

ABSTRACT/SUMMARY

Transmission line Impacts on Onshore Wind Location Suitability Analysis and Land Availability, Case of Atlantic Canada

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Onshore wind energy development requires available land, and nexus energy models connect the energy sector with land systems to address this concern. Although this improves energy system models, they lack the geospatial understanding of different locations. This causes difficulty in identifying the potential renewable sites and their capacity to generate power.

Therefore, researchers are investigating the link between energy-land models and geographical information systems to present suitable locations in terms of their potential and resource availability. Despite these efforts, the interplay of environmental and social aspects has not been taken into account with economic and technical challenges surrounding onshore wind location identification and grid integration. In this case, proximity to transmission lines raises concern since some of the environmentally identified locations are remote from the grid and impose grid development costs. Considering this gap, we address the techno-economic implication of choosing onshore wind locations and the impacts of their proximity to the grid, using the Atlite Python package.

We apply this to the Atlantic region of Canada, given the land availability and historical weather data. While this gives us the available wind potential of the region, we also consider proximity to the grid to minimize the costs of electricity generation and transmission. We then input the findings into the ACES model to study the impact of these factors on the energy system and capacity expansion prospects by 2050. This paper can help policymakers of Atlantic Canada and provides a methodology for researchers to implement in other case studies.

Poster Presentation

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