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To: Personnel involved in Ontario energy sector planning & approval

RE: Proposed Wind Power Project

DECLARATION OF INTEREST: The municipality in which I live is not currently considering a wind power project, nor do I have a financial interest either in the approval or disapproval of any particular wind turbine project. I am an Ontario electricity consumer, and in my capacity as Professor of Economics at the University of Guelph specializing in energy and environmental policy I have a professional interest in the electricity industry. With regard to projects under consideration at the Ontario Energy Board my comments are filed pursuant to Section 4.4 of the Ontario Energy Board Act.

SUMMARY OF COMMENTS: With regards to the criterion set out in Sect. 96(2) of the Ontario Energy Board Act, in my view the application is not in the public interest because (1) the proposed project will raise prices and decrease the reliability of the electricity system, and (2) the proposed project is inconsistent with pursuit of the stated goals of the Government of Ontario as regards development of the provincial energy grid.

DETAILS:

1. Regarding the "interests of consumers with respect to prices and the reliability and quality of electricity service" in my view this application fails to serve the public interest. It is aimed at expanding capacity for electricity production by means of new wind turbines. As was detailed in the 2011 report of the Auditor-General of Ontario (AGO),¹ the existing fleet of wind turbines is imposing large, unjustified costs on Ontario ratepayers, and expansion of the fleet will make the situation worse.

- a. **Ontario Auditor-General conclusions:** The AGO Report noted that, regarding the push for renewable power, "*no comprehensive business-case evaluation was done to objectively evaluate the impacts of the billion-dollar commitment.*" (p. 89, emphasis added.) It went on to say that such projects will have negative consequences both for prices and system reliability:

"wind and solar renewable power will add significant additional costs to ratepayers' electricity bills. Renewable energy sources such as wind and solar are also not as reliable and require backup from alternative energy-supply methods such as gas-fired generation... a typical residential electricity bill would rise about 7.9% annually over the next five years, with 56% of the increase due to investments in renewable energy" (AGO Report p. 89).

¹ Auditor-General of Ontario (2011) (AGO) Annual Report of the Office of the Auditor-General of Ontario. Toronto: Queen's Printer. Available at http://www.auditor.on.ca/en/reports_2011_en.htm

- b. **Certainty of cost increases:** Ontario already has surplus baseload generating capacity. In addition, wind output is out of phase with demand, peaking at hours and seasons when demand is at a minimum. Consequently Ontario frequently has to dump power on the export market at a substantial loss. Data available on the IESO website (<http://www.ieso.ca/>), supported by findings of the AGO report (p. 112) indicate that in every year since 2006, approximately 80% of the time that wind turbines have been supplying power to the grid, the entire output of the wind sector is surplus to current demand and has to be dumped on the export market. Because of the provisions of the Green Energy Act, the system operator is required to buy all available wind power at 13.5 ¢ per kWh, well above the domestic market price, and prices received for exported power are typically less than 4 ¢ per kWh (AGO 2011, p. 112). They are even negative at times, meaning we have to pay other jurisdictions to take the surplus power from us. The AGO estimated (p. 112) that from 2005 to 2011, Ontario lost \$1.8 billion on these transactions. The IESO is reporting annual export losses of \$200 million due to these forced buy-and-dump transactions.² This amount must be covered by ratepayers. Because electricity demand in Ontario is flat or declining, any addition of wind turbines to the grid will yield capacity at a cost of 13.5 ¢/kWh for power that will almost all be dumped on the export market for under 4 ¢/kWh, a net loss of 9.5 ¢/kWh. These costs must all be borne by ratepayers. Consequently, any expansion of wind energy under present and foreseen market conditions is against the interests of taxpayers and ratepayers.
 - c. **Structural mismatch of wind to demand:** The mismatch between wind energy and demand is structural and unique to wind. As the AGO report noted (p. 111), wind turbine output declines in the morning as demand is ramping up, and rises in the evening as demand is winding down. Also, wind output peaks in the mid-fall when seasonal demand is minimized because households are typically no longer using air conditioning nor have they yet started up wintertime electric heating systems. Data from the IESO website shows that wind output and demand are anticorrelated such that, on average, as wind production increases by 1%, system demand declines by 1%, and vice versa (calculations available on request). Therefore, addition of wind turbines to the Ontario grid is not a reliable way to match new capacity to the daily and seasonal power needs of Ontario consumers, a caution clearly indicated in the AGO Report.
 - d. **Unreliability of wind turbines:** An additional reason why wind power reduces the reliability of the electricity system is that wind turbines typically operate far below their rated capacity. IESO data indicates that, over the past two years, wind turbines operated at one-third or less of their rated capacity nearly two-thirds of the time. They operated below one-tenth of their rated capacity nearly a quarter of the time. So not only is wind out of phase with demand, but when the turbines are operating, they are extremely inefficient.
 - e. In sum, with regard to prices and the reliability of the Ontario electricity grid, wind energy unnecessarily inflates costs to taxpayers and ratepayers, it adds unreliable and inefficient capacity to the grid, and it is unsuitable for the purpose of matching supply to daily and seasonal cycles of demand.
2. Regarding the promotion of renewable energy sources “in a manner consistent with the policies of the Government of Ontario,” in its response to the Auditor General Report, the Ontario Ministry of Energy said that the expansion of renewable energy was intended to support three policy goals: to reduce greenhouse gas emissions, to reduce criterion air contaminants associated with coal-fired power plants, and to create jobs (AGO Report p. 92.) This proposal, as with major wind projects

² http://www.thestar.com/business/2013/02/26/surplus_wind_power_could_cost_ontario_ratepayers_up_to_200_million_ieso.html

generally, fails to advance these priorities and thus does not promote renewable energy in a manner consistent with the policies of the Government of Ontario.

- a. **Wind energy likely increases overall GHG and air contaminant emissions:** Since wind energy is intermittent, additions of wind turbines to the system also require additional gas-fired power plants, with a capacity of about 50% of the rated capacity of the wind turbines, to be spinning in the background, providing constantly-variable offsetting changes in power output (AGO Report p. 91). Thus wind energy, as actually utilized, is not zero-emissions. According to calculations by the Wind Energy Task Force of the Ontario Society of Professional Engineers, continued expansion of wind energy, in the context of Ontario's existing surplus of baseload power, will require replacement of non-emitting baseload sources (mainly nuclear) with a wind/gas mix. Since the grid operator is required by law to buy all the wind energy available, the system must be configured to absorb the maximum potential input from the wind turbine fleet. The existing surplus of baseload power means that, should additional wind capacity be added, in order to make the system able to absorb its full output, at least one nuclear generating unit will need to be removed from service.³ The net effect of replacing nuclear with a wind/gas mix will be an increase in both criterion air contaminants and greenhouse gas emissions.
- b. **Wind energy was not recommended by the DSS Report:** In its response to the AGO, the Ministry of Energy cited a 2005 cost-benefit analysis by DSS Consulting to justify its renewable energy strategy as a replacement for coal (p. 120). This was misleading, since the DSS study did not consider wind or solar options, and it did not recommend the province invest in wind energy as a replacement for coal. That study only examined the costs of retrofitting the existing coal-fired power plants with enhanced stack gas controls, or replacing them with a mix of new gas and nuclear plants. Both options were forecast to yield approximately the same improvements in Ontario air quality but at less than one-tenth of the costs associated with Ontario's expenditures to date on renewable energy. By appealing to the analysis in the DSS report, the Ministry of Energy has actually undermined the case for spending more money on renewables as a means of achieving its stated policy goals, since that report showed they could have been achieved by other means at a fraction of the cost.
- c. **Wind energy harms job creation:** The AGO Report also emphasizes (pp. 117-118) that the province made no effort to validate its claims that investments in renewable energy will create jobs or improve the economy, and substantial evidence exists to suggest the opposite will happen. The Province claimed that the renewables strategy would create 50,000 new jobs. But the AGO found that 40,000 of these were at most temporary construction jobs lasting only a year or two at most. Also, evidence from other jurisdictions on which the Ontario policy was based showed that the increases in energy costs would dampen growth in other sectors to such an extent that for every permanent job created in the renewables sector, between two and four jobs would be lost in other sectors.
- d. **Spanish and German experience shows inevitability of economic harm:** Ontario's renewables strategy was copied from German and Spanish systems. Hence, the subsequent experience of those jurisdictions shows us what the future will look like here. The Spanish and German governments have suffered heavy financial losses on renewable energy contracts amidst rapidly escalating energy prices and are bailing out on their commitments. This month, Spain introduced a new law that not only sharply rolls back subsidized tariff rates for wind and solar power producers, but it imposes a special tax on them to try and

³ See "Wind and the Ontario Electrical Grid – The Good, the Bad and the Ugly"; OSPE presentation online at http://c.yimcdn.com/sites/www.ospe.on.ca/resource/resmgr/doc_advocacy/2012_pp_22mar_windelegrid.pdf

recover some of the system-wide losses, which amount to over \$37 billion in Spain alone.⁴ The Germans are also rolling back subsidy rates for renewable power in response to consumer anger in advance of an election this fall.⁵ These volatile swings in policy, driven by extreme political and economic exigencies, are costly both to investors and consumers. These problems will of necessity hit Ontario in the years ahead. They illustrate the public harm done through the inadequate, back-of-the-napkin planning behind the Green Energy Act, so forcefully criticized by the Auditor-General. The relevant point for this application is that to the extent the Government of Ontario desires an energy policy that promotes growth and job creation, expansion of the wind energy sector detracts from that goal.

- e. In sum, promotion of renewable energy through the approval of new wind turbine installations is *inconsistent* with the stated policies of the Government of Ontario, since it will likely result in higher greenhouse gas and criterion air contaminant emissions, and will impair economic growth and job creation. As pointed out by the Auditor-General, the provincial government did not undertake any comprehensive analysis prior to adoption of its renewable energy strategy to examine these issues, and consequently has no basis on which to claim that further expansion of wind energy is an effective means to achieve its stated policy goals.

Yours truly,



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⁴ See news article at <http://planetark.org/wen/67930>.

⁵ See <http://blogs.the-american-interest.com/wrm/2013/02/17/germany-and-spain-throw-green-energy-under-the-bus/>.