Unlocking Canada’s Seabed Data for Offshore Wind: From early site investigation to lifecycle-ready digital assets

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As Canada advances its offshore wind ambitions, developers face the challenge of designing and deploying infrastructure in complex and often poorly characterized marine environments. While digital transformation in energy has traditionally focused on deep subsurface understanding, the role of **shallow seabed conditions and their interaction with environmental forces**—including waves, currents, and soil variability—is critical for offshore wind asset performance.

These interactions directly influence the design, installation, and long-term integrity of turbine foundations, export cables, and offshore substations. However, large volumes of legacy data collected over decades from offshore oil and gas and marine projects, usually remain locked in unstructured formats such as PDFs, limiting their reuse.

This paper presents explore the possibilities in using innovative methodology to unlock and leverage legacy shallow subsurface data for offshore wind development in Canada. Machine learning-based workflows are now being developed to automatically extract and digitize borehole log data from PDF records with aim to ingest it into structured geospatial databases. From these datasets enable the generation of high-resolution 3D ground models, supporting improved understanding of seabed variability and geohazards.

These kind of approaches directly supports key offshore wind challenges, including **foundation design optimization (monopiles, jackets, floating anchors), cable routing, and installation planning**. Integrated with metocean and environmental datasets via digital platforms, it also enables near real-time data access and adaptive site investigation strategies.

By unlocking legacy data and enabling integrated, data-driven workflows, this approach reduces uncertainty, accelerates project timelines, and supports more reliable and cost-efficient offshore wind development—contributing to the sustainable growth of Canada’s emerging offshore wind industry.