

Development of global offshore wind energy

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Introduction

- Capacity, available area, technological advancements, and climate change drive future offshore wind potential
- Development of 28 techno-climatic wind energy expansion scenarios for 2025-2054
- Hypothesis: climate change-induced wind resource changes impact energy yield

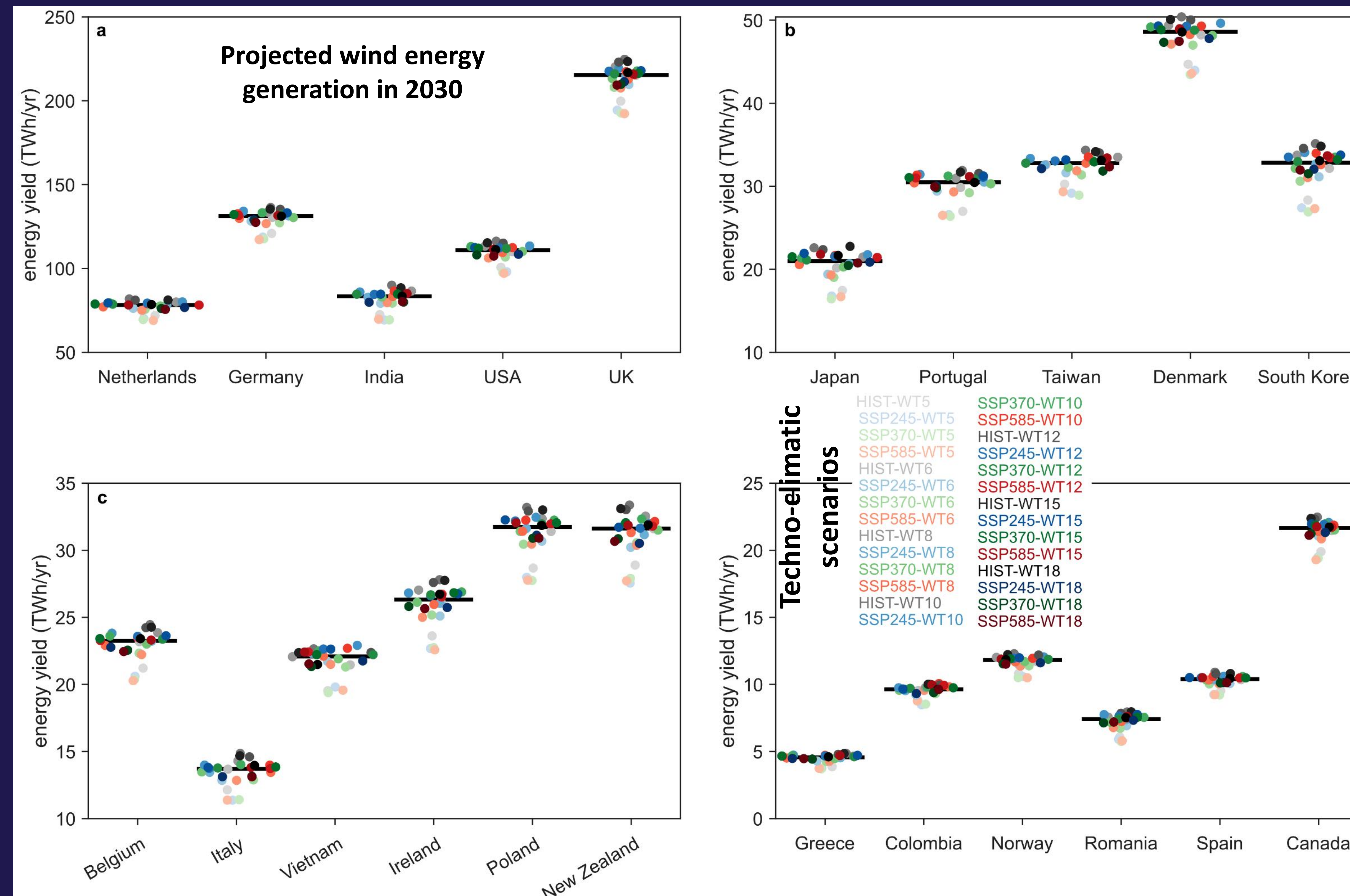
Methods

1. Potential future wind farm sites
2. Expansion targets
3. Wind speed data
4. Seven reference wind turbines
5. Application of 28 techno-climatic scenarios

Results and Discussion

- Capacity factors significantly decrease under climate change in 2025-2054
- Climate change-induced wind resource change is less than capacity factor variability within wind farm sites

Offshore wind expansion is an efficient climate protection measure that leads to higher capacity factors.



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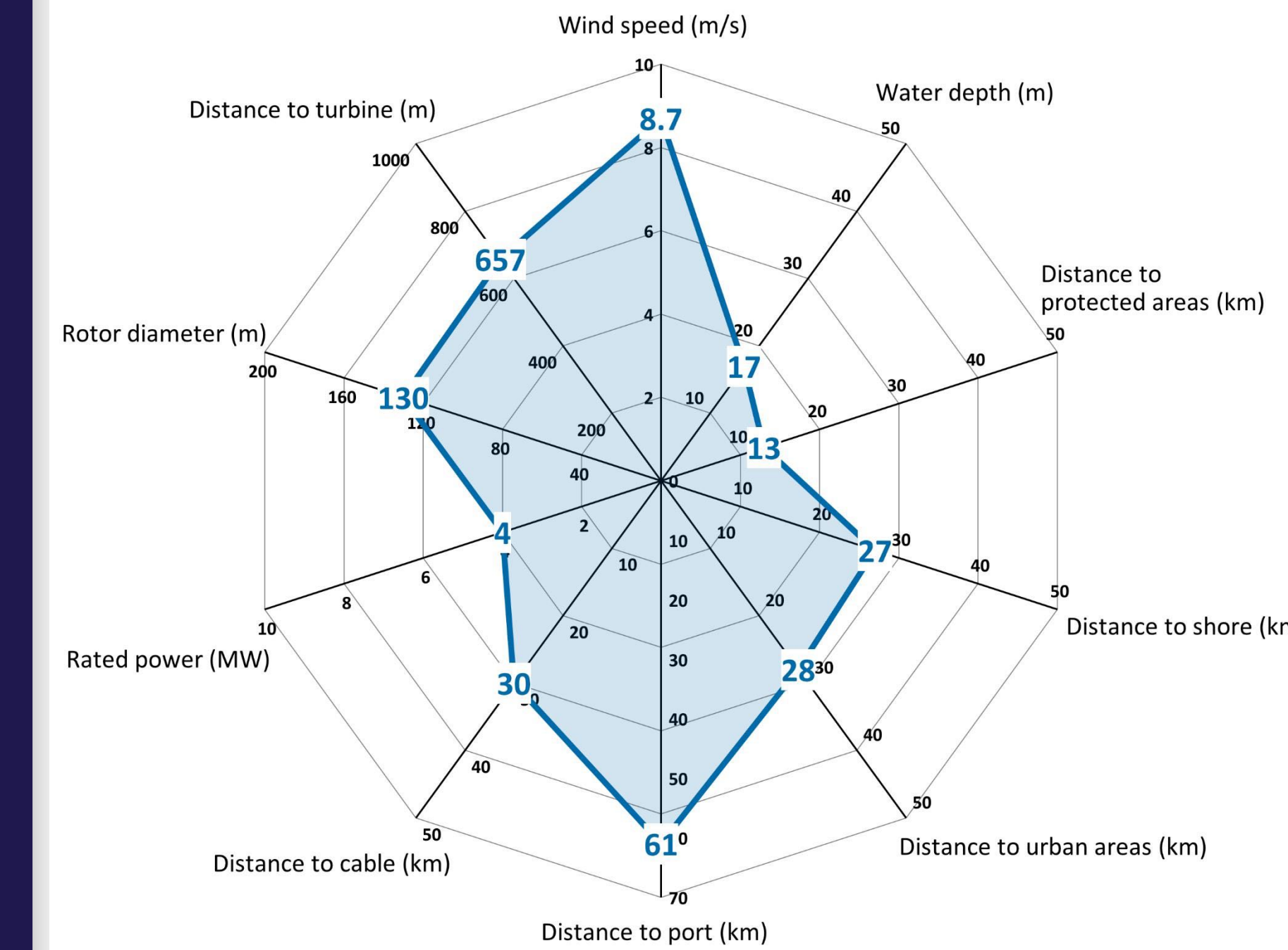


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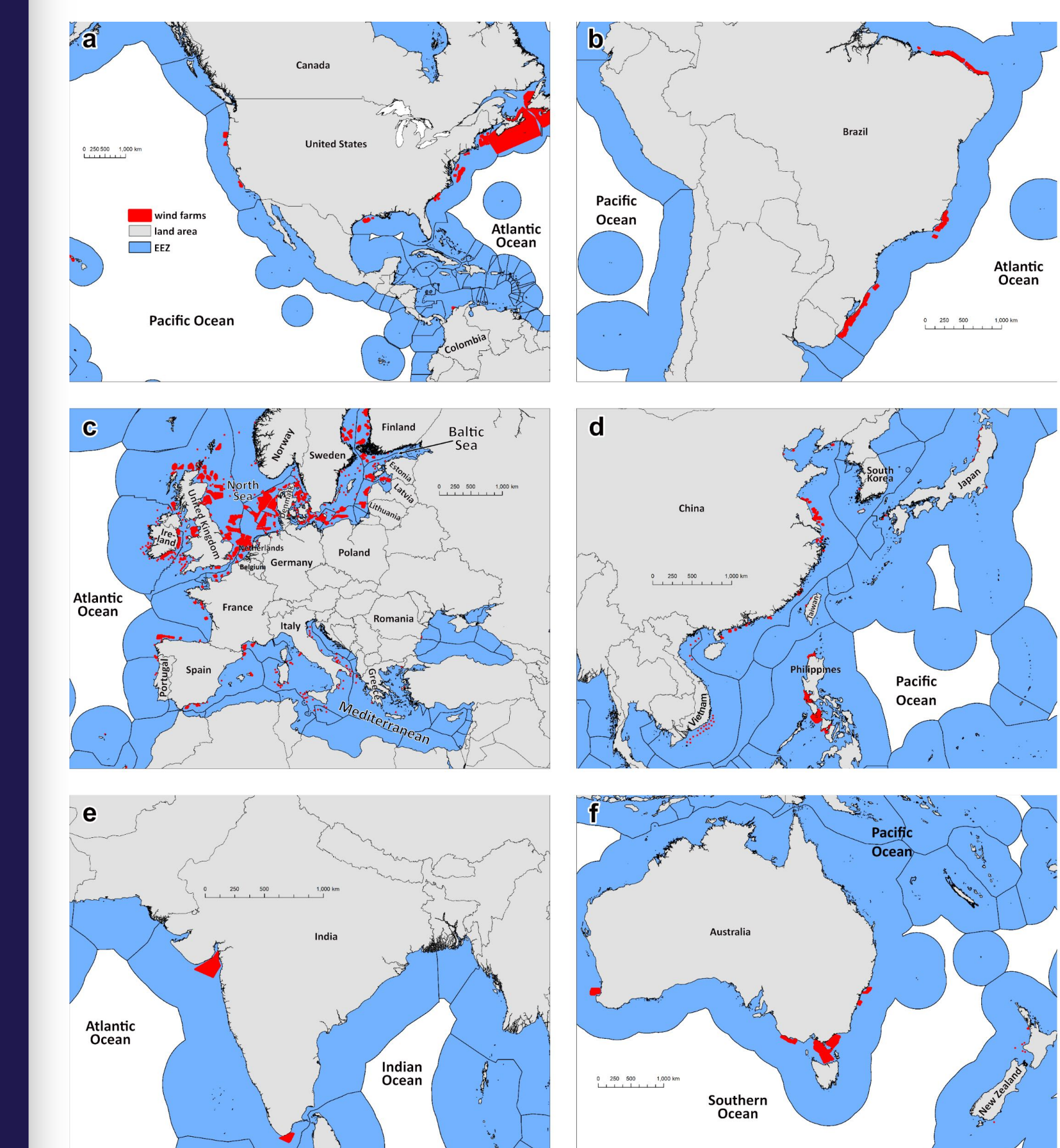


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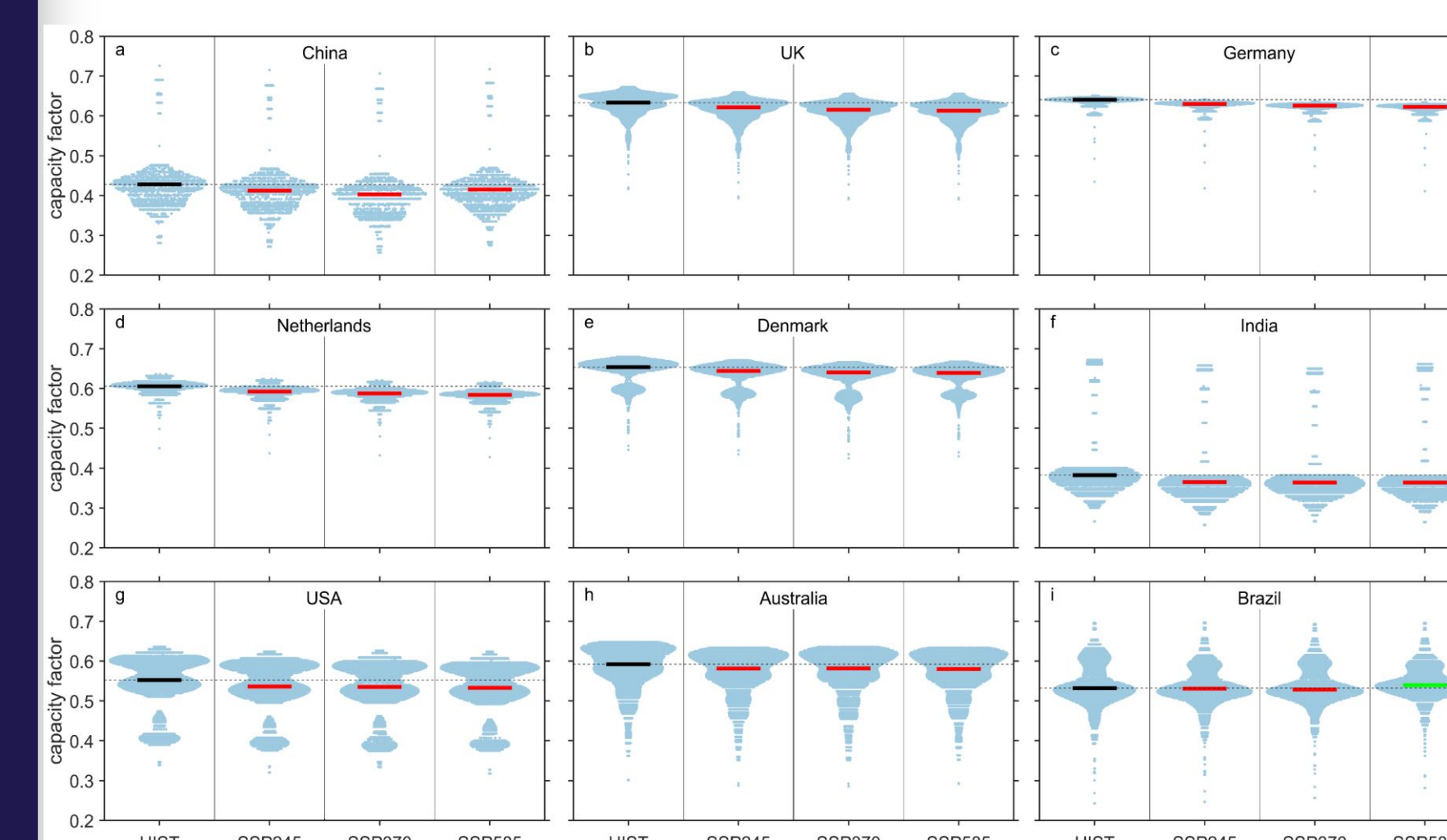
Additional info



Properties of the current global offshore wind turbine fleet.



Potential future offshore wind farm sites.



Modeled capacity factors in the exclusive economic zones of different countries under the climate change scenarios SSP245 (medium emissions), SSP370, and SSP585 (high emissions).