

Board Letter – July 12<sup>th</sup>, 2011

Q5. A report on the information and data collected for the wind farms.

**25 MW Wind PPA - 2014 - Isolated Island**

Price structure based on Hydro's current wind PPA structure:

At In-service date:

80% of energy price fixed

20% of energy price escalating at previous year's CPI

BOOT option enables Hydro to take possession of wind farm at the end of the 20 year contract for \$0.

Price based on information from Hydro's 2005 and 2006 wind RFPs: assumed \$0.09 per kWh in 2008\$.

Used Canadian CPI to escalate from 2008 to 2010: 2.51%

Strategist: Wind PPA modeled as a hydro unit.

\$ 6,465,350 2010\$ Fixed  
\$18.45 per MWh 2010\$ Variable

Both escalated to in-service year using previous year's CPI;  
Fixed price escalation stopped at in-service year;  
Variable price escalation continued to end of contract.

Annual Capacity Factor: 40% Based on average of expected capacity factors of existing wind farms at St. Lawrence (44.3%) and Fermeuse (35.7%).

**Replacements for 25 MW - 2014 Wind Farm and 27 MW St. Lawrence and Fermeuse**

As noted previously, Hydro can take possession of these wind farms at the end of the 20 year contracts.

At that time, it is assumed that the equipment would have reached the end of its life and Hydro would rebuild the wind farms, if it was the most cost-effective option.

Strategist: Wind farms modeled as a hydro unit.

**Capital Cost:**

An Installed Cost of \$2302 per kW (2008\$) was used.

This cost came from the 2007 Ontario Power Authority Integrated Power System Plan EB-2007-0707, Exhibit D, Tab 5 Schedule 1, Page 25, Table 14 (see attached).

[http://www.powerauthority.on.ca/sites/default/files/page/7764\\_D-5-1\\_updated\\_2008-09-04\\_v2.pdf](http://www.powerauthority.on.ca/sites/default/files/page/7764_D-5-1_updated_2008-09-04_v2.pdf)

The table gave a cost of \$2060 per kW (2007\$). This was escalated by 3% and increased by 8.5% for network and interconnection costs to arrive at the \$2302 per kW (2008\$).

This was escalated to 2010\$ using Hydro's CT escalation rate from 2008 to 2010 of 0.9%, giving \$2323 per kW in 2010\$ in Strategist.

An escalation rate of 2% was used to escalate the project cost to the in-service year.

**O&M Cost:** Based on information from Hydro's 2005 and 2006 wind RFPs, O&M costs are assumed to be:

Fixed: \$780,000 (2010\$) annually

Variable: \$5.90 per MWh (2010\$)

This equates to \$13.40 to \$15.14 per MWh (2010\$)

These costs are escalated by 2.8% annually.

**Annual Capacity Factor: 40%** Based on average of expected capacity factors of existing wind farms at St. Lawrence (44.3%) and Fermeuse (35.7%).

**Operating Life:** 20 Years

- 1 • Add connection costs, including those of lines shared by sites within a cluster;
- 2 • Add inter-regional transmission line and station upgrade costs, as applicable; and
- 3 • Adjust the costs to account for transmission losses.

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5 The result is the all-inclusive LUEC.

6 Table 14 summarizes key cost assumptions used in developing the unit costs. These  
7 costs do not reflect site-specific factors (other than capacity). This simplification adds  
8 uncertainty to the cost of any individual site, and will not capture general factors such as  
9 the higher cost of sites that are remote from population centres.

10 **Table 14: Key Cost Assumptions – Hydroelectric and Wind Resources**

Resource	Capacity (MW)	Installed cost (\$/kW)	Operation and Maintenance (¢/kWh)
Hydroelectric	5	4,162	0.10
	10	3,641	0.10
	20	3,121	0.10
	100	3,121	0.52
	>100	2,601	1.04
Wind	20	2,472	2.24
	50	2,163	2.04
	100	2,060	1.92
	150	2,019	1.85
	200	1,998	1.80

Source: OPA

Note: Installed costs, which exclude associated transmission costs, are from the Hatch Acres 2005 study, expressed in 2007 dollars. Wind capacity and OM&A costs from HéliMAX, expressed in 2007 dollars.

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12 Table 15 and Table 16 list the resulting unit costs of the potential renewable resources  
13 for hydroelectric resources and for large wind resources, respectively. These costs are  
14 given in order of increasing all-inclusive LUEC, that is, from most to least economic.

15 In Table 15, some potential projects subject to constraints, for which energy production  
16 and, hence, LUECs are not available, are not presented. The table also does not  
17 contain projects that are efficiency upgrades of existing facilities – such upgrades are