EXECUTIVE SUMMARY

Gentilly-2 nuclear generating station was commissioned in October 1983. It was designed to have a useful life of 30 years, given the inevitable aging of several major components. The facility's current operating licence, issued by the Canadian Nuclear Safety Commission (CNSC), requires that the facility be shut down at the end of 2012 and prohibits any extension of operations beyond that time without major refurbishment.

Hydro-Québec initiated draft-design studies at the beginning of the last decade to determine whether it would be feasible and advisable to refurbish Gentilly-2 in order to extend its useful life for an additional 30 years.

In August 2008, upon completion of these studies, Hydro-Québec announced its decision to proceed with the refurbishment. The anticipated cost of a second life cycle was $3.5 billion, plus operating expenses. Refurbishment was estimated at $1.9 billion for a unit cost of 8.6¢ per kilowatthour (kWh) of output, taking into account the required investment and future costs of $1.6 billion related to spent fuel and long-term facility dismantlement. On an incremental basis compared to the total costs associated with the short-term closure alternative, the unit cost of electricity produced under the refurbishment scenario amounted to 7.2¢/kWh. At that time, electricity market conditions were favorable, with prices exceeding 8¢ US per kWh as a result of high natural gas prices and anticipated future increases. Under these circumstances, the project was justified from a financial standpoint.

Several factors led to the postponement of the refurbishment project. Major problems were encountered by Atomic Energy of Canada Limited (AECL) in the refurbishment of similar nuclear plants in New Brunswick and South Korea, and the federal government's decision to sell AECL, announced in 2009, caused further uncertainties. Then came the nuclear incidents in Fukushima, Japan, in 2011. In light of these events, Hydro-Québec decided to slow down preparations for the refurbishment of Gentilly-2.

Feedback obtained from the projects in South Korea and New Brunswick now enable us to better assess the full refurbishment cycle of a nuclear facility such as Gentilly-2. Based on the new data, the cost of a second life cycle would amount to $6.3 billion, plus operating expenses. The refurbishment of Gentilly-2 would cost $4.3 billion and extend from January 2014 to September 2016. Such an investment would yield energy output at 12.3¢/kWh, taking into account the required investment and $2 billion in future costs associated with spent fuel and long-term facility dismantlement. On an incremental basis compared to the total cost associated with the short-term closure alternative, the refurbishment scenario would yield electricity at 9.7¢/kWh as of 2017. The refurbishment project would require a financial commitment of nearly $3.4 billion over and above the $965 million invested to date. This translates into a unit cost of 10.8¢/kWh, or 8.3¢/kWh on an incremental basis compared to the cost of a 2012 closure. In other words, project costs have increased.

Market conditions have also changed since 2008. Potential export revenue from the sale of energy produced at Gentilly-2 would be on the order of 4¢/kWh in 2017, given the spectacular drop in natural gas and electricity prices stemming mainly from the development of the US shale gas industry. Given the total anticipated volume of Hydro-Québec exports in the medium term, the closure of Gentilly-2 will mostly result in a reduction of sales in daily and seasonal off-peak periods on markets outside Québec, which explains the 4¢/kWh figure. It should also be mentioned that the Québec market presents electricity surpluses throughout the current decade.

The increase in project costs, combined with the decrease in accessible market revenue, has led Hydro-Québec to conclude that **the project is no longer justified from a financial standpoint.** The financial analysis on which this conclusion is based is summarized in the following table.

Financial Analysis Summary

GENTILLY-2 NUCLEAR GENERATING STATION	2008 analysis REFURBISHMENT ($ 2008)	2012 analysis ($ 2012)		
		REFURBISHMENT Total cost	REFURBISHMENT Future cost only	DECOMMISSIONING
Shutdown	March 2011	December 2012	December 2012	December 2012
Start of refurbishment	March 2011	January 2014	January 2014	–
Commissioning	November 2012	September 2016	September 2016	–
Projected cost of refurbishment	$1.9 billion	$4.3 billion	$3.4 billion	–
Cost of decommissioning	$1.6 billion	$2.0 billion	$2.0 billion	$1.8 billion
TOTAL COST	**$3.5 billion**	**$6.3 billion**	**$5.4 billion**	**$1.8 billion**
Total unit cost of refurbishment (¢2012/kWh)	**8.6**	**12.3**	**10.8**	**–**
Incremental unit cost of refurbishment (¢2012/kWh)	**7.2**	**9.7**	**8.3**	**–**

Closure of Gentilly-2 at the end of 2012 will cost $1.8 billion over a period exceeding 50 years. It will yield better financial results for Hydro-Québec in the future than would the refurbishment of the facility. The company's net annual income will be about $215 million higher in 2017 and subsequent years than it would be under a refurbishment scenario. This variance is based on the difference between the incremental refurbishment cost of 8.3¢/kWh and the marginal export revenue on the order of 4¢/kWh. The resulting 4.3¢/kWh variance, which will remain quite stable over time, multiplied by Gentilly-2's annual output of 5 billion kWh, amounts to $215 million per year. In other words,

refurbishment would lead to a decrease of $215 million in Hydro-Québec's annual earnings as of 2017.

This analysis factors in all costs associated with the closing of Gentilly-2, including the cost of spent fuel disposal in a definitive repository site and that of completely dismantling the generating station several decades from now. Closing the facility in the short term represents a major advantage in terms of future fuel disposal costs, since the volume of spent fuel will be about half of what it would be if the facility were to be refurbished and operated for an additional 30 years. It also translates into reduced risk.

The closure of Gentilly-2 will affect the 736 permanent and temporary employees currently working at the facility. Hydro-Québec will implement a gradual relocation plan for permanent employees based on staffing requirements for the preparations preceeding the station dormancy phase, which will last several decades. This phase will be followed by station dismantling and site restoration. All collective agreements and work standards will be respected. Unionized employees whose services will no longer be required at the facility will be paid until they are relocated.

Finally, the closure of Gentilly-2 **will have no impact on electricity rates for Québec consumers**, nor will it affect Hydro-Québec's obligation to provide 165 billion kWh of heritage pool electricity to the Québec market at 2.79¢/kWh.

In conclusion, the permanent shutdown of Gentilly-2 generating station at the end of 2012 is clearly more advantageous for Hydro-Québec in today's context, and the company recommends this course of action to its shareholder, the Québec government.