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Master's Thesis

Electrification of Artisanal-Fishing Boats in Cape Verde

Lucas Mário Freixo da Costa Dias — 2024

Key information

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Published in

12/06/2024

Abstract

Decarbonization is a global priority, and Cape Verde aims to reduce carbon emissions across various sectors, including small-scale fishing. Currently, the artisanal fishing boats in Cape Verde rely on fossil fuels, contributing to greenhouse gas emissions and ocean acidification. Transitioning to electric or hybrid propulsion systems presents a promising solution, despite the challenge of limited range for electric boats.

This thesis investigates the feasibility of converting an existing gasoline-powered fishing vessel in Cape Verde to hybrid and fully electric propulsion, analyzing market options and custom battery configurations to evaluate costs, fuel savings, and conversion practicality. A dynamic model using resistance prediction methods simulates real-world fishing scenarios by incorporating environmental variables like currents, wind, and waves, allowing for the analysis of their impact on hydrodynamic drag and energy consumption, while also assessing the feasibility of integrating photovoltaic panels as a renewable energy source to reduce reliance on

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This thesis successfully predicts powertrain demands in real-world scenarios using a robust Numerical Model, confirming the conversion viability. Despite challenging maritime conditions, integrating photovoltaic panels improves efficiency, reduces battery size, and supports grid-independent charging.

Publication details

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Fields of Science and Technology (FOS)

electrical-engineering-electronic-engineering-information-engineering - **Electrical engineering, electronic engineering, information engineering**

Publication language (ISO code)

eng - **English**

Rights type:

Embargo lifted

Date available:

09/30/2025

Institution name

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Cite publication