ABSTRACT/SUMMARY

Onshore wind energy land impacts: Implications for Nova Scotia using the Atlantic Canada Energy System Model (ACES)

Lead Author: Narges Sefid
Affiliation: Simon Fraser University

Other team members or authors:
Mohammed Alkatheri, Sven Scholtysik, and Taco Niet

Emissions from energy systems represent substantial global emissions and energy models play a crucial role in proposing pathways to mitigation. However, researchers often overlook the intricate interconnections between energy systems and critical resources, such as land and water, in their modeling efforts. Concurrently, policymakers intensify efforts to address emissions by promoting renewable energy strategies, but renewables like onshore wind and solar might require significant land use, competing with essential uses like agriculture. This motivates further analysis for addressing land-emission-energy assessments.

Over the past decade, research has examined energy system land use from various perspectives and methodologies, encompassing diverse spatial and temporal resolutions and technology analyses. Current research implements global constraints on land or technology-specific constraints on land for biofuels, only including their land use footprint. In this paper, we narrow our focus to land use constraints for onshore wind power, considering the spacing land footprint of wind farms in addition to their footprint.

This study explores how energy systems are sensitive to land use constraints for electricity generation. The constraint is implemented into the Atlantic Canada Energy System model (ACES) and is only applied to onshore wind. We first look at the future projections of Nova Scotia and the implications of targeting net zero without including land use considerations. Then we apply low, medium and high onshore land limit scenarios and investigate how they impact the energy system. Results showcase that the energy capacities are sensitive to the land use factor for onshore wind while transitioning to net zero targets.

Poster Presentation
Atlantic Canadian Conference on Energy Systems Modelling
Co-hosted by Energy Modelling Hub and Net Zero Atlantic
June 19-20, 2024 | Moncton, N.B.