Q. Re: Production Life: For each of the Company's generating units, please provide the following:

(a) The Mw (*sic*) capacity;

(b) That date of installation;

(c) The variable O&M cost excluding fuel, by year, for the past 10 years;

(d) The availability factor, by year, for the past 10 years;

(e) The capacity factor, by year, for the past 10 years;

(f) The primary fuel source;

(g) The temperature and pressure ratings;

(h) The annual heat rate for the past 10 years;

(i) A detailed narrative identifying all significant or major system improvements performed during the past 10 years;

(j) A detailed narrative identifying and explaining each of the anticipated significant or major capital improvements during the next 10 years;

(k) The number of cold starts per year for the past 10 years; and

(l) The outage rate per year for the past 10 years.

A. (a) Please refer to CA-NLH-54 Attachment 1.

(b) Please refer to CA-NLH-54 Attachment 1.

(c) Hydro does not maintain its O&M records in a manner which permits identification of the variable costs. Also, depending upon the nature of the generation, records may be maintained at the diesel plant level, for instance, rather than at the unit level. As a result, this data is not readily available.

(d) Please refer to CA-NLH-54 Attachment 2. The data for the diesel units is not maintained in a manner that makes it readily available.

(e) Please refer to CA-NLH-54 Attachment 3. The data for the diesel units is not maintained in a manner that makes it readily available.

(f) Please refer to CA-NLH-54 Attachment 1.

(g) Please refer to CA-NLH-54 Attachment 1.

(h) Please see table below for Holyrood heat rates, expressed in BTU/kWh. There is no relevant information available with respect to Hydro's other generating units.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Unit1	9432	9504	9609	9895	10977	10140	9949	9792	10104	10000
Unit2	9532	9684	9718	9843	10425	9922	9753	10156	10310	10111
Unit3	9447	9692	9593	9851	10298	9965	9667	9904	10315	10139

(i) Please refer to CA-NLH-54 Attachment 1.

(j) Please refer to CA-NLH-54 Attachment 1.

(k) Please see table below for Holyrood cold starts per year. There is no relevant information available with respect to Hydro's other generating units.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Unit1	4	3	3	1	3	2	7	2	2	3
Unit2	3	2	2	3	2	2	3	3	4	4
Unit3	2	3	4	3	1	3	1	1	1	1

(l) Please refer to CA-NLH-54 Attachment 4. The data for the diesel units is not maintained.

Generating Unit	(a) MW Capacity	(b) Date of Installation	(f) Primary Fuel Source	(g) Temperature and Pressure Ratings;	(l) Improvements during the past 10 Years;	(j) Anticipated Capital Improvements during the next 10 years;
Hydraulic Generation						
Bay d'Espoir (BDE) Unit 1	78	1967	N/A	N/A	main inlet (spherical) valve controls upgrade and cooling water piping replacement.	intake gate controls, generator rewind, generator protection replacement, generator bearing upgrade, autogreaser replacement, automate generator deluge, replace vent chambers, surge tank refurbishment, and rectifying transformer replacement.
BDE Unit 2	78	1967	N/A	N/A	main inlet (spherical) valve controls upgrade, cooling water piping replacement, generator rewind, and generator protection replacement.	intake gate controls generator bearing upgrade, autogreaser replacement, automate generator deluge, replace vent chambers, surge tank refurbishment, and rectifying transformer replacement.
BDE Unit 3	78	1967	N/A	N/A	main inlet (spherical) valve controls upgrade and cooling water piping replacement.	generator rewind, generator protection replacement, generator bearing upgrade, autogreaser replacement, automate generator deluge, replace vent chambers, surge tank refurbishment, and rectifying transformer replacement.
BDE Unit 4	78	1968	N/A	N/A	main inlet (spherical) valve controls upgrade and cooling water piping replacement.	intake gate controls, generator rewind, generator protection replacement, generator bearing upgrade, autogreaser replacement, automate generator deluge, replace vent chambers, surge tank refurbishment, and rectifying transformer replacement.
BDE Unit 5	78	1970	N/A	N/A	main inlet (spherical) valve controls upgrade, cooling water piping replacement and intake gate control upgrades	generator bearing upgrade, autogreaser replacement, automate generator deluge, replace vent chambers, surge tank refurbishment, and rectifying transformer replacement.
BDE Unit 6	78	1970	N/A	N/A	main inlet (spherical) valve controls upgrade, cooling water piping replacement and intake gate control upgrades	generator bearing upgrade, autogreaser replacement, automate generator deluge, replace vent chambers, surge tank refurbishment, and rectifying transformer replacement.
BDE Unit 7	150	1977	N/A	N/A	exciter replacement, cooling water piping replacement and intake gate control upgrades.	automate generator deluge, replace vent chambers, and rectifying transformer replacement
Hinds Lake	75	1980	N/A	N/A	cooling water piping replacement, runner refurbishment, sump system upgrades fire alarm system replacement, and intake gate control upgrades.	exciter replacement, slip ring replacement, and a generator rotor refurbishment.
Upper Salmon	84	1983	N/A	N/A	governor replacement, and intake gate control upgrades	exciter replacement, and governor oil filtration system.
Cat Arm Unit 1	67.5	1985	N/A	N/A	governor controls replacement, main inlet (spherical) valve refurbishment, cooling water piping replacement and generator oil level system	main inlet (spherical) valve controls replacement.
Cat Arm Unit 2	67.5	1985	N/A	N/A	governor controls replacement, main inlet (spherical) valve refurbishment, cooling water piping replacement and generator oil level system.	main inlet (spherical) valve controls replacement and exciter replacement.
Paradise River	8	1989	N/A	N/A	intake stop log replacement, draft tube stop log replacement, frazil ice monitoring system, and unit controller HMI replacement	generator protection replacement, unit controller replacement, diesel fuel tank replacement, diesel fuel monitoring system, increase the height of the earth dam.
Snook's Arm	0.54	1957	N/A	N/A	penstock replacement, and battery bank replacement	Intake refurbishment, main inlet valve replacement, turbine generator replacement or refurbishment, and unit auxiliaries replacement.

Generating Unit	(a) MW Capacity	(b) Date of Installation	(f) Primary Fuel Source	(g) Temperature and Pressure Ratings;	(i) Improvements during the past 10 Years;	(j) Anticipated Capital Improvements during the next 10 years;
Rodickton Mini Hydro	0.425	1975	N/A			
Venam's Bight	0.36	1957	N/A	N/A	improvements to the access trail	penstock replacement, intake refurbishment, main inlet valve replacement, turbine generator replacement or refurbishment, and unit auxiliaries replacement.
Granite Canal	40	2003	N/A	N/A	replacement of a servomotor shaft, and the addition of a compressed air system at the intake to remove frazil ice from the trash racks	Constructed in the last ten years.
Thermal Generation						
Holyrood Unit 1	175	1969	Number 6 Bunker "C" oil	1000°F and 1890 psia.	major turbine/generator disassembly, overhaul and repair (each Generation unit) every 9 years, turbine/generator valves disassembly, inspection and repair (each generation unit) every 3 years, boilers internal cleaning, inspection and minor repairs annually, upgrade exciter, upgrade governor controls, upgrade controls system, asbestos removal program for complete plant , replace boiler No. 1 superheater, install continuous emissions monitoring system (shared) , install cooper ion injection system (shared), replace burner management control system, motor control center upgrades, replacement of boiler blowdown tanks	Pages 8 to 11 of this attachment contains the planned capital proposals to Holyrood for the next 10 years.
Holyrood Unit 2	175	1969	Number 6 Bunker "C" oil	1000°F and 1890 psia.	major turbine/generator disassembly, overhaul and repair (each generation unit) every 9 years, turbine/generator valves disassembly, inspection and repair (each generation unit) every 3 years, boilers internal cleaning, inspection and minor repairs annually, upgrade exciter, upgrade governor controls, upgrade controls system, asbestos removal program for complete plant , replace boiler No. 2 superheater, Replace boiler No. 2 partial water wall, install continuous emissions monitoring system (shared) , install cooper ion injection system (shared), replace boiler stop valve, replace air pre-heater cold end; replace burner management control system, motor control center upgrades, replacement of boiler blowdown tanks	Pages 8 to 11 of this attachment contains the planned capital proposals to Holyrood for the next 10 years.
Holyrood Unit 3	150	1979	Number 6 Bunker "C" oil	1000°F and 1815 psia	turbine/generator valves disassembly, inspection and repair (each generation unit) every 3 years, boilers internal cleaning, inspection and minor repairs annually, upgrade controls system, asbestos removal program for complete plant , install continuous emissions monitoring system (shared) , install cooper ion injection system (shared), replace steam seal regulator, motor control center upgrades, replacement of boiler blowdown tanks	Pages 8 to 11 of this attachment contains the planned capital proposals to Holyrood for the next 10 years.
Diesel Generation			Diesel Fuel	N/A	Please refer to pages 5 - 7 of this attachment .	Please refer to Pages 12 to 14 of this attachment.

		Prime KW	
Francois	2001	136	1981
	587	200	2011
	570	275	2000
Grey River	2026	250	1989
	2062	136	2001
	2067	136	2002
Little Bay Islands	586	275	2011
	2023	450	1987
	2058	205	2000
	2035	450	1992
McCallum	2063	210	2001

Generating Unit		(a) MW Capacity	(b) Date of Installation	(f) Primary Fuel Source	(g) Temperature and Pressure Ratings;	(i) Improvements during the past 10 Years;	(j) Anticipated Capital Improvements during the next 10 years;
	2064	136	2001				
	589	100	2011				
Ramea	2045	925	1997				
	2077	925	2005				
	2047	925	1997				
St. Brendan's	578	277	2001				
	2055	210	1999				
	2056	225	1999				
Charlottetown	2034	300	1994				
	2061	725	2000				
	2079	759	2006				
	2087	545	1990				
	2088	910	2011				
Hawkes Bay	547	2500	1971				
	548	2500	1971				
L'Anse au Loup	2041	1000	1971				
	2012	1100	1984				
	2005	800	1988				
	246	600	1975				
	247	600	1975				
	2082	1825	2009				
Mary's Harbour	2037	540	1993				
	2038	540	1993				
	2083	820	2009				
Norman Bay	584	40	2010				
	581	50	2010				
	583	70	2010				
Port Hope Simpson	2043	455	1995				
	2042	455	1995				
	2073	455	2005				
St. Lewis	2039	365	1994				
	2015	250	1986				
	2080	455	2006				
St. Anthony	525	1000	1975				
	523	1000	1973				
	522	1000	1973				
	521	1000	1973				
	546	2000	1982				
	544	2000	1980				
	229	850	1980				
	2003	850	1980				
William's Harbour	580	80	2009				
	2075	210	2006				
	2057	90	1999				
Black Tickle	582	300	2009				
	579	250	2007				
	2066	455	2002				
Cartwright	2036	450	1992				
	2045	450	1993				
	2052	800	1998				

Generating Unit		(a) MW Capacity	(b) Date of Installation	(f) Primary Fuel Source	(g) Temperature and Pressure Ratings;	(i) Improvements during the past 10 Years;	(j) Anticipated Capital Improvements during the next 10 years;
	2086	600	2009				
Hopedale	2053	545	1998				
	2054	448	1999				
	2074	569	2005				
Makkovik	2029	600	1990				
	3033	450	1992				
	2059	635	2000				
Nain	574	865	2001				
	576	865	2001				
	2085	1275	2009				
Paradise River	254	50	1980				
	324	48	1994				
	585	50	2010				
Postville	573	275	2000				
	577	252	2001				
	2084	365	2009				
Rigolet	2051	545	1998				
	2065	320	2002				
	2081	455	2006				
Happy Valley	534	750	1952				
	535	750	1952				
	536	750	1952				
	537	750	1952				
	538	1250KVA	1958				
	539	2600	1974				
	540	2600	1968				
	541	2600	1969				

Question CA-54-NLH (i)
Diesel and Gas turbine Generation

The following is a list of significant or major system improvements made to Generating Stations under the responsibility of Hydro's Transmission and Rural Operations department between 2002 and 2011.

2002 - Diesel units in Grey River (1), Black Tickle (1), Rigolet (1) and Davis Inlet (1) were replaced. The generator on unit 561 in Norman Bay was replaced. A new diesel plant at Nain was constructed. Upgrades were made to the Nain fuel storage tank farm. As well a new storage shed was constructed in Rigolet. Unit # 2058 was relocated from Harbour Deep to Rencontre East. Diesel unit rentals were acquired for Rencontre East.

2003 – Replaced 1 diesel unit in Cartwright. Purchased and installed fire alarm systems at Postville and Rigolet. Service cables at Little Bay Islands, Hopedale and Makkovik were upgraded. Generation was increased at Mary's Harbour. The fuel storage tank at L'Anse au Loup was replaced. Fuel storage was increased at Postville and Rigolet. Fuel lines were upgraded at Makkovik and protection upgrades were performed at the Happy Valley North Plant.

2004 – Generation at Port Hope Simpson was increased. Diesel unit in Hopedale (1) was replaced. Mobile diesel unit was relocated from Roddickton to St. Anthony. Potential transformers were purchased and installed at Ramea diesel plant.

2005 – Replaced diesel units in Williams Harbour and Ramea. Generator relaying at Happy Valley North Plant was upgraded. The dam at Roddickton Mini Hydro was replaced. Fall arrest equipment was installed at various Hydro facilities. Fuel shut-off valves were installed in various diesel plants. Fuel storage tanks were installed in Hopedale and Paradise River diesel plants. Circuit breakers at Hawkes Bay Diesel plant were replaced. Buildings at the Happy Valley North Plant and Black Tickle were upgraded. Exhaust stacks at St. Brendan's, Black Tickle and Cartwright were raised for environmental compliance. Data acquisition software for diesel plants was purchased. Battery banks at L'Anse au Loup and Hawkes Bay diesel plants were replaced. The circuit breaker for unit 2044 at Port Hope Simpson was replaced. Fuel reconciliation flow meters were purchased and installed at Hardwoods and Stephenville Gas Turbines. A diesel backup generator was installed at Stephenville Gas Turbine. The diesel backup system at Hardwoods Gas Turbine was automated. A main fuel line at Hardwoods Gas turbine was installed. The HVAC unit for the control module at Hardwoods Gas Turbine was replaced. The battery bank at Hardwoods Gas Turbine was replaced.

2006 – The automatic voltage regulator at Hardwoods Gas Turbine was replaced. Generation was increased at L'Anse au Loup. The cooling system at Black Tickle was upgraded. A day tank and fuel meter was installed in Ramea. Digital metering was purchased and installed in Francois, McCallum and Grey River and Little Bay Islands. An intermediate fuel storage tank was installed in Charlottetown diesel plant. Diesel units in St. Lewis and Charlottetown were replaced. Fall arrest equipment was installed at various Hydro facilities. Generator breakers at Francois, Grey River and Little Bay Islands were replaced. The waste oil storage tank at Ramea was replaced. A sewage disposal field at Charlottetown was constructed. A storage ramp at L'Anse au Loup was constructed.

2007 – Main fuel lines at Hardwoods Gas Turbine were replaced. Plant condition assessments at Hardwoods and Stephenville Gas Turbines were performed. Operator console at Hardwoods Gas Turbine was upgraded. New diesel plant as St. Lewis was constructed. Diesel units in St. Lewis (1), Rigolet (1) and Black Tickle (1) were replaced. The control panel in Rigolet was replaced. NO_x monitoring in Little Bay Islands was installed. Unit breakers in Mary's Harbour were replaced. Fuel storage in Norman Bay was upgraded.

2008 – Fuel piping at Stephenville Gas Turbine was replaced. Vibration monitoring systems at Hardwoods and Stephenville Gas Turbines were upgraded. Mufflers at L'Anse au Loup and St. Anthony diesel plants were replaced. Underground fuel lines at Little Bay Islands and Grey River diesel plants were replaced. A day tank and fuel meter was installed at Hopedale. The diesel plant building at William's Harbour was extended. The fire alarm systems at Hopedale and Paradise River diesel plants were replaced. Waste oil storage tanks at Cartwright and Charlottetown were installed. A storage shed was constructed at Paradise River diesel plant. The water and sewer system at Hopedale was connected to the town system.

2009 – Plant life extension upgrades were performed at Hardwoods Gas Turbine. The automatic voltage regulator at Stephenville Gas Turbine was replaced. Plant automation was performed and the breaker panel replaced at Makkovik. Plant automation was performed at Rigolet. Diesel units in Postville (1), Cartwright (1) and Mary's Harbour (1) were replaced. The speed increaser at Roddickton Mini Hydro was replaced. Fuel storage at Cartwright was upgraded. Fuel reconciliation metering at Hawke's Bay diesel plant was installed. Ventilation system at Little Bay Islands diesel plant was upgraded. Waste oil storage tanks at Mary's Harbour were installed. A sewage disposal field at Makkovik was constructed.

2010 – Fuel tank farm controls at Happy Valley Gas Turbine were upgraded. Gas turbine refurbishment work at Stephenville Gas Turbine was performed. Diesel units in Paradise River (1), Norman Bay (3), and Black Tickle (1) were replaced. Switchgear at Cartwright was replaced. Rehabilitation work at Nain diesel plant was performed. The generator on unit 2066 at Black

tickle was replaced. Port Hope Simpson properties were upgraded. Accommodation at Norman Bay was upgraded.

2011 – Plant life extension upgrades were performed at Hardwoods Gas Turbine. Glycol cooling system at Stephenville Gas Turbine was upgraded. The operator console at Stephenville Gas Turbine was upgraded. Arc flash remediation was performed at various sites. The fuel storage facility at Postville was replaced. Diesel units in Francois (2), McCallum (1) and Little Bay Islands (1) were replaced. The generator on unit 2073 at Port Hope Simpson was replaced. The fuel storage tanks at Francois were replaced. Fuel storage at Norman Bay was upgraded. The plant lifting system at Mary's Harbour was upgraded. The generation capacity at L'Anse au Loup was increased. The generation capacity at Charlottetown was increased. Waste oil storage at St. Lewis was installed. Crown land at Mary's Harbour was purchased.

Question CA-NLH-54 (j): A detailed narrative identifying and explaining each of the anticipated significant or major capital improvements during the next 10 years;
Thermal Generation

2012 Replace Programmable Logic Controllers Waste Water Treatment Plant

Replace Steam Seal Regulator Unit 2

Upgrade Hydrogen System

Upgrade Synchronous Condenser Unit 3

Replace Relay Panels Unit 3

Upgrade Forced Draft Fan Ductwork Unit 2

Upgrade Stack Breaching Unit 2

Upgrade Fuel Oil Heat Tracing

Rewind Generator Units 1 and 2

Replace Beta Attenuation Monitoring Analyzers

Unit 1 Major Overhaul - Turbine Generator

Upgrade Stack Breeching Unit 1 (2011)

Refurbish Fuel Storage Facility (Tank #3 -2011)

Complete Condition Assessment

2013 Purchase Spare 4kV Motors

Upgrade Vibration Monitoring Equipment, Units 1, 2 and 3

Upgrade Electrical Equipment

Install Variable Speed Drives on 6 Forced Draft Fans

Upgrade Marine Terminal

Install Fire Protection (Fuel Delivery System)

Install Unit 3 CR Condensate Drains & HP Heater Trip Level

Replace Condensate Polisher Annunicator Panels - Units 1 & 2

Upgrade Governors on Units 1 & 2

Upgrade Fuel Oil Day Tank

Install Backup System for Raw Water Supply and Clarifiers

Complete Eng. Review to Determine System for SYN CND, Unit 1 & 2

Overhaul Unit 2 Extraction Pump South

Overhaul Unit 3 Boiler Feed Pump West

Overhaul Unit 3 Turbine Valves

2014 Replace Waste Water Basin Building

Upgrade Excitation Systems, Units 1 and 2

Replace 129 Volt DC Distribution Panels & Breakers

Upgrade Powerhouse Roofing

Replace Powerhouse Overhead Doors

Replace Plant Elevators

Overhaul Unit 2 Steam Turbine Generator

Overhaul Unit 1 Cooling Water Pump East

Overhaul Unit 1 Extraction Pump South

Overhaul Unit 3 Boiler Feed Pump East

2015 Replace Compressor #2

Upgrade Fire Protection (Out Buildings)

Upgrade Quarry Brook Dam Equipment

Replace 258 Volt DC Distribution Panels & Breakers

Convert Unit 1 to Synchronous Condensing System

Install Auxillary Boiler

Overhaul Unit 3 Extraction Pump South

Overhaul Unit 1 Boiler Feed Pump East

Overhaul Unit 1 Turbine Valves

2016 Rewind Unit 3 Generator Rotor and Install Rotor Flux Probe

Replace Compressor #1

Upgrade UPS 1 & 2

Convert Unit 2 to Synchronous Condensing System

Overhaul Unit 3 Steam Turbine Generator

Overhaul Unit 2 Cooling Water Pump East

Overhaul Unit 2 Extraction Pump North

Overhaul Unit 1 Boiler Feed Pump West

2017 Upgrade Lunch Room, Fitness Room & Women's Washroom

Upgrade Plant Access Road

Replace Stage 2 Diesel

Install Visible Isolation for 600 V HVAC System Admin Area

Upgrade UPS 3 & 4

Upgrade Forced Draft Fan Ductwork Unit 3

Overhaul Unit 2 Turbine Valves

Overhaul Unit 3 Cooling Water Pump West

Overhaul Unit 3 Extraction Pump North

Overhaul Unit 2 Boiler Feed Pump West

2018 Revisit Condition Assessment - Level 1

Upgrade cranes and hoists

Install new Lube Oil Seal Oil skids

Guardhouse and Administration Building Upgrades

Fire System Upgrades

Upgrade Cooling Water System Travelling Screens

2019 Replace existing U2 4160 V AC breakers for life expectancy to 2041

Electrical MACALLUM's Upgrade and Replacement

2020 Replace existing U3 4160 V AC breakers for life expectancy to 2041

De-commissioning and dismantling of Units 1,2,& 3 Boilers, Stacks and associated equipment not required for Synchronous Condenser Operation

Waste Water Treatment Basin Building Upgrades

De-commissioning Units 1,2,3 Steam Turbines and associated equipment not required for Synchronous Condenser Operation

Upgrade Cooling Water System Wet Well Stop Log

2021 Decommission Gas Turbine

Replace One of North or South Instrument Air Receiver Systems

Replace One of North or South Service Air Receivers

De-commissioning and dismantling of Fuel Oil Storage and Marine Terminal

2022 Upgrade On-Site Roads

Light Oil system inspection and upgrade

Replace Warm Air Makeup Louvres, Valves and Controls Unit 1, 2 and 3

Diesel and Gas Turbine Units

(j) A detailed narrative identifying and explaining each of the anticipated significant or major capital improvements during the next 10 years;

During the next ten years, diesel engines will be replaced at an interval of 100,000 hours and the projects are outlined in the table below. For growth in various communities, CA-NLH-54 Attachment 5 is a summary of the required generation additions and capital improvements for fuel storage for each of the isolated communities.

Diesel Engine Replacements: 2012 to 2023

Legend

R replacement (2 year projects)

	Projected Overhauls & Replacements (2012 - 2032)											
Engine	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Reclaimer 2071												
Spare 2072												
FRANCOIS 588												
FRANCOIS 587												
FRANCOIS 570												
GREY RIVER 2026												
GREY RIVER 2062												
GREY RIVER 2067												
HARDWOODS 572												
LITTLE BAY ISLANDS 2023												
LITTLE BAY ISLANDS 2035												
LITTLE BAY ISLANDS 2058												
LITTLE BAY ISLANDS 586												
MACALLUM 589												
MACALLUM 2063												
MACALLUM 2064												
RAMEA 2045												
RAMEA 2047												
RAMEA 2077												
ST. BRENDANS 2055												
ST. BRENDANS 2056												
ST. BRENDANS 578												
STEPHENVILLE 571												
BLACK TICKLE 2066												
BLACK TICKLE 579												
BLACK TICKLE 582												
CARTWRIGHT 2036												
CARTWRIGHT 2045												
CARTWRIGHT 2052					R	R						
CARTWRIGHT 2086												
HOPEDALE 2053									R	R		
HOPEDALE 2054							R	R				
HOPEDALE 2074											R	R
MAKKOVIK 2029												
MAKKOVIK 2059						R	R					
MAKKOVIK 3033										R	R	
NAIN 2085												
NAIN 574												
NAIN 576												
PARADISE RIVER 254				R	R							
PARADISE RIVER 324												

Diesel Engine Replacements: 2012 to 2023

Legend

R replacement (2 year projects)

	Projected Overhauls & Replacements (2012 - 2032)											
Engine	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
PARADISE RIVER 585												
POSTVILLE 2084												
POSTVILLE 573				R	R							
POSTVILLE 577						R	R					
RIGOLET 2051												
RIGOLET 2065												
RIGOLET 2081												
CHARLOTTETOWN 2088												
CHARLOTTETOWN 2034					R	R						
CHARLOTTETOWN 2061												
CHARLOTTETOWN 2079											R	R
CHARLOTTETOWN 2087												
L'ANSE AU LOUP 2005												
L'ANSE AU LOUP 2012												
L'ANSE AU LOUP 2041												
L'ANSE AU LOUP 2082												
L'ANSE AU LOUP 246												
L'ANSE AU LOUP 247												
Mobile 2044												
MARY'S HARBOUR 2037			R	R								
MARY'S HARBOUR 2038					R	R						
MARY'S HARBOUR 2083												
NORMAN'S BAY #581												
NORMAN'S BAY #583												
NORMAN'S BAY #584												
PORT HOPE SIMPSON 2042			R	R								
PORT HOPE SIMPSON 2043								R	R			
PORT HOPE SIMPSON 2073												
ST. LEWIS 2015												
ST. LEWIS 2039											R	R
ST. LEWIS 2080												
WILLIAMS HARBOUR 2057												
WILLIAMS HARBOUR 2075												
WILLIAMS HARBOUR 580												

For the Gas Turbine, there has been an ongoing refurbishment project at Hardwoods that is planned to be completed in 2013. This project will see the engines overhauled, power turbines inspected, clutch overhauled, coatings applied to all building structures, junction box replacement, unit breaker replacement, cabling replacement, new fuel valve, alternator inspected and partial discharge equipment installed. A similar project is planned as well at Stephenville starting in 2014. However at Stephenville the stator winding will be replaced in 2012 due to a failure in December of 2011, with the remaining work scheduled for 2014. For the Happy Valley Gas Turbine, the control system is scheduled to be replaced in 2013/2014. There is no major work scheduled to be completed at the St. Anthony, Hawks Bay, Mud Lake or the North Plant stand by diesel plants. The Roddickton Mini Hydro unit is scheduled to have the runner replaced in 2012 but this is being revisited due to the alternator being failed and a decision on how to proceed is pending.

(d) The availability factor, by year, for the past 10 years;

Generating Unit	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Bay D'Espoir Unit 1	83%	92%	95%	96%	99%	83%	94%	97%	96%	92%
Bay D'Espoir Unit 2	69%	93%	93%	96%	95%	83%	95%	95%	73%	91%
Bay D'Espoir Unit 3	95%	94%	92%	94%	96%	97%	94%	91%	89%	97%
Bay D'Espoir Unit 4	98%	93%	92%	93%	86%	97%	97%	95%	97%	93%
Bay D'Espoir Unit 5	95%	89%	96%	89%	93%	95%	95%	93%	94%	96%
Bay D'Espoir Unit 6	92%	92%	97%	98%	91%	95%	96%	94%	94%	93%
Bay D'Espoir Unit 7	95%	93%	91%	96%	97%	97%	94%	94%	90%	93%
Cat Arm Unit 1	89%	95%	94%	92%	86%	96%	71%	95%	96%	94%
Cat Arm Unit 2	96%	97%	93%	94%	89%	88%	70%	95%	95%	97%
Hinds Lake	96%	92%	97%	96%	91%	95%	95%	90%	84%	84%
Holyrood Unit 1	81%	63%	83%	51%	82%	73%	52%	64%	74%	77%
Holyrood Unit 2	75%	85%	79%	66%	29%	59%	77%	74%	83%	78%
Holyrood Unit 3	67%	83%	81%	78%	77%	58%	75%	53%	61%	49%
Holyrood Gas Turbine	97%	99%	98%	100%	69%	89%	99%	85%	24%	75%
Happy Valley GT	100%	88%	92%	87%	93%	94%	94%	99%	93%	98%
Hardwoods GT	99%	95%	99%	94%	92%	96%	96%	97%	84%	93%
Paradise River	97%	88%	98%	97%	97%	98%	98%	97%	92%	92%
Stephenville GT	99%	100%	99%	99%	100%	97%	97%	95%	92%	96%
Upper Salmon	90%	94%	96%	94%	94%	93%	94%	95%	93%	95%
Granite Canal		36%	88%	90%	89%	90%	88%	88%	89%	88%
Holyrood Unit 1	81%	62%	79%	51%	79%	54%	51%	61%	77%	76%
Holyrood Unit 2	74%	83%	76%	65%	37%	62%	77%	71%	82%	75%
Holyrood Unit 3	64%	82%	80%	73%	76%	56%	74%	54%	61%	48%

(e) The capacity factor, by year, for the past 10 years;

Generating Unit	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Bay D'Espoir Unit 1	47%	57%	67%	67%	66%	47%	58%	52%	60%	60%
Bay D'Espoir Unit 2	12%	21%	25%	27%	31%	29%	32%	20%	17%	28%
Bay D'Espoir Unit 3	70%	71%	70%	68%	68%	73%	72%	70%	65%	71%
Bay D'Espoir Unit 4	17%	23%	26%	30%	30%	24%	29%	18%	23%	28%
Bay D'Espoir Unit 5	31%	31%	41%	39%	43%	35%	44%	32%	29%	40%
Bay D'Espoir Unit 6	26%	34%	41%	36%	38%	36%	42%	28%	37%	50%
Bay D'Espoir Unit 7	76%	70%	77%	80%	72%	78%	77%	73%	69%	72%
Cat Arm Unit 1	66%	74%	63%	60%	69%	70%	61%	63%	69%	57%
Cat Arm Unit 2	70%	74%	64%	64%	76%	64%	59%	64%	66%	62%
Hinds Lake	55%	52%	49%	57%	52%	59%	51%	43%	52%	49%
Holyrood Unit 1	59%	47%	45%	30%	22%	27%	20%	25%	24%	27%
Holyrood Unit 2	62%	52%	35%	33%	11%	39%	38%	27%	21%	25%
Holyrood Unit 3	59%	48%	45%	39%	25%	29%	24%	19%	16%	15%
Holyrood Gas Turbine	0.12%	0.19%	0.05%	0.04%	0.12%	0.03%	0.42%	0.04%	0.24%	0.00%
Happy Valley GT	0.23%	0.05%	0.11%	0.26%	0.12%	0.11%	0.19%	0.46%	0.26%	0.18%
Hardwoods GT	0.05%	0.24%	0.02%	0.13%	0.24%	0.12%	0.83%	0.50%	0.65%	0.13%
Paradise River	46%	46%	46%	56%	52%	48%	54%	49%	48%	52%
Stephenville GT	0.00%	0.17%	0.01%	0.04%	0.15%	0.08%	0.05%	0.04%	0.08%	0.04%
Upper Salmon	67%	71%	80%	80%	77%	82%	79%	69%	68%	61%
Granite Canal		33%	70%	69%	71%	70%	73%	67%	59%	69%
Holyrood Unit 1	55%	44%	42%	28%	20%	26%	19%	24%	22%	26%
Holyrood Unit 2	58%	49%	33%	31%	11%	37%	36%	25%	20%	24%
Holyrood Unit 3	59%	48%	45%	39%	25%	29%	24%	19%	16%	15%

(l) The forced outage rate (%) per year for the past 10 years

Generating Unit	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Bay D'Espoir Unit 1	0.8%	0.1%	0.0%	0.0%	0.2%	0.2%	0.7%	0.0%	0.0%	0.0%
Bay D'Espoir Unit 2	2.0%	0.3%	0.2%	0.7%	0.2%	0.1%	0.8%	0.6%	0.0%	0.4%
Bay D'Espoir Unit 3	0.3%	0.5%	0.0%	0.0%	0.0%	0.0%	2.7%	0.0%	0.1%	0.0%
Bay D'Espoir Unit 4	2.1%	8.8%	0.0%	0.0%	0.3%	0.4%	0.1%	0.1%	0.5%	0.2%
Bay D'Espoir Unit 5	0.3%	0.2%	0.0%	0.2%	0.3%	0.6%	0.0%	0.0%	0.0%	0.1%
Bay D'Espoir Unit 6	1.2%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	2.1%	0.0%	0.0%
Bay D'Espoir Unit 7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cat Arm Unit 1	0.3%	0.3%	0.3%	0.1%	0.2%	0.6%	0.8%	0.1%	0.8%	1.0%
Cat Arm Unit 2	1.6%	0.0%	1.0%	0.4%	0.4%	1.1%	0.1%	1.1%	1.9%	0.0%
Hinds Lake	3.9%	0.9%	0.1%	0.3%	0.2%	0.8%	1.1%	0.4%	0.8%	8.1%
Holyrood Unit 1	5.6%	14.0%	0.6%	0.1%	5.2%	13.7%	29.8%	20.5%	2.8%	4.2%
Holyrood Unit 2	4.4%	0.8%	8.6%	7.8%	41.2%	22.6%	3.4%	0.7%	3.4%	2.6%
Holyrood Unit 3	19.7%	2.1%	3.1%	3.1%	1.1%	4.0%	8.6%	10.2%	5.4%	19.3%
Holyrood Gas Turbine	92.3%	72.8%	94.1%	0.0%	99.4%	26.3%	59.2%	98.3%	0.0%	0.0%
Happy Valley GT	15.4%	67.7%	21.7%	63.3%	61.8%	54.6%	93.5%	31.0%	43.5%	10.9%
Hardwoods GT	32.7%	1.1%	68.2%	11.6%	50.7%	67.6%	26.0%	38.7%	59.8%	42.4%
Paradise River	4.2%	1.2%	2.0%	0.9%	2.0%	0.9%	2.3%	2.2%	3.7%	8.8%
Stephenville GT	27.3%	2.2%	87.7%	68.8%	10.3%	13.9%	35.5%	95.8%	35.3%	93.6%
Upper Salmon	2.0%	1.6%	0.8%	0.2%	1.2%	0.6%	2.6%	2.1%	1.7%	0.4%
Granite Canal	0.0%	8.9%	1.3%	1.2%	0.5%	1.0%	3.6%	3.0%	0.7%	0.3%
Holyrood Unit 1	5.6%	14.0%	0.6%	0.1%	5.2%	13.7%	29.8%	20.5%	2.8%	4.2%
Holyrood Unit 2	4.3%	0.7%	8.4%	7.8%	19.8%	17.4%	3.4%	0.7%	3.4%	2.6%
Holyrood Unit 3	19.7%	2.0%	3.1%	3.0%	1.1%	3.9%	6.5%	7.4%	1.4%	19.3%

MEMO

TO: PAUL HUMPHRIES, HUGHIE IRELAND, DARREN MOORE

FROM: CHRIS WARREN

SUBJECT: RURAL ISOLATED GENERATION PLANNING REVIEW

DATE: DECEMBER 31, 2010

CC: BOB MOULTON, JON MATCHEM

RURAL ISOLATED GENERATION PLANNING REVIEW

A review of the Rural Generation Expansion Plan based in the Fall 2010 Operating Load Forecast has been completed.

The review covered the following equipment at each rural isolated generation site:

1. Firm generation capability against peak load.
2. Main Breaker loading.
3. Main Bus loading.
4. Service Conductor loading.
5. Substation Transformer loading.
6. Substation Recloser loading.
7. Fuel Storage Requirements.

Equipment information was supplied by the Long-term Asset Planning Group and in the Distribution and Diesel Plant Operating Diagrams.

The rated capacities of each of this equipment were reviewed against the forecasted peak loads for the particular system, and in the fuel of fuel storage against the forecasted winter fuel requirements. Where planning ratings are exceeded, the appropriate project with preliminary scope is flagged. The review has identified the following potential projects that should be included into the Capital Budget 5-year and 20-year plans.

Detailed engineering cost estimates for each project as noted below will be requested from the appropriate engineering departments for budgeting purposes.

Some of these may be updates to proposals initiated in the previous budget year.

TRO Central Region

507 – Francois (FRS)

The Francois diesel plant contains three diesel generators rated at 275 kW, 200 kW, and 136 kW respectively for an installed capacity of 611 kW and a firm capacity of 336 kW. The diesel units are coupled to a 400 A Main Bus. Distribution system protection is provided by a 400 A Main Breaker, which is connected to the diesel plant substation by a single run of 500 kcmil copper RW90 service cables. The substation consists of three 100 kVA single-phase step-up transformers. A single 9,000 L fuel storage tank is located onsite to supply the diesel plant. Table 1 below summarizes the ratings of equipment found in the Francois Diesel Plant.

Table 1: Francois Diesel Plant Equipment

Installed Capacity	611	kW
Firm Capacity	336	kW
Main Bus	400	A
Main Breaker	400	A
Service Conductors	395	A
Substation	300	kVA
Recloser	-	A
Fuel Storage	9,000	L

Fuel Storage:

The existing onsite storage accounts for about nine days worth of storage for the peak winter month. This is considered adequate provided that regular deliveries are available throughout the year.

No expansions to accommodate load growth were identified for the Francois Diesel Plant for the long-term.

506 – Grey River (GYR)

The Grey River diesel plant contains three diesel generators rated at 136 kW, 136 kW, and 250 kW respectively for an installed capacity of 522 kW and a firm capacity of 272 kW. The diesel units are coupled to an 800 A Main Bus. Distribution system protection is provided by an 800 A Main Breaker, which is connected to the diesel plant substation by a single run of 350 kcmil copper RW90 service cables. The substation consists of three 100 kVA single-phase step-up transformers. There are two fuel storage tanks located onsite with a total capacity of 45,460 L to supply the diesel plant. Table 2 below summarizes the ratings of equipment found in the Grey River Diesel Plant.

Table 2: Grey River Diesel Plant Equipment

Installed Capacity	522	kW
Firm Capacity	272	kW
Main Bus	800	A
Main Breaker	800	A
Service Conductors	325	A
Substation	300	kVA
Recloser	-	A
Fuel Storage	45,460	L

Fuel Storage:

The existing fuel storage is considered adequate provided that regular deliveries are available throughout the year.

No expansions to accommodate load growth were identified for the Grey River Diesel Plant for the long-term.

116 – Little Bay Islands (LBI)

The Little Bay Islands diesel plant contains three diesel generators rated at 300 kW, 450 kW, 205 kW, and 450 kW mobile generator is installed outside the plant respectively for an installed capacity of 1,405 kW and a firm capacity of 955 kW. The diesel units are coupled to a 1,200 A Main Bus. Distribution system protection is provided by a 1,200 A Main Breaker, which is connected to the diesel plant substation by two runs of 500 kcmil copper RW90 service cables. The substation consists of three 333 kVA single-phase step-up transformers. A single 22,730 L fuel storage tank is located onsite to supply the diesel plant. Table 3 below summarizes the ratings of equipment found in the Little Bay Islands Diesel Plant.

Table 3: Little Bay Islands Diesel Plant Equipment

Installed Capacity	1,405	kW
Firm Capacity	955	kW
Main Bus	1,200	A
Main Breaker	1,200	A
Service Conductors	790	A
Substation	999	kVA
Recloser	-	A
Fuel Storage	22,730	L

Fuel Storage:

The existing fuel storage is considered adequate provided that regular deliveries are available throughout the year.

No expansions to accommodate load growth were identified for the Little Bay Islands Diesel Plant for the long-term.

122 – McCallum (MCC)

The McCallum diesel plant contains three diesel generators rated at 136 kW, 210 kW, and 136 kW respectively for an installed capacity of 482 kW and a firm capacity of 272 kW. The diesel units are coupled to an 800 A Main Bus. Distribution system protection is provided by an 800 A Main Breaker, which is connected to the diesel plant substation by a single run of 300 kcmil copper RW90 service cables. The substation consists of three 100 kVA single-phase step-up transformers. A single 90,800 L fuel storage tank is located onsite to supply the diesel plant. Table 4 below summarizes the ratings of equipment found in the McCallum Diesel Plant.

Table 4: McCallum Diesel Plant Equipment

Installed Capacity	482	kW
Firm Capacity	272	kW
Main Bus	800	A
Main Breaker	800	A
Service Conductors	295	A
Substation	300	kVA
Recloser	-	A
Fuel Storage	90,800	L

No expansions to accommodate load growth were identified for the McCallum Diesel Plant for the long-term.

505 – Ramea (RAM)

The Ramea diesel plant contains three diesel generators rated at 925 kW each for an installed capacity of 2,775 kW and a firm capacity of 1,850 kW. The diesel units are coupled to a 1,200 A Main Bus. Distribution system protection is provided by two 1,200 A Feeder Breakers, which are each connected directly to the distribution system by a single run of 2/0 AWG copper 5 kV power cables. A single 45,460 L fuel storage tank is located onsite to supply the diesel plant. Table 5 below summarizes the ratings of equipment found in the Ramea Diesel Plant.

Table 5: Ramea Diesel Plant Equipment

Installed Capacity	2,775	kW
Firm Capacity	1,850	kW
Main Bus	1,200	A
Main Breaker	2,400	A
Service Conductors	370	A
Substation	-	kVA
Recloser	-	A
Fuel Storage	45,460	L

Fuel Storage:

The existing fuel storage is considered adequate provided that regular deliveries are available throughout the year.

No expansions to accommodate load growth were identified for the Ramea Diesel Plant for the long-term.

111 – St. Brendan's (SBN)

The St. Brendan's diesel plant contains three diesel generators rated at 277 kW, 210 kW, and 225 kW respectively for an installed capacity of 712 kW and a firm capacity of 435 kW. The diesel units are coupled to a 1,200 A Main Bus. Distribution system protection is provided by a 1,200 A Main Breaker, which is connected to the diesel plant substation by a single run of 500 kcmil copper RW90 service cables. The substation consists of three 167 kVA single-phase step-up transformers. A recloser on the transformer primary provides primary distribution system protection. A single 68,190 L fuel storage tank is located onsite to supply the diesel plant. Table 6 below summarizes the ratings of equipment found in the St. Brendan's Diesel Plant.

Table 6: St. Brendan's Diesel Plant Equipment

Installed Capacity	712	kW
Firm Capacity	435	kW
Main Bus	1,200	A
Main Breaker	1,200	A
Service Conductors	395	A
Substation	501	kVA
Recloser	560	A
Fuel Storage	68,190	L

Fuel Storage:

The existing fuel storage is considered adequate provided that regular deliveries are available throughout the year.

No expansions to accommodate load growth were identified for the St. Brendan's Diesel Plant for the long-term.

TRO Labrador Region

408 – Black Tickle (BTK)

The Black Tickle diesel plant contains three diesel generators rated at 300 kW, 455 kW, and 250 kW respectively for an installed capacity of 1,005 kW and a firm capacity of 550 kW. The diesel units are coupled to a 1,000 A Main Bus. Distribution system protection is provided by a 1,000 A Main Breaker, which is connected to the diesel plant substation by two runs of 350 kcmil copper RW90 service cables. The substation consists of three 333 kVA single-phase step-up transformers with a spare unit stored at the site. A recloser on the transformer primary provides primary distribution system protection. There are two fuel storage tanks located onsite with a total capacity of 514,000 L to supply the diesel plant. Table 7 below summarizes the ratings of equipment found in the Black Tickle Diesel Plant.

Table 7: Black Tickle Diesel Plant Equipment

Installed Capacity	1,005	kW
Firm Capacity	550	kW
Main Bus	1,000	A
Main Breaker	1,000	A
Service Conductors	650	A
Substation	999	kVA
Recloser	560	A
Fuel Storage	514,000	L

Firm Generating Capacity:

Black Tickle will require a capacity increase by spring 2023. The project was originally identified at the last review for completion in 2021 can be moved out one year. The system peak occurs in summer; therefore the project must be advanced one year earlier starting in 2021 for completion in 2022. Black Tickle has a very low load factor, therefore the preferred expansion method is to add forth unit in the range of 150 kW to 200 kW. If it is not possible to add a fourth unit to the plant the 250 kW unit (#579) will have to be replaced with a 300 kW to 350 kW unit. The minimum load in black Tickle is about 60 kW which is 20% of a 300 kW unit, so minimum loading problems (i.e. sooting events, increased maintenance costs, and poor efficiency) may occur.

No other expansions to accommodate load growth were identified for the Black Tickle Diesel Plant for the long-term.

404 – Cartwright (CTW)

The Cartwright diesel plant contains four diesel generators rated at 450 kW, 600 kW, 720 kW, and 450 kW respectively for an installed capacity of 2,220 kW and a firm capacity of 1,500 kW. The diesel units are coupled to a 2,400 A Main Bus. The Main Bus is connected to the diesel plant substation by four runs of 535 kcmil copper DLO cables. The substation consists of three 333 kVA single-phase step-up transformers with a spare unit stored at the site. A recloser on the transformer primary provides primary distribution system protection. There is a single fuel storage tank located onsite with a total capacity of 46,202 L to supply the diesel plant. Table 8 below summarizes the ratings of equipment found in the Cartwright Diesel Plant.

Table 8: Cartwright Diesel Plant Equipment

Installed Capacity	2,220	kW
Firm Capacity	1,500	kW
Main Bus	2,400	A
Main Breaker	-	A
Service Conductors	1,427	A
Substation	999	kVA
Recloser	560	A
Fuel Storage	46,202	L

Diesel Plant Substation Capacity:

The system peak load will exceed the substation capacity (999 kVA) in 2016. The project was identified at the last review for completion in 2014, and can therefore be moved out two years. Cartwright experiences a summer peak; therefore the project must be advanced one year starting in 2015 and finishing no later than April 2016. A cost estimate was prepared for replacement of the existing bank of 3x333 kVA transformers with a bank of 3x500 kVA plus one spare 500 kVA transformer at the site by the Electrical Engineering Department in February 2010. The estimate for this project is $281,500.

Fuel Storage:

The existing onsite storage is considered adequate provided that regular deliveries are available throughout the year.

No other expansions to accommodate load growth were identified for the Cartwright Diesel Plant for the long-term.

406 – Hopedale (HPD)

The Hopedale diesel plant contains three diesel generators rated at 569 kW, 448 kW, and 545 kW respectively for an installed capacity of 1,562 kW and a firm capacity of 993 kW. The diesel units are coupled to a 1,200 A Main Bus. The Main Bus is connected to the diesel plant substation by three runs of 500 kcmil copper RW90 service cables. The substation consists of three 333 kVA single-phase step-up transformers with a spare unit stored at the site. A recloser on the transformer primary provides primary distribution system protection. There is a single fuel storage tank located onsite with a total capacity of 22,700 L to supply the diesel plant. Table 9 below summarizes the ratings of equipment found in the Hopedale Diesel Plant.

Table 9: Hopedale Diesel Plant Equipment

Installed Capacity	1,562	kW
Firm Capacity	993	kW
Main Bus	1,200	A
Main Breaker	-	A
Service Conductors	1,185	A
Substation	999	kVA
Recloser	560	A
Fuel Storage	22,700	L

Firm Generation Capacity:

Growth in system peak load will exceed firm plant capacity by 2014 and a second increase will be required five years later in 2019. These projects were identified for 2014 and 2018 during the last review and the 2018 project can be deferred one year accordingly. To maintain firm capacity requirements, unit 2054 (448 kW) should be replaced with a unit between 900 kW and 1,000 kW. The project will start in 2013 and finish in 2014, with the preceding budget proposal being prepared in 2012. The project cost is estimated to be approximately $1,100,000, but an updated estimate will be requested from the Mechanical Engineering Department. This project will increase the plant firm capacity to 1,114 kW. By 2019, growth in system peak load is expected to again exceed firm capacity requiring another capacity addition. To maintain firm capacity requirements, unit 2053 (545 kW) should be replaced with a unit between 800 kW and 900 kW. This will increase the plant firm capacity to at least 1,369 kW which should be sufficient for the foreseeable future.

Diesel Plant Main Bus:

Peak load is forecasted to exceed 100 % of the bus rating in 2019. This project was initially identified for 2018 during the last review and can accordingly be deferred one year to 2019. The existing system is currently served by a 1,200 A bus. A cost estimate was requested from the Electrical Engineering Department for the purchase and installation of a new 1,600 A bus to replace the existing 1,200 A bus. The project will start and finish in 2019, with the preceding budget proposal being prepared in 2018.

Diesel Plant Service Conductor Capacity:
Growth in system peak load is forecasted to exceed 100 % of the service conductors rating in 2023. This project was initially identified for 2020 during the last review and can accordingly be deferred three years to 2023. The existing system is currently served by three runs of 500 kcmil Copper RW90 service cable. A cost estimate was requested from the Electrical Engineering Department to add a fourth run of 500 kcmil Copper RW90 cable in parallel with the existing three runs. The project will start and finish in 2023, with the preceding budget proposal being prepared in 2022.

Diesel Plant Substation Capacity:
Growth in system peak load will exceed the substation capacity (999 kVA) in 2018. This project was initially identified for 2015 during the last review and can accordingly be deferred three years to 2018. Hopedale experiences a winter peak; therefore the project must be completed by the early fall of 2018. The Project Proposal will be prepared in 2017 with the work scheduled to start and complete in 2018. A cost estimate was prepared for replacement of the existing bank of 3x333 kVA transformers with a bank of 3x500 kVA plus one spare 500 kVA transformer at the site by the Electrical Engineering Department in February 2010. The estimate for this project is $317,100.

To reduce overall engineering and project management costs the second generation increase, main bus replacement, and substation upgrade can all be done concurrently in the year 2019.

Fuel Storage:
The existing onsite storage is considered adequate provided that regular deliveries are available throughout the year.

No other expansions to accommodate load growth were identified for the Hopedale Diesel Plant for the long-term.

<u>411 – Makkovik (MAK)</u>
The Makkovik diesel plant contains three diesel generators rated at 635 kW, 450 kW, and 600 kW respectively for an installed capacity of 1,685 kW and a firm capacity of 1,050 kW. The diesel units are coupled to a 2,000 A Main Bus. The Main Bus is connected to the diesel plant substation by three runs of 500 kcmil copper RW90 service cables. The substation consists of three 333 kVA single-phase step-up transformers with a spare unit stored at the site. A recloser on the transformer primary provides primary distribution system protection. There are six fuel storage tanks located onsite with a total capacity of 1,123,840 L to supply the diesel plant. Table 10 below summarizes the ratings of equipment found in the Makkovik Diesel Plant.

Table 10: Makkovik Diesel Plant Equipment

Installed Capacity	1,685	kW
Firm Capacity	1,050	kW
Main Bus	2,000	A
Main Breaker	-	A
Service Conductors	1,185	A
Substation	999	kVA
Recloser	560	A
Fuel Storage	1,123,840	L

Firm Generation Capacity:
Growth in system peak load will exceed firm plant capacity by 2027. This project was initially identified for 2029 during the last review and will accordingly need to be advanced two years to 2027. Since a generation increase is a two year project, Makkovik is a summer peaking system and the capacity increase is required by early spring 2027; the project must be advanced for completion a year earlier in 2026. The recommendation is to add a fourth unit to the plant between 900 kW and 1,000 kW. If it is not possible to add a fourth unit to the plant, then unit #3033 (450 kW) should be replaced with a unit between 900 kW and 1,000 kW. The project will start in 2025 and finish in 2026, with the preceding budget proposal being prepared in 2024. The project cost is estimated to be $1,393,600, and was prepared by the Mechanical Engineering Department in November 2010. This project will increase the plant firm capacity to 1,235 kW.

Diesel Plant Substation Capacity:
Growth in system peak load will exceed the substation capacity (999 kVA) in 2026, which was previously identified during the last review. Makkovik experiences a summer peak; therefore the project must be advanced for completion a year earlier in 2025. The Project Proposal will be prepared in 2024 with the work scheduled to start and complete in 2025. A cost estimate will be prepared by the Electrical Engineering Department for the purchase and installation of three 500 kVA, 600/2400 V single-phase transformers plus one spare 500 kVA transformer at the site to replace the existing bank of three 333 kVA units. The estimate for this project is $317,100 based on the estimate for the Hopedale substation.

To reduce overall engineering and project management costs the generation increase, and substation upgrade can be done concurrently in the year 2026.

No other expansions to accommodate load growth were identified for the Makkovik Diesel Plant for the long-term.

402 – Nain (NAN)

The Nain diesel plant contains three diesel generators rated at 865 kW, 1,275 kW, and 865 kW respectively for an installed capacity of 3,005 kW and a firm capacity of 1,730 kW. The diesel units are coupled to a 1,200 A Main Bus. Distribution system protection is provided by one 1,200 A Feeder Breaker, which is connected directly to the distribution system by a single run of 500 kcmil copper 5 kV power cables. There are five fuel storage tanks located onsite with a total capacity of 1,077,820 L to supply the diesel plant. Table 11 below summarizes the ratings of equipment found in the Nain Diesel Plant.

Table 11: Nain Diesel Plant Equipment

Installed Capacity	3,005	kW
Firm Capacity	1,730	kW
Main Bus	1,200	A
Main Breaker	1,200	A
Service Conductors	395	A
Substation	-	kVA
Recloser	-	A
Fuel Storage	1,077,820	L

Firm Generation Capacity:

Growth in system peak load will exceed firm plant capacity by 2014. This project was initially identified for 2013 during the last review and will accordingly need to be deferred one year to 2014. Since a generation increase is a two year project, and Nain is a winter peaking system. The capacity increase is required by fall of 2014.

There are two alternatives to increase the capacity of the Nain Diesel Plant.

1. Install a fourth unit ranging in size from 650 kW to 750 kW in 2014. Another capacity increase will be required in 2027 or later depending on the size of unit that is installed in 2014.

2. Install a new 1275 kW (or larger) unit in place of one of the existing 865 kW units. The increase will be required by 2014 based on the current forecast for Nain. Another capacity increase (likely the addition of a fourth unit) will be required by 2021.

An economic analysis will be performed to determine the most favourable alternative. The project will start in 2013 and finish in 2014, with the preceding budget proposal being submitted to the PUB in 2012. The project cost is estimated to be approximately $1,200,000, and was prepared by the Mechanical Engineering Department in 2010. This project will increase the plant firm capacity to at least 2,140 kW.

Diesel Plant Service Conductor Capacity:
Growth in system peak load is forecasted to exceed 100 % of the service conductors rating in 2030. The existing system is currently served by one run of 500 kcmil copper 5 kV power cables. A cost estimate will be requested from the Electrical Engineering Department to add a second run of cables in parallel with the existing run. The project will start and finish in 2030, with the preceding budget proposal being submitted to the PUB in 2029.

Fuel Storage:
Fuel storage is considered adequate provided that regular deliveries are available throughout the winter.

No other expansions to accommodate load growth were identified for the Nain Diesel Plant for the long-term.

409 – Paradise River (PDR)
The Paradise River diesel plant contains three diesel generators rated at 90 kW, 48 kW, and 50 kW respectively for an installed capacity of 188 kW and a firm capacity of 98 kW. The 90 kW diesel unit is being replaced with a 50 kW unit in 2010. The diesel units are coupled to a 225 A Main Bus. Distribution system protection is provided by a 400 A Main Breaker, which is connected to the diesel plant substation by a single run of 4/0 AWG copper RW90 service cables. The substation consists of three 25 kVA single-phase step-up transformers with a spare unit stored at the site. There is a single fuel storage tank located onsite with a total capacity of 45,400 L to supply the diesel plant. Table 12 below summarizes the ratings of equipment found in the Paradise River Diesel Plant.

Table 12: Paradise River Diesel Plant Equipment

Installed Capacity	188	kW
Firm Capacity	98	kW
Main Bus	225	A
Main Breaker	400	A
Service Conductors	235	A
Substation	75	kVA
Fuel Storage	45,400	L

Fuel Storage:
Fuel storage is considered adequate provided that regular deliveries are available throughout the winter.

No expansions to accommodate load growth were identified for the Paradise River Diesel Plant for the long-term.

407 – Postville (POV)

The Postville diesel plant contains three diesel generators rated at 365 kW, 252 kW, and 275 kW respectively for an installed capacity of 892 kW and a firm capacity of 527 kW. The diesel units are coupled to an 800 A Main Bus. Distribution system protection is provided by an 800 A Main Breaker, which is connected to the diesel plant substation by two runs of 300 kcmil copper RW90 service cables. The substation consists of three 167 kVA single-phase step-up transformers with a spare unit stored at the site. A recloser on the transformer primary provides primary distribution system protection. There are nine fuel storage tanks located onsite with a total capacity of 409,130 L to supply the diesel plant. Table 13 below summarizes the ratings of equipment found in the Postville Diesel Plant.

Table 13: Postville Diesel Plant Equipment

Installed Capacity	892	kW
Firm Capacity	527	kW
Main Bus	800	A
Main Breaker	800	A
Service Conductors	590	A
Substation	501	kVA
Recloser	560	A
Fuel Storage	409,130	L

Diesel Plant Substation Capacity:

The last review identified a substation capacity increase for the year 2028. The latest load forecast does not identify any requirement within the next twenty years. Therefore, the project to replace the existing substation transformers (3x167 kVA) with three 250 kVA units can be removed from the twenty year plan.

Fuel Storage:

Fuel requirements have exceeded the available on-site storage, which is currently 409,130 L. A proposal was submitted in 2010 to replace the entire tank-farm in 2011 based on a condition assessment. The replacement tank farm will be sized to include the required capacity increase. At this time, approximately 530,000 L of fuel storage would be required to achieve a 25 year tank farm life without any further upgrades. A long-term fuel storage forecast was produced by System Planning's Market Analysis Section to estimate fuel storage requirements for Postville.

No other expansions to accommodate load growth were identified for the Postville Diesel Plant for the long-term.

410 – Rigolet (RIG)

The Rigolet diesel plant contains three diesel generators rated at 455 kW, 320 kW, and 545 kW respectively for an installed capacity of 1,320 kW and a firm capacity of 775 kW. The diesel units are coupled to a 1,200 A Main Bus. The Main Bus is connected to the diesel plant substation by two runs of 500 kcmil copper RW90 service cables. The substation consists of three 500 kVA single-phase step-up transformers with a spare unit stored at the site. A recloser on the transformer primary provides primary distribution system protection. There are six fuel storage tanks located onsite with a total capacity of 595,350 L to supply the diesel plant. Table 14 below summarizes the ratings of equipment found in the Rigolet Diesel Plant.

Table 14: Rigolet Diesel Plant Equipment

Installed Capacity	1,320	kW
Firm Capacity	775	kW
Main Bus	1,200	A
Main Breaker	-	A
Service Conductors	790	A
Substation	1,500	kVA
Recloser	560	A
Fuel Storage	595,350	L

Firm Generation Capacity:

Growth in system peak load will exceed firm plant capacity by 2024. To maintain firm capacity requirements, a fourth unit sized between 700 kW and 750 kW should be added to the plant. The project will start in 2023 and finish in 2024, with the budget proposal being submitted to the PUB in 2022. The project cost is estimated to be approximately $750,000, but an updated estimate will be requested from the Mechanical Engineering Department. This project will increase the plant firm capacity to 1,320 kW which should be sufficient for the foreseeable future.

Diesel Plant Service Conductor Capacity:

Growth in system peak load is forecasted to exceed 100 % of the service conductors rating in 2023. The existing system is currently served by two runs of 500 kcmil Copper RW90 service cable. A cost estimate was requested from the Electrical Engineering Department to add a third run of 500 kcmil Copper RW90 service cable in parallel with the existing two runs. The project will start and finish in 2023, with the preceding budget proposal being prepared and submitted to the PUB in 2022. This project could be done in conjunction with the generation upgrade in 2024 to reduce project management costs.

Fuel Storage:
Fuel requirements will exceed available on-site storage of 595,350 L for the 2012/2013 winter season. A proposal will be prepared in the spring 2011 to increase the fuel storage in 2012. The existing fuel storage site at Rigolet is already congested, and does not permit any additional tanks to be added to the existing tank farm. The proposed project is to remove the two existing horizontal fuel storage tanks 12A (90,920 L) and 12B (90,900 L), and install a new 300,000 L vertical fuel storage tank in the existing dyke. The estimated cost to complete this work is $750,000 which was prepared by the Civil Engineering Department in the spring of 2010. Following this upgrade the total fuel storage at the facility will be 713,530 L which, based on current growth projections should be adequate for the next twenty-five years.

No other expansions to accommodate load growth were identified for the Rigolet Diesel Plant for the long-term.

TRO Northern Region

305 – Charlottetown (CHT)

The Charlottetown diesel plant contains five diesel generators rated at 250 kW, 250 kW, 759 kW, 300 kW, and a 725 kW mobile generator installed outside the plant respectively for an installed capacity of 2,284 kW and a firm capacity of 1,525 kW. The diesel units are coupled to a 3,000 A Main Bus. The Main Bus is connected to the diesel plant substation by four runs of 750 kcmil copper RW90 service cables. The substation consists of three 500 kVA single-phase step-up transformers with a spare unit stored at the site. A recloser on the transformer primary provides primary distribution system protection. There are two fuel storage tanks located onsite with a total capacity of 309,000 L to supply the diesel plant. Table 15 below summarizes the ratings of equipment found in the Charlottetown Diesel Plant.

Table 15: Charlottetown Diesel Plant Equipment

Installed Capacity	2,284	kW
Firm Capacity	1,525	kW
Main Bus	3,000	A
Main Breaker	-	A
Service Conductors	1,600	A
Substation	1,500	kVA
Recloser	560	A
Fuel Storage	309,000	L

Charlottetown requires immediate upgrades to the plant firm capacity, service conductors, and the substation transformers. This requirement will be met with the construction of a new diesel plant starting in 2012. Interim power requirements are being met using temporary generation.

Fuel Storage:

The existing fuel storage is considered adequate provided that regular deliveries are available throughout the year.

304 – Port Hope Simpson (PHS)

The Port Hope Simpson diesel plant contains three diesel generators rated at 455 kW, 455 kW, and 455 kW respectively for an installed capacity of 1,365 kW and a firm capacity of 910 kW. The diesel units are coupled to a 1,200 A Main Bus. The Main Bus is connected to the diesel plant substation by four runs of 313 kcmil copper DLO cables. The substation consists of three 333 kVA single-phase step-up transformers with a spare unit stored at the site. A recloser on the transformer primary provides primary distribution system protection. There are two fuel

storage tanks located onsite with a total capacity of 45,460 L to supply the diesel plant. Table 16 below summarizes the ratings of equipment found in the Port Hope Simpson Diesel Plant.

Table 16: Port Hope Simpson Diesel Plant Equipment

Installed Capacity	1,365	kW
Firm Capacity	910	kW
Main Bus	1,200	A
Main Breaker	-	A
Service Conductors	1,050	A
Substation	999	kVA
Recloser	560	A
Fuel Storage	45,460	L

Firm Generation Capacity:
Growth in system peak load will exceed firm plant capacity by 2023. This project was initially identified for 2014 during the last review and will accordingly need to be deferred nine years to 2023. Since a generation increase is a two year project, and the Port Hope Simpson system peak occurs in winter. The capacity increase is required to be completed by the fall of 2023. The recommendation is to add a fourth unit to the plant between 750 kW and 850 kW. If it is not possible to add a fourth unit to the plant, then unit #2042 (455 kW) and unit #2043 (455 kW) should be replaced with two 725 kW units. The project will start in 2022 and finish in 2023, with the preceding budget proposal being prepared in 2021. The project cost to install the fourth unit is estimated to be $1,036,300, and was prepared by the Mechanical Engineering Department in November 2010. This project will increase the plant firm capacity to 1,365 kW. Replacing two units with larger diesel generators would increase firm capacity to 1,180 kW.

Diesel Plant Main Bus:
A project to replace the main bus was identified during the last review for the year 2028. The project is no longer required and can be cancelled.

Diesel Plant Service Conductor Capacity:
Growth in system peak load is forecasted to exceed 100 % of the service conductors rating in 2030. This project was initially identified for 2021 during the last review and can accordingly be deferred nine years to 2030. The existing system is currently served by four runs of 313.1 kcmil copper DLO cable. A cost estimate was requested from the Electrical Engineering Department to add a fifth run of 313.1 kcmil copper DLO cable in parallel with the existing four runs. If this alternative is not possible, then replace the existing service conductors with three runs of 500 kcmil Copper RW90 Cable. The project will start and finish in 2030, with the preceding budget proposal being prepared and submitted to the PUB in 2029. It may be prudent to size the new service run to match a 1,500 kVA transformer bank.

Diesel Plant Substation Capacity:
Growth in system peak load will exceed the substation capacity (999 kVA) in 2031. This project was initially identified for 2021 during the last review and can accordingly be deferred ten years to 2031. Port Hope Simpson experiences a winter peak; therefore the project must be completed by the early fall of 2031. The Project Proposal will be prepared and submitted to the PUB in 2030 with the work scheduled to start and complete in 2031. A cost estimate was prepared for replacement of the existing bank of 3x333 kVA transformers with the purchase and installation of 3x500 kVA, 600/7200 V single-phase transformers plus one spare 500 kVA unit at the site by the Electrical Engineering Department in February 2010. The estimate for this project is $317,100 based on the estimate for the Hopedale Substation.

Fuel Storage:
The existing fuel storage is considered adequate provided that regular deliveries are available throughout the year.

No other expansions to accommodate load growth were identified for the Port Hope Simpson Diesel Plant for the long-term.

307 – Norman Bay (NOB)
The Norman Bay diesel plant was refurbished in 2010, and the ratings of all new equipment are unknown at this time. The three new diesel generators are rated at 40 kW, 50 kW, and 70 kW respectively for an installed capacity of 160 kW and a firm capacity of 90 kW. The old diesel plant had the units coupled to a 225 A Main Bus. Distribution system protection was provided by a 200 A Main Breaker, which was connected to the diesel plant substation by one run of 3/0 AWG copper RW90 service cables. The substation consists of three 25 kVA single-phase step-up transformers with a spare unit stored at the site. There are two fuel storage tanks located onsite with a total capacity of 64,800 L to supply the diesel plant. Table 17 below summarizes the ratings of equipment found in the Norman Bay Diesel Plant. Note the ratings of all equipment must be confirmed.

Table 17: Norman Bay Diesel Plant Equipment

Installed Capacity	160	kW
Firm Capacity	90	kW
Main Bus	225	A
Main Breaker	200	A
Service Conductors	210	A
Substation	75	kVA
Recloser	-	A
Fuel Storage	64,800	L

Diesel Plant Substation Capacity:
Growth in system peak load will exceed the substation capacity (75 kVA) in 2011. An increase in the forecasted peak load for Norman Bay with the most recent forecast has identified the need for this project. Norman Bay experiences a winter peak; therefore the project must be completed by the early fall of 2012. The Project Proposal will be prepared and submitted to the PUB in 2011 with the work scheduled to start and complete in 2012. A cost estimate will be prepared for replacement of the existing cluster of 3x25 kVA transformers with the purchase and installation of 3x50 kVA, 600/2400 V single-phase transformers plus one spare 50 kVA unit at the site by the Transmission and Distribution Engineering Department. The preliminary estimate for this project is roughly $30,000 but a detailed cost estimate will need to be prepared.

Fuel Storage:
Fuel requirements have exceeded the available on-site storage of 64,800 L. A proposal was submitted in 2010 to increase fuel storage by 20,000 L which has been subsequently approved. The latest estimate of winter fuel storage requirements for Norman Bay has the fuel storage short fall at 15,100 L. To allow a sufficient margin for uncertainty in fuel requirements a larger tank size is now recommended, and the additional fuel tank should be 32,400 L. This is the same size as the existing two tanks, and the largest that can be practically transported to the site. The cost of this work was estimated at approximately $113,800 for installing a 20,000 L tank. To install a 32,400 L tank it is estimated the project will cost approximately an additional $15,000 for a total of $128,800. A detailed cost estimate will be prepared for this change to the work.

No other expansions to accommodate load growth were identified for the Norman Bay Diesel Plant for the long-term.

<u>302 – Mary's Harbour (MSH)</u>
The Mary's Harbour diesel plant contains three diesel generators rated at 545 kW, 545 kW, and 820 kW respectively for an installed capacity of 1,910 kW and a firm capacity of 1,090 kW. The diesel units are coupled to a 1,200 A Main Bus. The Main Bus is connected to the diesel plant substation by four runs of 313 kcmil copper DLO cables. The substation consists of three 333 kVA single-phase step-up transformers with a spare unit stored at the site. A recloser on the transformer primary provides primary distribution system protection. There are two fuel storage tanks located onsite with a total capacity of 628,000 L to supply the diesel plant. Table 18 below summarizes the ratings of equipment found in the Mary's Harbour Diesel Plant.

Table 18: Mary's Harbour Diesel Plant Equipment

Installed Capacity	1,910	kW
Firm Capacity	1,090	kW
Main Bus	1,200	A
Main Breaker	-	A
Service Conductors	1,050	A
Substation	999	kVA
Recloser	560	A
Fuel Storage	628,000	L

In the spring of 2010 Hydro learned, through a request for a line to be relocated, that the local crab processing operation in Mary's Harbour was preparing to construct a new crab plant to replace the existing facility, and they had already submitted an environmental impact statement to the provincial governments Department of Environment. Hydro made contact with the owner of the operation and requested information on the electrical loads that could be expected from the new plant. Hydro received this information in October 2010, once the design on the crab plant had progressed far enough to provide the information. With this information Hydro prepared a forecast of the impacts of the new operation on the system peak load, and identified a number of pieces of equipment that would require capacity increases which are listed in the following sections to support the new load.

Firm Generation Capacity:
Growth in system peak load will exceed firm plant capacity by 2012. Since a generation increase is a two year project, and the Mary's Harbour system experiences a late spring and summer peak. The capacity increase is required to be completed by the early spring 2012; the project must be advanced for completion a year earlier in 2011. The recommendation is to add a fourth unit to the plant between 600 kW and 800 kW. If it is not possible to add a fourth unit to the plant, then unit #2037 (545 kW) should be replaced with an 800 kW unit. The project will start in 2011 and finish in early 2012, with the preceding budget proposal being prepared as soon as practically possible. The project cost is estimated to be $1,036,300, which is based on the cost for installing the fourth unit in Port Hope Simpson. Adding the fourth unit will increase the plant firm capacity to 1,890 kW. This project will be impacted by the plant crane system which is inadequate to lift an 800 kW unit, and the plant does not have sufficient ceiling height to accommodate a larger lifting system. In order the install a larger lift system, the plant height will have to be raised.

Diesel Plant Main Bus:
Peak load is forecasted to exceed 100 % of the bus rating in the spring of 2012. The existing system is currently served by a 1,200 A bus. A cost estimate will be requested from the Electrical Engineering Department for the purchase and installation of a new 2,000 A bus to

replace the existing 1,200 A bus. The project will start in 2011 and finish in early spring of 2012 in advance of the system peak. The budget proposal will be prepared in conjunction with the generation capacity increase.

Diesel Plant Service Conductor Capacity:
Growth in system peak load is forecasted to exceed 100 % of the service conductors rating in 2030. This project was initially identified for 2026 during the last review and can accordingly be advanced to 2011. The existing system is currently served by four runs of 313.1 kcmil copper DLO cable. A cost estimate was requested from the Electrical Engineering Department to add another duct with four runs of 313.1 kcmil copper DLO cable in parallel with the existing four runs. The project will start and finish in 2011, with the preceding budget proposal being prepared and submitted to the PUB as soon as practically possible in conjunction with the upgrades listed above. It may be prudent to size the new service run to match a 1,500 kVA transformer bank.

Diesel Plant Substation Capacity:
Growth in system peak load will exceed the substation capacity (999 kVA) in 2012. This project was initially identified for 2027 during the last review and can accordingly be advanced to 2011. Mary's Harbour experiences a supper peak; therefore the project must be completed no later than the early spring of 2012 and preferably by the fall of 2011. The Project Proposal will be prepared and submitted to the PUB as soon as practically possible in conjunction with the upgrades listed above with the work scheduled to start and complete in 2011. Upgrading the existing transformer bank is not adequate because the capacity does not leave room for additional growth and would require an additional capacity increase in the near future. An alternative is to construct a second substation complete with a recloser and three 500 kVA transformers, and split the distribution feeder into two feeders. A gang operated disconnect switch would be installed between the two feeders to serve as a tie point for performing substation maintenance without system outages. A cost estimate was prepared for replacement of the existing bank of 3x333 kVA transformers with the purchase and installation of 3x500 kVA, 600/2400 V single-phase transformers plus one spare 500 kVA unit at the site by the Electrical Engineering Department in February 2010. The estimate for this project is $317,100 based on the estimate for the Hopedale Substation, and does not include the cost for a recloser and four pole structure.

Fuel Storage:
The existing fuel storage is considered adequate provided that regular deliveries are available throughout the year.

No other expansions to accommodate load growth were identified for the Mary's Harbour Diesel Plant for the long-term.

308 – L'Anse au Loup (LAL)

The L'Anse au Loup diesel plant contains five diesel generators rated at 800 kW, 1,100 kW, 1,000 kW, 600 kW, 600 kW, and a 1,825 kW mobile generator installed outside the plant. The system also has an interconnection to the Lac Robertson system in Quebec which is contracted as a secondary supply at 3,000 kW, but is treated as a firm power source. Due to age and amount of use, one 600 kW diesel generator is discounted from the installed capacity of the plant. Therefore, the system has a total installed capacity of 8,325 kW and a firm capacity of 5,325 kW. The diesel units are coupled to a 1,200 A Main Bus. Substation protection is provided by a 1,200 A Main Breaker, which is connected to the diesel plant substation by four runs of 500 kcmil copper RW90 service cables; two runs go separately to each transformer. The substation consists of two three-phase power transformers rated at 5000 kVA, and 3330 kVA. A spare transformer for this substation is stored at Bishop's Falls. There are two fuel storage tanks located onsite with a total capacity of 45,430 L to supply the diesel plant. Table 19 below summarizes the ratings of equipment found in the L'Anse au Loup Diesel Plant.

Table 19: L'Anse au Loup Diesel Plant Equipment

Installed Capacity	8,325	kW
Firm Capacity	5,325	kW
Main Bus	1,200	A
Main Breaker	1,200	A
Service Conductors	1,264	A
Substation	8,330	kVA
Recloser	1,120	A
Fuel Storage	45,430	L

Firm Generation Capacity:

Growth in system peak load will exceed firm plant capacity by 2015. This project was also identified for 2015 during the last review. Since a generation increase is a two year project, and the L'Anse au Loup system peak occurs in winter. The capacity increase is required to be completed by the fall of 2015. The recommendation is to purchase and install a new 2000 kW unit in the plant to replace one of the 600 kW units. Depending on space constraints a plant extension may be necessary to accommodate larger diesel generators. Note that unit 246 and unit 247 are obsolete units that are due for replacement, and the capacity increase should be done in conjunction with this work. The project will start in 2014 and finish in 2015, with the preceding budget proposal being prepared in 2013. The project cost is estimated to be $1,584,100, and was prepared by the Mechanical Engineering Department in November 2010. This project will increase the plant installed capacity to 7,325 kW. Replacing two units with larger diesel generators would increase installed capacity to 9,325 kW.

Fuel Storage:
The existing fuel storage is considered adequate provided that regular deliveries are available throughout the year.

No other expansions to accommodate load growth were identified for the L'Anse au Loup Diesel Plant for the long-term.

303 – St. Lewis (SLE)

The St. Lewis diesel plant contains three diesel generators rated at 250 kW, 365 kW, and 455 kW respectively for an installed capacity of 1,070 kW and a firm capacity of 615 kW. The diesel units are coupled to a 1,200 A Main Bus. The Main Bus is connected to the diesel plant substation by two runs of 750 kcmil copper RW90 service cables. The substation consists of three 333 kVA single-phase step-up transformers with a spare unit stored at the site. A recloser on the transformer primary provides primary distribution system protection. There are six fuel storage tanks located onsite with a total capacity of 409,140 L to supply the diesel plant. Table 20 below summarizes the ratings of equipment found in the St. Lewis Diesel Plant.

Table 20: St. Lewis Diesel Plant Equipment

Installed Capacity	1,070	kW
Firm Capacity	615	kW
Main Bus	1,200	A
Main Breaker	-	A
Service Conductors	1,000	A
Substation	999	kVA
Recloser	560	A
Fuel Storage	409,140	L

No expansions to accommodate load growth were identified for the St. Lewis Diesel Plant for the long-term.

306 – William's Harbour (WHR)

The William's Harbour diesel plant contains three diesel generators rated at 80 kW, 210 kW, and 90 kW respectively for an installed capacity of 380 kW and a firm capacity of 170 kW. The diesel units are coupled to a 600 A Main Bus. Distribution system protection is provided by an 800 A Main Breaker, which is connected to the diesel plant substation by one run of 500 kcmil copper RW90 service cables. The substation consists of three 50 kVA single-phase step-up transformers with a spare unit stored at the site. There are three fuel storage tanks located onsite with a total capacity of 121,173 L to supply the diesel plant. Table 21 below summarizes the ratings of equipment found in the William's Harbour Diesel Plant.

Table 21: William's Harbour Diesel Plant Equipment

Installed Capacity	380	kW
Firm Capacity	170	kW
Main Bus	600	A
Main Breaker	800	A
Service Conductors	395	A
Substation	150	kVA
Recloser	-	A
Fuel Storage	121,173	L

No expansions to accommodate load growth were identified for the William's Harbour Diesel Plant for the long-term.

FORECAST - Fall 2010

Island Rural Isolated Hydro Distribution System Forecasts - Fall 2010

		5-Year Plan					20-Year Plan															Peak
Peaks	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**Season**
Francois	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	Winter
net	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	
Grey River	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	Winter
net	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	
Little Bay Islands	622	619	615	610	605	601	596	591	587	582	577	573	568	563	558	554	549	544	540	535	530	Summer
net	610	607	603	598	593	589	584	579	575	570	565	561	556	551	546	542	537	532	528	523	518	
McCallum	168	166	164	162	160	158	156	154	152	150	148	146	144	142	140	138	136	135	133	131	129	Winter
net	162	160	158	156	154	152	150	148	146	144	142	140	138	136	134	132	130	128	126	124	122	
Ramea	1,237	1,244	1,245	1,246	1,246	1,247	1,248	1,248	1,249	1,249	1,250	1,251	1,251	1,252	1,253	1,253	1,254	1,255	1,255	1,256	1,257	Winter
net	1,206	1,212	1,213	1,214	1,215	1,215	1,216	1,216	1,217	1,218	1,218	1,219	1,220	1,220	1,221	1,222	1,222	1,223	1,224	1,224	1,225	
St Brendans	352	350	347	345	343	342	339	337	335	333	331	329	326	324	322	320	318	316	314	312	310	Winter
net	341	338	336	333	331	330	327	325	323	321	319	317	315	313	311	309	307	305	302	300	298	

Labrador Rural Isolated Hydro Distribution System Forecasts - Fall 2010

		5-Year Plan					20-Year Plan															Peak
Peaks	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**Season**
Black Tickle	522	523	525	528	530	533	536	538	541	543	546	549	551	554	556	559	562	564	567	569	572	Summer
net	499	500	502	505	507	510	513	515	518	520	523	526	528	531	533	536	539	541	544	546	549	
Cartwright	984	994	1,002	1,013	1,021	1,032	1,041	1,051	1,060	1,070	1,079	1,089	1,098	1,108	1,117	1,127	1,136	1,146	1,155	1,165	1,175	Summer
net	947	957	965	976	984	995	1,004	1,014	1,023	1,033	1,042	1,052	1,061	1,071	1,080	1,090	1,099	1,109	1,118	1,128	1,138	
Charlottetown	1,646	1,666	1,684	1,702	1,723	1,744	1,763	1,782	1,802	1,822	1,841	1,861	1,880	1,900	1,920	1,939	1,959	1,978	1,998	2,018	2,037	Summer
net	1,595	1,615	1,633	1,651	1,672	1,693	1,712	1,731	1,751	1,771	1,790	1,810	1,830	1,849	1,869	1,888	1,908	1,928	1,947	1,967	1,986	
Natuashish	1,729	1,798	1,837	1,871	1,906	1,935	1,973	2,007	2,041	2,075	2,110	2,144	2,178	2,213	2,247	2,281	2,316	2,350	2,384	2,419	2,453	Winter
net	1,684	1,753	1,792	1,826	1,861	1,890	1,928	1,962	1,996	2,030	2,065	2,099	2,133	2,168	2,202	2,236	2,271	2,305	2,339	2,374	2,408	
Hopedale	931	961	986	1,008	1,031	1,054	1,077	1,100	1,123	1,146	1,169	1,192	1,215	1,238	1,262	1,285	1,308	1,331	1,354	1,377	1,400	Winter
net	842	872	897	919	942	965	988	1,011	1,034	1,057	1,080	1,103	1,126	1,149	1,173	1,196	1,219	1,242	1,265	1,288	1,311	
L'Anse au Loup	5,148	5,179	5,240	5,296	5,352	5,408	5,466	5,523	5,580	5,636	5,693	5,750	5,807	5,864	5,921	5,978	6,035	6,092	6,149	6,206	6,263	Winter
net	5,027	5,058	5,120	5,176	5,231	5,287	5,345	5,402	5,459	5,516	5,573	5,630	5,687	5,744	5,801	5,858	5,915	5,972	6,029	6,086	6,143	
Makkovik	805	832	846	858	881	891	908	923	939	954	969	985	1,000	1,015	1,031	1,046	1,061	1,077	1,092	1,107	1,123	Summer
net	760	787	801	813	836	846	863	878	894	909	924	940	955	970	986	1,001	1,016	1,032	1,047	1,062	1,078	
Mary's Harbour	919	1,277	1,287	1,296	1,304	1,312	1,321	1,330	1,338	1,347	1,356	1,364	1,373	1,382	1,390	1,399	1,408	1,416	1,425	1,434	1,442	Spring
net	879	1,237	1,247	1,256	1,264	1,272	1,281	1,290	1,298	1,307	1,316	1,324	1,333	1,342	1,350	1,359	1,368	1,376	1,385	1,394	1,402	
Nain	1,625	1,676	1,725	1,780	1,831	1,883	1,936	1,988	2,040	2,092	2,144	2,197	2,249	2,301	2,353	2,405	2,458	2,510	2,562	2,614	2,666	Winter
net	1,584	1,635	1,685	1,740	1,791	1,843	1,895	1,947	1,999	2,052	2,104	2,156	2,208	2,260	2,313	2,365	2,417	2,469	2,521	2,573	2,626	
Norman Bay	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	Winter
net	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	
Paradise River	46	47	48	48	49	50	50	51	52	52	53	53	54	55	55	56	57	57	58	58	59	Winter
net	39	40	41	42	42	43	44	44	45	45	46	47	47	48	49	49	50	50	51	52	52	
Port Hope Simpson	753	779	793	805	817	829	842	855	868	880	893	905	918	931	943	956	968	981	993	1,006	1,019	Winter
net	733	759	773	785	797	809	822	835	848	860	873	885	898	911	923	936	948	961	973	986	999	
Postville	417	421	425	429	434	438	442	447	451	455	460	464	468	472	477	481	485	490	494	498	502	Winter
net	402	406	410	414	419	423	427	432	436	440	444	449	453	457	462	466	470	474	479	483	487	
Rigolet	611	624	637	650	664	677	690	703	716	730	743	756	769	782	796	809	822	835	848	861	875	Winter
net	591	604	617	630	644	657	670	683	696	710	723	736	749	762	776	789	802	815	828	841	855	
St. Lewis	512	511	511	511	511	511	511	510	510	510	510	510	510	510	509	509	509	509	509	509	508	Summer
net	491	490	490	490	490	490	490	489	489	489	489	489	489	489	488	488	488	488	488	488	487	
Williams Harbour	100	100	101	101	102	102	103	103	103	104	104	105	105	106	106	107	107	108	108	109	109	Winter
net	89	90	90	90	91	91	92	92	93	93	94	94	95	95	96	96	97	97	98	98	99	

Diesel Engine Summary (Updated 2010 12 22)

Central Region

Location		G1 (kW)	G2 (kW)	G3 (kW)	G4 (kW)	G5 (kW)	G6 (kW)	G7 (kW)	Installed Capacity (kW)	Firm Capability (kW)
Francois	Nameplate Rating	275	200	136					611	336
	Unit #	570	566	2001					3	2
Grey River	Nameplate Rating	136	136	250					522	272
	Unit #	2067	2062	2026					3	2
Little Bay Islands	Nameplate Rating	300	450	205	450				1405	955
	Unit #	565	2023	2058	2035				4	3
McCallum	Nameplate Rating	136	210	136					482	272
	Unit #	2018	2063	2064					3	2
Ramea	Nameplate Rating	925	925	925					2775	1850
	Unit #	2045	2077	2047					3	2
St. Brendan's	Nameplate Rating	277	210	225					712	435
	Unit #	578	2055	2056					3	2

Northern and Labrador Regions

Location		G1 (kW)	G2 (kW)	G3 (kW)	G4 (kW)	G5 (kW)	G6 (kW)	G7 (kW)	Installed Capacity (kW)	Firm Capability (kW)
Black Tickle	Nameplate Rating		300	250	455				1005	550
	Unit #		582	579	2066				3	2
Cartwright	Nameplate Rating	450	600	450	720				2220	1500
	Unit #	2036	2086	2045	2052				4	3
Charlottetown	Nameplate Rating	250	250	759	300	725			2284	1525
	Unit #	200	2019	2079	2034	2061			5	4
Natuashish	Nameplate Rating	635	910	910	671				3126	2216
	Unit #	2068	2069	2070	2076				4	3
Hopedale	Nameplate Rating	569	448	545					1562	993
	Unit #	2074	2054	2053					3	2
L'Anse au Loup	Nameplate Rating	800	1100	1000	600	600	1825	3000	8325	5325
	Unit #	2005	2012	2041	246	247	2082	1	6	5
Makkovik	Nameplate Rating	635	450	600					1685	1050
	Unit #	2059	3033	2029					3	2
Mary's Harbour	Nameplate Rating		545	545	820				1910	1090
	Unit #		2037	2038	2048				3	2
Nain	Nameplate Rating	865	1275	865					3005	1730
	Unit #	574	2085	576					3	2
Norman Bay	Nameplate Rating	40	50	70					160	90
	Unit #	1	2085	3					3	2
Paradise River	Nameplate Rating	90	48	50					188	98
	Unit #	2020	324	254					3	2
Port Hope Simpson	Nameplate Rating	455	455	455					1365	910
	Unit #	2043	2042	2073					3	2
Postville	Nameplate Rating		365	252	275				892	527
	Unit #		2084	577	573				3	2
Rigolet	Nameplate Rating		455	320	545				1320	775
	Unit #		2081	2065	2051				3	2
St. Lewis	Nameplate Rating	250	365	455					1070	615
	Unit #	2015	2039	2080					3	2
William's Harbour	Nameplate Rating	80	210	90					380	170
	Unit #	580	2075	2057					3	2

TRO Central Tank Volume

Community	Tank ID #	JDE #	Volume (L)	Total Capacity (L)
Francois	26A	26655	9,000	
				9,000
Grey River	27A	26801	22,730	
	27B	275248	22,730	**45,460**
Little Bay Islands	29B	26074	22,730	
				22,730
McCallum	30A	26513	90,800	
				90,800
Ramea	31B	26965	45,460	
				45,460
St. Brendan's	33B	26226	68,190	
				68,190

TRO Labrador Tank Volume

Community	Tank ID #	JDE #	Volume (L)	Total Capacity (L)
Black Tickle	1A	45568	257,000	
	1B	275990	257,000	
				514,000
Cartwright	2A	332111	46,202	
				46,202
Hopedale	6A	299007	22,700	
				22,700
Makkovik	7A	45589	45,460	
	7B	275936	68,190	
	7C	275937	68,190	
	7D	275938	314,000	
	7E	275939	314,000	
	7F	275940	314,000	
				1,123,840
Nain	9A	45582	144,140	
	9B	275821	144,140	
	9C	275822	144,140	
	9D	275823	600,000	
	9E	275824	45,400	
				1,077,820
Paradise River	10A	297890	45,400	
				45,400

TRO Labrador Tank Volume

Community	Tank ID #	JDE #	Volume (L)	Total Capacity (L)
Postville	11A	45576	22,730	
	11B	275951	22,730	
	11C	275952	45,460	
	11D	275953	45,460	
	11E	275954	45,460	
	11F	275955	45,460	
	11G	275956	68,190	
	11H	275957	68,190	
	11I	275976	45,450	
				409,130
Rigolet	12A	275912	90,920	
	12B	275913	90,900	
	12C	275911	22,730	
	12D	45572	300,000	
	12E	275983	45,400	
	12F	275982	45,400	
				595,350
Natuashish	13A	289021	45,481	
	13B	289020	45,481	
				90,962

TRO Northern Tank Volume

Community	Tank ID #	JDE #	Volume (L)	Total Capacity (L)
Charlottetown	14A	59135	300,000	
	14C	304390	9,000	
				309,000
L'Anse au Loup	16A	275974	22,700	
	16B	27301	22,730	
				45,430
Mary's Harbour	17D	275595	314,000	
	17E	275596	314,000	
				628,000
Norman Bay	18A	308890	32,400	
	18B	308891	32,400	
				64,800
Port Hope Simpson	19A	60025	22,730	
	19B	275618	22,730	
				45,460
St. Lewis	23A	60184	68,190	
	23B	275652	68,190	
	23C	275653	68,190	
	23D	275654	68,190	
	23E	275655	68,190	
	23F	275656	68,190	
				409,140
Williams Harbour	24A	308899	40,391	
	24B	308900	40,391	
	24C	308901	40,391	
				121,173

SUMMARY - December 2010 - Based on Fall 2010 Forecast

Last Updated: 21-Dec-10 Updated By: Chris Warren

Island Rural Isolated System Generation Expansion Summary

		5-Year Plan					20-Year Plan													
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Francois net																					
Grey River net																					
Little Bay Islands net																					
McCallum net																					
Ramea net																					
St Brendans net																					

Labrador Rural Isolated System Generation Expansion Summary

		5-Year Plan					20-Year Plan													
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Black Tickle net													GEN								
Cartwright net						XFMR															
Charlottetown net	GEN XFMR/COND																				
Natuashish net													COND		GEN	XFMR					
Hopedale net			GEN					XFMR	GEN BUS				COND								
L'Anse au Loup net					GEN																
Makkovik net																XFMR	GEN				
Mary's Harbour net	BUS COND	GEN XFMR																			

Labrador Rural Isolated System Generation Expansion Summary

	2011	5-Year Plan 2012	2013	2014	2015	2016	20-Year Plan 2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Nain				GEN													GEN				
net																				COND	
Norman Bay	FUEL																				
net	XFMR																				
Paradise River																					
net																					
Port Hope Simpson													GEN								
net																				COND	XFMR
Postville	FUEL																				
net																					
Rigolet		FUEL												GEN							
net													COND								
St. Lewis																					
net																					
Williams Harbour																					
net																					

FIRM CAPACITY

Island Rural Isolated Hydro Distribution System Forecasts - Fall 2010

Peaks	2011	5-Year Plan 2012	2013	2014	2015	2016	20-Year Plan 2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Firm kW	No O/L kW	Loading Check
Francois	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	336	336	OK
net	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269			
Grey River	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	272	272	OK
net	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186			
Little Bay Islands	622	619	615	610	605	601	596	591	587	582	577	573	568	563	558	554	549	544	540	535	530	955	955	OK
net	610	607	603	598	593	589	584	579	575	570	565	561	556	551	546	542	537	532	528	523	518			
McCallum	168	166	164	162	160	158	156	154	152	150	148	146	144	142	140	138	136	135	133	131	129	272	272	OK
net	162	160	158	156	154	152	150	148	146	144	142	140	138	136	134	132	130	128	126	124	122			
Ramea	1,237	1,244	1,245	1,246	1,246	1,247	1,248	1,248	1,249	1,249	1,250	1,251	1,251	1,252	1,253	1,253	1,254	1,255	1,255	1,256	1,257	1,850	1,850	OK
net	1,206	1,212	1,213	1,214	1,215	1,215	1,216	1,216	1,217	1,218	1,218	1,219	1,220	1,220	1,221	1,222	1,222	1,223	1,224	1,224	1,225			
St Brendans	352	350	347	345	343	342	339	337	335	333	331	329	326	324	322	320	318	316	314	312	310	435	435	OK
net	341	338	336	333	331	330	327	325	323	321	319	317	315	313	311	309	307	305	302	300	298			

Labrador Rural Isolated Hydro Distribution System Forecasts - Fall 2010

Peaks	2011	5-Year Plan 2012	2013	2014	2015	2016	20-Year Plan 2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Firm kW	No O/L kW	Loading Check
Black Tickle	**522**	**523**	**525**	**528**	**530**	**533**	**536**	**538**	**541**	**543**	**546**	**549**	551	554	556	559	562	564	567	569	572	550	550	CHECK
net	499	500	502	505	507	510	513	515	518	520	523	526	528	531	533	536	539	541	544	546	549			
Cartwright	984	994	1,002	1,013	1,021	1,032	1,041	1,051	1,060	1,070	1,079	1,089	1,098	1,108	1,117	1,127	1,136	1,146	1,155	1,165	1,175	1,500	1,500	OK
net	947	957	965	976	984	995	1,004	1,014	1,023	1,033	1,042	1,052	1,061	1,071	1,080	1,090	1,099	1,109	1,118	1,128	1,138			
Charlottetown	1,646	1,666	1,684	1,702	1,723	1,744	1,763	1,782	1,802	1,822	1,841	1,861	1,880	1,900	1,920	1,939	1,959	1,978	1,998	2,018	2,037	1,525	1,525	CHECK
net	1,595	1,615	1,633	1,651	1,672	1,693	1,712	1,731	1,751	1,771	1,790	1,810	1,830	1,849	1,869	1,888	1,908	1,928	1,947	1,967	1,986			
Natuashish	**1,729**	**1,798**	**1,837**	**1,871**	**1,906**	**1,935**	**1,973**	**2,007**	**2,041**	**2,075**	**2,110**	**2,144**	**2,178**	**2,213**	2,247	2,281	2,316	2,350	2,384	2,419	2,453	2,216	2,216	CHECK
net	1,684	1,753	1,792	1,826	1,861	1,890	1,928	1,962	1,996	2,030	2,065	2,099	2,133	2,168	2,202	2,236	2,271	2,305	2,339	2,374	2,408			
Hopedale	**931**	**961**	**986**	1,008	**1,031**	**1,054**	**1,077**	**1,100**	1,123	1,146	1,169	1,192	1,215	1,238	1,262	1,285	1,308	1,331	1,354	1,377	1,400	993	993	CHECK
net	842	872	897	919	942	965	988	1,011	1,034	1,057	1,080	1,103	1,126	1,149	1,173	1,196	1,219	1,242	1,265	1,288	1,311			
L'Anse au Loup	**5,148**	**5,179**	**5,240**	**5,296**	5,352	5,408	5,466	5,523	5,580	5,636	5,693	5,750	5,807	5,864	5,921	5,978	6,035	6,092	6,149	6,206	6,263	5,325	5,325	CHECK
net	5,027	5,058	5,120	5,176	5,231	5,287	5,345	5,402	5,459	5,516	5,573	5,630	5,687	5,744	5,801	5,858	5,915	5,972	6,029	6,086	6,143			
Makkovik	**805**	**832**	**846**	**858**	**881**	**891**	**908**	**923**	**939**	**954**	**969**	**985**	**1,000**	**1,015**	**1,031**	**1,046**	1,061	1,077	1,092	1,107	1,123	1,050	1,050	CHECK
net	760	787	801	813	836	846	863	878	894	909	924	940	955	970	986	1,001	1,016	1,032	1,047	1,062	1,078			
Mary's Harbour	**919**	1,277	1,287	1,296	1,304	1,312	1,321	1,330	1,338	1,347	1,356	1,364	1,373	1,382	1,390	1,399	1,408	1,416	1,425	1,434	1,442	1,090	1,090	CHECK
net	879	1,237	1,247	1,256	1,264	1,272	1,281	1,290	1,298	1,307	1,316	1,324	1,333	1,342	1,350	1,359	1,368	1,376	1,385	1,394	1,402			
Nain	**1,625**	**1,676**	**1,725**	1,780	1,831	1,883	1,936	1,988	2,040	2,092	2,144	2,197	2,249	2,301	2,353	2,405	2,458	2,510	2,562	2,614	2,666	1,730	1,730	CHECK
net	1,584	1,635	1,685	1,740	1,791	1,843	1,895	1,947	1,999	2,052	2,104	2,156	2,208	2,260	2,313	2,365	2,417	2,469	2,521	2,573	2,626			
Norman Bay	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	90	90	OK
net	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78			
Paradise River	46	47	48	48	49	50	50	51	52	52	53	53	54	55	55	56	57	57	58	58	59	98	98	OK
net	39	40	41	42	42	43	44	44	45	45	46	47	47	48	49	49	50	50	51	52	52			
Port Hope Simpson	**753**	**779**	**793**	**805**	**817**	**829**	**842**	**855**	**868**	**880**	**893**	**905**	918	931	943	956	968	981	993	1,006	1,019	910	910	CHECK
net	733	759	773	785	797	809	822	835	848	860	873	885	898	911	923	936	948	961	973	986	999			
Postville	417	421	425	429	434	438	442	447	451	455	460	464	468	472	477	481	485	490	494	498	502	527	527	90%
net	402	406	410	414	419	423	427	432	436	440	444	449	453	457	462	466	470	474	479	483	487			
Rigolet	**611**	**624**	**637**	**650**	**664**	**677**	**690**	**703**	**716**	**730**	**743**	**756**	**769**	782	796	809	822	835	848	861	875	775	775	CHECK
net	591	604	617	630	644	657	670	683	696	710	723	736	749	762	776	789	802	815	828	841	855			
St. Lewis	512	511	511	511	511	511	511	510	510	510	510	510	510	510	509	509	509	509	509	509	508	615	615	OK
net	491	490	490	490	490	490	490	489	489	489	489	489	489	489	488	488	488	488	488	488	487			
Williams Harbour	100	100	101	101	102	102	103	103	103	104	104	105	105	106	106	107	107	108	108	109	109	170	170	OK
net	89	90	90	90	91	91	92	92	93	93	94	94	95	95	96	96	97	97	98	98	99			

MAIN BUS

Island Rural Isolated Hydro Distribution System Forecasts - Fall 2010

Peaks	2011	5-Year Plan 2012	2013	2014	2015	2016	20-Year Plan 2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Amps/PH	Volts	kVA	kW @ 0.9 pf	No O/L kW	Loading Check
Francois	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	400	600	416	374	374	OK
net	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269						
Grey River	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	800	600	831	748	748	OK
net	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186						
Little Bay Islands	622	619	615	610	605	601	596	591	587	582	577	573	568	563	558	554	549	544	540	535	530	1,000	600	1,039	935	935	OK
net	610	607	603	598	593	589	584	579	575	570	565	561	556	551	546	542	537	532	528	523	518						
McCallum	168	166	164	162	160	158	156	154	152	150	148	146	144	142	140	138	136	135	133	131	129	800	600	831	748	748	OK
net	162	160	158	156	154	152	150	148	146	144	142	140	138	136	134	132	130	128	126	124	122						
Ramea	1,237	1,244	1,245	1,246	1,246	1,247	1,248	1,248	1,249	1,249	1,250	1,251	1,251	1,252	1,253	1,253	1,254	1,255	1,255	1,256	1,257	1,200	4,160	8,646	7,782	7,782	OK
net	1,206	1,212	1,213	1,214	1,215	1,215	1,216	1,216	1,217	1,218	1,218	1,219	1,220	1,220	1,221	1,222	1,222	1,223	1,224	1,224	1,225						
St Brendans	352	350	347	345	343	342	339	337	335	333	331	329	326	324	322	320	318	316	314	312	310	800	600	831	748	748	OK
net	341	338	336	333	331	330	327	325	323	321	319	317	315	313	311	309	307	305	302	300	298						

Labrador Rural Isolated Hydro Distribution System Forecasts - Fall 2010

Peaks	2011	5-Year Plan 2012	2013	2014	2015	2016	20-Year Plan 2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Amps/PH	Volts	kVA	kW @ 0.9 pf	No O/L kW	Loading Check
Black Tickle	522	523	525	528	530	533	536	538	541	543	546	549	551	554	556	559	562	564	567	569	572	1,000	600	1,039	935	935	OK
net	499	500	502	505	507	510	513	515	518	520	523	526	528	531	533	536	539	541	544	546	549						
Cartwright	984	994	1,002	1,013	1,021	1,032	1,041	1,051	1,060	1,070	1,079	1,089	1,098	1,108	1,117	1,127	1,136	1,146	1,155	1,165	1,175	2,400	600	2,494	2,245	2,245	OK
net	947	957	965	976	984	995	1,004	1,014	1,023	1,033	1,042	1,052	1,061	1,071	1,080	1,090	1,099	1,109	1,118	1,128	1,138						
Charlottetown	1,646	1,666	1,684	1,702	1,723	1,744	1,763	1,782	1,802	1,822	1,841	1,861	1,880	1,900	1,920	1,939	1,959	1,978	1,998	2,018	2,037	3,000	600	3,118	2,806	2,806	OK
net	1,595	1,615	1,633	1,651	1,672	1,693	1,712	1,731	1,751	1,771	1,790	1,810	1,830	1,849	1,869	1,888	1,908	1,928	1,947	1,967	1,986						
Natuashish	1,729	1,798	1,837	1,871	1,906	1,935	1,973	2,007	2,041	2,075	2,110	2,144	2,178	2,213	2,247	2,281	2,316	2,350	2,384	2,419	2,453	1,200	4,160	8,646	7,782	7,782	OK
net	1,684	1,753	1,792	1,826	1,861	1,890	1,928	1,962	1,996	2,030	2,065	2,099	2,133	2,168	2,202	2,236	2,271	2,305	2,339	2,374	2,408						
Hopedale	**931**	**961**	**986**	**1,008**	**1,031**	**1,054**	**1,077**	**1,100**	**1,123**	1,146	1,169	1,192	1,215	1,238	1,262	1,285	1,308	1,331	1,354	1,377	1,400	1,200	600	1,247	1,122	1,122	CHECK
net	842	872	897	919	942	965	988	1,011	1,034	1,057	1,080	1,103	1,126	1,149	1,173	1,196	1,219	1,242	1,265	1,288	1,311						
L'Anse au Loup	5,148	5,179	5,240	5,296	5,352	5,408	5,466	5,523	5,580	5,636	5,693	5,750	5,807	5,864	5,921	5,978	6,035	6,092	6,149	6,206	6,263	1,200	4,160	8,646	7,782	7,782	OK
net	5,027	5,058	5,120	5,176	5,231	5,287	5,345	5,402	5,459	5,516	5,573	5,630	5,687	5,744	5,801	5,858	5,915	5,972	6,029	6,086	6,143						
Makkovik	805	832	846	858	881	891	908	923	939	954	969	985	1,000	1,015	1,031	1,046	1,061	1,077	1,092	1,107	1,123	2,000	600	2,078	1,871	1,871	OK
net	760	787	801	813	836	846	863	878	894	909	924	940	955	970	986	1,001	1,016	1,032	1,047	1,062	1,078						
Mary's Harbour	**919**	**1,277**	1,287	1,296	1,304	1,312	1,321	1,330	1,338	1,347	1,356	1,364	1,373	1,382	1,390	1,399	1,408	1,416	1,425	1,434	1,442	1,200	600	1,247	1,122	1,122	CHECK
net	879	1,237	1,247	1,256	1,264	1,272	1,281	1,290	1,298	1,307	1,316	1,324	1,333	1,342	1,350	1,359	1,368	1,376	1,385	1,394	1,402						
Nain	1,625	1,676	1,725	1,780	1,831	1,883	1,936	1,988	2,040	2,092	2,144	2,197	2,249	2,301	2,353	2,405	2,458	2,510	2,562	2,614	2,666	1,200	4,160	8,646	7,782	7,782	OK
net	1,584	1,635	1,685	1,740	1,791	1,843	1,895	1,947	1,999	2,052	2,104	2,156	2,208	2,260	2,313	2,365	2,417	2,469	2,521	2,573	2,626						
Norman Bay	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	225	600	234	210	210	OK
net	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78						
Paradise River	46	47	48	48	49	50	50	51	52	52	53	53	54	55	55	56	57	57	58	58	59	225	600	234	210	210	OK
net	39	40	41	42	42	43	44	44	45	45	46	47	47	48	49	49	50	50	51	52	52						
Port Hope Simpson	753	779	793	805	817	829	842	855	868	880	893	905	918	931	943	956	968	981	993	1,006	1,019	1,200	600	1,247	1,122	1,122	90%
net	733	759	773	785	797	809	822	835	848	860	873	885	898	911	923	936	948	961	973	986	999						
Postville	417	421	425	429	434	438	442	447	451	455	460	464	468	472	477	481	485	490	494	498	502	800	600	831	748	748	OK
net	402	406	410	414	419	423	427	432	436	440	444	449	453	457	462	466	470	474	479	483	487						
Rigolet	611	624	637	650	664	677	690	703	716	730	743	756	769	782	796	809	822	835	848	861	875	1,200	600	1,247	1,122	1,122	OK
net	591	604	617	630	644	657	670	683	696	710	723	736	749	762	776	789	802	815	828	841	855						
St. Lewis	512	511	511	511	511	511	511	510	510	510	510	510	510	510	509	509	509	509	509	509	508	1,200	600	1,247	1,122	1,122	OK
net	491	490	490	490	490	490	490	489	489	489	489	489	489	489	488	488	488	488	488	488	487						
Williams Harbour	100	100	101	101	102	102	103	103	103	104	104	105	105	106	106	107	107	108	108	109	109	600	600	624	561	561	OK
net	89	90	90	90	91	91	92	92	93	93	94	94	95	95	96	96	97	97	98	98	99						

MAIN BREAKER

Island Rural Isolated Hydro Distribution System Forecasts - Fall 2010

Peaks	2011	5-Year Plan 2012	2013	2014	2015	2016	20-Year Plan 2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Amp Rating	Volts	kVA	kW @ 0.9 pf	No O/L kW	Loading Check
Francois	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282						
net	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	400	600	416	374	374	OK
Grey River	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201						
net	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	800	600	831	748	748	OK
Little Bay Islands	622	619	615	610	605	601	596	591	587	582	577	573	568	563	558	554	549	544	540	535	530						
net	610	607	603	598	593	589	584	579	575	570	565	561	556	551	546	542	537	532	528	523	518	1,200	600	1,247	1,122	1,122	OK
McCallum	168	166	164	162	160	158	156	154	152	150	148	146	144	142	140	138	136	135	133	131	129						
net	162	160	158	156	154	152	150	148	146	144	142	140	138	136	134	132	130	128	126	124	122	800	600	831	748	748	OK
Ramea	1,237	1,244	1,245	1,246	1,246	1,247	1,248	1,248	1,249	1,249	1,250	1,251	1,251	1,252	1,253	1,253	1,254	1,255	1,255	1,256	1,257						
net	1,206	1,212	1,213	1,214	1,215	1,215	1,216	1,216	1,217	1,218	1,218	1,219	1,220	1,220	1,221	1,222	1,222	1,223	1,224	1,224	1,225	1,200	4,160	8,646	7,782	7,782	OK
St Brendans	352	350	347	345	343	342	339	337	335	333	331	329	326	324	322	320	318	316	314	312	310						
net	341	338	336	333	331	330	327	325	323	321	319	317	315	313	311	309	307	305	302	300	298	1,200	600	1,247	1,122	1,122	OK

Labrador Rural Isolated Hydro Distribution System Forecasts - Fall 2010

Peaks	2011	5-Year Plan 2012	2013	2014	2015	2016	20-Year Plan 2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Amp Rating	Volts	kVA	kW @ 0.9 pf	No O/L kW	Loading Check
Black Tickle	522	523	525	528	530	533	536	538	541	543	546	549	551	554	556	559	562	564	567	569	572						
net	499	500	502	505	507	510	513	515	518	520	523	526	528	531	533	536	539	541	544	546	549	1,000	600	1,039	935	935	OK
Cartwright	984	994	1,002	1,013	1,021	1,032	1,041	1,051	1,060	1,070	1,079	1,089	1,098	1,108	1,117	1,127	1,136	1,146	1,155	1,165	1,175						
net	947	957	965	976	984	995	1,004	1,014	1,023	1,033	1,042	1,052	1,061	1,071	1,080	1,090	1,099	1,109	1,118	1,128	1,138	560	4,160	4,035	3,631	3,631	OK
Charlottetown	1,646	1,666	1,684	1,702	1,723	1,744	1,763	1,782	1,802	1,822	1,841	1,861	1,880	1,900	1,920	1,939	1,959	1,978	1,998	2,018	2,037						
net	1,595	1,615	1,633	1,651	1,672	1,693	1,712	1,731	1,751	1,771	1,790	1,810	1,830	1,849	1,869	1,888	1,908	1,928	1,947	1,967	1,986	560	4,160	4,035	3,631	3,631	OK
Natuashish	1,729	1,798	1,837	1,871	1,906	1,935	1,973	2,007	2,041	2,075	2,110	2,144	2,178	2,213	2,247	2,281	2,316	2,350	2,384	2,419	2,453						
net	1,684	1,753	1,792	1,826	1,861	1,890	1,928	1,962	1,996	2,030	2,065	2,099	2,133	2,168	2,202	2,236	2,271	2,305	2,339	2,374	2,408	1,200	4,160	8,646	7,782	7,782	OK
Hopedale	931	961	986	1,008	1,031	1,054	1,077	1,100	1,123	1,146	1,169	1,192	1,215	1,238	1,262	1,285	1,308	1,331	1,354	1,377	1,400						
net	842	872	897	919	942	965	988	1,011	1,034	1,057	1,080	1,103	1,126	1,149	1,173	1,196	1,219	1,242	1,265	1,288	1,311	560	4,160	4,035	3,631	3,631	OK
L'Anse au Loup	5,148	5,179	5,240	5,296	5,352	5,408	5,466	5,523	5,580	5,636	5,693	5,750	5,807	5,864	5,921	5,978	6,035	6,092	6,149	6,206	6,263						
net	5,027	5,058	5,120	5,176	5,231	5,287	5,345	5,402	5,459	5,516	5,573	5,630	5,687	5,744	5,801	5,858	5,915	5,972	6,029	6,086	6,143	1,200	4,160	8,646	7,782	7,782	OK
Makkovik	805	832	846	858	881	891	908	923	939	954	969	985	1,000	1,015	1,031	1,046	1,061	1,077	1,092	1,107	1,123						
net	760	787	801	813	836	846	863	878	894	909	924	940	955	970	986	1,001	1,016	1,032	1,047	1,062	1,078	560	4,160	4,035	3,631	3,631	OK
Mary's Harbour	919	1,277	1,287	1,296	1,304	1,312	1,321	1,330	1,338	1,347	1,356	1,364	1,373	1,382	1,390	1,399	1,408	1,416	1,425	1,434	1,442						
net	879	1,237	1,247	1,256	1,264	1,272	1,281	1,290	1,298	1,307	1,316	1,324	1,333	1,342	1,350	1,359	1,368	1,376	1,385	1,394	1,402	560	4,160	4,035	3,631	3,631	OK
Nain	1,625	1,676	1,725	1,780	1,831	1,883	1,936	1,988	2,040	2,092	2,144	2,197	2,249	2,301	2,353	2,405	2,458	2,510	2,562	2,614	2,666						
net	1,584	1,635	1,685	1,740	1,791	1,843	1,895	1,947	1,999	2,052	2,104	2,156	2,208	2,260	2,313	2,365	2,417	2,469	2,521	2,573	2,626	1,200	4,160	8,646	7,782	7,782	OK
Norman Bay	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80						
net	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	200	600	208	187	187	OK
Paradise River	46	47	48	48	49	50	50	51	52	52	53	53	54	55	55	56	57	57	58	58	59						
net	39	40	41	42	42	43	44	44	45	45	46	47	47	48	49	49	50	50	51	52	52	400	600	416	374	374	OK
Port Hope Simpson	753	779	793	805	817	829	842	855	868	880	893	905	918	931	943	956	968	981	993	1,006	1,019						
net	733	759	773	785	797	809	822	835	848	860	873	885	898	911	923	936	948	961	973	986	999	560	12,470	12,095	10,886	10,886	OK
Postville	417	421	425	429	434	438	442	447	451	455	460	464	468	472	477	481	485	490	494	498	502						
net	402	406	410	414	419	423	427	432	436	440	444	449	453	457	462	466	470	474	479	483	487	560	4,160	4,035	3,631	3,631	OK
Rigolet	611	624	637	650	664	677	690	703	716	730	743	756	769	782	796	809	822	835	848	861	875						
net	591	604	617	630	644	657	670	683	696	710	723	736	749	762	776	789	802	815	828	841	855	560	4,160	4,035	3,631	3,631	OK
St. Lewis	512	511	511	511	511	511	511	510	510	510	510	510	510	510	509	509	509	509	509	509	508						
net	491	490	490	490	490	490	490	489	489	489	489	489	489	489	488	488	488	488	488	488	487	560	12,470	12,095	10,886	10,886	OK
Williams Harbour	100	100	101	101	102	102	103	103	103	104	104	105	105	106	106	107	107	108	108	109	109						
net	89	90	90	90	91	91	92	92	93	93	94	94	95	95	96	96	97	97	98	98	99	800	600	831	748	748	OK

SERVICE CONDUCTORS Use ratings in Table 2 of the Canadian Electrical Code, Part 1. Allowable Ampacities for not more than 3 Copper Conductors in raceway or cable (based on ambient temperature of 30 C)
Where more than 3 conductors are present, the ampacity correction factors of Table 5C of the Canadian Electrical Code, Part 1 shall apply.

Island Rural Isolated Hydro Distribution System Forecasts - Fall 2010

		5-Year Plan					20-Year Plan																							
Peaks	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**#/Ph**	**Size**	**Material**	**Amps**	**Volts**	**kVA**	**kW @ 0.9 pf**	**No O/L kW**	**Loading Check**
Francois	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282									
net	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	1	500	Cu	395	600	410	369	369	OK
Grey River	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201									
net	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	1	350	Cu	325	600	338	304	304	OK
Little Bay Islands	622	619	615	610	605	601	596	591	587	582	577	573	568	563	558	554	549	544	540	535	530									
net	610	607	603	598	593	589	584	579	575	570	565	561	556	551	546	542	537	532	528	523	518	2	500	Cu	790	600	821	739	739	OK
McCallum	168	166	164	162	160	158	156	154	152	150	148	146	144	142	140	138	136	135	133	131	129									
net	162	160	158	156	154	152	150	148	146	144	142	140	138	136	134	132	130	128	126	124	122	1	300	Cu	295	600	307	276	276	OK
Ramea	1,237	1,244	1,245	1,246	1,246	1,247	1,248	1,248	1,249	1,249	1,250	1,251	1,251	1,252	1,253	1,253	1,254	1,255	1,255	1,256	1,257									
net	1,206	1,212	1,213	1,214	1,215	1,215	1,216	1,216	1,217	1,218	1,218	1,219	1,220	1,220	1,221	1,222	1,222	1,223	1,224	1,224	1,225	2	2/0	Cu	370	4,160	2,666	2,399	2,399	OK
St Brendans	352	350	347	345	343	342	339	337	335	333	331	329	326	324	322	320	318	316	314	312	310									
net	341	338	336	333	331	330	327	325	323	321	319	317	315	313	311	309	307	305	302	300	298	1	500	Cu	395	600	410	369	369	90%

Labrador Rural Isolated Hydro Distribution System Forecasts - Fall 2010

		5-Year Plan					20-Year Plan																							
Peaks	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**#/Ph**	**Size**	**Material**	**Amps**	**Volts**	**kVA**	**kW @ 0.9 pf**	**No O/L kW**	**Loading Check**
Black Tickle	522	523	525	528	530	533	536	538	541	543	546	549	551	554	556	559	562	564	567	569	572									
net	499	500	502	505	507	510	513	515	518	520	523	526	528	531	533	536	539	541	544	546	549	2	350	Cu	650	600	675	608	608	90%
Cartwright	984	994	1,002	1,013	1,021	1,032	1,041	1,051	1,060	1,070	1,079	1,089	1,098	1,108	1,117	1,127	1,136	1,146	1,155	1,165	1,175									
net	947	957	965	976	984	995	1,004	1,014	1,023	1,033	1,042	1,052	1,061	1,071	1,080	1,090	1,099	1,109	1,118	1,128	1,138	4	535	Cu	1,427	600	1,483	1,335	1,335	OK
Charlottetown	1,646	1,666	1,684	1,702	1,723	1,744	1,763	1,782	1,802	1,822	1,841	1,861	1,880	1,900	1,920	1,939	1,959	1,978	1,998	2,018	2,037									
net	**1,595**	1,615	1,633	1,651	1,672	1,693	1,712	1,731	1,751	1,771	1,790	1,810	1,830	1,849	1,869	1,888	1,908	1,928	1,947	1,967	1,986	4	750	Cu	1,600	600	1,663	1,496	1,496	CHECK
Natuashish	1,729	1,798	1,837	1,871	1,906	1,935	1,973	2,007	2,041	2,075	2,110	2,144	2,178	2,213	2,247	2,281	2,316	2,350	2,384	2,419	2,453									
net	**1,684**	**1,753**	**1,792**	**1,826**	**1,861**	**1,890**	**1,928**	**1,962**	**1,996**	**2,030**	**2,065**	**2,099**	**2,133**	2,168	2,202	2,236	2,271	2,305	2,339	2,374	2,408	1	350	Cu	325	4,160	2,342	2,108	2,108	CHECK
Hopedale	931	961	986	1,008	1,031	1,054	1,077	1,100	1,123	1,146	1,169	1,192	1,215	1,238	1,262	1,285	1,308	1,331	1,354	1,377	1,400									
net	**842**	**872**	**897**	**919**	**942**	**965**	**988**	**1,011**	**1,034**	**1,057**	**1,080**	**1,103**	**1,126**	1,149	1,173	1,196	1,219	1,242	1,265	1,288	1,311	3	500	Cu	1,185	600	1,231	1,108	1,108	CHECK
L'Anse au Loup	5,148	5,179	5,240	5,296	5,352	5,408	5,466	5,523	5,580	5,636	5,693	5,750	5,807	5,864	5,921	5,978	6,035	6,092	6,149	6,206	6,263									
net	5,027	5,058	5,120	5,176	5,231	5,287	5,345	5,402	5,459	5,516	5,573	5,630	5,687	5,744	5,801	5,858	5,915	5,972	6,029	6,086	6,143	4	500	Cu	1,264	4,160	9,108	8,197	8,197	OK
Makkovik	805	832	846	858	881	891	908	923	939	954	969	985	1,000	1,015	1,031	1,046	1,061	1,077	1,092	1,107	1,123									
net	760	787	801	813	836	846	863	878	894	909	924	940	955	970	986	1,001	1,016	1,032	1,047	1,062	1,078	3	500	Cu	1,185	600	1,231	1,108	1,108	90%
Mary's Harbour	919	1,277	1,287	1,296	1,304	1,312	1,321	1,330	1,338	1,347	1,356	1,364	1,373	1,382	1,390	1,399	1,408	1,416	1,425	1,434	1,442									
net	**879**	**1,237**	1,247	1,256	1,264	1,272	1,281	1,290	1,298	1,307	1,316	1,324	1,333	1,342	1,350	1,359	1,368	1,376	1,385	1,394	1,402	4	313	Cu	1,050	600	1,091	982	982	CHECK
Nain	1,625	1,676	1,725	1,780	1,831	1,883	1,936	1,988	2,040	2,092	2,144	2,197	2,249	2,301	2,353	2,405	2,458	2,510	2,562	2,614	2,666									
net	**1,584**	**1,635**	**1,685**	**1,740**	**1,791**	**1,843**	**1,895**	**1,947**	**1,999**	**2,052**	**2,104**	**2,156**	**2,208**	**2,260**	**2,313**	**2,365**	**2,417**	**2,469**	**2,521**	**2,573**	2,626	1	500	Cu	395	4,160	2,846	2,561	2,561	CHECK
Norman Bay	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80									
net	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	1	3/0	Cu	210	600	218	196	196	OK
Paradise River	46	47	48	48	49	50	50	51	52	52	53	53	54	55	55	56	57	57	58	58	59									
net	39	40	41	42	42	43	44	44	45	45	46	47	47	48	49	49	50	50	51	52	52	1	4/0	Cu	235	600	244	220	220	OK
Port Hope Simpson	753	779	793	805	817	829	842	855	868	880	893	905	918	931	943	956	968	981	993	1,006	1,019									
net	**733**	**759**	**773**	**785**	**797**	**809**	**822**	**835**	**848**	**860**	**873**	**885**	**898**	**911**	**923**	**936**	**948**	**961**	**973**	**986**	999	4	313	Cu	1,050	600	1,091	982	982	CHECK
Postville	417	421	425	429	434	438	442	447	451	455	460	464	468	472	477	481	485	490	494	498	502									
net	402	406	410	414	419	423	427	432	436	440	444	449	453	457	462	466	470	474	479	483	487	2	300	Cu	590	600	613	552	552	OK
Rigolet	611	624	637	650	664	677	690	703	716	730	743	756	769	782	796	809	822	835	848	861	875									
net	**591**	**604**	**617**	**630**	**644**	**657**	**670**	**683**	**696**	**710**	**723**	**736**	**749**	762	776	789	802	815	828	841	855	2	500	Cu	790	600	821	739	739	CHECK
St. Lewis	512	511	511	511	511	511	511	510	510	510	510	510	510	510	509	509	509	509	509	509	508									
net	491	490	490	490	490	490	490	489	489	489	489	489	489	489	488	488	488	488	488	488	487	2	750	Cu	1,000	600	1,039	935	935	OK
Williams Harbour	100	100	101	101	102	102	103	103	103	104	104	105	105	106	106	107	107	108	108	109	109									
net	89	90	90	90	91	91	92	92	93	93	94	94	95	95	96	96	97	97	98	98	99	1	500	Cu	395	600	410	369	369	OK

Substation Transformers

Island Rural Isolated Hydro Distribution System Forecasts - Fall 2010

Peaks	2011	5-Year Plan 2012	2013	2014	2015	2016	20-Year Plan 2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Config	Amps LV	Volts LV	kVA	kW @ 0.9 pf	10% O/L kW	Loading Check
Francois	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282	282							
net	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	3-100	289	600	300	270	297	90%
Grey River	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201							
net	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	3-100	289	600	300	270	297	OK
Little Bay Islands	622	619	615	610	605	601	596	591	587	582	577	573	568	563	558	554	549	544	540	535	530							
net	610	607	603	598	593	589	584	579	575	570	565	561	556	551	546	542	537	532	528	523	518	3-333	961	600	999	899	989	OK
McCallum	168	166	164	162	160	158	156	154	152	150	148	146	144	142	140	138	136	135	133	131	129							
net	162	160	158	156	154	152	150	148	146	144	142	140	138	136	134	132	130	128	126	124	122	3-100	289	600	300	270	297	OK
Ramea	1,237	1,244	1,245	1,246	1,246	1,247	1,248	1,248	1,249	1,249	1,250	1,251	1,251	1,252	1,253	1,253	1,254	1,255	1,255	1,256	1,257							
net	1,206	1,212	1,213	1,214	1,215	1,215	1,216	1,216	1,217	1,218	1,218	1,219	1,220	1,220	1,221	1,222	1,222	1,223	1,224	1,224	1,225	No XFMR						
St Brendans	352	350	347	345	343	342	339	337	335	333	331	329	326	324	322	320	318	316	314	312	310							
net	341	338	336	333	331	330	327	325	323	321	319	317	315	313	311	309	307	305	302	300	298	3-167	482	600	501	451	496	OK

Labrador Rural Isolated Hydro Distribution System Forecasts - Fall 2010

Peaks	2011	5-Year Plan 2012	2013	2014	2015	2016	20-Year Plan 2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Config	Amps LV	Volts LV	kVA	kW @ 0.9 pf	10% O/L kW	Loading Check
Black Tickle	522	523	525	528	530	533	536	538	541	543	546	549	551	554	556	559	562	564	567	569	572							
net	499	500	502	505	507	510	513	515	518	520	523	526	528	531	533	536	539	541	544	546	549	3-333	961	600	999	899	989	OK
Cartwright	984	994	1,002	1,013	1,021	1,032	1,041	1,051	1,060	1,070	1,079	1,089	1,098	1,108	1,117	1,127	1,136	1,146	1,155	1,165	1,175							
net	**947**	**957**	**965**	**976**	**984**	**995**	1,004	1,014	1,023	1,033	1,042	1,052	1,061	1,071	1,080	1,090	1,099	1,109	1,118	1,128	1,138	3-333	961	600	999	899	989	CHECK
Charlottetown	1,646	1,666	1,684	1,702	1,723	1,744	1,763	1,782	1,802	1,822	1,841	1,861	1,880	1,900	1,920	1,939	1,959	1,978	1,998	2,018	2,037							
net	**1,595**	1,615	1,633	1,651	1,672	1,693	1,712	1,731	1,751	1,771	1,790	1,810	1,830	1,849	1,869	1,888	1,908	1,928	1,947	1,967	1,986	3-500	1,443	600	1,500	1,350	1,485	CHECK
Natuashish	1,729	1,798	1,837	1,871	1,906	1,935	1,973	2,007	2,041	2,075	2,110	2,144	2,178	2,213	2,247	2,281	2,316	2,350	2,384	2,419	2,453							
net	**1,684**	**1,753**	**1,792**	**1,826**	**1,861**	**1,890**	**1,928**	**1,962**	**1,996**	**2,030**	**2,065**	**2,099**	**2,133**	**2,168**	**2,202**	**2,236**	2,271	2,305	2,339	2,374	2,408	3-750	312	4,160	2,250	2,025	2,228	CHECK
Hopedale	931	961	986	1,008	1,031	1,054	1,077	1,100	1,123	1,146	1,169	1,192	1,215	1,238	1,262	1,285	1,308	1,331	1,354	1,377	1,400							
net	**842**	**872**	**897**	**919**	**942**	**965**	**988**	**1,011**	1,034	1,057	1,080	1,103	1,126	1,149	1,173	1,196	1,219	1,242	1,265	1,288	1,311	3-333	961	600	999	899	989	CHECK
L'Anse au Loup	5,148	5,179	5,240	5,296	5,352	5,408	5,466	5,523	5,580	5,636	5,693	5,750	5,807	5,864	5,921	5,978	6,035	6,092	6,149	6,206	6,263	5,000						
net	5,027	5,058	5,120	5,176	5,231	5,287	5,345	5,402	5,459	5,516	5,573	5,630	5,687	5,744	5,801	5,858	5,915	5,972	6,029	6,086	6,143	3,330	1,156	4,160	8,330	7,497	8,247	OK
Makkovik	805	832	846	858	881	891	908	923	939	954	969	985	1,000	1,015	1,031	1,046	1,061	1,077	1,092	1,107	1,123							
net	**760**	**787**	**801**	**813**	**836**	**846**	**863**	**878**	**894**	**909**	**924**	**940**	**955**	**970**	**986**	**1,001**	1,016	1,032	1,047	1,062	1,078	3-333	961	600	999	899	989	CHECK
Mary's Harbour	919	1,277	1,287	1,296	1,304	1,312	1,321	1,330	1,338	1,347	1,356	1,364	1,373	1,382	1,390	1,399	1,408	1,416	1,425	1,434	1,442							
net	**879**	**1,237**	1,247	1,256	1,264	1,272	1,281	1,290	1,298	1,307	1,316	1,324	1,333	1,342	1,350	1,359	1,368	1,376	1,385	1,394	1,402	3-333	961	600	999	899	989	CHECK
Nain	1,625	1,676	1,725	1,780	1,831	1,883	1,936	1,988	2,040	2,092	2,144	2,197	2,249	2,301	2,353	2,405	2,458	2,510	2,562	2,614	2,666		557	4,160	4,013	3,612	3,612	OK
net	1,584	1,635	1,685	1,740	1,791	1,843	1,895	1,947	1,999	2,052	2,104	2,156	2,208	2,260	2,313	2,365	2,417	2,469	2,521	2,573	2,626	No XFMR	374	4,160	2,695	2,425	2,425	CHECK
Norman Bay	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80							
net	**78**	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	3-25	72	600	75	68	74	CHECK
Paradise River	46	47	48	48	49	50	50	51	52	52	53	53	54	55	55	56	57	57	58	58	59							
net	39	40	41	42	42	43	44	44	45	45	46	47	47	48	49	49	50	50	51	52	52	3-25	72	600	75	68	74	OK
Port Hope Simpson	753	779	793	805	817	829	842	855	868	880	893	905	918	931	943	956	968	981	993	1,006	1,019							
net	**733**	**759**	**773**	**785**	**797**	**809**	**822**	**835**	**848**	**860**	**873**	**885**	**898**	**911**	**923**	**936**	**948**	**961**	**973**	**986**	**999**	3-333	961	600	999	899	989	CHECK
Postville	417	421	425	429	434	438	442	447	451	455	460	464	468	472	477	481	485	490	494	498	502							
net	402	406	410	414	419	423	427	432	436	440	444	449	453	457	462	466	470	474	479	483	487	3-167	482	600	501	451	496	90%
Rigolet	611	624	637	650	664	677	690	703	716	730	743	756	769	782	796	809	822	835	848	861	875							
net	591	604	617	630	644	657	670	683	696	710	723	736	749	762	776	789	802	815	828	841	855	3-500	1,443	600	1,500	1,350	1,485	OK
St. Lewis	512	511	511	511	511	511	511	510	510	510	510	510	510	510	509	509	509	509	509	509	508							
net	491	490	490	490	490	490	490	489	489	489	489	489	489	489	488	488	488	488	488	488	487	3-333	961	600	999	899	989	OK
Williams Harbour	100	100	101	101	102	102	103	103	103	104	104	105	105	106	106	107	107	108	108	109	109							
net	89	90	90	90	91	91	92	92	93	93	94	94	95	95	96	96	97	97	98	98	99	3-50	144	600	150	135	149	OK

Rural Isolated Systems

Winter Diesel Fuel Requirements[1] (litres)

Diesel Plant	Installed Volume (L)	Alternate Supply	2011 - 2012	2012 - 2013	2013 - 2014	2014 - 2015	2015 - 2016	2016 - 2017	2011 - 2012	2012 - 2013	2013 - 2014	2014 - 2015	2015 - 2016	2016 - 2017
TRO Central														
Francois	9,000	Yes bi - weekly	100,700	100,700	100,700	100,700	100,700	100,700	Delivery	Delivery	Delivery	Delivery	Delivery	Delivery
Grey River	45,460	Yes bi - weekly	76,900	76,900	76,900	76,900	76,900	76,900	Delivery	Delivery	Delivery	Delivery	Delivery	Delivery
Little Bay Islands	22,730	Yes bi - weekly	126,500	125,800	124,800	123,900	122,900	122,000	Delivery	Delivery	Delivery	Delivery	Delivery	Delivery
McCallum	90,800	Yes bi - weekly	67,300	66,500	65,700	64,900	64,100	63,300	OK	OK	OK	OK	OK	OK
Ramea	45,460	Yes bi - weekly	398,300	399,800	400,200	400,400	400,600	400,700	Delivery	Delivery	Delivery	Delivery	Delivery	Delivery
St. Brendan's	68,190	Yes bi - weekly	114,500	113,700	112,900	112,200	111,600	111,300	Delivery	Delivery	Delivery	Delivery	Delivery	Delivery
TRO Labrador														
Black Tickle	514,000	No	352,500	354,200	356,000	357,700	359,500	361,300	OK	OK	OK	OK	OK	OK
Cartwright	46,202	Yes on-demand	1,103,200	1,113,100	1,124,300	1,134,200	1,145,500	1,157,500	Delivery	Delivery	Delivery	Delivery	Delivery	Delivery
Hopedale	22,700	Yes on-demand	1,075,100	1,104,300	1,129,900	1,155,900	1,181,600	1,207,400	Delivery	Delivery	Delivery	Delivery	Delivery	Delivery
Makkovik	1,123,840	No	813,700	830,800	834,100	842,800	863,000	886,500	OK	OK	OK	OK	OK	OK
Nain	1,077,820	Yes	1,684,800	1,735,400	1,789,700	1,842,500	1,895,000	1,948,800	Delivery	Delivery	Delivery	Delivery	Delivery	Delivery
Paradise River	45,400	Yes tanker truck	71,100	72,300	73,300	74,200	75,200	76,200	Delivery	Delivery	Delivery	Delivery	Delivery	Delivery
Postville	**409,130**	No	**417,300**	**421,600**	**425,800**	**430,200**	**434,400**	**438,600**	**8,170**	**12,470**	**16,670**	**21,070**	**25,270**	**29,470**
Rigolet	**595,350**	No	586,600	**599,000**	**611,300**	**623,900**	**636,300**	**648,900**	OK	**3,650**	**15,950**	**28,550**	**40,950**	**53,550**
Natuashish	**90,962**	Yes							OK	OK	OK	OK	OK	OK
TRO Northern														
Charlottetown	309,000	Yes tanker truck	1,056,600	1,068,100	1,079,400	1,092,300	1,105,500	1,118,800	Delivery	Delivery	Delivery	Delivery	Delivery	Delivery
Charlottetown (8 Months)	309,000	Yes tanker truck	809,500	818,400	827,100	836,900	847,000	857,200	Delivery	Delivery	Delivery	Delivery	Delivery	Delivery
L'Anse au Loup	45,430	Yes tanker truck	400,000	400,000	400,000	400,000	400,000	400,000	Delivery	Delivery	Delivery	Delivery	Delivery	Delivery
Mary's Harbour	628,000	Yes tanker truck	953,000	962,200	971,700	980,400	988,700	997,000	Delivery	Delivery	Delivery	Delivery	Delivery	Delivery
Mary's Harbour (8 Months)	628,000	Yes tanker truck	844,300	852,400	860,800	868,500	875,800	883,100	Delivery	Delivery	Delivery	Delivery	Delivery	Delivery
Norman Bay	**64,800**	**No**	**79,900**	**79,900**	**79,900**	**79,900**	**79,900**	**79,900**	**15,100**	**15,100**	**15,100**	**15,100**	**15,100**	**15,100**
Port Hope Simpson	45,460	Yes tanker truck	791,200	808,800	821,700	834,200	846,500	858,900	Delivery	Delivery	Delivery	Delivery	Delivery	Delivery
St. Lewis	409,140	Yes tanker truck	395,000	394,900	394,700	394,600	394,500	394,400	OK	OK	OK	OK	OK	OK
St. Lewis (8 Months)	409,140	Yes tanker truck	353,800	353,700	353,600	353,500	353,400	353,300	OK	OK	OK	OK	OK	OK
Williams Harbour	121,173	No	117,200	117,800	118,300	118,900	119,400	120,000	OK	OK	OK	OK	OK	OK
Williams Harbour (8 Months)	121,173	No	105,800	106,300	106,800	107,300	107,800	108,300	OK	OK	OK	OK	OK	OK

(1) Winter requirements are four months for Island systems and nine months for Labrador systems unless otherwise noted.

Source: Market Analysis Section, System Planning Department
Fall 2010