

Remote Renewable Energy Hubs in the High Seas: a Battery-Based Fully-Electric Ecosystem

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Abstract

In this paper, we propose an overview of a fully-electric RREH (Remote Renewable Energy hub). RREHs are energy hubs located in areas with abundant renewable energy sources, such as solar in the Sahara Desert or wind in Greenland. Our studied RREH harnesses high quality wind energy in the high seas to power continental grids. To reach this goal, we opt for battery packs as a mean for energy storage and transportation. A battery pack is a standard maritime container filled with batteries. This choice is based on the idea that batteries will become both cheaper and more energy-dense in the years to come. More precisely, we describe the entire ecosystems composed of the electrical production unit in the high seas, the transportation of this produced electricity by means of battery packs and the delivery to the grid. Additionally, we evaluate energy efficiencies and costs of electricity for different alternatives regarding the means of transportation. These means of transportation include electrical boats, drones, and airships. Our results show that the most cost effective configuration studied is the one based on electrical boat transportation. Costs of electricity linked to this configuration amount to 206\$/MWh for a production unit located at a distance of 400 km from the coast, in the high seas.

Keywords: Renewable energy, High seas, Remote renewable energy hub, Electricity, Wind power, Energy transition

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