



Minimizing Ontario's Green House Gas Emissions

Background

Thanks to its strong reliance on hydroelectric and nuclear power, Ontario's electricity is among the cleanest in the world. As of 2011, only 17% of Ontario's electricity is generated with fossil fuels, with hydroelectric accounting for 22% and nuclear for 57%. This means that Ontario's electricity is responsible for less than 100 grams of CO₂ per KWh of electricity, less than one-fifth of the CO₂ content of Germany's electricity which comes in at about 500 grams per KWh. Despite Germany's success in integrating renewable energy, 57% of their electricity still comes from fossil fuels such as coal and natural gas, leading to "dirty" electricity.

While Ontario's electricity was always clean relative to most of the world, it wasn't always as clean as it is now. In 2000, Ontario's emissions were 3 times higher, almost 300 grams CO₂ per KWh. The reduction in emissions has largely been made possible by increased generation by our nuclear fleet. In 2000 nuclear only accounted for 37% of Ontario's electricity while 36% of our electricity came from fossil fuels. With the 20% increase in nuclear power and the corresponding reduction in fossil fuel, we have been able to cut our emissions by a factor of three.

Unfortunately, time takes its toll on machinery, and Ontario's nuclear fleet is aging and is in need of maintenance and renewal. The success of our renewal program is critical to keeping Ontario's electricity clean.

The Issue – Nuclear Fleet Renewal

Over the next 10 years, many of Ontario's nuclear generating units will require major maintenance programs - known as refurbishments - to extend their life. These refurbishments were always part of the long term planning process and are no different than having your engine rebuilt to extend the life of your family car. Without these refurbishments, these nuclear units will have to be shut down and we will have to find replacement energy.

Similarly, in the next 10 years, many of our nuclear units will have to be removed from service because they will have reached the end of their useful life. Ontario will have to find replacement power for those units.

Alternative Sources of Energy and Controlling Emissions

Our nuclear units are the work horse of the electricity sector, they run 24 hours a day, 7 days a week, providing energy to Ontario. Any replacement energy must run 24/7. While wind is a low CO₂ energy source, unfortunately the wind blows less than 25% of the time in Ontario (varying between 7% summer, 28% winter). The reality is the only possible alternative to nuclear power is a combination of a fossil fuel such as natural gas with wind, where the fossil fuel operates on average at least 75% of the time. So replacing nuclear with a gas/wind combination increases our CO₂ levels.

In fact, replacing all of our current nuclear fleet with the most optimistic mix of natural gas and wind generation would increase Ontario's emissions back up to about 300 grams per KWh, what they were before we began our "off coal" program. This would mean that Ontario had spent billions of dollars to clean up our electricity system, and be no better off than we were when we started!

Cost

The cost of our energy supply is a natural concern. Fortunately, refurbishments of nuclear units are cost effective compared to the cost of building new replacement generation. While the total dollar figures for refurbishment can sound high, given the large amounts of energy generated, the expected cost of 7 cents per KWh is in line with the current cost of Ontario's energy. New construction of nuclear plants is of course more expensive than refurbishments, but with an anticipated, risk free cost in the order of 9 cents per KWh, new build nuclear is still competitive with a gas/wind mix and of course is CO₂ free making it a far superior option for baseload generation.

Summary

Ontario's nuclear fleet has been the workhorse that has allowed Ontario to eliminate coal generation and achieve one of the cleanest electricity systems in the world. As our nuclear fleet ages, it is essential that Ontario re invest in this infrastructure to avoid taking our electricity back to the same emission levels we had before closing our coal stations.

