Comments on Issues the Ontario Energy Board Should Consider when Reviewing

Ontario Power Authority Integrated Power Supply Plan And Procurement Processes

Submitted by

William K.G. Palmer P. Eng.
TRI-LEA-EM RR 5
Paisley, ON N0G 2N0
palmer.b@bmts.com

(519) 353-5921
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Submitted to:
Kirsten Walli, Board Secretary
Ontario Energy Board
PO Box 2319
2300 Yonge Street, Suite 2701
Toronto, ON M4P 1E4
Fax (416) 440-7656
Boardsec@oeb.gov.on.ca

Copied to:
Ontario Power Authority
120 Adelaide Street W
Suite 1600
Toronto, ON M5H 1T5
EB-2007-0707@powerauthority.on.ca

Issue 1:

Compliance with the Directives issued by the Minister of Energy: Supply Mix Directive, June 13, 2006 & Comments on the Directives

A significant issue that the Ontario Energy Board should consider as a non-partisan representative functioning for the good of all citizens of Ontario, is that there is no opportunity for members of the public to comment on weaknesses apparent in the Supply Mix Directive.

In 1994, the Ontario electrical system peak demand was 21,849 MW, and total Ontario electrical consumption was 129 TWh. The Ontario Hydro 1994 Annual Report shows contributors to the system were:

Nuclear ~	14,000 MW	Nuclear Generation ~	85 TWh
Hydraulic ~	7,500 MW	Hydraulic Generation ~	35 TWh
Coal ~	9,300 MW	Fossil Generation ~	15 TWh
Oil & Gas ~	3,000 MW	Generation sold to US ~	13 TWh
Total	34,432 MW	Ontario Consumption	129.0 TWh
Peak Demand	21,849 MW	Total Generation	134.9 TWh

The Ontario electrical contribution to greenhouse gases was moderately low, even though fossil generation had increased from the year previous due to an aggressive marketing program to sell surplus generation to US utilities.

By 2006, IPSP and IESO documentation shows the Ontario electrical system peak demand was 27,005 MW, and total Ontario electrical consumption was 151 TWh. Contributors were:

Nuclear ~	11,414 MW	Nuclear Generation ~	85 TWh
Hydraulic ~	7,768 MW	Hydraulic Generation ~	34 TWh
Coal ~	6,434 MW	Coal Generation ~	24 TWh
Gas / Oil ~	5.103 MW	Gas / Oil Generation ~	17 TWh
Wind ~	396 MW	Wind Generation ~	1 TWh
Biomass ~	70 MW	Biomass Generation ~	<0.5TWh
Total ~	31,185 MW	Generation Sold to others ~	13 TWh
Peak Demand ~	27,005 MW	Total Generation ~	164 TWh

The difference in 12 years is notable. Total generating capacity is reduced. Nuclear capacity is down, but energy supplied is the same, showing improved performance. Hydraulic capacity is increased slightly, but energy supplied is decreased slightly, due to less water availability. Total other generation capacity (coal, gas, oil, wind, biomass) is about the same, but coal is now about half instead of the predominant contributor. Fossil generation (coal, oil, and gas) increased from about 15 TWh to about 41 TWh, more than doubling greenhouse gas production. Fossil generation has become a continuous contributor as nuclear and hydraulic are no longer adequate to meet the system baseload.

Looking ahead to 2025, the OPA forecasts an only slightly increased system peak of 30,000 MW, and an annual consumption of 177 TWh (after 19 TWh reduction is assumed from Conservation Demand Management). However, it is informative to note that the planned contributors would be;

Nuclear ~	14,000 MW (same as 1994)	Nuclear Generation ~	103 TWh
Hydraulic ~	10,800 MW (increased 3000)	Hydraulic Generation ~	40 TWh
Wind ~	8,700 MW (increased 8300)	Wind Generation ~	20 TWh
Gas ~	11,000 MW (increased 6500)	Gas Generation ~	30 TWh
Others ~	1,600 MW	Other Generation ~	2 TWh
Peak Demand ~	30,000 MW	Net Export ~	14 TWh

Experience to date shows that the system planners and operators of generating plants will plan maintenance on major generators to occur during off-peak periods, but hydraulic generation does fall off during the summer peak period due to low water levels, and wind generation has shown low availability during summer system peak hours. IESO data for 100 summer days from May 29 through September 6, 2007, during system peak hour, shows wind generation at wind stations even though in diverse locations have a total capacity of less than 18% on peak hour, with about half the time (48 out of 100 days) having capacity of 10% or less during peak hour. The summer of 2006 also showed low wind generation output during peak hour. Wind generation cannot be counted on as a capacity contributor during system summer peak.

Looking at the OPA planned resources, consider that the system capacity available at peak can reasonably be anticipated from previous experience to be:

Nuclear	85% x 14,000 MW	= 11,900 MW
Hydraulic	70% x 10,000 MW	= 7,000 MW
Wind	10% x 8,700 MW	= 870 MW
Gas	85% x 11,000 MW	= 9,350 MW
Others	60% x 1,600 MW	= 960 MW
TOTAL		= 30,080 MW

This demonstrates that the planned proposal has little or no flexibility and will demand the gas generation to be in service daily at full available capability. The gas generators will have to accommodate the daily fall of wind generation that has been demonstrated to occur during the afternoon peak hours. For that reason the gas generators will need to cycle in output daily, and cannot be high efficiency combined cycle gas generators which operate continuously. This high demand on single cycle gas generators is contrary to the directive to use gas only in a high efficiency, cost effective manner.

The installation of “smart meters” and load shifting strategies by consumers are anticipated to result in result to some degree of leveling of electrical load during the day. Thus, an issue to consider is that the fact that the OPA projection from

1994 to 2025 anticipates a system peak load increase from 21,849 MW to 30,000 MW (an increase of 37%) and a similar consumption increase from 129 TWh to 177 TWh (also 37%). This is contrary to the expected impact of load shifting strategies, which would predict energy consumption will increase more than the 37% increase in peak. The OPA assumption should be challenged.

An increased energy consumption suggests the need to consider additional reliable base load generation. Limiting nuclear to 14,000 MW while expecting nuclear to meet base-load generation are mutually exclusive assumptions, as baseload will likely exceed 14,000 MW due to load shifting strategies. A proposal that assumes the same nuclear base load generation in 2025 as existed over 30 years earlier in 1994 and compensates by installing gas generators that will be forced to run daily to meet base load does not make environmental sense. Not only will CO2 green house gas production increase from today's value, but there will be a high reliance on a limited resource, supported by a vulnerable pipeline infrastructure. This proposal poses a high risk to price control.

Issue 2:

Threats Posed by Selected Generation Means

The Issues list proposed by the OPA does not adequately allow for consideration of the threats posed by the selected supply options.

The new hydraulic generation option, provide a large energy supply option. They form a significant part of the renewable option, but harbor significant threats to installation, as it will have significant environmental effects on indigenous peoples. The largest supply will be from the Albany River which are recognized as being restricted from development, due to their environmental impact. Large areas would be flooded due to the fairly gradual flood plain leading into James Bay which may displace many communities. The Environmental Assessment of this option is a significant threat.

Wind turbines supply a large part of the MW of the supply option, but no assured capacity option, as during some weather conditions all Ontario wind turbines have shown that they provide very low output. They will provide some energy over time – but as a non-dispatchable option. There is an additional significant threat to the wind turbine option. There has been repetitive input to the Ministry of the Environment that the siting currently being approved for wind turbines are going to result in challenges to the Environmental Protection Act. A MOE Focus Group session demonstrated the majority of the Acoustical Consulting Engineers in the province have concerns about the noise that wind turbines will produce, noise that will exceed Ontario guidelines. The wind turbines installed may not be able to operate due to court injunctions.

The simple cycle natural gas option chosen poses a significant threat due to the vulnerability of the long term natural gas supply. Choosing this short sited option will not allow time for other options to be installed if the natural gas supply is threatened. It will also cause terrific pressures on the cost of Ontario electricity by depending on a scarce resource, and as a result on Ontario industry. Depending on remote hydraulic and wind generation options poses significant threat to the need to install new transmission lines. Potential delays posed by this threat are significantly higher than considering the option of bringing Pickering Units 2 and 3 back into service. They are located where the generation is needed, and where they will provide more stability to the Greater Toronto Area than remote generation. These Pickering units can be rehabilitated. To neglect this as an option is neither reasonable nor responsible.

Issue 3:

Consideration of Other Options

The IPSP should consider other options which are reasonable and responsible. These would include:

- Rehabilitation of Pickering A and B units
- Eventual rehabilitation of All Bruce and Darlington Units when needed
- New Build at Bruce and Darlington
- Consideration of conversion of Nanticoke site to a new nuclear site.

Issue 4:

Environmental Impacts

The ISP should identify that options considered have environmental impacts.

- The hydraulic options pose a threat to the environment as noted above
- The wind option poses a threat to people living near them if not sited responsibly
- The natural gas option increases fine particulate emissions, as well as CO2 emissions compared to increasing the nuclear supply
- Nuclear options pose environmental risk, but can be located on currently licensed sites, and environmental assessment for new build at both Darlington and Bruce sites are underway.
- An interim option that is cost effective and reinforces the electrical system stability is to continue the Nanticoke and Lambton plants in service – but to consider environmental enhancements to reduce CO2 emissions through new technology currently under development

Issue 5:

Economic Prudence and Cost Effectiveness

Comments on the ISP should continue to assess this factor, as the chosen options will pose considerable threat to Ontario economically, both due to embracing high cost, scare resources (natural gas) vulnerable to cost variation as a significant factor. Simple review of IESO data shows that as natural gas generators come on line, the cost of power in Ontario drastically increases. The IPSP proposal will depend on this resource for generation not only during peaking, but as a baseload generator, and electricity costs will be significantly impacted.

Costs should be compared against other options, such as increased nuclear baseload above 14,000 MW to show that the IPSP proposal will pose harm to Ontario industry and Ontario consumers in terms of loss of jobs well beyond the increase in power cost.

Comments on the IPSP should allow the opportunity to comment on the costing method used by IESO where all "market" generators are paid the cost bid by the last generator to enter the market. A preferred option would be for generators to bid for long term contracts identifying what price they will receive for all generation produced as was bid for the refurbishment of Bruce Power Units 3 and 4. That permits the supplier to know that they can recover their costs, but prevents a supplier from having to underbid to stay on line, or to receive the fruits of the costs of the last bidder to enter the market as it results in ridiculous results when hydraulic generators are paid at costs in excess of $100 a MWh at some hours, and $4 a MWh at other times, even though their costs have been fixed for years.

Request to Provide Comments on Phase 2:

I request to be added to the list of those who will be invited to provide comments on the final issues list.

Submitted by,

William K.G. Palmer P. Eng.
TRI-LEA-EM RR 5
Paisley, ON N0G 2N0
palmer.b@bmts.com
(519)-353-5921