Q. From the Report referred to in PUB-Nalcor-151, it seems that Hydro is assuming that all Gas Turbines will be available to increase the amount of load that can be served from the eastern transmission system. What has been Hydro's experience with the failure to start of the Gas Turbines and how would that affect the ability to serve load?

A. NL Hydro has assumed that all generation resources will be available to serve load in the event of a transmission contingency.

The following table provides statistics on the number of starts and failures to start for the Hardwoods and Stephenville combustion turbines since 2000:

Hardwoods/Stephenvile Gas Turbine Starts & Starting Failures 2000 to 2011

	Hardwoods		Stephenville	
	Number of Starts	Number of Starting Failures	Number of Starts	Number of Starting Failures
2000	18	9	1	4
2001	8	2	3	0
2002	12	5	6	0
2003	26	0	22	0
2004	7	1	8	2
2005	35	1	14	2
2006	47	1	22	2
2007	35	5	43	3
2008	68	1	23	3
2009	57	3	22	0
2010	81	0	32	1
2011	32	1	19	0
Total	426	29	215	17

Over the past 5 years, Hardwoods and Stephenville have started on 96.5% and 95.2% of requests respectively, and over the 11 years reported, Hardwoods and Stephenville have started on 93.6% and 92.7% of requests respectively.

NL Hydro filed a report titled *"Hardwoods Gas Turbine Plant Life Extension Upgrades"* with the Board as part of NL Hydro's 2010 Capital Budget Application[1]. Table 2 in the report shows combustion turbine operating performance from 2004 to 2008. The performance of NL Hydro's combustion turbines, and the Hardwoods facility in particular, is below the average performance of Canadian Electrical Association member companies over a similar period.

Table 2
Hardwoods Gas Turbine Five Year Average (2004-2008) All Causes

Unit	Capability Factor (%)[1]	UFOP (%)[2]	Failure Rate[3]
Hardwoods	82.45	10.94	183.57
All Hydro Gas Turbine Units	87.02	11.39	42.12
CEA (2002-2006)	88.62	8.11	10.82

[1]Capability Factor is defined as unit available time. It is the ratio of the unit's available time to the total number of unit hours.

[2]UFOP is defined as the Utilization Forced Outage Probability. It is the probability that a generation unit will not be available when required. It is used to measure performance of standby units with low operating time such as gas turbines.

[3]Failure Rate is defined as the rate at which the generating unit encounters a forced outage. It is calculated by dividing the number of transitions from an operating state to a forced outage by the total operating time.

The report outlines steps to be taken to address issues with the Hardwoods combustion turbine, and recommends expenditures of approximately $6 million on the Hardwoods facility. These were based on recommendations made by Stantec[2], who completed a condition assessment of the Hardwoods and Stephenville facilities in 2007.

[1] Filed as Exhibit 115.
[2] The executive summary of the Stantec report is included in Exhibit 115.

The objective of the capital expenditures approved by the Board for Hardwoods and those to be considered by the Board[3] is to provide reliable performance until 2022 and 2024, when these units are planned to be retired[4] after approximately 45 years of service. With reliable performance of the units, Nalcor foresees no issues with calling on the units or their ability to serve load.

[3] NL Hydro's 2012 Capital Plan identifies $6.3 million and $3.4 million to be spent on the Stephenville and Hardwoods combustion turbines respectively.
[4] Nalcor's Submission, Table 22, page 106 and Table 26, page 117