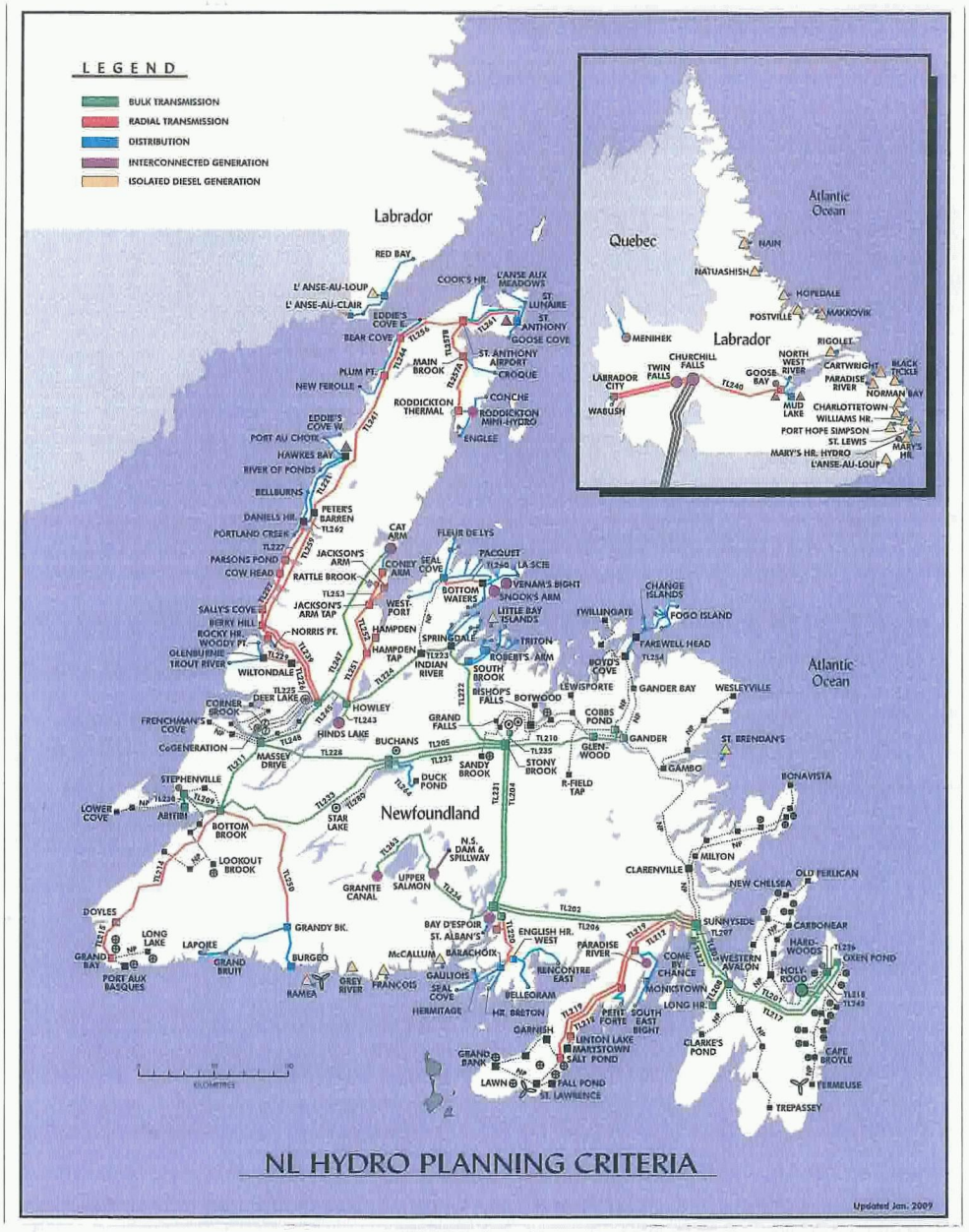
Newfoundland and Labrador Hydro
2009 Planning Criteria Review



Prepared by: System Planning Department
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Bulk Transmission Planning Criteria

- Hydro's bulk transmission is planned to be capable of sustaining the single contingency loss of any transmission element without loss of system stability.
- In the event a transmission element is out of service, power flow in all other elements of the power system should be at or below normal rating.
- The Hydro system is planned to be able to sustain a successful single pole reclose for a line to ground fault based on the premise that all system generation is available.

Transformer Capacity

- Transformer additions at all major terminal stations (i.e. two or more transformers per voltage class) are planned on the basis of being able to withstand the loss of the largest unit.
- For single transformer stations there is a back-up plan in place which utilizes Hydro's and/or Newfoundland Power's mobile equipment to restore service.

Operating Voltages

- For normal operations, the system is planned on the basis that all voltages be maintained between 95% and 105%.
- For contingency or emergency situations 90% to 110% is considered

Radial Transmission System Planning Criteria

- Radial transmission systems are planned to supply peak load with all elements in service
- The single contingency loss of certain transmission elements could result in an interruption to some or all of the customers served by that system.
- The Corporate Business Continuity Planning process has defined Maximum Acceptable down times for the various elements of the Radial systems and plans are in place to ensure service restoration within these timeframes

Transformer Capacity

- Most radial systems employ only single transformer stations. There is a back-up plan in place which utilizes Hydro's and/or Newfoundland Power's mobile equipment to restore service.
- In areas where suitable backup transformation cannot be identified Installed redundancy is applied

Operating Voltages

- For normal operations, the system is planned on the basis that all voltages be maintained between 95% and 105%.
- For contingency or emergency situations 90% to 110% is considered acceptable.

Distribution Planning Criteria

A. Normal Voltage – Based on CSA CAN3-C235-83 ("Preferred Voltage Levels...") and the CEA "Distribution Planner's Guide".

B. Load – Equipment loading no greater than 100% rating.

- conductor ampacity adjusted for appropriate temperature during peak.
- short term overloading on transformers permitted.

B. Voltage Flicker Limit – maximum of 5% voltage flicker.

Island Interconnected Generation Planning Criteria

Hydro has established criteria related to the reliability of the total Island Interconnected System and the timing of generation additions. These criteria set the minimum level of reserve capacity and energy installed in the system.

Energy

The Island Interconnected System should have sufficient generating capability to supply all of its firm load requirements with firm system capability.

Capacity

The Island Interconnected System should have sufficient generating capacity to satisfy a Loss of Load Expectation (LOLE) target of not more than 2.8 hours per year.

Isolated Diesel Generation Planning Criteria

- The Diesel System should have sufficient firm capacity to supply the peak load of the system. Firm generation capacity is defined as the total installed capacity on the system minus the largest unit.
- In each system Hydro installs a minimum of three units to meet the load requirements of the system.

System Planning Criteria Update 2009

LEGEND

	No deficiencies identified
	Deficiencies identified

Island Generation		Current generation expansion plan assumes the addition of a 3rd 25 MW wind farm by 2013, final decision to proceed required by early 2011.

Island Bulk Transmission		Inadequate voltage support on East Coast proposal to add capacitors at Come-by Chance In 2010.Unbudgeted proposal currently being prepared Proposal to add 20 MVAR reactor at Bottom Brook to alleviate high voltage at light load. 2012 proposal in-service 2013

Bulk System Transformers		
Oxen Pond		Additional 230 kV transformer.2012 proposal in-service 2013
Hardwoods		No criteria violations identified -
Holyrood		"
Western Avalon		"
Long Hr.		"
Come-By-Chance		"
Sunnyside		"
Bay D'Espoir		"
Stony Brook		"
Buchans		"
Massey Drive		"
Bottom Brook		"
Stephenville		"
Deer Lake		"
Cat Arm		"
Howley		"
Indian River		"
Springdale		"

Island Radial Transmission Systems		
Burin Peninsula		No criteria violations identified
Great Northern Peninsula		"
Connaigre Peninsula		"
Bottom Waters		"
Boyd's Cv.- Farewell Head		"
Bottom Brk.- Grandy Brk.		"
Doyles – Port Aux Basque		"
Howley – Coney Arm		"

Island Radial System Transformers		
Barachoix		No criteria violations identified
Bear Cove		"
Berry Hill		"
Bottom Waters		"
Coney Arm		"
Conne River		Transformer fans to increase capacity to load growth 2014
Cow Head		No criteria violations identified
Daniel's Hr.		"
Doyles		"
English Hr. West		"
Farewell Head		"
Glenburnie		"
Grandy Brook		"
Hampden		"
Hawke's Bay		"
Jackson's Arm		"
Main Brook		"
Parson's Pond		"
Peter's Barren		"
Plum Point		"
Rocky Harbour		"
Roddickton		"
Sally's Cove		"
South Brook		"
St Anthony Airport		"
St. Anthony Diesel Plant		"
Wiltondale		"

Island Interconnected Distribution		
South Brook		No criteria violations identified
Bottom Waters		"
Bay D'Espoir		"
English Hr. West		"
Little Bay		"
Fluer-de-Lys		"
Barachoix		"
Westport		"
Hampden		"
Farewell Head		"
Monkstown		"
King's Point		"
Jackson's Arm		"
Rencontre East		"
South East Bight		"
Petit Forte		"
Harbour Deep		"
Conne River		Voltage violation: Proposal to add voltage regulator 2011
Coney Arm		"
Hawke's Bay		"
Daniel's Hr.		"
Cow Head		"
Wiltondale		"
Glenburnie		"
Plum Point		"
Bear Cove		"
Sally's Cove		"
Parson's Pond		"
St. Anthony		"
Roddickton		"
Main Brook		"
Lapoile		"
Petits		"
Grand Bruit		"
Grandy Brook		"

Labrador Interconnected Distribution		
Labrador City		25 kV voltage conversion, distribution upgrade complete 2013
Happy Valley/Goose Bay		Upgrade distribution feeder L7 2012

Isolated Generation and Distribution

	GEN	DIST	
NAIN			Increased generation capacity 2014
HOPEDALE			Increased generation capacity 2015
POSTVILLE			Increased fuel storage 2011
MAKKOVIK			No criteria violations identified
RIGOLET			Increased fuel storage 2011
CARTWRIGHT			Increase Diesel Plant substation capacity (2013)
PARADISE RIVER			No criteria violations identified
BLACK TICKLE			"
NORMAN BAY			Increased fuel storage 2011
CHARLOTTETOWN			New diesel plant in service 2013
WILLIAM'S HR.			No criteria violations identified
PORT HOPE SIMPSON			Increase generation capacity 2014
ST. LEWIS			No criteria violations identified
MARY'S HR.			"
Decision LANSE-AU-LOUP			Proposal to install new voltageregulator2011
ST. BRENDAN'S			No criteria violations identified
LITTLE BAY ISLANDS			"
RAMEA			"
GREY RIVER			"
FRANCOIS			"
McCALLUM			"