included in this scope are provisions for a centralized monitoring station for dedicated monitoring, initiating responses and notification as well as act as a central repository for all security records to ensure NERC compliance.	Aug 2017
Generation South Security Installations/Upgrades	10,662	Upgrade physical security systems at southern generating stations into a comprehensive, layered plan to increase security. Also, included in this scope are provisions for a centralized monitoring station for dedicated monitoring, initiating responses and notification as well as act as a central repository for all security records to ensure NERC compliance.	Feb 2017
Generation Operations NERC Cyber Security Upgrades	5,944	To upgrade existing facilities to meet the requirements of NERC Cyber Security Standards. The identification of critical cyber assets will include all equipment that is used for protection, control or monitoring and utilizes routable protocols (i.e. TCP/IP) or serial dial up communication. The following generating stations require upgrade - Seven Sisters, Pine Falls, Great Falls, Grand Rapids, Kelsey, Kettle, Long Spruce and Limestone.	Mar 2018
Public Water Safety/Security	18,257	Implement a comprehensive "Public Water Safety Around Dams" program which is aligned with the Canadian Dam Association (CDA) Guidelines for Public Safety Around Dams for 15 generating stations, 7 control structures, and 2 weirs.	Oct 2020
Generation North Sewer & Domestic Water System Install/Upgrades	29,803	Upgrade or replace the domestic water and waste water systems at northern generating facilities to ensure a continuing safe supply of drinking water and compliance with Waste Water regulations.	Dec 2023
Generation South Sewer & Domestic Water System Install/Upgrades	26,561	Upgrade or replace the domestic water and waste water systems at southern generating facilities to ensure a continuing safe supply of drinking water and compliance with Waste Water regulations.	Mar 2017
Seven Sisters Townsite	4,578	Transfer of responsibility for the provision of sewer and water services for the Seven Sisters Townsite from Manitoba Hydro to the Rural Municipality of Whitemouth. Manitoba Hydro will contribute funding towards R.M. of Whitemouth sewer and water projects, which would include the connection of the Seven Sisters Townsite sewer and water system to the R.M. of Whitemouth municipal sewer and water system.	Mar 2016
Generation South - Winnipeg Riverbank Protection	21,457	Placement of rock protection and construction of slope stabilization to reduce erosion of riverbanks along the Winnipeg River. The work includes inspection, design, mapping, land acquisition and remedial construction at priority locations along reaches of the Winnipeg River affected by our operations.	Mar 2017
Generation South Roof Replacement Program	6,316	Replace roof systems in disrepair with new modern roof system that will provide 30+yrs of reliable service. This work will also include the removal of any and all redundant roofing structures or protrusions to prevent future leaks.	Oct 2017
Kettle G.S. Petroleum Storage Facility Tank	3,533	Design, purchase and installation of American Petroleum Institute (API) compliant storage tanks and new oil pumping system, decommissioning and removal of non-compliant tanks, and replacement of piping system to satisfy provincial regulatory requirements.	Jun 2015
Generation South - Hydraulic Controls	7,435	Replace obsolete control equipment with unit control and monitoring systems (UCMS) at Seven Sisters, Jenpeg, and McArthur Falls Generating Stations.	Mar 2019
Generation Operations Remote Control & Monitoring	12,840	Install required automation, remote control and protective devices to reduce any risks associated with the destaffing of the hydraulic station control rooms.	Mar 2018
Slave Falls G.S. Creek Spillway Rehabilitation	26,026	Replace or repair the Slave Falls Creek Spillway to safely retain the forebay and meet the applicable Canadian Dam Association (CDA) guidelines	Oct 2017
Slave Falls Spillway Rehabilitation	28,889	Extend the life of the Slave Falls Spillway by increasing the stability of the concrete structures, reinforcing the sluiceway gates and spillway stoplogs, decommissioning the water conveyance of the ice sluiceway and installation of a new gate.	Oct 2022
Jenpeg Transformer Refurbishment/Spare	3,455	Purchase a spare generator step-up transformer (GSU) and refurbish the existing generator step-up transformers at Jenpeg Generating Station.	Jun 2019
Grand Rapids Unit Transformer Replacement	20,989	Purchase and install 5 GSU's for Units 1 and 3 at Grand Rapids Generating Station to provide substantial reduction of in-service failure, lost generation risk and improve overall reliability.	Jun 2017
Great Falls Transformer Spares	3,167	Purchase 2 spare GSU's and install one in the existing bank 6 location.	Oct 2017
Jenpeg Accommodation Facility	5,122	Install a new pre-constructed modular accommodation facility attached to the staffhouse at Jenpeg. The accommodations will provide fitness and common areas lacking in the existing facilities and provide accommodation to staff that are currently occupying houses which have exceeded their life expectancy.	Feb 2016
Generation South PCB Regulation Compliance	4,506	Replace equipment identified as containing a polychlorinated biphenyl (PCB) content >50 ppm at southern generating stations to comply with regulation.	Mar 2018

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	Total Project Cost (in 000's)	Description	In-Service Date (ISD)
Kettle Transformer Replacement Program	45,602	Purchase and replace the step-up transformers at the Kettle Generating Station due to increased winding failures as the existing transformers are reaching life expectancy. This program includes the purchase of 2 spare transformers, one of which is a universal spare for northern generating stations.	Mar 2017
McArthur Falls/Pine Falls Breaker Replacement Program	15,045	Replace McArthur Falls 115kV current transformers (CTs) and breakers and Pine Falls 115kV breakers to address the frequency and severity of failures.	Jul 2015
Seven Sisters Protection Upgrades	7,271	Replace and upgrade generator and transformer protection to a redundant multifunction system with breaker fail protection, transient fault recording and metering replacement on Units 1, 2, 3, 4, & 6 at Seven Sisters Generating Station.	Oct 2015
Grand Rapids Excitation Program	14,760	Implement a generator excitation system (exciter) replacement program to phase out unsupported and obsolete equipment at Grand Rapids.	Nov 2017
Laurie River & CRD Communications	7,360	Upgrade the communications infrastructure and replace the annunciation systems with programmable logic controller (PLC) based unit control monitoring system (UCMS) at Laurie River, Missi Falls and Notigi. Updated communications infrastructure and annunciation systems will provide more accurate water level information from the Churchill River Diversion allowing Manitoba Hydro to optimize water flows through the Lower Nelson River generating stations as well as reducing maintenance costs.	Dec 2017
Notigi Marine Vessel Replacement & Infrastructure Improvement	7,024	Purchase a new tug boat and barge, refurbishment of the existing self-propelled Dallas Faye barge and improvements to the marina at Notigi.	Aug 2016
Limestone Stilling Basin Rehabilitation	2,103	Rehabilitate the eroded concrete baffle blocks and stilling basin floor of the Limestone G.S. spillway to ensure the long-term safe and reliable operation of the spillway.	Oct 2015
Kettle Wicket Gates Lever Refurbishments	2,137	Refurbish levers for the wicket gate and replace the existing upper guide bushing and thrust washer on various units as the gate assemblies are deteriorating faster than anticipated.	Oct 2015
Limestone Governor Replacements	4,325	Replace the existing governor controls and the field device connected to the control system as the system is no longer supported by the manufacturer and is proprietary in design.	Oct 2017
Limestone Generating Station Control and Data Acquisition (GSCADA) Replacement	5,143	Replacement of the generating station control and data acquisition (GSCADA) system with unit control and monitoring system (UCMS) due to multiple failures and equipment has reached its life expectancy.	Mar 2020
Jenpeg Unit 4 Partial Overhaul	8,672	Refurbish failed Unit 4 restoring rod. Work includes unit disassembly and removal of runner, repair of the generator and turbine restoring rod, unit reassembly and commissioning, and inspections in order to gain condition assessment information for future overhaul planning.	Jun 2015
Jenpeg Unit 1 Fire Rehabilitation	11,090	Repair the fire damage to Jenpeg Unit 1 and perform a mechanical condition assessment of high risk components.	Mar 2016
Generation South - Slave Falls Seven Bay Sluiceway	16,469	Rehabilitation of the Slave Falls Seven Bay Sluiceway including gate hoists, gate & gain heating, and installation of monitoring equipment for concrete assessments. This work will improve the operating reliability of the sluiceway which provides controlled spill and dam safety in high water flow conditions or emergency spill requirements.	Apr 2018
Brandon Unit 5 License Review	10,314	Under the Manitoba Environment Act, renewal of the license for Brandon G.S. Unit #5 is required for continuing operation. The implementation of capital upgrades proposed in the Environmental Impact Statement (EIS) is dependent on the outcome of the licence review process and the updated licence terms and conditions. Major capital works are being deferred pending a response from Manitoba Conservation with the knowledge Unit 5 end-of-life date is currently 2019.	Mar 2018
Selkirk Environmental Enhancements	14,693	Perform environmental enhancements in accordance with the revised licence terms and conditions approved by the Province of Manitoba. The approval was based on continuing operation of the once-through cooling system with the following modifications to the facility: cooling water intake fish screen rehabilitation/modification, lube oil cooling system modification and condenser re-tubing.	Dec 2015
Long Spruce Fire Protection System Replacement	7,274	Replace the fire detection and monitoring system at Long Spruce Generating Station due to system failures and obsolescence.	Jun 2017
Kettle Fire Protection System Replacement	2,670	Upgrade the fire system at Kettle Generating Station to ensure adequate water flow and pressure to all parts of the station including the replacement of obsolete and undersized fire pumps as well as replacement of defective pipe sections, valves, fittings and main headers.	Jun 2017
Halon Replacement Project	25,566	To install smoke management systems (SMS) at various Manitoba Hydro locations where halon fire protection systems were removed as a result of provincial legislation.	Jun 2015
Grand Rapids Housing	12,585	Major renovations to 26 homes within the Grand Rapids townsite. Most of these houses were built in the 1960's. A renovation program is needed to provide a stock of modern, mould free housing.	Mar 2020
Grand Rapids Fish Hatchery Project	4,908	In order to modernize obsolete and high maintenance assets, rehabilitation work at the Grand Rapids Fish Hatchery is required, including the main hatchery building, the aeration building, the east and west pump houses, etc. In addition, rehabilitation work is related to fulfilling the services agreement with the Province.	Oct 2015
Gillam Housing Retrofit Program	10,703	Retrofit the interior and exterior of all 1970 vintage houses including houses provided to the Town of Gillam, Frontier School Division and Gillam	Mar 2017
Gillam Redevelopment & Expansion Phase 1A	24,116	Redevelop and expand the infrastructure in the Town of Gillam to prepare for growth associated with new generation facilities including upgrades to the town centre (stage 1), residential subdivisions, recreation centre refurbishments, and other small projects.	Oct 2016
Great Falls Stator Frame Spare	5,750	Procure and construct a 30 MVA spare generator stator to protect against an in service failure of Units 1, 3, 5 and 6.	May 2017

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	Total Project Cost (in 000's)	Description	In-Service Date (ISD)
Water Licenses & Renewals	89,297	Activities necessary to obtain final and renewal licences under the Water Power Act. Interim licences that require finalization are Churchill River Diversion, Lake Winnipeg Regulation, Jenpeg, Limestone, and Wuskwatim. Licences that currently require renewal are Seven Sisters, Laurie River #1 and #2, Pine Falls, McArthur, Grand Rapids, Kelsey, and Pointe Du Bois.	Sep 2020
Kettle G.S. - Units 5 - 10 & 12 Surface Area Cooler (SAC) Replacement	1,550	Purchase surface air coolers (SAC) with installation piping to replace those on units 5 to 10 and 12 as existing equipment has exceed life expectancy and are showing signs of failure.	May 2015
Kettle Compressed Air System Replacement	1,190	Replacement of various compressors, receivers, panels and air dryers as the compressed air system is a critical component for the generation of power.	Jul 2015
Laurie River Switchyard Bank 2 Replacement	1,864	Procure and install a 20 MVA autotransformer in the 138kV Switchyard Bank 2 position at Laurie River to ensure reliable power to the northern communiites of Pukatawagan, Lynn Lake and Granville Lake. Bank 2 has failed twice and if Bank 1 failed, Laurie River Generating Station would be disconnected from the power system and maintaining frequency would be very difficult.	Jul 2016
Laurie River Access Road Upgrade	1,657	Gravel, grading and drainage improvements along access road from the airport to Laurie River 1.	Aug 2015
Winnipeg River Governor Pumps Replace Valve & ACC Tank	2,924	Replace existing governor pumps, unloader and pressure relief valves with certified components at Great Falls, Seven Sisters, Pine Falls and McArthur Falls Generating Stations as they no longer comply with the Manitoba Department of Labor and Immigration standards. Failure to proceed with the work could revoke operating licenses.	May 2016
Generation South Portable Emergency Station Service Diesel Generator	2,842	Purchase a 900 KW portable diesel generator to maintain black start capability. In addition, design and construct docking stations for the diesel generator at both Grand Rapids and Seven Sisters Generating Stations.	Jul 2015
Brandon Unit 5 High Pressure Loop Piping Replacement	2,249	Replace the high pressure loop piping necessary for the safe and reliable operation of Brandon Unit 5.	Jul 2015
Generation South Fall Protection Program	3,416	Assessment of fall protection requirements at stations and diesel sites, excluding switchyards. Includes design, procurement and installation of fall protection devices to comply with legislation.	Jan 2017
Slave Falls Washroom, Lunchroom and Office Renovation	1,691	Renovation of existing washrooms, lunchroom and office spaces to provide designated male and female washroom and locker room facilities, a designated lunchroom facility to accommodate all workers on site, and office and conference space.	Jul 2014
McArthur Falls Sluiceway Anchoring	1,320	Install spillway rollway mechanical rock anchors and pier top membrane to conform with Dam Safety guidelines.	Oct 2015
McArthur Falls Battery Bank and Inverter Upgrade	1,233	Replacement and upgrade of the McArthur Falls 250Vdc battery banks and replacement of the vital systems generator with an inverter system, to ensure functionality of a healthy backup supply system and that future automation loads are met.	Feb 2016
Slave Falls Roof Replacement	1,897	Replace roof elevations at Slave Falls Generating Station and the Pointe du Bois administration building in poor condition with new modern roof systems that will provide 30 yrs of reliable service. This work also includes the removal of any and all redundant roofing structures or protrusions to prevent future leaks.	Oct 2014
Slave Falls 129VDC System Upgrade	1,298	Install dual battery banks with eight-hour capacity, two new battery chargers, and replace the existing DC Distribution Panel No. 1 to meet current and future loading demands.	Mar 2017
Jenpeg Staffhouse Flood Renovation	1,663	Complete renovations to Jenpeg staffhouse to remediate effects of flooding due to frozen pipes. Replace all walls, ceilings, and floors damaged by flooding, and ensure moisture remediation is performed to prevent the growth of mould. Inspect and replace all kitchen equipment or other furnishings as required.	Mar 2015

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Transmission			
Station Battery Bank Capacity & System Reliability Increase	46,328	Conduct individual studies, and replace and/or upgrade battery bank capacity and chargers in 156 transmission and distribution stations and 7 stand-alone communications sites, in order to meet the NERC requirements to have a workable system restoration plan. Includes AC service upgrades and building upgrades or extensions.	Mar 2022
Waverley Service Centre Oil Tank Farm Replacement	3,933	Replace all remaining single-wall oil tanks and upgrade of associated systems at the Waverley Service Centre Oil Tank Farm due to visible corrosion points found during inspection which were considered as non-repairable by the provincial authorities.	Jun 2014
Brandon Area Transmission Improvements	12,314	Install a 4th bank at Cornwallis Station to address load requirements beyond firm capacity and close line MR11 at Raven Lake Station to reduce the power flow through Cornwallis transformers.	Nov 2016
V38R 230kV Transmission Line ROW in Riding Mountain National Park	2,303	Prepare a comprehensive Environmental Assessment for the 230kV Transmission Line, Vermillion — Raven Lake, in Riding Mountain National Park, negotiate and acquire a long term Land Use Agreement with Parks Canada, and clear vegetation from the corridor in order to be compliant with NERC standards.	Jun 2016
Whiteshell Bank 1 Replacement	3,035	Replace Whiteshell Station Bank 1 with a new 115 - 33 x 66kV 3OMVA power transformer.	Nov 2017
Neepawa New 230 - 66kV Station	31,304	Construct a new 230-66kV terminal station at Neepawa to provide firm supply.	Aug 2015
13.2kV Shunt Reactor Replacements	15,414	Replace fifteen 13.2kV shunt reactors which have reached their life expectancy as identified through internal inspections and dissolved gas analysis.	Nov 2018
Laverendrye-St. Vital 230kV Line & Breaker Replacement	32,898	Install a new 230kV transmission line from Laverendrye Station to St. Vital Station and replace 115kV and 230kV breakers at Laverendrye Station to address circuit breakers that are under-rated for the increase in available fault current that will occur upon completion of Bipole III and the Riel Converter Station.	Feb 2021
Breaker Fail Protection Implementation	7,302	Implement breaker failure protection at Ashern, Grand Rapids, Vermillion and Mystery Lake 230kV Stations to comply with NERC standards.	Jun 2015
Southwest Winnipeg 115kV Transmission Improvements	41,050	Improve the capacity into the Southwest Winnipeg 115kV transmission system supplied by the Laverendrye, Rosser and St. Vital 230-115kV Stations. Improvements include rebuilding 115kV lines (Laverendrye to Harrow and St. Vital to Stafford), as well as performing station upgrades at Laverendrye, Harrow, St. Vital, Mohawk and Wilkes.	Oct 2022
Brandon Victoria Ave Breaker Replacement	4,280	Replace nine 115kV circuit breakers at Brandon Victoria Station following an assessment which recommended the replacement of under-rated breakers at a fault level of approximately 95% of their individual Maximum Symmetrical Interrupting Rating (MSIR).	Oct 2019
Transmission Breaker Sustainment Capital Program	14,924	Implement a Breaker Sustainment Capital Program to replace 21 transmission system breakers over the next twenty years as a result of an analysis of asset condition.	Mar 2033
Transmission Transformer Sustainment Capital Program	67,612	Implement a Transformer Sustainment Capital Program to replace 21 transmission system transformers over the next twenty years-as a result of an analysis of asset condition.	Sep 2032
Transmission Line Wood Pole Structure Replacement Program	14,172	Replace approximately 817 transmission line wood poles structures over a multi-year period based on health index scores and failure rate assessments.	Mar 2023
Transmission Line Wood Pole Spar Arm Replacement Program	10,334	Replace approximately 1,642 spar arms on other transmission line wood pole structures over a multi-year period based on health index scores and failure rate assessments.	Mar 2023
Bi-Pole I & II Spacer Damper Replacements (Phase 2)	30,908	Replace all spacer dampers on Bipole I and II. The existing units have reached the end of their lives and are no longer protecting the conductors from aeolian vibration.	Jun 2017
Southern AC System Breaker Replacements	14,728	Replace fifteen 230kV circuit breakers at Dorsey Station, two 115kV circuit breakers at McPhillips Station and one 66kV circuit breaker at Boyd Station due to increasing fault levels.	Nov 2016
Winnipeg-Brandon Transmission System Improvements	43,141	Perform environmental assessments and route selection, design and construct transmission and terminal facilities to provide firm supply to Portage South.	Apr 2019
Stanley Station 230-66kV Transformer Addition	16,689	Install a 230-66kV transformer and associated equipment at Stanley Station. The transformer was previously anticipated to have been installed as a hot standby.	Oct 2018
Ashern Station Bank Addition	10,421	Addition of a third 230-66kV transformer bank and the creation of a new 66 kV four-breaker ring bus at Ashern Station as two existing banks have reached their winter firm limit.	Sep 2019
Souris East Transformer Capacity Enhancement	11,217	Installation of a 230-66kV transformer at Souris East Station and associated equipment to provide firm transmission. The absence of firm transmission at Souris East Station could result in loss of power to customers during a transformer outage.	Apr 2019
Shamattawa Capacity Increase	1,113	Install additional capacity at the Shamattawa Diesel Generating Station in order to meet increasing load resulting from new infrastructure development within the community.	Nov 2014
Tadoule Lake Diesel G.S. Tank Farm Upgrade	1,446	Upgrade of the Tadoule Lake diesel fuel tank farm to provide adequate storage to meet current and future demands and comply with the Canadian Council of Ministers of the Environment (CCME) - Environmental Code of Practice.	Oct 2015
Transmission Line Protection & Teleprotection Replacement	26,978	Replace the existing protection and teleprotection equipment identified on 30 transmission lines due to experiencing an increasing trend of misoperations of the protection schemes.	May 2018

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Mobile Radio System Modernization	24,190	Replacement of radios and control electronics of the VHF Mobile Radio System with a modern digital system of increased capability due to aging condition and changing requirements for the radio license.	Jun 2017
HVDC Fire Protection Projects	6,990	Replace existing incipient fire detection (IFD) panels at all HVDC stations, fire piping & pumps at Radisson C.S. and install a fire water backup system at Henday C.S. The IFD system, required for early detection of fires within the valve halls, has high failure rates and the backup fire protection does not meet fire code.	Oct 2017
HVDC Transformer Bushing Draw Rod & Cap Replacement	3,476	Replace the trench DC bushing draw rods and caps on various converter transformers at all converter stations to eliminate the risk of transformers reaching operating temperatures above recommended levels and the possibility of an explosion.	Sep 2017
HVDC Auxiliary Power Supply Upgrades	5,737	Upgrade Bi-Pole 1 (BP1) and Bi-Pole 2 (BP2) auxiliary power supply at all converter stations and at Radisson and Henday Relay Buildings to reduce pole outages and maintain reliability of the HVDC system.	Mar 2018
HVDC Domestic Water System Installations/Upgrade	2,435	To complete all domestic water treatment upgrades and replacements for Dorsey and Radisson Converter Stations to ensure full compliance with the Canadian Drinking Water Guidelines, provincial regulation and system licenses.	Sep 2019
HVDC System Transformer & Reactor Fire Protection Upgrades	10,738	Install fire protection upgrades on 28 converter transformers and 2 synchronous condenser transformers. Also, install water deluge sprinklers at Dorsey and Henday and construct fire response buildings at Dorsey and Radisson. This will minimize the high risk of fire spread and catastrophic damage throughout the AC and DC switchyards and eliminate a potential transformer loss.	Oct 2016
HVDC Transformer Replacement Program	178,400	Maintain an inventory of eight (8) spare converter transformers for use at Radisson, Henday and Dorsey Converter Stations, and purchase additional transformers to replace critical units. This program will improve reliability, reduce potential outage costs and reduce the risk of catastrophic failure. Insufficient spares could result in prolonged outages (up to 3 years) while replacements are procured.	Jun 2025
HVDC Site Upgrades for Transformer Moves	3,079	Fortify the roadways/access corridors at Dorsey Converter Station and upgrade the rail spur at Radisson Converter Station to facilitate the safe movement of transformers during the replacement of aging BP1 transformers.	Oct 2020
HVDC Stations Ground Grid Refurbishment	4,147	Upgrade the existing ground grid systems at Dorsey, Radisson and Henday Converter Stations to address frost heaving and extensive corrosion to improve the integrity of the system.	Oct 2018
HVDC Circuit Breaker Operating Mechanism Replacement	14,046	Replace existing circuit breaker operating mechanisms to improve system reliability and reduce repair and maintenance frequency.	Mar 2019
BP1 Pole Differential Protection	3,345	Modify and/or upgrade the BP1 Pole Differential Protection in order to prevent the blocking of a healthy pole to reduce outages and increase availability.	Mar 2019
HVDC BP1 By-Pass Switch Replacement	12,181	Replace the existing by-pass vacuum switch (BPVS) and by-pass switch (BPS) with a single BPS in each of the Bipole valve halls at Dorsey and Radisson Converter Stations. The existing switches are at the end of their useful life, require substantial maintenance and have caused many forced outages.	Nov 2015
HVDC BP2 Refrigerant Condenser Replacement	13,021	Replace existing air conditioning systems in the BP2 valve halls, maintenance block and administration areas at Dorsey and Henday Converter Stations as the systems have reached their life expectancy and are experiencing frequent failures. In addition, repair and maintenance costs are increasing and there is the potential for increased costly valve outages.	Feb 2023
HVDC BP2 Smoothing Reactor Replacement	21,027	Replace four existing oil-filled BP2 smoothing reactors with air core smoothing reactors at Dorsey and Henday Converter Stations as the reactors have exceeded their life expectancy. Replacement will alleviate environmental and fire concerns and ensure transmission reliability and protection.	Sep 2017
HVDC BP1 P1 & P2 Battery Bank Separation	3,325	Separate Pole 1 & Pole 2 battery banks at Dorsey and Radisson Converter Stations and upgrade the battery banks and charger ratings to comply with current Manitoba Hydro design criteria.	Mar 2018
HVDC BP1 Direct Current - Current Transformer (DCCT) Transductor Replacement	11,307	Replace existing oil-filled DC transductors with optical transductors at Dorsey and Radisson Converter Stations as the transductors are reaching the end of their useful life, failures are becoming more frequent and could result in a lengthy pole outage.	Oct 2019
BP1 & 2 DC Converter Transformer Bushing Replacement	8,560	Replace bushings on converter transformers at all converter stations due to reaching life expectancy. Bushing failures can result in transformer failures.	Mar 2021
HVDC BP2 Valve Hall Wall Bushing Replacement	19,071	Replace all oil-filled wall bushings in the BP2 valve halls as they are reaching the end of their useful life and are experiencing gassing, fire and overheating issues.	Oct 2022
HVDC BP1 CQ Disconnect Replacement	5,204	Replace AC and DC disconnects at Radisson and Dorsey Converter Stations as the disconnects have been in service for approximately 43 years and have experienced recent failures causing pole outages.	Oct 2019
HVDC BP2 Thyristor Module Cooling Refurbishment	7,563	Refurbish 1,566 thyristor module cooling components in BP2 by replacing the manifolds, connectors, and cooling tubes as they are reaching the end of life expectancy and are causing forced system outages.	Oct 2019
HVDC Transformer Marshalling Kiosk Replacement	6,555	Replace nine BP1 transformer marshalling kiosks and upgrade nineteen control boxes at the transformer. The kiosks have reached the end of their useful life and the control boxes are not operating efficiently causing several forced outages due to failures of tap changer timing relays or temperature extremes.	Oct 2018
HVDC - Gapped Arrester Replacement	16,253	Replace existing gapped arresters, porcelain supports, and their associated counters with metal oxide varistor (MOV) arresters, silicon shed supports, and new counters as they have exceeded life expectancy and malfunctions can result in damage to equipment and increase safety risks for employees.	Nov 2019
Dorsey AC 500 kV Transformer Refurbishment	5,341	Refurbish select Dorsey AC transformers as a result of increased age of the transformers combined with oil leaking issues which can cause extensive damage and result in a forced outage.	Jun 2015

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NERC Critical Infrastructure Protection (CIP) V5 Implementation - Transmission Sites	4,178	Implement physical security infrastructure and systems integration with the new corporate Centralized Security Management System (CSMS) at 56 transmission stations in order to achieve compliance and audit readiness with the North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection (CIP) standard.	Mar 2017
NERC Critical Infrastructure Protection (CIP) V5 Implementation - HVDC Sites	2,164	Implement physical security infrastructure and systems integration with the new corporate Centralized Security Management System (CSMS) at all converter stations in order to achieve compliance and audit readiness with the North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection (CIP) standard.	Mar 2016
Reston Station New 230kV Ring Breaker	2,661	Install a new 230kv breaker and re-configure the 230kv ring bus at Reston Station to address the post contingency voltage violations at Virden West, Birtle South, Raven Lake and Reston Stations under certain breaker fail contingencies.	Jun 2020
La Verendrye Station 230-66kV Bank Addition	12,895	Addition of a third 230-66kV transformer at Laverendrye Station. Based on current load growth on the west side of Winnipeg, the firm rating at Laverendrye Station will be exceeded by the winter of 2017/18.	Oct 2021
New 230kV Supply to Enbridge	3,615	Provide a 230kV supply to Enbridge Pipelines Inc.'s new station via a new 230kV transmission line from the St. Leon Station.	Jul 2017
Mobile Substation Replacement	3,970	Purchase a new 15MVA mobile substation as a replacement for a failed mobile substation.	Nov 2016
Stanley Area 115kV to 230kV Migration	25,901	Install a third 230-66kV transformer bank at Stanley Station in order to address load growth in the area and provide for the transfer of all 115kV demand from Morden Corner and Rosenfeld Stations, including decommissioning of the two stations plus removal of corresponding transmission lines.	Mar 2021
Diesel Upgrades - Brochet Diesel G.S.	3,851	Upgrade the diesel generating station and diesel fuel storage tank farm at Brochet to maintain station reliability, compliance with provincial petroleum storage regulations and employee safety.	Mar 2020
Diesel Upgrades - Lac Brochet Diesel G.S.	7,977	Design and construction of a new diesel generating station in Lac Brochet, including the replacement of the existing diesel fuel storage tank farm as the diesel generators are approaching the end of their expected service life and will not be capable of reliably meeting the forecasted load growth in the community.	Mar 2020
Dorsey-Riel South Loop ROW Property Acquisition	1,882	Acquire the necessary right-of-way (ROW) for future transmission lines to be routed around the west and south side of Winnipeg from Dorsey-Laverendrye-St Vital-Riel Stations to protect future development.	Mar 2011
Second Communications Link to U.S.	3,054	Replace the existing power line carrier and leased circuits to the U.S. on 230kV lines which provide a second communications path to the U.S. with digital electronics on optical links from Letellier Station to the U.S. border to improve reliability and availability of the tie lines. In addition, replace the existing line protection with digital and fully redundant 'A' and 'B' relay systems at Letellier and Richer Stations for NERC and MRO compliance.	Nov 2013
Communication Sites Standby Power Upgrades	2,092	Conduct geotechnical investigation of the various contaminated corporate facilities to delineate the extent of any contamination on and/or around the site and prepare a site investigation. Remediate any contaminated areas identified in the site investigation report to environmentally acceptable limits. Issue a final report on the project confirming the facility and surrounding area were remediated and all areas of the work were left in accordance with applicable environmental regulations.	Mar 2014
Interlake Microwave (ILMW) Diesel Controllers & Switches Replacement	1,250	The Diesel generator controllers and automatic transfer switches are to be replaced at eighteen radio sites along the Interlake Microwave Radio Route due to increasing failures, discontinued manufacturer's support and spare parts are no longer available.	Mar 2015
MTS Fibre Exchange-Neepawa to Roblin	1,385	Construct cable entrances at Russell Customer Service Centre, Roblin South Station and Birtle South Station to facilitate the access of MTS fibre optic cable as part of an agreement with MTS to exchange two strands of fibre optic cable on Manitoba Hydro's Interlake Nelson River Optical Cable System (INROCS).	Mar 2017
Sherridon Station-Diesel Back-Up	2,371	Prepare, test, and install two 855kW diesel generators at Sherridon Station for emergency power. Build a structure to hold step-up transformers for emergency diesel supply. Procure and install two emergency transformer trailers to provide for quicker set-up when diesel generation is required.	Jul 2015
HVDC Stations BP1 - 1000 PSI Air Dryer Replacement	1,234	Replace three BP1 air dryers with four new 1,000 psi air dryer. The current air dryers are approximately 40 years old and have reached the end of their useful life. If the air dryer were to fail during the winter operating season it could result in a BP1 forced outage.	Apr 2015
HVDC Transformer Tapchanger Refurbishment	6,577	Refurbish the remaining 27 transformer tap changers and include the addition of MESSKO breathers and larger diverter tanks on BP2 as well as MESSKO breathers on BP1. These tapchangers and associated equipment are over 40 years old and have reached the end of their useful life.	Nov 2015
HVDC BP1 Pole Interlocking Relay Replacement	1,036	Replace BP1 pole interlocking relays with new equipment at Dorsey and Radisson which have surpassed the end of their useful life and regularly misoperate during maintenance outages, therefore extending the amount of time required for the pole outage.	Nov 2023
HVDC BP1 Transformer Neutral Bushing Replacement	1,165	Replace all old 15kV neutral bushings on Bipole 1 Converter Transformers as they have surpassed their useful life. Due to their deteriorated condition, the bushings leak oil and the potential for overheating, causing a risk of fire and a catastrophic failure of the transformers is greatly increased.	Mar 2017
Dorsey Synchronous Building Roof Rehabilitation	1,041	Install two-ply modified bituminous roofing system over existing sheet metal roof on all BP1 and BP2 Sync building at Dorsey Converter Station. Install cladded and roofed tower over buswork conduits on Syncs 11, 12, and 13 to waterproof awkward existing roof details. The electrical equipment inside the Sync building is crucial to the operation of the Dorsey Converter Station and potential roof leaks increases the risk of forced outages.	Mar 2018
HVDC BP2 Voltage Divider Replacement	2,389	Purchase ten 500kV voltage dividers with eight of them being installed (four at Dorsey and four at Henday) and two as spares. These voltage dividers have reached the end of their useful life and have been experiencing electrical discharge and overheating issues which could result in a forced pole outage.	Mar 2016
HVDC Deluge Valve Trim Kit Replacement	1,042	Dismantle, remove, install, and reassemble the appropriate components of the Deluge Valve system in order to remove the existing isolation gate valves, deluge valve sealing components and trim kits and install with new materials/components. This replacement is required due to a prior check valve failure causing the deluge system to operate while the transformer was energized, resulting in a seven day forced outage.	Jun 2015

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Customer Service & Distribution			
Winnipeg Area 66kV Line Upgrades	2,031	Upgrade 108 spans on Winnipeg area 66 kV lines to meet minimum clearance requirements.	Dec 2019
Birtle South Line 97 66kV Upgrades	2,268	Rebuild and reconductor 66kV line and add distribution capacitors to Rosburn Distribution Supply Centre (DSC) to address load growth.	May 2015
Neepawa Area 66kV System Improvement	7,377	Install new 66 kV lines from Neepawa Station to the Neepawa area to address reliability issues and load growth.	Oct 2016
Whiteshell 33 kV System Improvements	3,520	Improvements to the Whiteshell 33 kV System, including upgrading of distribution lines and installation of 33kV regulators to address load growth.	Oct 2017
Interlake 66kV System Improvement Work	6,644	66 kV improvements to the Interlake 66 kV System to address load growth and reliability issues.	Sep 2018
Winnipeg Distribution Infrastructure Requirement	24,527	Completion of all identified replacements to underground distribution (URD) plants in Winnipeg as determined by the URD Assessment Program, including transformers, elbows, and terminations to address aging infrastructure and improve system reliability.	Mar 2017
Rover 4kV Station Salvage& Feeder Conversion	12,752	Construct a new control/terminal building on site and salvage the existing control/terminal building to address aging infrastructure, reliability and safety concerns regarding conductor clearances and electrically underrated equipment.	Oct 2017
Martin Station-New 66-4/12kV Station	31,853	Replace Martin Station with a 5 x 15 MVA bank conventional outdoor station to address load growth.	Oct 2015
William Avenue - New Ductline	15,382	Construct a new duct line along William Ave. and extend five feeders from King Station (new Adelaide Station) to the Health Sciences Centre Complex (HSC) to address load growth and aging infrastructure.	Jun 2016
Health Science Centre Service Consolidation & Distribution Upgrade	10,216	Organize the existing service points at the HSC complex, as well as seven proposed additional services, into five distribution groups based on geographic proximity. The existing distribution feeders will be salvaged and the buildings will be re-supplied via a modular dual radial distribution system to address aging infrastructure and to allow for anticipated load growth.	Dec 2015
Harrow Station - Bank & Feeder Addition	25,100	Install one transformer bank and six breaker positions, as well as upgrade four existing station breakers and bank low-side disconnects to address load growth and reliability issues.	Dec 2019
Waverley West Supply-Stage 2 (Distribution Supply Centres)	6,619	Install three 10 MVA 66-24kv DSC's to supply the Bridgewater Lakes and South Pointe developments in the Waverley West subdivision.	Oct 2015
Mohawk Station - Bank & Feeder Addition	19,701	Install one 115kV-24kV 100MVA transformer bank, four feeder breakers and a capacitor bank to increase Mohawk Station capacity.	Jun 2019
New McPhillips Station - 115kV to 24kV	47,228	Build a new distribution station with three transformers with load tap changers and associated equipment to address load growth and aging infrastructure.	Oct 2018
Property Acquisition-N Downtown Station Site	4,000	Purchase three properties bounded by Notre Dame Ave., Hargrave Ave. and Adelaide Ave.as the future site for a downtown distribution substation to replace King Station.	Apr 2015
York Station-Bank 1,3,5 & SwitchGear Addition	18,481	Install three transformers and three line-ups of switchgear for twelve additional feeder positions at the existing York (2) Station site to address load growth.	Jun 2016
Tyndall Distribution Supply Centre	5,700	Install a DSC located between the communities of Garson & Tyndall to address load growth.	Jun 2016
Lockport Distribution Supply Centre	5,000	Install a DSC centered between the communities of Lockport and Birdshill to address load growth.	Dec 2015
Steinbach Keating/Steinbach Biscayne Distribution Supply Centres	7,394	Install two DSCs located on the northwest and south side of the city of Steinbach to address load growth.	Oct 2016
McTavish Distribution Supply Centre & Feeder Conversion	4,054	Install a DSC and convert feeders from 8kV to 25kV distribution to address load growth.	Aug 2015
Kleefeld Distribution Supply Centre	2,869	Install a new DSC with provisions for a second bank, on the east side of the town of Kleefeld complete with three 12kV feeders to address load growth.	Jun 2015
Mystery Lake Station Switchgear Replacment & Bank Addition	8,500	Replace switchgear and add a transformer bank to address reliability issues and projected load growth.	Aug 2015
Gimli West Station GW08-11 & -09 25kV Conversion	2,994	Convert the Gimli West Feeders to 25kV to accommodate load growth and address reliability issues.	Aug 2015
Hochfeld Distribution Supply Centre	4,716	Install a new DSC site with two high voltage padmount transformers south of Winkler to address load growth.	Aug 2015
Winkler West Distribution Supply Centre	5,210	Installation of a DSC and transfer of approximately 11MVA of load from Winkler North Station. Includes 66kV line extension and feeder construction to address load growth.	Oct 2015
Norway House Station Bank Addition	3,990	Installation of a new 66-12.47kV 9/12/15MVA transformer at Norway House Station to ensure firm capacity is available in the community of Norway House beyond fifteen years, mitigating the risk of extended customer outages.	Jun 2017
Ste Agathe Station Bank Addition	2,348	Install a new transformer at Ste. Agathe Station and associated equipment to address load growth.	Sep 2017
Brandon West 4kV - 12kV Conversion	4,652	Convert Brandon McTavish and Elviss Stations from 4kV to 12kV, transferring the load to Brandon Fortier Station and installing a 124kV interchange bank as a new tie to Brandon University.	Mar 2017
Glenboro Town 8-25kV Conversion and 8kV Station Salvage	1,681	Convert the Town of Glenboro from 8.32kV to 24.9kV to address to address load growth and aging infrastructure.	Mar 2016
Brandon Crocus Plains 115-25kV Bank Addition	5,887	Intall one transformer with a Load tap changer and associated equipment to address load growth.	Oct 2020
Relocation L17 Semple Station to Kingsbury	1,764	Install 24kV feeder underground from McPhillips Station to Semple Station and reconfigure Semple Station to address reliability issues.	Apr 2015
Enbridge Gretna Capacitor Bank Addition	2,500	Purchase of land, installation of one padmount transformer and associated equipment to address load requirements for Enbridge pipelines.	Nov 2017
Portage South 66kV L54 & L84 Upgrade	4,400	Rebuild portions of 66kV Lines 54 and 84 and reconductor Line 84 and 54 to eliminate overloads during contingencies and improve voltage at Southport.	Oct 2018
Norcraft Distribution Supply Centre Site Bank Addition	3,150	Install a new 10MVA DSC bank at Norcraft DSC site in order to provide a reliable supply to CPR station customers and add needed capacity to Norcraft DSC site while re-validating feeder ties.	Oct 2017
Anola Distribution Supply Centre	4,000	Construct a new DSC site near the town of Anola to address load growth.	Oct 2015

**CAPITAL EXPENDITURE FORECAST (CEF15)
APPENDIX B**

	Total Project Cost (in 000's)	Description	In-Service Date (ISD)
Outlets of Seasons Development Expansion	3,268	Install underground electrical distribution system with associated distribution centres (DCs), automated vista gear and transformation in order to service the proposed Outlets of Seasons development including a fashion mall, hotels, auto dealerships and a variety of retail and multi-unit residential buildings.	Jun 2016
Victoria Beach Distribution Supply Centre	3,600	Installation of a DSC adjacent to Victoria Beach Station site to increase capacity and reliability in the area.	Nov 2016
Notre Dame de Lourdes Distribution Supply Centre	3,518	Install a DSC site adjacent to Notre dame Des Lourdes station to address load growth.	Nov 2015
Elie Station Bank Replacement	2,421	Install a new transformer (Bank 1) and associated electrical hardware/civil plant to address load growth.	Sep 2017
Gimli West GW08-5 & GW08-8 Conversion	2,004	Conversion of Gimli West feeders from 8kV to 24.9kV to address load growth.	Sep 2016
Alexander 66-25kV Distribution Supply Centre & Conversion	6,291	Install a DSC and convert feeders from 8kV to 25kV to address load growth.	Mar 2018
Ste. Rose Distribution Supply Centre	1,700	Install a DSC and associated equipment at Ste. Rose to address aging infrastructure.	Mar 2016
Dallas Station Bank Addition	1,616	Install a new transformer and associated equipment to address load growth.	Oct 2015
66kV L14 Upgrade Saltel Tap to Blumenort	1,857	Reconductor 8 km of the 66 kV Line and install a 66kV switch at Steinbach First Avenue Station to address load growth.	Mar 2016
Eleanor Lake Distribution Supply Centre & Land Purchase	1,907	Install a DSC to supply a new customer and address load growth.	Oct 2015
Morris Feeder MS08-8 Conversion	1,100	Convert three phase and single phase from 8kV to 24.9kV and transfer load to McTavish DSC to address load growth and reliability issues.	Mar 2016
Teulon 12kV Area System Improvement	1,620	Install/rebuild 12kV lines and equipment as required to address area Teulon area load growth.	Mar 2016
Wilkes Station New Feeders W61,W66,W67,W72	1,820	Install five new 24kV breakers and associated equipment at Wilkes Station to address load growth.	Mar 2016
GP12-09 Reconductor Single Phase Taps	1,600	Reconductor and standardize the main feeder trunk and two single phase taps that are overloaded during winter peak conditions, replacing existing 219 A voltage regulators and balance feeder loads to maintain a more uniform voltage profile.	Oct 2015
Waterford Green Sub division Feeders	1,997	Extend two new 12kV feeders from Court Station to the Waterford Green subdivision and establish an alternate supply for Amber Trails subdivision to address load growth.	Jun 2016
Convert Feeder BWS12-07 & 12-09 4kV to 12kV	1,950	Convert the feeder area located in the north end of Winnipeg from 4kV to 12kV distribution to support decommissioning of aging 66kV, 12kV and 4kV equipment at Charles and Rover Stations and better provide for future load growth in the area.	Dec 2016
Convert Feeder BWS 12-03 from 4kV to 12kV	1,950	Convert the feeder area located in the north end of Winnipeg from 4kV to 12kV distribution to support decommissioning of aging 66kV, 12kV and 4kV equipment at Charles and Rover Stations and better provide for future load growth in the area.	Sep 2016
Convert Feeder BWS 12-05 from 4kV to 12kV	1,950	Convert the feeder area located in the north end of Winnipeg from 4kV to 12kV distribution to support decommissioning of aging 66kV, 12kV and 4kV equipment at Charles and Rover Stations and better provide for future load growth in the area.	Dec 2015
Extend Plessis Station 24kV Feeder P86	1,762	Extend 24kV feeder from Plessis Station to the Transcona West area to offload Peguis Station and Atwood Station 12kV feeders to address load growth.	Oct 2015
St. John's Ravenscourt 24kV Feeder Extension	1,235	Supply St.John's Ravenscourt School with an underground 24kV feeder to address load growth.	Oct 2014
Reconductor H56 Replacement	1,412	Reinsulate and replace the hemp conductor on Harrow Station 24kV feeder to address reliability issues and aging infrastructure, and upgrade other conductors, cables and equipment as required to relocate the conductor to a new alignment out of the transmission line R.O.W. to make way for the future rapid transit corridor.	Mar 2016
Star Lake STL12-2 Extension (Falcon Estates)	1,250	Extend distribution line to supply the new Falcon Estates sub-division.	Nov 2016
Waverley Service Centre 10MVA 66-24KV Distribution Supply Centre	1,834	Install one DSC and associated equipment to address load growth.	Nov 2014
AR721 Feeder Extension	1,297	Extend a new 2kV feeder from Augier Station to Gaol Rd. to reduce loading, improve voltage in the area and supply the Headingly Water Treatment Plant.	Oct 2015

**CAPITAL EXPENDITURE FORECAST (CEF15)
APPENDIX B**

	Total Project Cost (in 000's)	Description	In-Service Date (ISD)
Human Resources & Corporate Services			
Fleet Services Relocation to Rosser Station	12,894	Construct a vehicle and maintenance facility adjacent to Rosser Station and relocate 700 Harrow Fleet Services functions to the new location. The existing Fleet Services facility at 700 Harrow was built in 1957 and is currently undersized to accommodate the physical height of many fleet units. In addition, the building is difficult to access and the expansion of the Taylor Switchyard will further constrain the site making movement of large equipment more difficult and time consuming.	Mar 2019
Ashern District Office	8,037	Build a new District Office in Ashern as part of the Rural District Reorganization program. This is one project of many which will see the construction of two new district offices (Ashern and Neepawa) and undertake the renovation and retrofit of existing rural sites to accommodate the relocation of staff.	Jan 2016
Neepawa District Office	9,653	Build a new District Office in Neepawa as part of the Rural District Reorganization program.	Feb 2016
Rural Consolidation	10,148	Renovation and retrofit of existing offices to accommodate the relocation of staff displaced from the closing of other district offices.	Mar 2017
Enterprise Asset Management (EAM) Phase 2	35,186	Enterprise Asset Maintenance (EAM) is the replacement of the Applied Maintenance Planning System (AMPS) which is obsolete and no longer supported. EAM is the maintenance planning system for assets primarily in the generating and converter stations.	Mar 2018
Station Transformer Trailer Replacement	3,000	Replace the existing 150 ton capacity trailer for Haulage Services as the existing trailer no longer has the capacity to transport the new larger station transformers.	Aug 2016
Rosser Site Development	3,500	Site preparation and development of the Rosser site for future construction requirements including the new Fleet Services building, the emergency fuel requirement storage, pole yard distribution centre and a mobilization site for a variety of work crews, etc.	Sep 2017
Chevrier Land Purchase	3,500	Purchase land adjacent to the south east section of 1840 Chevrier for the strategic protection of the High Voltage Test Facility.	Feb 2016
Centralized Security Management System	1,739	The Centralized Security Management System (CSMS) will manage physical access to all NERC identified high and medium impact sites. The project includes a combination of software, hardware and physical site renovations including door hardening, two factor door accesses, and a video monitoring system.	Oct 2015
Travel and Expense Management	2,807	Implementation of the SAP Travel and Expense Management module in order to consolidate all travel and expense-related expenditures, simplify reporting, bring greater transparency and provide integration with existing SAP modules.	Jan 2014
Outage Mgmt System (Phase 1)	1,474	Replace the Trouble Call Response System (TCRS) with the GE PowerOn Outage Management System (OMS) to mitigate the risk associated with the technical obsolescence of TCRS.	May 2014
Environmental Health & Safety Management	1,873	Implementation of the SAP Environmental Health & Safety module in order to address data management of hazardous materials, as well as streamline and enhance the process for incident management, analysis and reporting.	Dec 2015