Everything else

Thu. Nov 12, 2026 11:00 AM - 12:30 PM JST | Thu. Nov 12, 2026 2:00 AM - 3:30 AM UTC | Posters (3F)

Posters 1

[KSxAOV1I-21] Digital Twin Readiness for Offshore Wind: Stakeholder-Driven Insights from Nova Scotia's Marine Environment

*Madhulika Bhati[1] (1. Dalhousie University (Canada))

Nova Scotia's (NS) emerging interest in large-scale offshore wind development has intensified the need to understand how renewable energy expansion can proceed without compromising marine ecosystem integrity. In response, this study proposes the Digital Twin for Offshore Wind Farms and Marine Ecosystems (DT-OWF-MPA) as a conceptual framework for creating dynamic, data-driven virtual representations of offshore wind installations and the marine environments they influence. Using a systems-theoretical perspective, the research explores how DT could support environmental monitoring, predictive modelling, and the evaluation of ecological trade-offs within Marine Protected Areas (MPAs).
The study draws on multi-sector technical workshops, focus group discussions, and expert interviews to examine stakeholder perspectives on the anticipated value, feasibility, and governance considerations for DT adoption. Although the project does not develop an operational DT, stakeholder engagement reveals several critical socio-technical factors that must be addressed before meaningful implementation is possible. Participants emphasized the importance of integrating cultural and Indigenous knowledge systems into environmental assessment processes, improving occupational health and safety through predictive modelling of worker exposure and operational risks, and addressing region-specific geotechnical challenges. They also highlighted enabling conditions such as digital literacy, data accessibility, and transparent modelling practices, noting that the effectiveness of DT depends on diverse user groups' ability to interpret, engage with, and contribute to complex digital models.

These insights position DTs not only as environmental monitoring tools but as multi-dimensional platforms capable of supporting cultural inclusion, workforce safety, regional risk mitigation, and broader socio-technical capacity building. At the same time, concerns related to fragmented data systems, institutional constraints, limited technical capacity, and the risk of opaque "black-box" models underscore the need for careful governance. The study concludes that technological sophistication alone is insufficient; meaningful adoption requires open data principles, transparent modelling, inclusive governance, and incremental pilot initiatives that build trust and cross-sector collaboration
.

© 2026 DITTO Summit Local Organising Committee. All rights reserved.