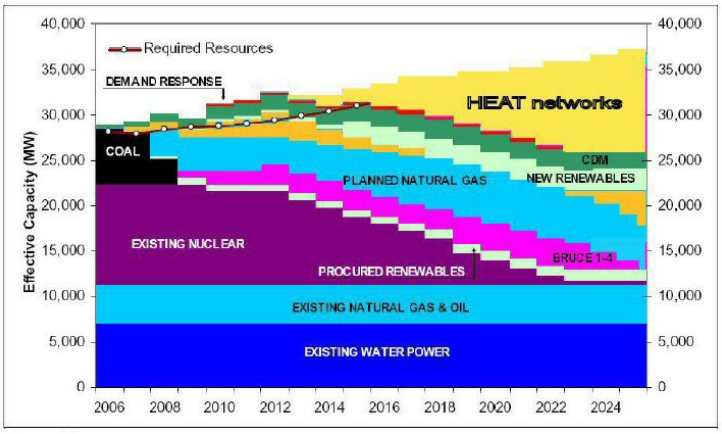
Response to OPA Recommendations

EBR Registry No. PO05E0001

Executive summary

The OPA review omitted the primary means available for utilizing renewable energy in Canada – the use of seasonal storage to store winter's cold and summer's heat. Such seasonal storage would quickly stop the growth in the peak electric power demand in the summer and could in time almost eliminate that summer peak, since it is caused by the demand for electricity for air conditioning that could be satisfied instead by the stored cold. Seasonal storage can also be used to store summer heat for heating our homes in the winter. Since relatively few homes employ electric heating that would have only a modest impact on electric power use in the winter, but the reductions in demand for natural gas for heating purposes would reduce the cost for that fuel and redirect its use to more appropriate applications.



The above graph summarizes the differences from the OPA recommendations with respect to the effective electrical capacity. The primary difference is that no new nuclear power stations would be required, and the existing nuclear power plants would be phased out in accordance with the schedule suggested in the OPA report. The dark yellow areas show where seasonal heat systems would substitute for presently planned energy sources, particularly in the near future as coal is phased out. The light yellow area, marked “HEAT networks” shows how seasonally stored energy would enable Ontario to meet its energy needs in the longer term.

The term “HEAT networks” refers to municipally operated (or supervised) systems that store the seasonal heat and cold in underground storage modules located under city streets and parks. The essential step required of the provincial government is that it must initiate the implementation of such HEAT networks by Ontario cities. Such systems would be made up of many small, identical modules that become productive in less than six months after they are built. Such systems can be largely self financing, so there is no need for huge expenditures on a program that has a long lead time, as is encountered with the nuclear option. The required technology for seasonal heat storage is well established, and is taught in Ontario universities such as UOIT, which uses a massive seasonal heat store for its own buildings as well as for teaching the principles. The only missing element is the lack of government attention to this solution to our energy problem.

Quite apart from the negative worldwide impact of a nuclear expansion, the OPA's nuclear proposal does not make business sense. Canada's proven and anticipated uranium resources are sufficient for only 36 years at the current consumption rate, but that current rate has been depressed by the substantial number of CANDU reactors that are out of service. An expanded program, plus the announced resumption of a nuclear program in the US would greatly shorten the viable lifetime of the planned reactors, possibly to the point where affordable uranium might run out before the proposed reactors are even built, and certainly long before the end of their lifetime as projected by the OPA. At the end of the “nuclear bubble” Ontario would have to return to the use of combustible fuels.

Moreover, the OPA program presents an extraordinarily high supply risk, even for the shorter term. The OPA estimates start from the assumption that the demand will decline in spite of population increases (without justifying that assumption) and then they calculate “effective capacity” by adding factors like demand management that do not actually produce any power. The OPA concludes that renewables will contribute 43% of production in 2025, but that figure is based on a substantial decline in per capita consumption, which makes the existing hydro component loom large, and on a 15% addition from wind power, which the OPA admits is dubious. (Wind power does not add anything at all to peak capacity because it cannot be relied on, so it does not contribute to the key problem of meeting summer peak demands.) The OPA report assumes that the reactors can be built much faster and and at a lower cost than the previous Canadian reactors, that they will work much more reliably, and it also assumes that we will continue to turn a blind eye to the insurance costs, the cost of dismantling the reactors, and the long term liability of managing the nuclear waste.

If the OPA plan is to work then there is no room whatsoever for errors, delays, overruns or failures in any of these factors. If anything at all goes wrong then we would be obliged to revert to using natural gas, oil or coal. If the seasonal storage solution is not adopted then the cost of natural gas will be prohibitive so the most likely outcome would be a massive swing to coal and oil. Note that even as it stands the OPA plan would require abandoning the Kyoto objectives.

The seasonal storage option is permanently sustainable. It could handle large increases in Canada's population because the limitation in its use is not the availability of sufficient energy but rather the demands of applications for which thermal energy can be used. Those applications are very large, and could lead to a reduction of greenhouse gases in Canada of 250 million tonnes/year. We know that the energy is available and we know that seasonal storage works, so the only bar to this solution is the reluctance of our governments to stop using fossil fuels. The rapid escalation in the cost of fossil fuels is in fact the primary incentive for the fossil fuel industry (and tax hungry governments) to resist a switch to renewable energy.

The attached chapters outline the seasonal storage technology and its scope for meeting our energy needs in more detail.

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