

NER-SC Objectives

(From the NER-SC Statement of Objectives)

“The Non-Emitting Resource Subcommittee (NER-SC) is a Subcommittee of the Market Renewal Working Group1 (MRWG) tasked with investigating how non-emitting resources can efficiently participate in Ontario’s future electricity market in order to meet the province’s policy objectives for the electricity sector.”

The energy plans outlined in Ontario’s LTEP suffer from three flaws:

- (1) The costs of the program are grossly excessive, resulting in the waste of many tens of billions of dollars over the coming decade
- (2) The LTEP will result in large increases in GHG emissions rather than the reductions that are mistakenly projected, and
- (3) The Plan is unsustainable. It proposes that Ontario will cling to energy sources and distribution methods that should have been abandoned many years ago.

The NER-SC statement of objectives is ambiguous. Superficially it implies that the subcommittee should investigate how non-emitting resources could contribute to Ontario’s electricity needs but in fact it requires that “the province’s policy objectives” must take precedence over any proposed innovations. There is at least one alternative to the LTEP that avoids all three of flaws outlined above but for years the IESO has refused to consider that alternative, or even to permit explanations of the alternative concept to be made in public and private meetings. The IESO’s rationale for refusing to consider any significant changes in energy policies was that such changes would be incompatible with the government’s “policy objectives”, which was certainly true for the previous administration (now out of power) but that is not yet defined for the new government. Hopefully the new government will in particular examine the prodigious waste of money that would result from proceeding with the current IESO plans.

Scope:

Electricity markets should not be examined in isolation from the other energy markets, for example the energy used for heating and cooling our buildings and the energy used for transportation. A large part of the market for electricity is the result of using electricity for heating and cooling, so any changes in how those heating/cooling needs are met will have a big effect on the market for electricity. That effect would be a reduction in demand if Ontario used exergy storage for heating/cooling or it could be an increase in demand if Ontario switched to electric heating or the use of geothermal heating (GSHP’s). Ironically, exergy stores and GSHP’s use the same components (a heat pump and ground heat exchangers) but they have opposite consequences for the electricity markets so they must not be confused with each other.

On the transportation front the transition from gas-fuelled vehicles to EV’s is well under way with the obvious implication that the electricity supply system must cope with that new market. The primary limitation to this revolutionary change is that current EV’s have a limited range. That means that they will not achieve their potential market penetration until a large network of fast chargers has been

created. That creates a “chicken or the egg” situation – purpose-built fast chargers will not be economically viable until the number of vehicles grows but that growth is restrained because the fast chargers are not available. EV’s can use overnight slow charging as an alternative but that severely restricts their use for long distance travelling. Exergy storage systems solve this dilemma because the widespread use of exergy stores for heating would create a large network of fast-charge stations, which means that purpose-built fast chargers will not be needed.

It should be noted that Canada (and Ontario) have adequate electricity supply capacity to handle EV’s – the problem is not a matter of energy supply but rather the grid’s capacity to handle the large and abrupt changes in load caused by fast-chargers. Exergy stores are inherently capable of providing the regulation capability that is needed to stabilize that load.

Exergy stores provide solutions for three Ontario challenges:

- * how we heat and cool our buildings
- * how we supply electricity
- * how we switch to EV’s

If we solve the first of those three challenges then the other two are solved almost automatically and at very little added expense. This is not self evident, hence the need for more detailed explanation, which the IESO has adamantly refused to hear.

Electricity cost

At the present time Ontario has about 36,000 MW of electricity generation capacity. About half of the energy produced is used for thermal applications (heating, cooling and DHW) so by using a thermal supply system like exergy stores there would be a large reduction in electricity demand. Much more importantly, the large peak demands that occur in the summer and the winter will disappear and even the diurnal demand fluctuations will flatten out as EV’s begin using nighttime power. The end result is that Ontario’s peak power demand could theoretically be reduced from 36,000 MW to just 8,000 MW. That does not imply any reduction at all in the amount of energy that we are using for heating/cooling, for electrical appliances or for transportation. In Ontario the cost of electricity is primarily determined by the capital cost of the generation facilities – nuclear plants, peaking stations, renewables and hydro stations – so the long term electricity production cost reduction would be in proportion to the reduction in capital cost. Moreover, the distribution costs will be likewise reduced because of the radical reduction in peak power demands. Most of the IESO’s plans for generation and distribution should be thrown in the garbage.

Greenhouse gas emissions

The Ontario government has been misrepresenting the National GHG Inventory as the measurement of GHG that results from its energy choices. In point of fact Ontario imports all of the natural gas and oil it uses so none of the upstream emissions are presently included in the Ontario numbers – just the emissions from combusting the fuels. However, the upstream GHG emissions are greater than the locally-produced emissions, particularly from natural gas. At the moment the error amounts to about a factor of six, partly the consequence of inaccurate industry estimates for the amount of fugitive emissions that occur before the gas reaches Ontario and partly because an improper value is being used for the GWP of methane. In the long term those upstream emissions are likely to increase to roughly 10,000 megatonnes/yr (for Ontario) once the underground release of uncaptured methane from the fracking process reaches the surface. That release is not yet a major problem because it is just now

beginning to reach the atmosphere but for the past decade the underground concentration has been growing rapidly and there is no known way of preventing it from eventually being released to the atmosphere.

Sustainability

The world cannot sustain the present practice of releasing 10,000 megatonnes/yr of GHG(eq) for Ontario, plus the even greater contributions from the other jurisdictions that use fracked natural gas. We are also recovering oil from shale rock via fracking so that adds to the problem. It is of extreme importance that we stop using fracked natural gas and oil ASAP. That could be done by using exergy stores and theoretically there might be other solutions as well (although none have been proposed by the IESO or Energy Ministry). The point is that if there is at least one practical solution then that should be used as the reference point for comparison with alternatives, such as the “solution” that is being advocated by the ISEO.

If it takes steps to flatten the electricity load then Ontario will not need any expensive nuclear plants, or gas-fired peaking stations, or fossil-fuelled heating systems, or gas/diesel fuel for vehicles. Our reactors are nearing the end of their useful lives and since there is no Canadian substitute available anyway they should be taken out of service ASAP and the current round of refurbishments should be stopped. Exergy stores could supply most of the energy we need using local energy sources so the cabal of centralized grid suppliers and regulators (including the IESO) could and should be shut down. Putting the IESO in charge of planning was an extreme example of “putting the fox in the hen house”. The beneficiary of the existing centralized supply system is the supply cabal, which is raking in tens of billions of dollars at the expense of Ontario residents, and is putting our environment at risk as well.

The technical aspects of exergy stores have been covered in previous submissions to the IESO.

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