

Nova Scotia as a Clean Electricity Hub: An analysis of possible subsea cable interconnections with our neighbours

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Abstract

Nova Scotia has two greenhouse gas emission reduction targets through its Environmental Goal and Climate Change Reduction Act. The first target is to reduce greenhouse gas emissions by 53% below 2005 levels by 2030 and the second is to achieve net-zero greenhouse gas emissions by 2050. Achieving these targets requires the province to decarbonize its energy system. Nova Scotia has mandated the phase-out of coal from its electricity generation and is targeting a minimum of 80% renewable energy sources in electricity generation by 2030. Also, the province wants to achieve clean electricity grid by reducing its emissions intensity to below 30 tonnes GHG/GWh limit set by Canada Energy Regulator. The province is advancing towards this goal, and according to Nova Scotia Power, by August 2023, more than 40% of the electricity it supplies comes from renewable sources.

Without the Atlantic Loop, Nova Scotia faces challenges in meeting its goals for a clean electricity grid and achieving net-zero emissions from its electricity system by 2050. Originally these targets were intended to be fulfilled through the implementation of the Atlantic Loop, a proposed grid linking Nova Scotia to renewable energy sources in Newfoundland and Labrador (the eastern loop) by 2020 and Québec via New Brunswick (the western loop) by 2030.

Nova Scotia's Clean Power Plan prioritizes greater investments in renewables sources such as offshore wind and solar energy, and this may result in substantial overproduction that will require curtailment or export. Potential markets for Nova Scotia's clean electricity include regions such as Québec, the Atlantic Provinces, and New England.

This research aims to investigate the feasibility of subsea power cable grid infrastructures connecting Nova Scotia with neighbouring regions for clean electricity export and import. Such grid infrastructure has the potential to make Nova Scotia a clean energy hub, connecting Atlantic Canada, Québec and New England while also improving Nova Scotia's energy security. The expected outcome of this research includes identifying the subsea cable routes, cost estimates and configuration and determining the energy security risks and benefits of the different subsea cable routes.