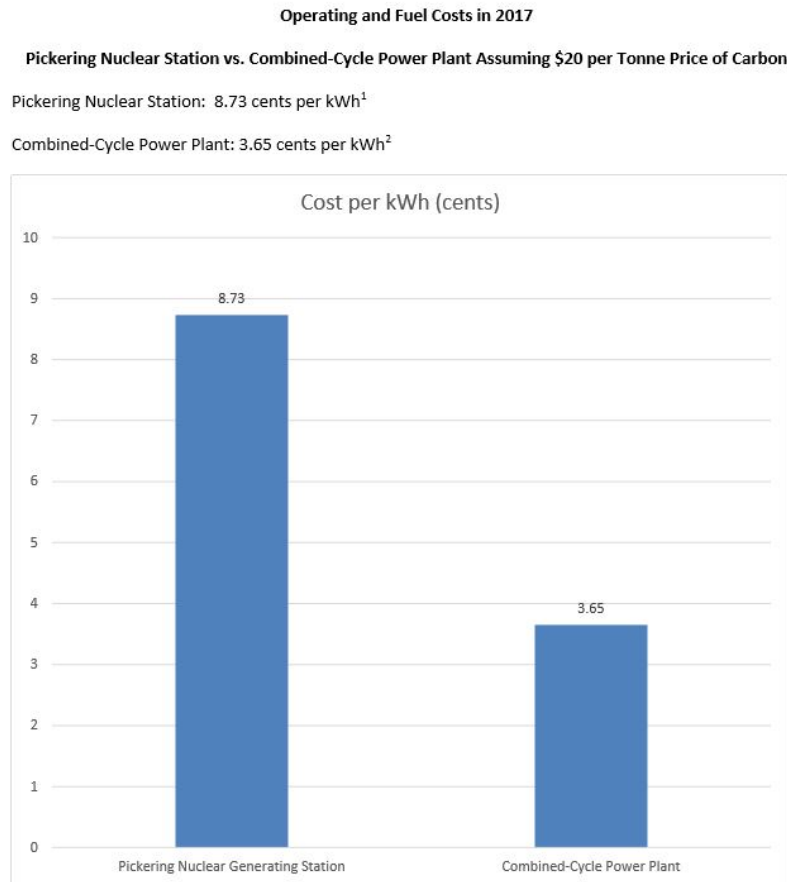


Exhibit F2-2-3 Attachment 1

### Assessment of Pickering Enhanced Operations (IESO evidence)

from: Environmental Defence Compendium for Panel 3A, Page 3



<sup>1</sup> Undertaking JT2.4.

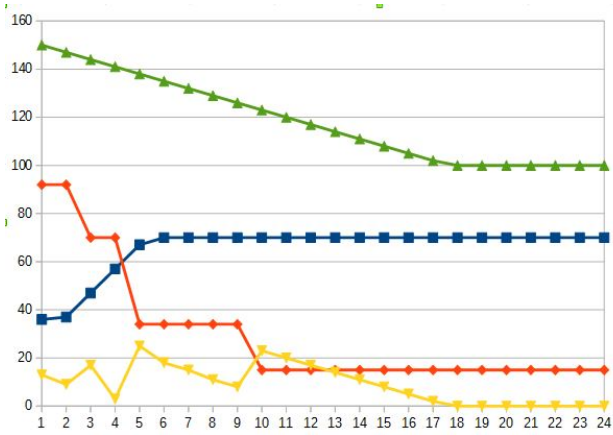
<sup>2</sup> Assumptions: Gas cost of \$3.85 per MMBtu (March 7, 2017 Henry Hub gas price of \$2.87 per MMBtu and exchange rate of 0.7457 per the March 7, 2017 *Report on Business*); carbon tax of \$20 per tonne, which is equivalent to \$1 per MMBtu (see Ex. F2-2-3, Attachment 1, Page 64); combined-cycle plant heat rate of 6,800 Btu per kWh (Ex. L, Tab 6.5, Sch. 1 Staff-125, Page 2); combined-cycle power plant's variable operating and maintenance costs of 0.35 cents per kWh (F2-2-3, Attachment 1, Page 64).

**Question:** Are these values reasonable for this cost comparison?

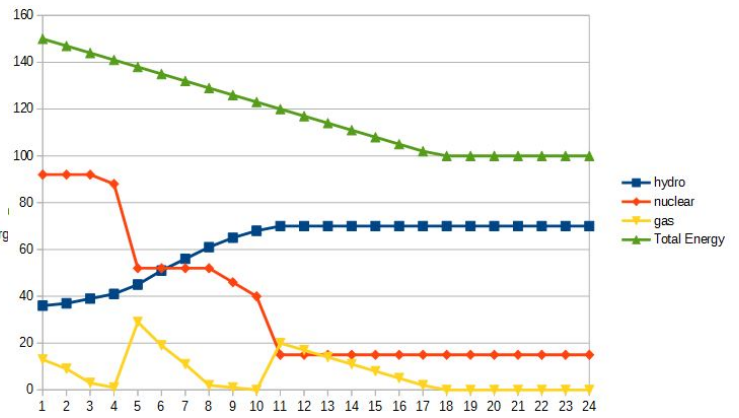
**Question:** Are the existing gas/oil-fired generators capable of delivering the required amount of power during the Pickering extension period?

**Question:** Considering the high cost of the Pickering power is there an alternative, such as imported power, that might be feasible and potentially less expensive?

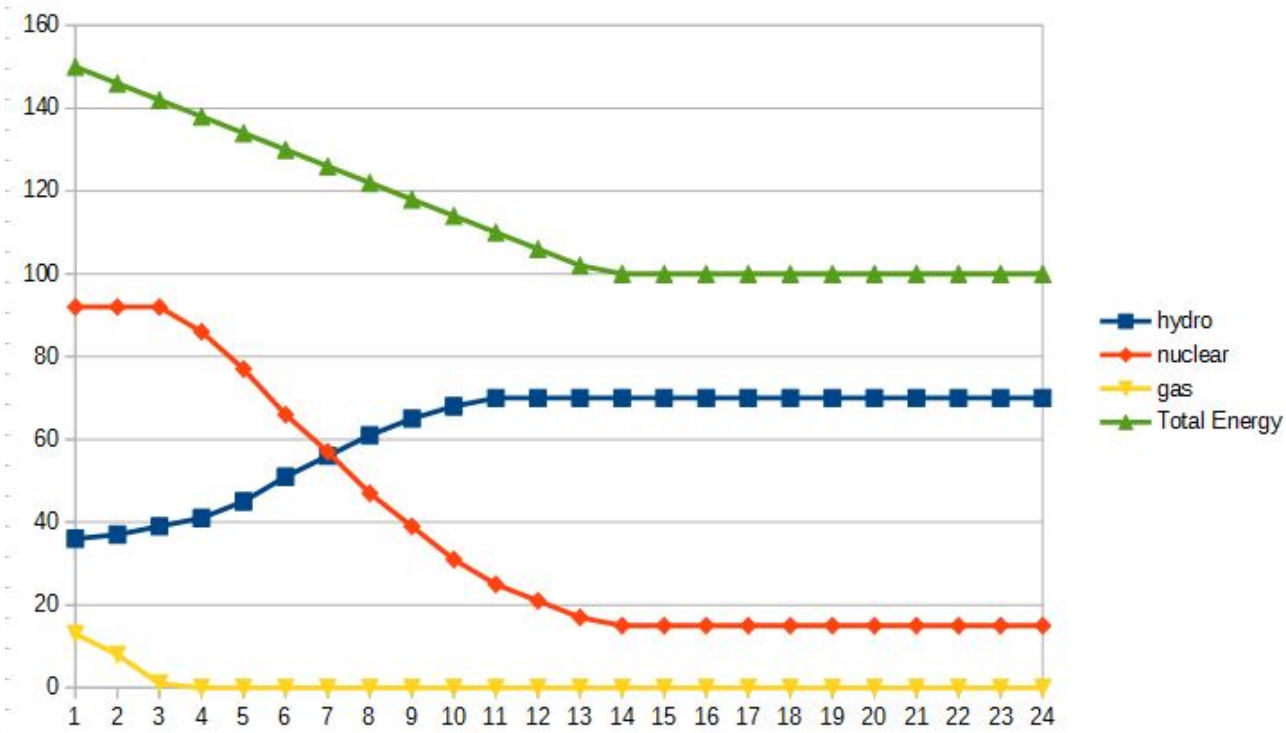
**Question:** Does 8.73 cents/kWh represent the historic cost of Pickering power or the incremental cost of the power produced during the extension period?



**Left:** (from Exhibit K10.6) TWh generation to 2040, based on closing Pickering at the date of CNSC licence expiration. Based on other CNSC licence expiries, reductions in the demand and increases in supply (in response to the LTEP that is in preparation).



**Right:** Adding the electrical energy produced during the Pickering extension to the previous graph provides more time to adapt via demand reductions and new generation sources but the timing calls for substantial use of natural gas peaking power.



**Above:** If the reactors are shut down in a sequence that produces a smoother plot for the nuclear contribution then the need for the gas-fired generation falls to zero in the coming two years and remains at that value until 2040 providing the LTEP produces demand reductions (Green line) and generation increases (Blue line). Two reactors (Darlington 2 and Bruce 4) are assumed to remain in operation.

**Caveat:** The values shown in the graph include wind turbine generation (9.3 TWh growing to 15 TWh) but that contribution is not plotted.

**Question:** Given the emphasis put on conservation and other demand reduction measures by the IESO and the Energy Ministry is it reasonable to expect that the result will be substantial reductions in demand (the green line)?

**Question:** Will these reductions result in large part from reductions in power that is used for thermal applications, such as space heating and cooling and DHW?

**Question:** Are the big demand peaks that occur in the summer and the winter primarily caused by the demand caused by thermal loads?

**Question:** If the thermal demand peaks are flattened by employing better building insulation, using GSHP's or by exergy storage what effect will that have on the need for peaking power?

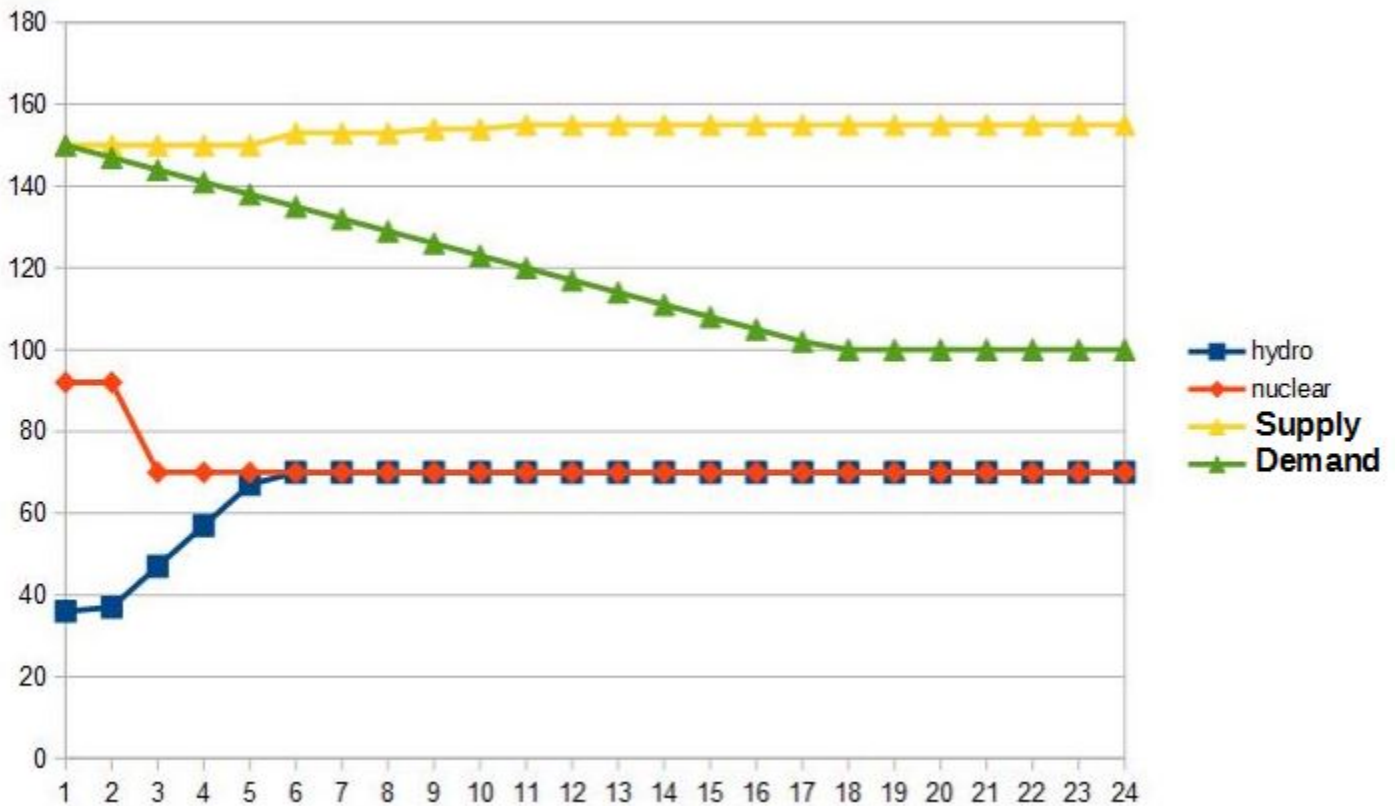
**Question:** Is there a potential for reducing the demand by reductions in non-thermal electricity like lighting and appliance/machinery efficiencies?

**Question:** Is there also a potential for increasing the electricity supply by using generation that does not generate GHG, such as enhanced hydro generation (made possible by incorporating pumped hydro or other storage methods like exergy storage), or by wind and solar power generation?

**Question:** Are there any physical obstructions to achieving substantial demand reductions and supply enhancements as shown in the graph?

**Question:** Does the IESO expect that the future cost of wind and solar power will be competitive with the 8.73 cents per kWh for Pickering electricity?

**Question:** If the hydro generation is increased by utilizing storage provided at the consumer end of the supply chain that increase could be achieved with the existing hydro facilities with no changes in the river flow or damming, but that might call for increased turbine capacities. Has the IESO carried out a study on those costs?



Plot of Supply and Demand based on:

- \* Pickering being shut down
- \* Darlington and Bruce reactors being refurbished and put back into service (red line)
- \* Reductions in demand as previously discussed (green line)
- \* Increases in supply as discussed (blue line)
- \* The resultant total electricity supply (TWh) is shown in the yellow line

**Question:** I assume that you agree that in power grids the supply must match the demand?

**Question:** How does the IESO propose to achieve that supply/demand balance if the supply grossly exceeds the demand?

**Question:** If production needs to be curtailed which cutbacks would be preferable:

- (a) to OPG or IESO
- (b) to ratepayers

**Question:** If the LTEP is successful in achieving its top objective (conservation/demand reduction) and there is no reduction in supply how will it ever be possible to achieve any balance in supply and demand irrespective of the magnitude of the supply and demand improvements?

**Question:** If the Bruce refurbishments are subject to binding contracts but the OPG stations are not does that put the OPG stations at risk that the refurbishments might not be approved?

**Question:** What is the rationale behind Regulation 53/05?

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