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EBR: 012-0774 - Response to the Amherst Island Wind Energy Project Decommissioning Plan Report

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Introduction

The final REA documents include a chapter on decommissioning. This chapter describes in some detail the step-by-step process by which the project will be de-constructed and the material will be removed. However, there is no consideration given to the cost of decommissioning or to the source of funding for the decommissioning. Given that Windlectric is a shell company, this is a worry. Given that there are tax reasons for several changes of ownership over the 20-year contract period, this also is a worry. Given that there is very little likelihood of a positive internal rate of return for the project, this is a further concern. The only way to be sure that the project will be decommissioned at the end of its life, which could come well before the 20-year contract period, is to demand a bond to cover the decommissioning.

Decommissioning Costs

The Ministry of the Environment requires that all renewable energy projects be decommissioned at the end of the contract period. Mr. Sean Fairfield, Senior Manager, Algonquin Power, has written a letter dated April 8th, 2013 to Loyalist Township to assure the Township that Windlectric will cover the full cost of decommissioning the Amherst Island wind project[1]. More recently he has been giving assurances that salvage value will cover the cost of decommissioning. This assurance is not justified and is patently untrue.

Mr. John Foster[2] estimated that the capital cost of the Wolfe Island wind project was equally divided between the cost of the turbines and ancillary equipment and the cost of the on-site construction. The $230 million Amherst Island wind project is also an island project and therefore it is reasonable to put the cost of construction at $100 million or more. Decommissioning is the mirror image of commissioning or on-site construction. There is no room on the island for the concrete and rock fill and so it will need to be barged off the island. The island landfill cannot possibly take any of the debris and in fact Algonquin Power has committed not to use the landfill. Therefore, the cost of decommissioning will also be about $100 million or more.

As shown below, the salvage value of the project is estimated to be $6.3 million. Therefore the net cost of decommissioning will be about $95 million. In our analysis of

[1] To quote: "The project developer (Windlectric Inc. – a subsidiary of Algonquin Power Co.) is responsible (not the landowners) for all financial issues (including safety and decommissioning costs) regarding the proposed construction and operation."

[2] Presentations to Probus (a Kingston association of professional and business people) and to the Kingston Branch of the Institute of Electrical and Electronics Engineers (IEEE) by John Foster, at the time a representative of TransAlta, the owner of the Wolfe Island wind energy generating system.

the economic viability of the project, we have assumed a conservative cost of $70 million (in 2013 dollars).

Salvage Value of the Project

The Stantec Decommissioning Plan Report notes: "As much of the facility would consist of reusable or recyclable materials there would be minimal waste as a result of decommissioning the facility." There is no engineering study to back this up.

Much of the facility in fact will consist of between 60,000 and 90,000 cubic metres of concrete and aggregate. There is no possible use for this material on a 16,000 acre island; it will have to be removed by truck and barge to a landfill site. Algonquin Power has assured Loyalist Township that no use will be made of the limited island landfill site. The blades are supposed to be taken to a registered landfill site for such hazardous waste but no such facility exists in Ontario. World-wide, there is no recycling facility for wind turbine blades with their mix of hazardous material. After 20 years there will be no more future for the generators and transformers than there would be for a 20-year-old car or truck, other than for scrap.

There is scrap value in the steel towers and the copper in the generators and cabling; there is potential value in the neodymium used in the generator magnets. The scrap value is estimated as follows, starting with the current scrap prices for steel and copper:

Scrap values as of July 22nd, 2013[3]:
Steel: $264/tonne (1000 kg)
Copper: $6.28/ kg

<u>Steel</u>
Weight of steel tower: 300 tonnes[4];
Weight of steel component of the nacelle: 50 tonnes (estimate);
Total steel: 350 tonnes.
Scrap value of steel: $0.09 million/turbine or $3.0 million total

<u>Copper</u>
Weight of copper in a turbine: 5.6 tonnes/MW[5] (includes cabling).
Weight of copper in Siemens 2.3 MW turbine including cabling: 13 tonnes (estimate).
Scrap value of Copper: $0.08 million/turbine or $2.7 million total

[3] Darin Horner – Lighting Dimension (Toronto), private communication, July 2013.
[4] Algonquin Power Co. Draft Road Use Report (Hatch, Oct. 24th, 2012)
[5] Ian Falconer, M.Sc. Thesis, University of Exeter, 2009.

Neodymium
Weight of neodymium iron boride magnet in a turbine: 2 tonnes (estimate).
Weight of neodymium: 0.5 tonnes (estimate)
Cost of neodymium: $75/kg[6]
Cost of neodymium: $0.04 million/turbine or $1.2 million total

The problem: "The neodymium-iron-boron material decomposes peritectically — it changes composition — when heated to its melting point," says Chumbley, lead researcher on the project. "So it can't just be melted down and reused. But it's too valuable to throw away, so there are literally warehouses full of 55-gallon drums of the stuff waiting to be recycled."[7]

The future: The DOE Ames Lab is working on the problem: “Scientists at the U.S. Department of Energy’s (DOE) Ames Laboratory are working to more effectively remove the neodymium, a rare earth element, from the mix of other materials in a magnet. Initial results show recycled materials maintain the properties that make rare-earth magnets useful.”[8]

Assume that the problem will be resolved and allow a total scrap value of $0.6 million

Conclusion: The scrap value of the Windlectric project is estimated to be $6.3 million. This is approximately 6% of the estimated decommissioning cost.
These scrap values are in 2013 dollars.

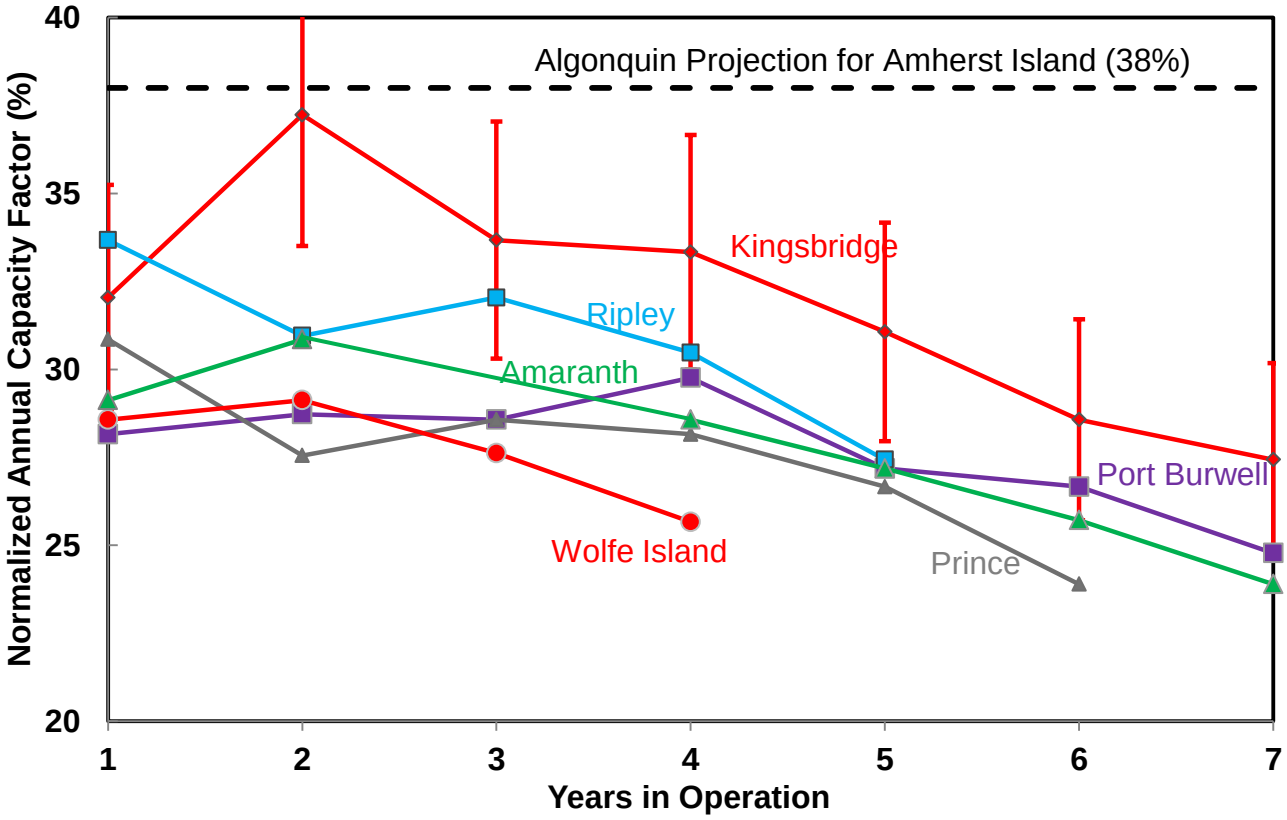
Economic Assessment of the Project[9]
Algonquin Power has informed its investors that the capacity factor of the Amherst Island project will be 38% and that the project will provide a return on investment of more than 10%. Our own estimates are based upon the overall performance of the Ontario-wide system of wind energy generating systems.

Figure 1 shows the normalized capacity factor for all of the wind energy generating systems that have been operating for 4 years or more. No project has attained a

[6] As of July 2013: http://www.metal-pages.com/metalprices/neodymium/
[7] US Department of Energy news release: http://www.eurekalert.org/features/doe/2001-07/dl-nlf060502.php
[8] News release Oct. 2012: https://www.ameslab.gov/news/news-releases/reclaiming-rare-earths
[9] A copy of the full report is available at: http://www.protectamherstisland.ca/issues/economics/
As the Ministry of the Environment will be aware I have no qualifications as an economist. However, this analysis was in collaboration with others who are qualified: a professional economist, three corporate bankers (one of whom finances renewable energy projects for one of the big 6 banks), and the business development executive for a major corporation.

capacity factor of 38%. Even looking at the more recent projects with modern turbines the highest capacity factor is 36%, for Port Alma-2 and Dillon located along the high-wind north shore of Lake Erie. Amherst Island, in the lee of Prince Edward County, has significantly less wind than Wolfe Island. Our projection is that the capacity factor will be 26%. It will then decline by 1%/year in line with other Ontario projects.

Normalized Capacity Factor for Ontario Wind Energy Generating Systems as a Function of Years of Service



This prediction then informs our economic analysis of the project. The analysis, described in the full report, is summarized in the Table below. With favourable bank financing and with the inclusion of the decommissioning cost the long term internal rate of return for Algonquin Power is -4.1%. With Algonquin Power's unrealistic capacity factor and with our conservative decommissioning cost the internal rate of return is 5.4%, well below the predicted double digit return.

It is clear that this project has no viability over the 20-year contract period and that at some point Algonquin Power will walk away from it. It is essential that the Ontario Power Authority and the Ministry of the Environment demand a bond of $100 million before a shovel meets the ground! If not, Ontario will be on the hook for the decommissioning of the Amherst Island project, a scandal that will reflect on all those who approved the development.

Net Present Value and Internal Rate of Return

Three Annual Capacity Factor Scenarios			
	APAI Year-One Scenario: 26% CF	APAI Long-Term Scenario: 20% CF	APCo Scenario: 38% CF
Optimistic Costs: 5.5% Loan Rate; $20/MWh O&M; Investor Cost: $60 million			
NPV (Project)	($175,000,000)	($220,000,000)	($100,000,000)
IRR (Project)	- 0.2%	- 2.8%	3.2%
NPV (Equity)	**($100,000,000)**	**($145,000,000)**	**($24,000,000)**
IRR (Equity)	**- 0.3%**	**- 4.1%**	**5.4%**

NB: The NPV (Project) and IRR (Project) refer to the unlevered case, with no bank financing; these entries are for reference only. The NPV (Equity) and IRR (Equity) refer to return to the equity holders for the levered case with 80% bank financing. The NPV in Table 2 is relative to a benchmark return of 7.5%. Numbers in brackets are negative.

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March 5th, 2014