

# NORTH SEA INDUSTRIALISATION

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## Introduction

All of the countries around the North Sea have programmes in place to develop offshore wind energy. The UK has been at the forefront of these efforts, and now has over 10 GW of capacity in operation. However, the Netherlands, Germany and Denmark all have growing offshore wind fleets.

This factsheet looks at the impact of these programmes – both current and future.

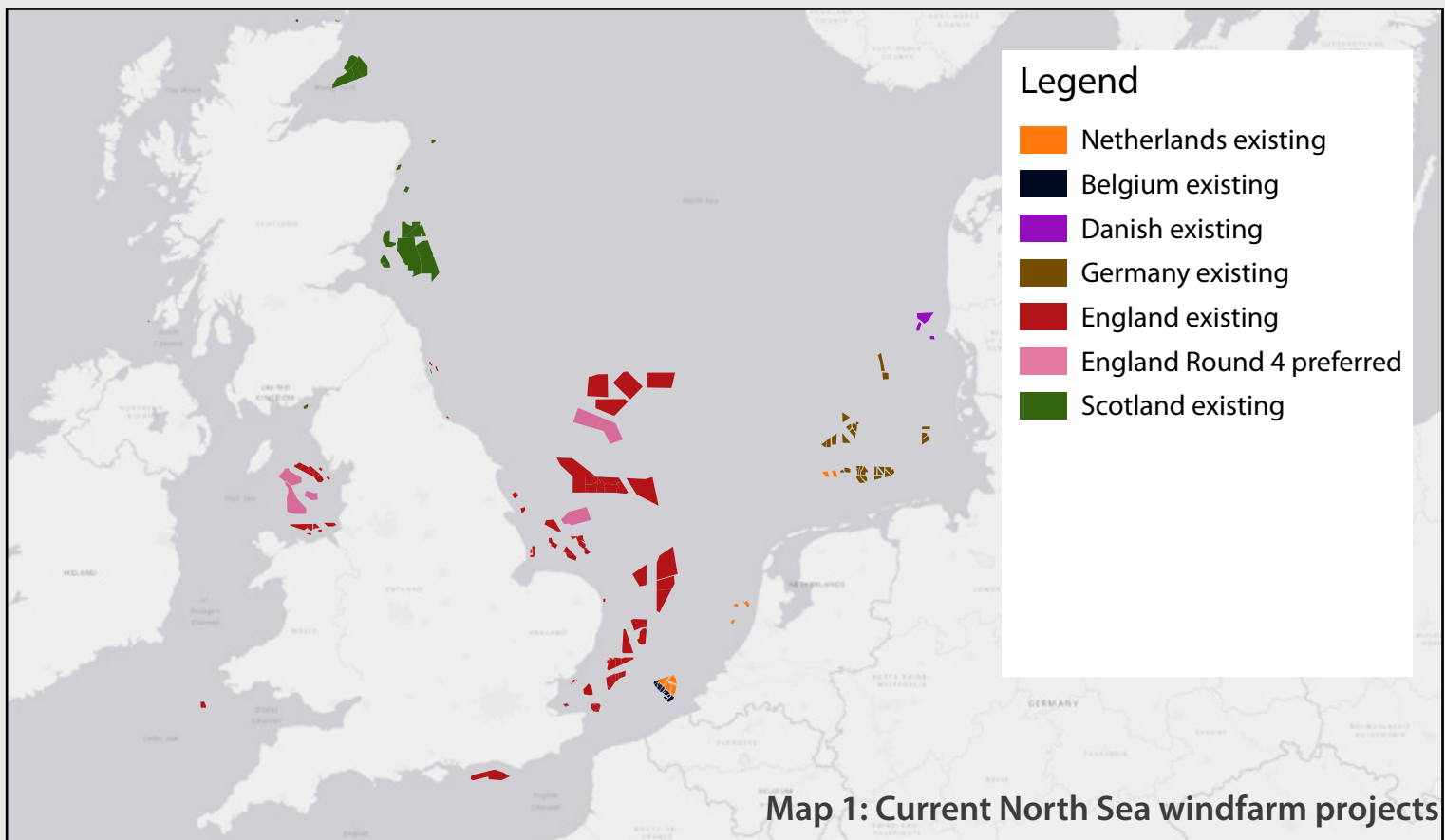
## Current situation

Map 1 shows current windfarm projects, both operational and those where specific plans are in place for individual windfarms.

The extent of the UK's ambition in this area is clear. By the time Hornsea 4 comes on stream in 2027, the national offshore wind capacity will have risen to above 20 GW.

In contrast, the other countries bordering the North Sea have relatively modest offshore wind fleets.

However, plans to fully decarbonise the economy, similar to those in the UK are in place across the EU. This will necessitate a major expansion of offshore wind capacity.



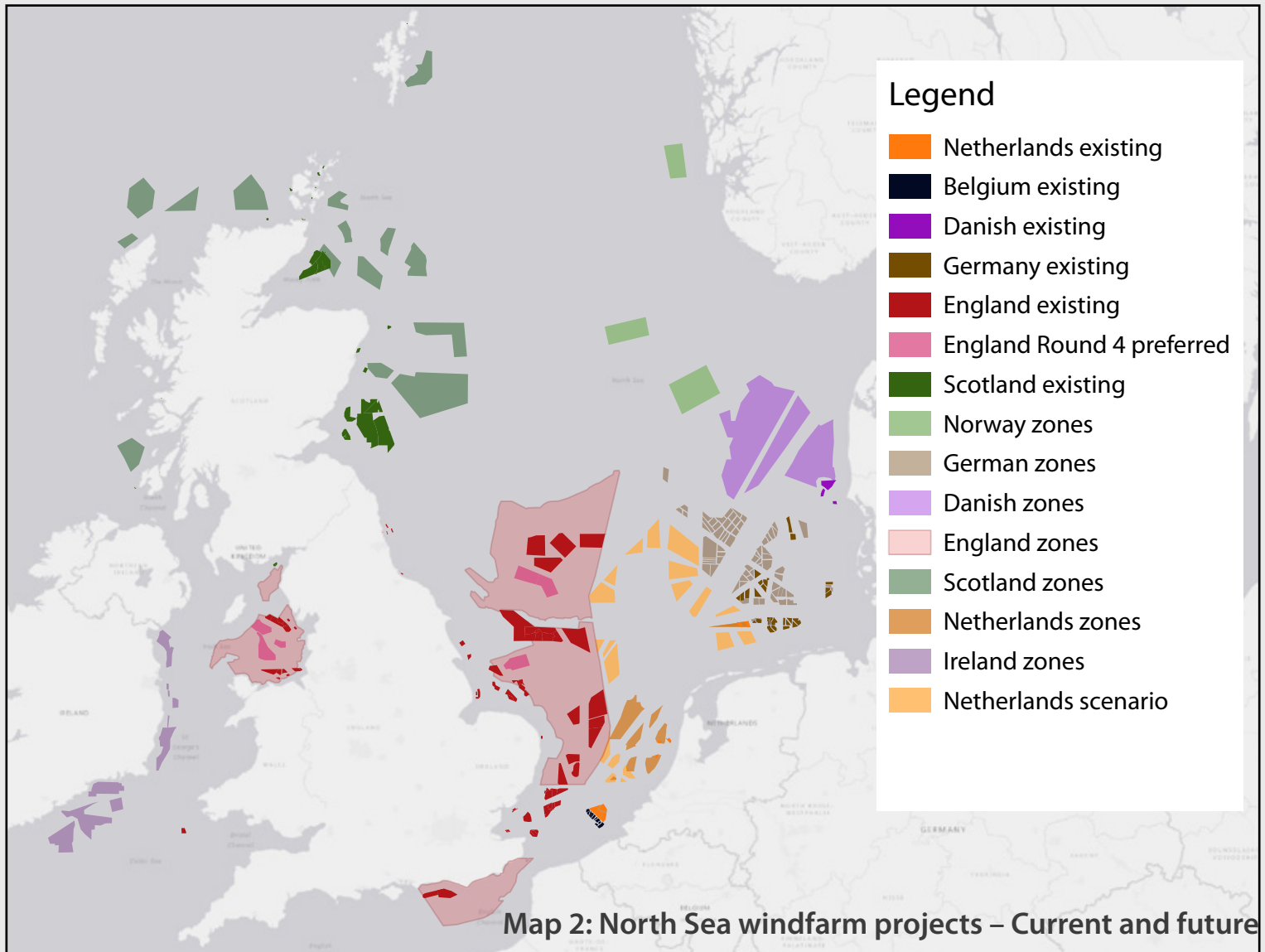
## Notes

- <https://www.argusmedia.com/en/news/2161496-eu-raises-offshore-wind-target-to-300gw-by-2050>
- CCC. Net Zero: The UK's contribution to stopping global warming. Committee on Climate Change, 2019.
- <https://renewablesnow.com/news/rsted-cuts-irr-target-after-new-data-for-blockage-wake-effects-674266/>

4. For example, the Dogger Bank windfarms will be at 2MW/km<sup>2</sup>

5. Map data: UK: Crown Estate and Crown Estate Scotland; Netherlands: <https://offshorewind.rvo.nl/>; Germany: Federal Agency for Nature Conservation <https://www.bfn.de/en/activities/marine-nature-conservation/pressures-on-the-marine-environment/offshore-wind-power.html>; Denmark: <https://www.offshorewind.biz/2020/06/05/denmark-rolls-out-18-gw-offshore-wind-map/>.

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Map 2 adds the offshore wind development zones instituted by countries bordering the North Sea. It also shows a 'net zero' scenario for the Netherlands. The extent of the planned industrialisation of the North Sea becomes clear – it will be windfarms from the Thames estuary to the Danish Straits.

It might be argued that the existence of a development zone (or a scenario) does not imply that windfarms will be built on them in practice. However, the area of the EU development zones is around 30,000 square kilometres. At the often cited figure of 6 MW/km<sup>2</sup>, that would deliver 180 GW of capacity, against a target of 300 GW.<sup>1</sup> The English development zone would be more than enough for its immediate target of 40 GW, or the 75 GW that the Committee on Climate Change advises is needed to achieve 'Net Zero' (the true figure is likely to be much larger).<sup>2</sup>

However, building windfarms too close together has been causing difficulties for the industry,<sup>3</sup> and new developments are being planned at power densities of 2 or 3 MW/km<sup>2</sup>.<sup>4</sup> If that figure is the new normal, then a much larger area of windfarms will be required to deliver the targets.

Even if these developments were economically viable, industrialisation of the marine environment of this scale would be highly questionable, and in other circumstances the green NGOs would be offering stiff opposition. But as is now increasingly well-understood, the economics of offshore wind in Europe are unsound, with capex remaining high and opex rising. Most of the projects described here are likely to require continuing non-market subsidy, without which their owners would become bankrupt leaving a gigantic decommissioning disaster in the North Sea.