

Ontario Wind Farm Productivity and Variability by In-service Year

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The capacity factors and standard deviations of the electricity production of Ontario's largest wind farms completing at least one full year of service calculated by in-service year are as follows:

Wind Farm	Capacity Factor by in-service year				Standard deviation per unit of capacity			
	yr 1	yr 2	yr3	yr4	yr 1	yr 2	yr3	yr4
Amaranth I	27.6%	29.9%	*		27.0%	28.1%	*	
Amaranth I&II	24.6%				24.3%			
Kingsbridge	31.1%	33.9%	32.9%	29.1%	30.4%	33.1%	31.7%	30.9%
Prince Farm	28.2%	28.1%	26.5%		28.1%	27.5%	27.7%	
Port Burwell	28.6%	26.8%	29.0%	25.1%	29.2%	29.1%	28.6%	26.1%
Ripley South	32.3%	29.8%			28.4%	29.7%		
Port Alma	37.2%				33.4%			
Underwood	26.9%				28.4%			
Wolfe Island	24.1%				27.1%			

*Amaranth II went into service in Nov. '08 causing data mixing with Amaranth I in Year 3. Combined results for both Amaranth farms are reported starting at the in-service date of the second farm.

The variability of output is greater for more productive wind sites, with a correlation coefficient of capacity factor vs. standard deviation of 86.6%. In scanning the data, it is obvious why this is the case. The more productive wind farms have similar numbers of hours of little or no output but greater numbers of high output hours as compared with their less productive peers. Archer and Jacobson have suggested that standard deviation is not the correct measure of intermittency. Instead they posit the ratio of standard deviation divided by the mean as the correct measure of intermittency. ¹ The logic of the Archer and Jacobson position is that a 1 MW variation from a higher output generator has lesser impact on the grid than if the same 1 MW variation was delivered from a lower output generator. In reality, the impact of generator variability on the grid is unrelated to average output of that generator. Future editions of this report will discontinue updates of the variability ratios.

Kruger Energy's wind farm near Port Alma completed its first year of service in October 2009 with an average capacity factor of 37.2%, the best annual result seen so far in Ontario and far better than any result posted so far by its nearest neighbor Port Burwell.

The Wolfe Island wind farm developed by Canadian Hydro, recently purchased by TransAlta, had a first year capacity factor of only 24.1%, the worst showing so far in the rooky year for a large Ontario wind farm. The Wolfe Island wind farm produced at less than 5% capacity factor 30.4% of the hours and

¹ http://www.stanford.edu/group/efmh/winds/aj07_jamc.pdf

greater than 95% capacity only 1.8% of the hours during its first year of production. The location of the wind farm in sensitive habitat has been controversial. High rates of bird and bat mortality have been measured at the site.

The April 6, 2010 edition of this report contained incorrect year 3 production data for the Prince Farm, located near the eastern outlet of Lake Superior and owned by Brookfield.

The next edition of this report will be issued in early November.