

IESO Engagement

From: Don Cameron
Sent: July 11, 2021 7:57 PM
To: IESO Engagement
Subject: Phasing out gas generators

Hello,

A friend forwarded an email that you sent to her in which you said:

"The IESO is embarking on a technical assessment of the implications of phasing out gas generation on the reliability, cost and operability of Ontario's power system. This study is intended to help inform any discussions related to the future of gas generation from a grid reliability perspective.

Phasing out gas generation in Ontario would require a comprehensive plan to develop and invest in suitable replacement supply and reorient the system around a new supply mix. The IESO recently launched a stakeholder engagement seeking input on the scope of the assessment, in order to ensure that the study looks at all relevant factors that could impact or contribute to the reliable operation of the grid. The assessment will focus only on grid reliability and will be provided to inform future discussions on the topic. It will be published this fall."

I recently completed a study of this very question using 2020 hourly gas-fuelled generation data as demand and Pan-Canadian Wind Integration Study (PCWIS) hourly wind farm data and National Renewable Energy Laboratory hourly solar farm data (based on Ontario weather data) as supply. The hourly comparison revealed runs of demand in excess of renewable energy generation as long as 5 days in length. Fortunately, Quebec has sufficient long-duration storage in dam reservoirs to satisfy these long runs of excess demand. Ontario has a contract with Quebec Hydro for an annual draw of 2 TWh. I calculated that to replace the gas generators would require an annual draw of 3.4 TWh, but I would like my calculations verified.

I calculated that based on the 2020 numbers, 3500 MW of wind and 3500 MW of solar would be sufficient. The PCWIS capacity factor was 0.34 and the NREL capacity factor was 0.17. So, the math worked out to make the ratio of wind MWh to solar MWh roughly 2:1.

Pickering is shutting down in 2024 and the go-to replacement is gas generators. How can Ontario meet its share of the 2030 emission reduction target of 40%-45% if nuclear is replaced by gas?

Amassing the land to host this amount of capacity is an issue. Most of the gas plants are close to the shores of the Great Lakes, so off-shore wind farms would reduce the amount of land needed for wind. Could larger transmission rights-of-way be used to provide land for the solar farms? The decarbonizing paper by Dolter and Rivers makes the case for beefed up transmission to assist in the balancing problem.

Managed demand in the form of a smart grid could shift some demand into hours of peak renewable energy generation (see Summerside PEI municipal wind farm production being used to energize purpose-built hot water heaters).

My fear is that depending on Quebec hydropower as the critical resource to guarantee grid reliability in the absence of gas generators raises a security issue that might derail a proposition that bases the grid reliability solution on a

combination of wind, solar, and hydro power. If the solution is governed only by a market-only mechanism, it might lead to have-not-hydro provinces being afraid of price-gouging by have-hydro provinces.

All the good hydro power resources are in BC, Quebec, and NL. Ontario is not the only have-not-hydro power province. I am wondering if a national energy security policy hammered out by all stakeholders (national, provincial, territorial, indigenous, municipal, corporate and citizen groups) could put the security issues to rest.

I have a paper and a spreadsheet. Are you interested?

Regards,
Don Cameron

