EB-2007-0707 OPA Integrated Power System Plan Clean, Affordable Energy (CAE) Alliance Response to Xylene Power Ltd.

1. In the CAE submission on pages 7 to 9 as well as pages 22, 28, 46, 55, 56 there are repeated references to the need for load following capability with supplementary black start, reactive support and voltage control. However, there is no consideration of use of pumped hydraulic energy storage, electro-chemical energy storage or thermal energy storage for achieving these functions. Why?

We are unaware of any realistically sized projects that will come online in the foreseeable future. The economic viability of the alternatives proposed appears to be cost-prohibitive at this time.

Although the Ontario Power Authority (OPA) initially considered some pumped storage sites (Supply Mix Advice and Recommendations 2005), these are not included in the IPSP. OPA notes that "there are no planned pumped storage resources specifically identified in the Plan, primarily because further certainty in load forecast and baseload resource projection is required. The next IPSP will contain further assessment of the potential for storage resources, both alone and in combination with wind resources." (EB 2007-0707, Exhibit D, Tab 5, Schedule 1, Page 12)

Regarding electro-chemical energy storage or thermal energy storage, it seems that these technologies are not sufficiently advanced and/or economically viable to satisfy the requirements of the Ontario electrical system. (Although it would appear that there is potential for thermal energy storage in the GTA that is not being utilized.)

2. In the CAE submission on pages 11, 12 and 13 there is an analysis of the impact of Smart Meters on Small Business Use and on Commercial Use. However, there is no consideration of use of electrochemical energy storage and/or thermal energy storage for mitigating the energy costs of Small Business and Commercial users. Why?

See answers to Questions 1 and 5. These methods, if available to these consumers, will entail additional costs which will vary from consumer to consumer. We have insufficient knowledge of the cost impacts to provide a fuller answer to this question, although your question #5 would indicate that significant costs are associated with electrochemical and thermal energy storage.

3. On page 80 the CAE submission states: "Human contributions represent 4% of all greenhouse gas releases." How was the stated number of 4% obtained? ... Does the Clean Affordable Energy Alliance (CAE) truly believe that mankind is responsible for only 4% of present CO_2 emissions to the atmosphere? If so, what factual data does CAE rely on to support that belief? If CAE does not have factual data relating to its claim of 4%, is CAE prepared to withdraw its recommendations regarding continuing use of coal for electricity generation?

The CAE Alliance has obtained our information from Environment Canada, and the United Nations, which indicate that the anthropogenic contributions to greenhouse gases are 2% - 4% of the total; an estimated 96 - 98% arises from natural sources. We believe these sources are sufficiently credible to base our assessment of the impact of Ontario's coal-fired generators on total global greenhouse gas emissions.

As CO_2 is not a pollutant or toxin, and does not impact Ontario's air quality, it is considered in a global context in terms of impact on climate change. Therefore, if we consider the contribution of Ontario's coal-fired generation to climate change potential world wide, we conclude that the impact is very, very small. (see (ii), page 4) The net impact of switching from coal to natural gas does not warrant the immense cost ramifications to the Ontario ratepayer, and the economy in general.

(i)

• According to Environment Canada, "On a worldwide basis, the anthropogenic emissions of CO_2 are known to be small. In comparison with the gross fluxes of carbon from natural systems they represent only a fraction (~2%) of total global emissions ..." (http://www.ec.gc.ca/pdb/ghg/about/gases_e.cfm)

■ According to the United Nations Intergovernmental Panel on Climate Change, 2001, about 3.4% of carbon dioxide emitted to the atmosphere annually is from human sources. (Climate Change 2001: The Scientific Basis)

■ Figure 1: Sources of carbon dioxide - Approximately 5% man-made contribution



Man-made emissions

(From the UK Atmosphere, Climate & Environment Information Programme - Information and Teaching Resources

http://www.ace.mmu.ac.uk/Resources/Teaching_Packs/Key_Stage_4/Climate_Change/02p.html)

■ The following chart is from "Some Interesting Observations concerning CO₂ in the Atmosphere, Dr. Fred Goldberg"



■ "Just how much of the "Greenhouse Effect" is caused by human activity? It is about 0.28%, if water vapor is taken into account-- about 5.53%, if not.

Man-made and natural carbon dioxide (CO₂) comprises 99.44% of all greenhouse gas concentrations (368,400 / 370,484)--(ignoring water vapor).

Anthropogenic (man-made) CO2 additions comprise (11,880 / 370,484) or 3.207% of all greenhouse gas concentrations, (ignoring water vapor).

Total combined anthropogenic greenhouse gases comprise (12,217 / 370,484) or 3.298% of all greenhouse gas concentrations, (ignoring water vapor)."

(Global Warming: A closer look at the numbers, Monte Hieb, 2003)

■ "... manmade (*ghg*) emissions account for only 2% of all sources of greenhouse gases worldwide ..." (Canadian Manufacturers and Exporters, "Pain Without Gain: Canada and the Kyoto Protocol")

(ii) Environment Canada indicates that **Canadian** contribution to global ghgs is about 2%. The following chart from Natural Resources Canada (2003) indicates about 1.8%.

CET	Global emission outlook			
		Greenhouse Gas	Population Millions	
		Mt CO ₂ eq		
	Global Total	33,144	5,292	
		Percentage		
	Oceania	1.40%	23	
	Canada	1.80%	27	
	Middle East	3.50%	206	
	Japan	3.80%	124	
	Eastern Europe	4%	124	
	Eastern Asia	4.10%	370	
	Africa	6.60%	643	
	India (incl. S Asia)	6.80%	1,158	
	Latin America	8.60%	441	
	China	12.60%	1,263	
	Western Europe	12.90%	375	
	ormer Soviet Unio	14.20%	289	
	United States	18.80%	250	
			Data Source: Envi	ronment Canada year 2003
Natural Resources Ressources naturelles Canada Canada		3	(Canada

As noted in our information provided to the Board, if global anthropogenic greenhouse gas emissions are about 2%-4% of total atmospheric ghg emissions, and Canada contributes about 2% to that total, and Ontario Power Generation's coal fired power plants contribute 3% to the Canadian total, then the overall contribution from Ontario's coal-fired power plants to global greenhouse gas emissions is inconsequentially small. (0.000024% - 4% anthropogenic contributions x 2% Canadian contribution x 3% Ontario coal-fired generation contribution)



"Environment Canada, Summary of Canada's 2004 Greenhouse Gas Inventory"

- ◆ Total Canadian Greenhouse Gases 758.0 MT
- OPG (coal) Greenhouse Gas Emissions 26.5 MT
- % OPG (coal) of all Canadian GHG emissions approx. 3%

(includes Lakeview Generating Station, since removed from service)

(iii) You mention China in your calculations. China has 690,000 MW of installed coal-fired generation capacity, and rising, (MIT - The Future of Coal: Options for a Carbon Constrained World, 2007) compared with Ontario's 6,434 MW of installed coal-fired capacity. A serious desire to impact global greenhouse gas reductions would include trade restrictions on goods purchased from China.

4. Is CAE prepared to support the development and large scale application of pumped hydraulic energy storage, electro-chemical energy storage and thermal energy storage in Ontario in order to realize load following, black start and reactive power support without reliance on coal fueled electricity generation?

■ The CAE Alliance is a group of lay ratepayers, without the expertise to assess the potential of the suggested storage options. However, if these technologies were available as both affordable and environmentally acceptable, the CAE Alliance would have no reason to oppose them.

■ Although we believe that pumped storage has a place within the supply portfolio for Ontario, for the required load following, black start and reactive support capability, Ontario would need storage capability in the order of something the size of the Niagara station located in and around Southern Ontario (where the demand is). Placed elsewhere would result in huge transmission, and associated losses and costs. (See also response to question 1.)

■ The CAE Alliance has made our submission to the Board within the context of the proposed 20 year power plan which promotes natural gas-fired generation as the resource required to fulfill the requirements of load following, black start and reactive power support. The OPA and the government

are in the process of procuring significant natural gas-fired generation for Ontario in addition to what has already been contracted over the past few years. The CAE Alliance believes it would be better to retain the current coal-fired generating units - with best available emissions technology upgrades. This would preserve system stability and reliability while new and renewed resources are added, would mitigate costs, and would allow for vital monetary resources to be directed to the development of increasingly viable and renewable power supplies.

Provincial coal plants have been paid for by the tax-payers and are the most flexible and reliable source of electricity generation. It is imprudent to replace one fossil fuel with a greatly more expensive one. We have two of the cleanest coal-fired units in North America. The others could be cleaned up at a comparatively small cost. As noted, there will be insignificant improvement regarding greenhouse gas emissions switching to gas-fired generators if lifecycle emissions are taken into account.

5. In order to financially enable energy storage high differential time-of-use (TOU) electricity rates are required. Is the CAE prepared to support such high differential TOU electricity rates for non-residential users in Ontario in order to enable energy storage and hence realize load following without reliance on coal fueled electricity generation?

■ Please review the information provided in our submission to the Board regarding the impact of TOU pricing, particularly pages 12 and 13 in respect of commercial and small business use in Ontario. We are very concerned about the projected rise in rates during normal business hours. The impact will be devastating to many business owners, as well as the farming community, and will filter down to all Ontario consumers. We cannot support - what is to us at this time - uncertain measures with uncertain gain at the cost of economic sustainability.

■ It would appear that Xylene Power is suggesting a metering methodology for TOU pricing different from that which is already in process. We lack the expertise to comment on the comparison. However, we believe that altering the metering at this stage of the process would contribute to the escalating costs to consumers.

■ We do not have sufficient information to comment regarding what is needed to "financially enable" storage projects and how the non-residential rates would impact residential rates. Since all electricity comes from the same grid there will obviously be some interrelation.

6. In order to enable energy storage in plug-in hybrid vehicles and electric vehicles, is the CAE prepared to support giving residential users the option of adopting TOU electricity rates?

The CAE Alliance is supportive of plug-in hybrid vehicles. We acknowledge that electricity use for these vehicles will occur primarily during off peak hours (10 p.m. to 7 a.m.) which will impact baseload consumption during these times. We do not however support the adoption of TOU electricity rates for residential users. We have concluded that TOU pricing will result in increased electricity rates to all consumers, and will have little impact on load reduction. (Please refer to pages 13-16 and Appendix A of our submission to the Board.) A big concern for the CAE is the TOU cost impacts that will impact a vulnerable segment of the residential consumers. Those who are already at the low end of consumption and cannot change consumption profiles will be unfairly penalized. Further inequities resulting from TOU pricing would occur. For example, since residential electricity rates are supposedly a zero sum balance, your suggestion would mean that a bed-ridden invalid using air conditioning to ease their suffering would be subsidizing a motorist topping up their fuel supply.