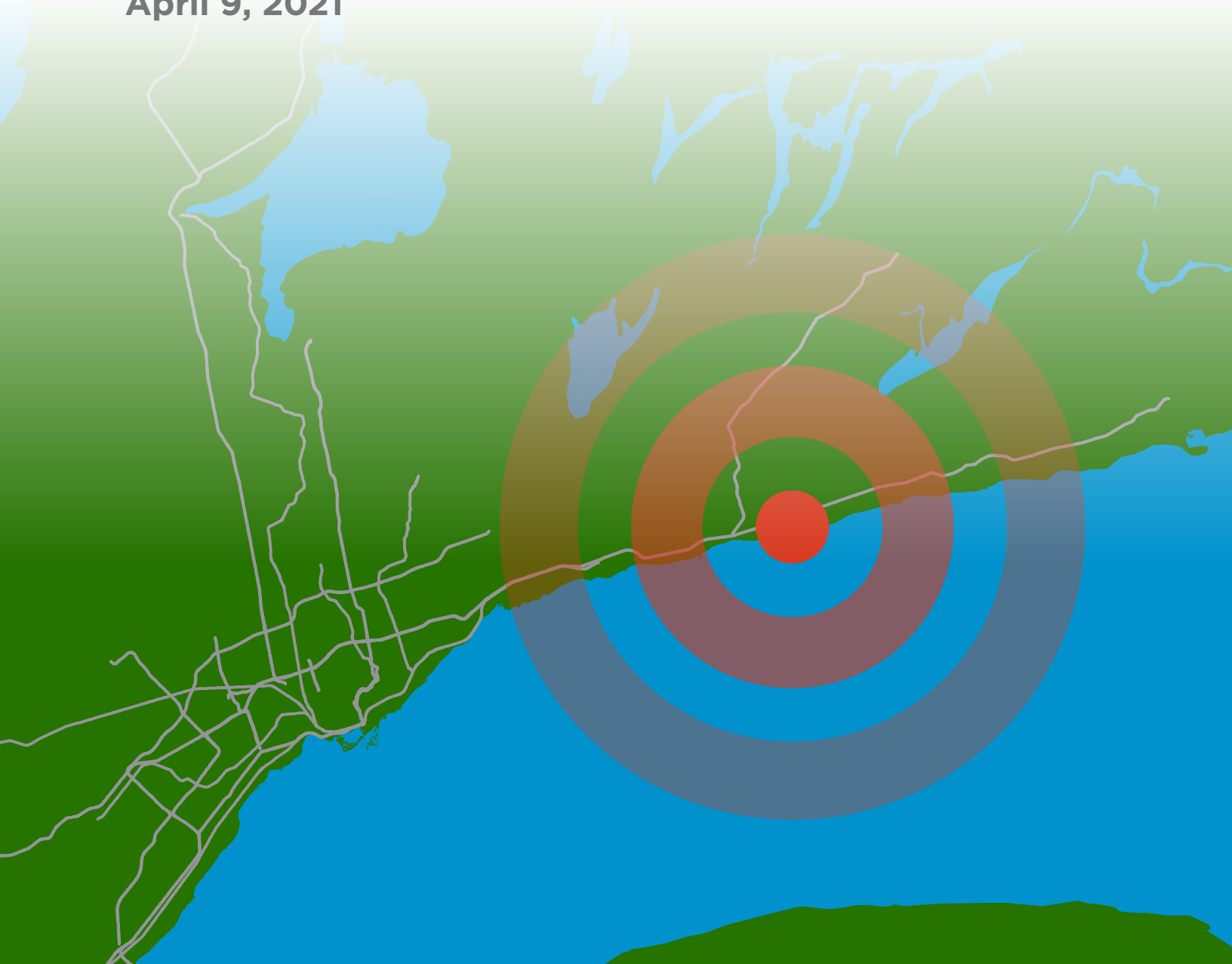


An Unreasonable Risk:

A New GTA Nuclear Reactor

April 9, 2021





Introduction

Ontario Power Generation (OPG) is applying to the Canadian Nuclear Safety Commission for a Site Preparation Licence for its **proposed new Greater Toronto Area (GTA) nuclear reactor** which it wants to build beside the Darlington Nuclear Station near Oshawa.

OPG's proposal to build a new GTA nuclear reactor is problematic for at least four reasons.

- 1** Ontario has cleaner, safer and lower-cost renewable options to keep its lights on.
- 2** Siting a new reactor with unproven technology in the Greater Golden Horseshoe would be reckless.
- 3** OPG does not have a long-term facility for the safe storage of its nuclear wastes.
- 4** OPG does not have a plan or a budget to immediately dismantle the proposed GTA nuclear reactor after it comes to the end of its commercial life.

Ontario has

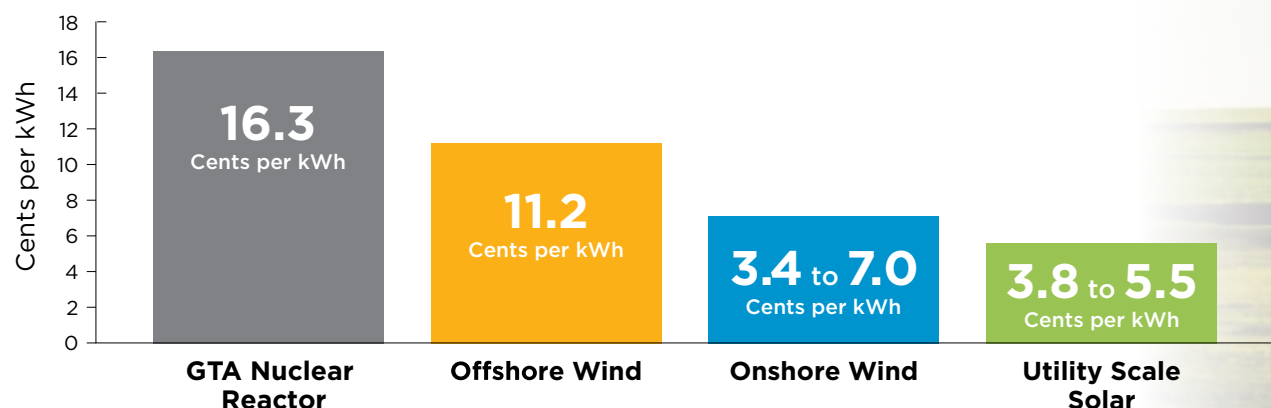
Cleaner, Safer and Lower Cost

Renewable Options to Keep Our Lights On

OPG is proposing to build a so-called small (300 to 400 megawatts) modular nuclear reactor (SMR) next door to the Darlington Nuclear Station.¹ According to the Canadian Small Modular Reactor Roadmap Steering Committee's forecast, an SMR will produce electricity at a cost of 16.3 cents per kilowatt-hour (kWh). The Committee hopes that the first commercial SMR will be in operation by 2030.²

On the other hand, according to Lazard, the world's largest independent investment bank, solar and onshore wind can now supply electricity at a cost of 3.4 to 7.0 cents per kWh.³ This means that the forecast cost of power from the proposed GTA nuclear reactor is two to almost five times greater than the cost of power from solar and onshore wind.

Electricity Cost Comparison



Ontario has a large potential supply of wind and solar energy. For example, a report prepared for the Government of Ontario identified 64 potential offshore wind power sites in the Great Lakes that could produce 111.5 billion kWh of electricity per year.⁴ This is equivalent to 84% of Ontario's total electricity consumption in 2020.⁵



Quebec's Green Battery

However, since the wind doesn't always blow and the sun doesn't always shine, these intermittent renewable energy resources must be combined with storage systems if they are to displace nuclear generation during every hour of the year.

The lowest cost storage option for Ontario's electricity system is Hydro Quebec's hydro-electric reservoirs.⁶ Specifically, when our wind or solar power production is above average, our surplus green energy can be exported to Quebec to keep the lights on in Montreal, and Hydro Quebec can store more water in its reservoirs. Conversely, when our wind and solar power generation is below average, Hydro Quebec can use the extra water in its reservoirs to produce electricity for export back to Ontario. **In short, by integrating our wind and solar generation with Hydro Quebec's reservoirs, we can convert our intermittent wind and solar energy into a firm 24/7 source of baseload electricity supply for Ontario.**

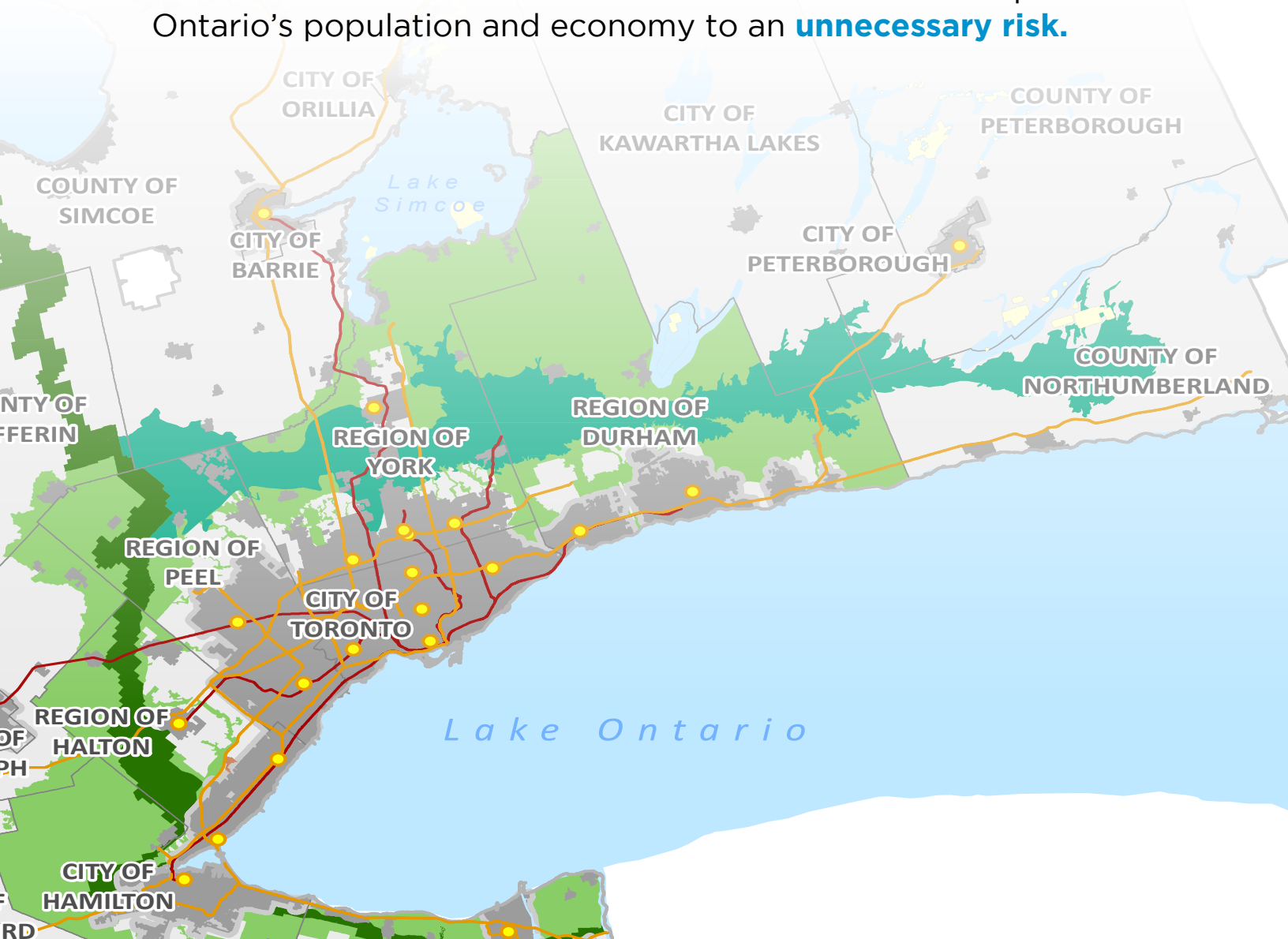
With our existing transmission connections, Hydro Quebec's reservoirs can provide Ontario with approximately 2,000 megawatts (MW) of storage for our wind and solar generation.⁷ By building a new 20 km transmission line through an existing transmission corridor in Ottawa, we could enable Quebec's reservoirs to provide us with an additional 2,000 MW of storage for solar and wind generation at a construction cost of approximately \$80 million.⁸



Siting a new reactor with unproven technology in the Greater Golden Horseshoe would be reckless.

The Greater Golden Horseshoe is one of North America's fastest growing regions. It is responsible for one quarter of Canada's population (9 million people) and two-thirds of Ontario's gross domestic product. The region includes some of Canada's most productive farmland, as well as world-renowned natural features, like the Niagara Escarpment, the Greenbelt, and the Oak Ridges Moraine.⁹

Putting a nuclear reactor with technology that has never been tested in the Greater Golden Horseshoe would expose Ontario's population and economy to an **unnecessary risk**.



OPG Does Not Have

a Long-term Facility for the Safe Storage of its Nuclear Wastes

Despite the fact that OPG has operated large, commercial nuclear reactors in Ontario for 50 years, it still does not have a long-term safe storage facility for its highly toxic radioactive wastes which will need to be kept secure for hundreds of thousands of years.

OPG is hoping that the wastes from its nuclear reactors can eventually be transferred off-site to a deep geological storage facility, **but no such facility currently exists or is even in the construction planning stage in Canada.**

OPG Does Not Have

a Plan or a Budget to Immediately Dismantle the Proposed GTA Nuclear Reactor After it Comes to the End of its Commercial Life

The International Atomic Energy Agency says that immediate dismantling is the “preferred decommissioning strategy” for nuclear plants.¹⁰ But instead, OPG is proposing to defer the dismantling of its nuclear stations for 30 years after they are shut down. OPG believes that the dismantling will take approximately ten years, meaning that local communities will have to wait at least 40 years after shut down for the opportunity to revitalize the prime waterfront sites occupied by OPG’s reactors.



Conclusion

The *Nuclear Safety and Control Act* requires the Canadian Nuclear Safety Commission to **regulate the use of nuclear energy to “prevent unreasonable risk” to:**

- i) the environment;**
- ii) the health and safety of persons; and**
- iii) national security.**

In the 1950s the nuclear industry proclaimed that nuclear electricity would be too cheap to meter. As a result, many people concluded that the risks associated with nuclear electricity were “reasonable” relative to the financial, public health and environmental costs of dirty coal.

But it is now 2021 and according to the International Energy Agency (IEA), “Solar PV and onshore wind are already the cheapest ways of adding new electricity-generating plants in most countries today.” As result, the IEA is forecasting that “renewables are set to account for 95% of the net increase in global power capacity through 2025.”¹¹

Consequently, in 2021, it would be unreasonable to subject present and future generations to the risks associated with the proposed new GTA reactor given that wind and solar energy are cleaner, safer and lower cost options to keep our lights on.

Therefore the Canadian Nuclear Safety Commission must reject OPG’s request for a Site Preparation Licence for a new GTA nuclear reactor.

Endnotes

- 1 Letter from Mark Knutson, Senior Vice-President, OPG to C. Carrier, Director, New Major Facilities Licensing Division, Canadian Nuclear Safety Commission, (December 2, 2020).
- 2 Canadian Small Modular Reactor Roadmap Steering Committee (2018), *A Call to Action: A Canadian Roadmap for Small Modular Reactors*, pages 35 and 54.
- 3 According to Lazard, the cost of utility scale solar PV is 2.9 to 4.2 cents per kWh (US\$); the cost of onshore wind is 2.6 to 5.4 cents per kWh (US\$); and the cost of offshore wind is 8.6 cents per kWh (US\$). We have converted these costs to Canadian dollars by multiplying them by 1.3. Lazard, *Lazard's Levelized Cost of Energy Analysis – Version 14.0, (October 2020)*, page 2.
- 4 Helimax Energy Inc., *Analysis of Future Offshore Wind Farm Development in Ontario*, (April 2008), pages iii, 18 & 19.
- 5 Independent Electricity System Operator, *2020 Year in Review*, (January 2021).
- 6 Emil Dimanchev, Joshua Hodge and John Parsons, *Two-Way Trade in Green Electrons: Deep Decarbonization of the Northeastern U.S. and the Role of Canadian Hydropower*, Massachusetts Institute of Technology Center for Energy and Environmental Policy Research, (February 2020).
- 7 Power Advisory LLC, *Ontario Wholesale Electricity Market Price Forecast: For the Period November 1, 2020 through April 30, 2022*, (October 13, 2020), page 8.
- 8 The Independent Electricity System Operator (IESO) analysed three new transmission options to allow us to import an additional 2,000 MW of electricity from Quebec. According to the IESO, the 350 km transmission line option could cost up to \$1.4 billion. We have estimated the cost of the 20 km option assuming that its cost per km would be the same as the 350 km option. IESO, *Ontario-Quebec Interconnection Capability: A Technical Review*, (May 2017), pages 24 to 27.
- 9 <http://www.mah.gov.on.ca/AssetFactory.aspx?did=10852>
- 10 International Atomic Energy Agency, *Decommissioning of Facilities: General Safety Requirements Part 6*, (2014), page 12.
- 11 International Energy Agency, *Renewables 2020: Analysis and forecast to 2025*, (November 2020), page 8.







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