

How to consider metocean conditions and accessibility in site prospection and LCOE estimations: An example from the Gulf of St Lawrence to the Gulf of Mexico

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When developers prospect for offshore wind farms, they commonly use regional metocean databases to produce a qualitative descriptor to be used with other spatially varying parameters in a risk-based decision-making tool.

This risk-based decision approach prioritizes areas with high wind speed and suitable depths, but neglects the risk of low accessibility due to poor weather. Consequently, sites with high wind yield and challenging metocean criteria can get selected without correctly appreciating the economic impact of poor accessibility.

As the offshore wind industry evolves projects are moving into deeper water with harsher weather. Here the larger components also require lower wind thresholds to install and service.

These factors all increase exposure to weather downtime, which increases CAPEX and OPEX. In extreme cases this could lead to prioritization of development of wind farms that are too challenging to build or operate.

It is therefore important to move from qualitative descriptors and instead quantify the impact of the metocean conditions on site operability. However, assessing the weather downtime for large areas is a resource intensive exercise, and no common approach to factor this in site selection has been commonly agreed upon to date.

In this presentation, installation and O&M costs are estimated along the coast between Newfoundland and Texas, based on publicly available data using Ramboll's weather downtime assessment tool. Regionwide maps of costs are produced that can be considered in Lowest Cost of Energy (LCOE) models, so that the costs of weather downtime are considered during site selection.

The presentation will illustrate:

- How different metocean regimes influence operability.
- How metocean parameters from renewable energy atlases can be used to quantify the cost of weather downtime.

An initial approach to factoring operability into site selection.