Geological and Site Conditions of the Canadian East Coast Wind Energy Areas

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As offshore wind development progresses along the Atlantic coast of Canada, a robust understanding of the geological and anthropogenic constraints is essential to support early-stage site selection, engineering design, and risk management. This study presents the desktop-level findings of the geological and site conditions across the five proposed offshore Wind Energy Areas (WEAs) located offshore Nova Scotia (French Bank, Middle Bank, Sable Island Bank, Sydney Bight, and Western/Emerald Bank) and the Newfoundland and Labrador region in recognition of the recent Bill 90 legislation.

The presentation will summarize a comparative review of available data sets, including water depth / bathymetry conditions, seabed morphology, and anthropogenic constraints such as existing infrastructure, Unexploded Ordnance (UXO) risk, and maritime activity. Seabed sediments and sub-surface geological conditions are assessed using public-domain geophysical, geotechnical, and geological information. Key considerations include sediment types, thickness, soil layering, bedrock, mineralogy, and identification of geohazards such as shallow gas, faulting, hard ground etc. Each constraint identified will be discussed with regards to engineering implications and possible mitigation strategies to minimize the impact these will have on offshore wind development.

The study concludes with a high-level screening of foundation options for both fixed and floating turbines based on the geological suitability and constraints observed at each site.

The findings of this study will provide developers, planners, and policymakers with a comparative baseline to guide site selection, making use of OWC’s global experience of site appraisal and site characterization, and open the door for further, more detailed studies of offshore renewable energy sites.