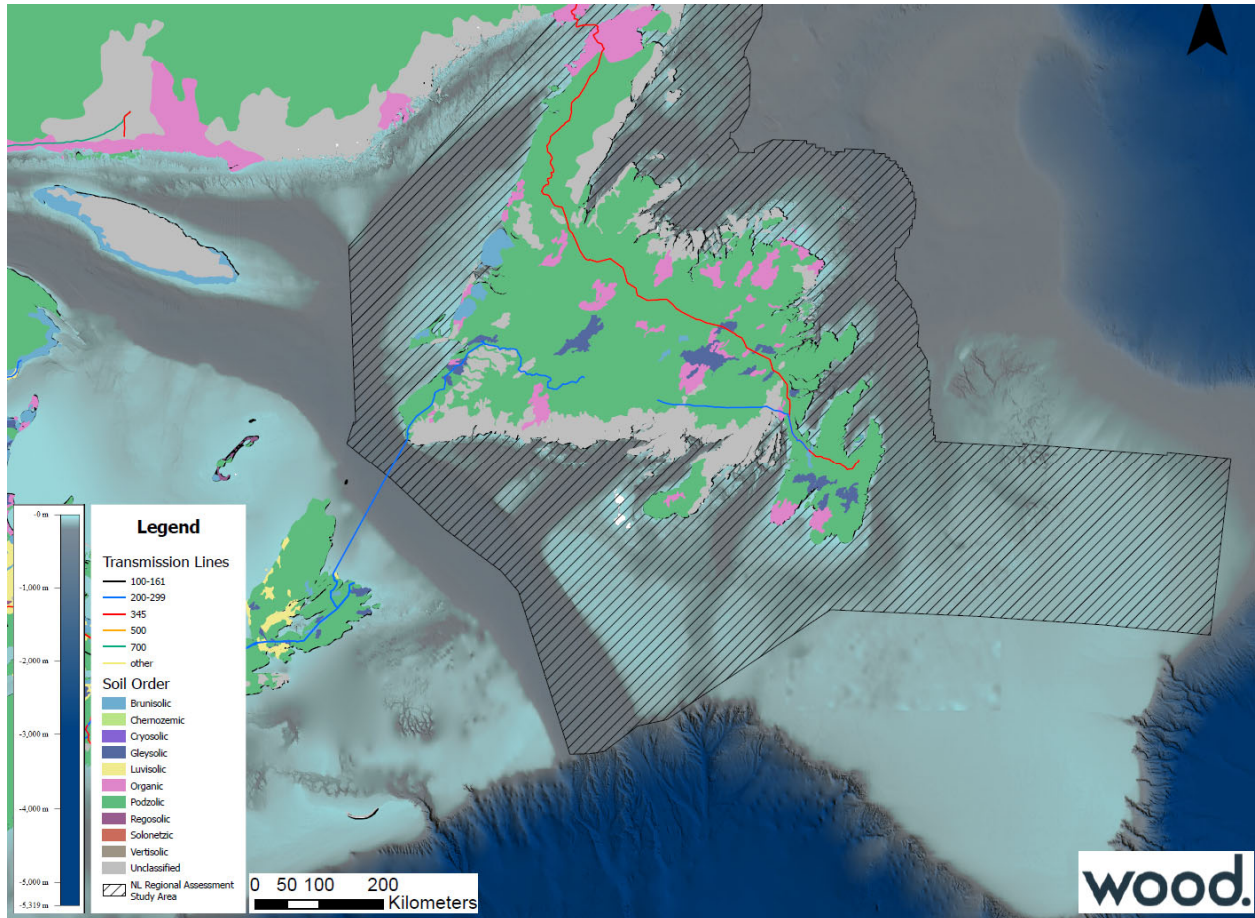


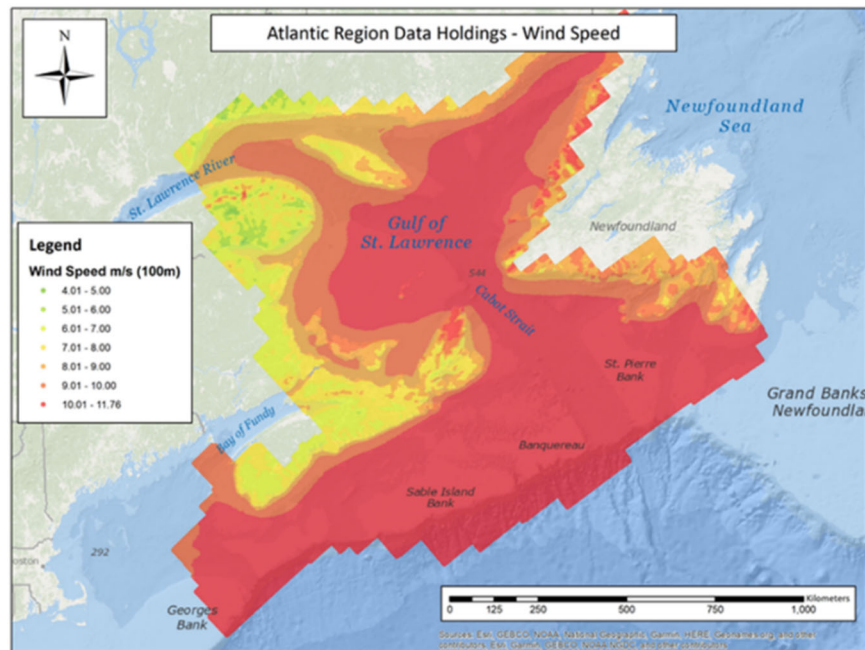
Technical Memo

Purpose: Regional Assessment of Offshore Wind Development in Newfoundland and Labrador

Date: September 21, 2023



Wind resource



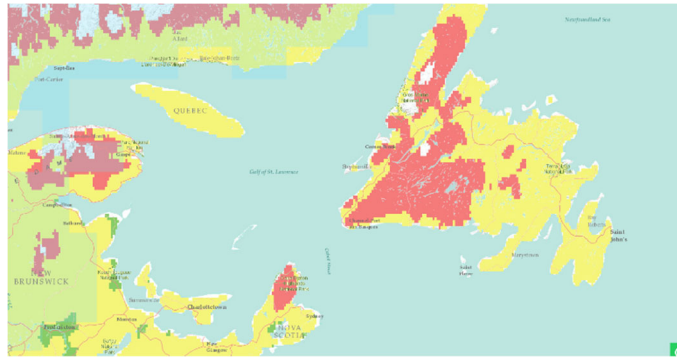
Source: CanmetEnergy Ottawa, Modelled wind speed data in Atlantic Canada, 2019

The coastal and near-shore areas around Newfoundland have excellent wind resource, as depicted in the figure above. According to CanmetEnergy and Global Wind Atlas (“GWA”) - a publicly available microscale wind model built by DTU Wind Energy based on ERA-5 reanalysis data - mean wind conditions at 100m above mean sea level (“AMSL”) off the eastern coast of Newfoundland are over 10.5 m/s (IEC Class I) whereas wind speeds off the western and southern coasts are slightly lower but still very desirable. Additionally, the predominant wind direction is from southwest to west.

Wood notes that the Grand Banks have been excluded from the focus area due to either iceberg risks and/or fishing community-related impacts. As was mentioned during our first Advisory group meeting (on September 13th 2023) by a member, climate change may significantly reduce the risk associated with icebergs and based on experience in Europe, fishing community-related impacts might be lesser than anticipated. Given the high wind speeds and low bathymetry in those excluded areas, *Wood would like to suggest to investigate the excluded areas further.*

Wood notes that the wind resource suggested by GWA and other reanalysis data sources are highly uncertain; *as such deployment of meteorological masts and/or lidars to collect onsite measurements and reduce uncertainty is highly recommended before the selection of a preferred area for the upcoming auction.* This is common practice in Europe and NYSEDA also followed this same approach.

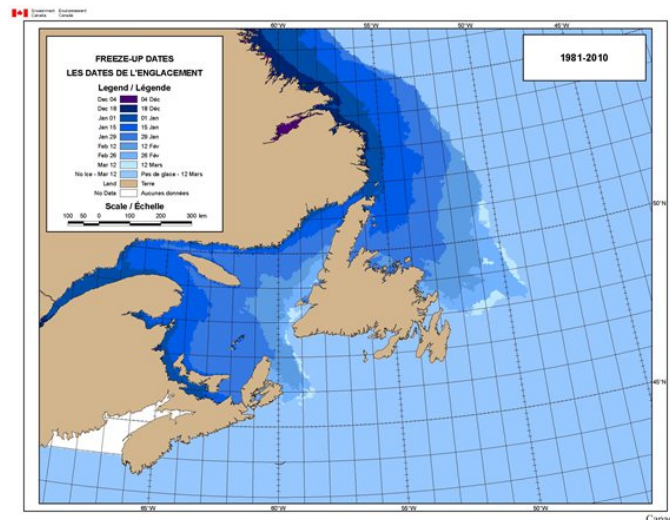
Atmospheric icing



Source: ArcGIS, VTT Publich Wice Atlas

According to Wice Atlas - a map of International Energy Agency's icing class developed by VTT - the land area of Newfoundland is classified as IEA ice class 3, 4 or 5. This suggests significant production losses can be expected for onshore. Wood expects the icing conditions offshore to persist offshore but could be less severe. *It is strongly recommended that further studies are completed to assess the atmospheric icing risk ahead of the auction in case that one area is concluded to be more favorable than others.*

Sea Icing

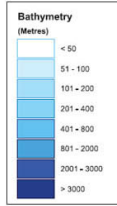


Source: gcc.gc.ca, Chapter 3: Ice climatology and environmental conditions

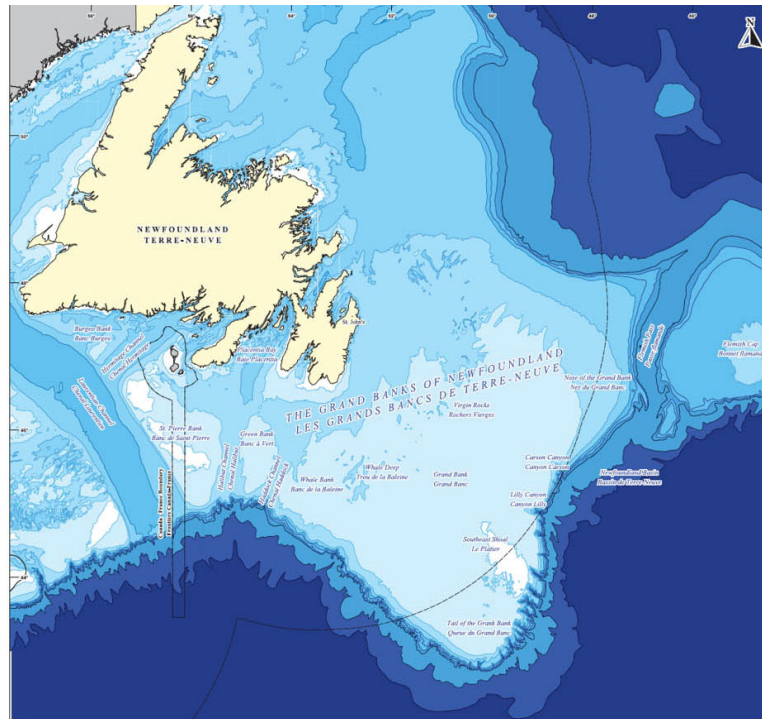
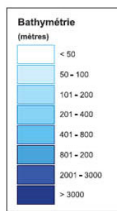
Sea ice will affect the foundations of the turbines. WTGs will need stronger foundations and additional groundwork to avoid potential damage. Wood notes that floating wind is unproven for sea ice. Based on the map above (Chapter 3: Ice climatology and environmental conditions gcc.gc.ca), it appears that the southern coast could be less challenging than the western coast. *Wood recommends further sea ice investigation before selected optimal areas.*

Seabed

The Grand Banks of Newfoundland
Atlas of Human Activities



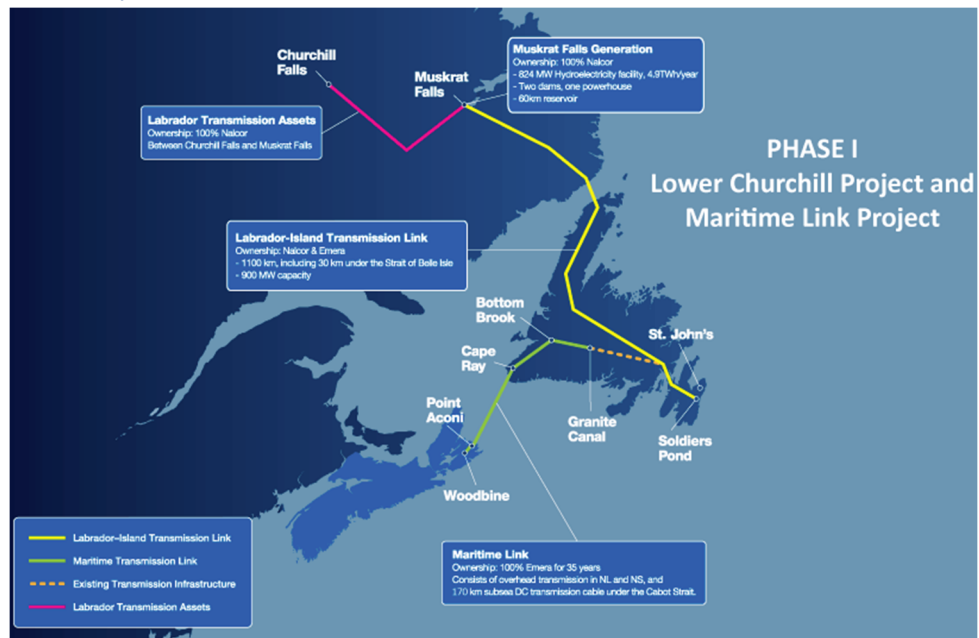
Les Grands Bancs de Terre-Neuve
Atlas des activités humaines



Source: gcc.gc.ca, The Grand Banks of Newfoundland: Atlas of Human Activities

The bathymetry in the study area ranges from less than 50 meters to over 300 meters. The water depth is not proportional to the distance from Newfoundland and there are relatively few shallow areas (less than 50m), except in the west and the Great Banks. There are shallow areas in the south, but these are in close proximity to shore (less than 10km) and close to St. Pierre. With regards to shallow waters near St. Pierre, these appear to fall outside NFL's exclusive economic zone. Due to the proximity to shore and bedrock conditions, it is possible that fixed foundations will be restricted to Gravity Based Structures (GBS). GBS are relatively more expensive than monopiles and may need to rely more heavily on the local supply chain. *Wood recommends performing a foundation feasibility study before an auction takes place in order to ensure consistency of bidders and bidding strategy.*

Transmission system



Source: Emera, Power Grid International

Maritime Transmission Link and Labrador Island Transmission Link were both completed in 2018. A cluster of projects on the Western tip and around Stephenville would be most attractive considering proximity to transmission lines. Limited transmission availability also suggests necessity of hydrogen exports.