

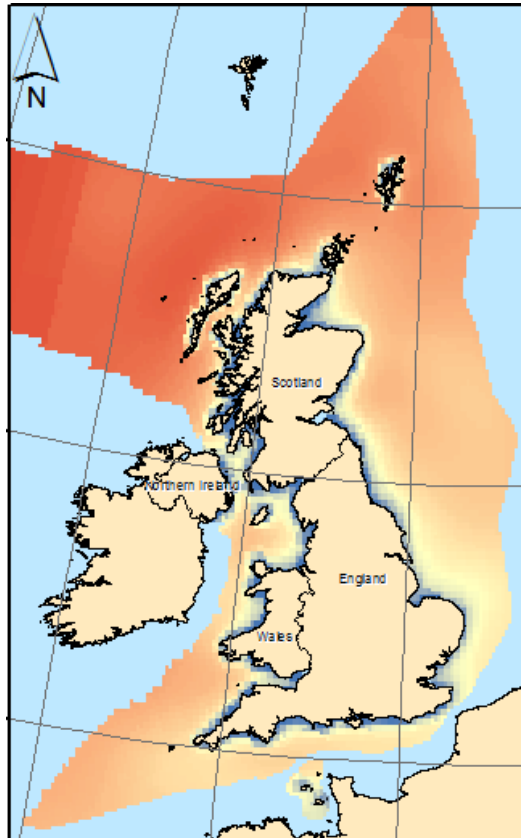
Offshore grid coordination in the UK: facilitating the transition to Net Zero

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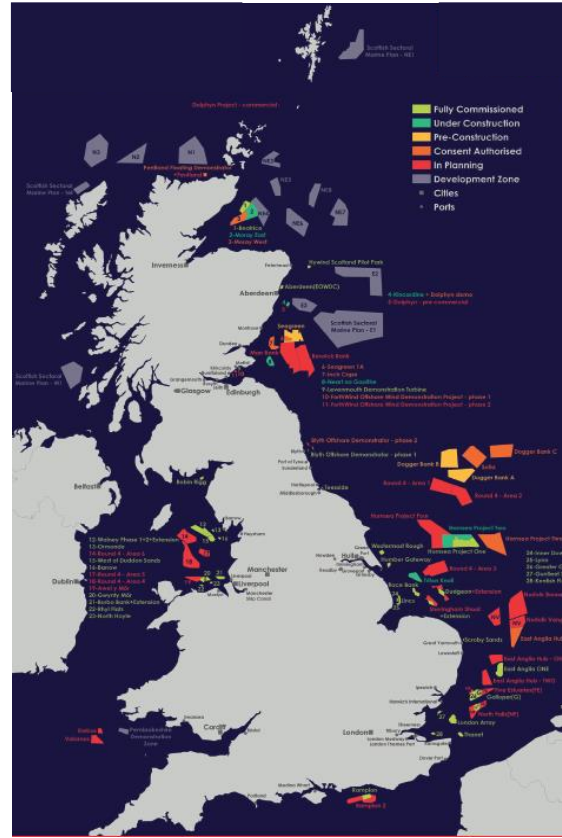
Department for
Energy Security
& Net Zero

UK Offshore wind and transmission infrastructure



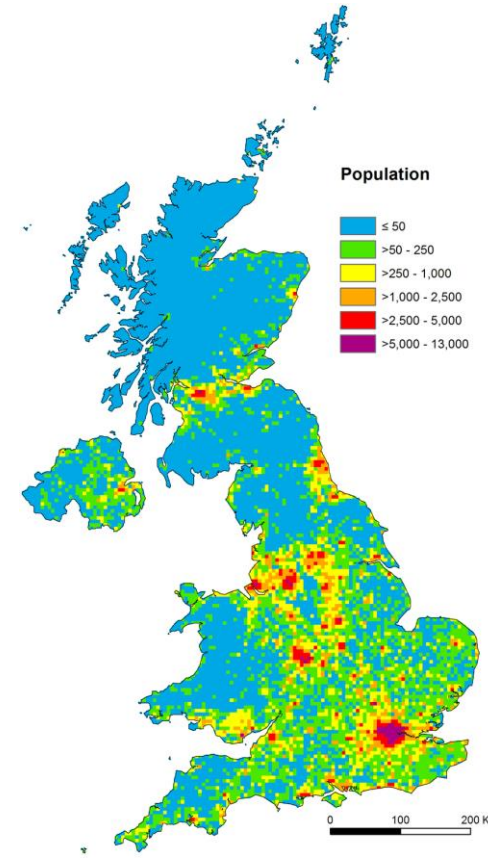
UK wind resource

Source: <https://blogs.ubc.ca/offshore-winduk/methodology/factor-methods/>



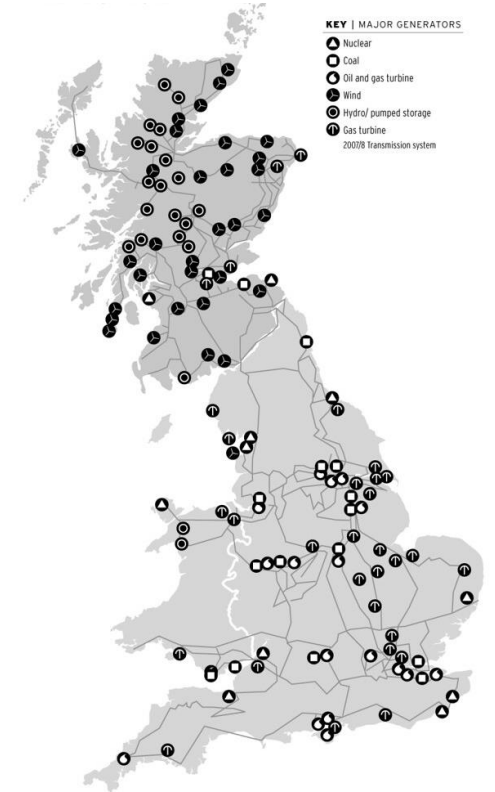
UK offshore wind plans

Source: 4C Offshore



UK population density

Source: https://www.researchgate.net/figure/Grid-ded-UK-population-density-based-on-the-UK-census-at-the-5-km-5-km-grid-spatial_fig2_292189735



UK major power stations (plus onshore wind)

Source: <https://www.flickr.com/photos/adamwilson/976969497>



UK Energy and Net Zero

10
Point Plan

50GW
by 2030

68%
Reduction in GHG
by 2030

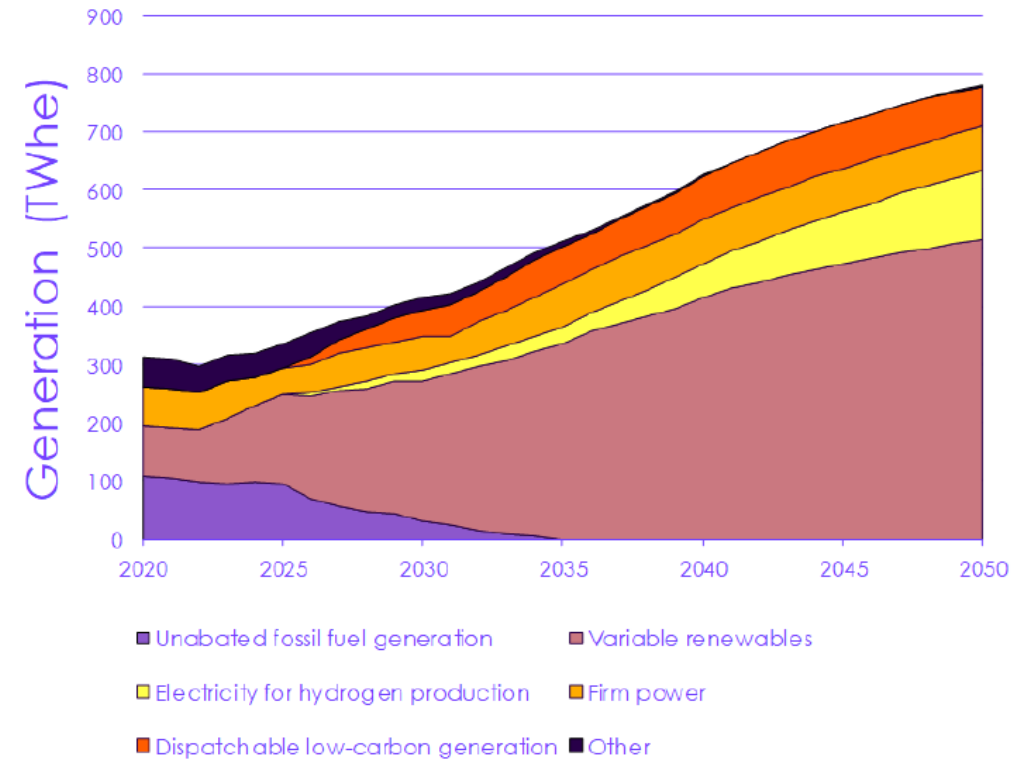
2050
Net Zero

100GW?
by 2050

Net Zero Landscape

- Offshore wind is central to the UK's Net Zero goals, the 2022 British Energy Security Strategy re-emphasised this with new targets
- Core target of an additional 50GW by 2030 (from 11GW)
- Ambition for circa 100GW by 2050
- Ambitious expansion of floating offshore wind (5GW by 2030)
- Aim for UK to be net exporter of energy by 2040, with 18GW of interconnection
- Full electricity grid decarbonisation by 2035.

Figure 3.4.c Illustrative generation mix for the Balanced Net Zero Pathway (2020-50)



Source: CCC analysis.

Notes: Chart reflects UK electricity generation. Additional capacity is available through interconnection. Unabated fossil fuel generation includes coal and gas. Variable renewables include wind and solar. Firm power includes nuclear. Dispatchable low-carbon generation includes gas CCS, BECCS and hydrogen.



What is the Offshore Transmission Network Review?

OTNR Objective

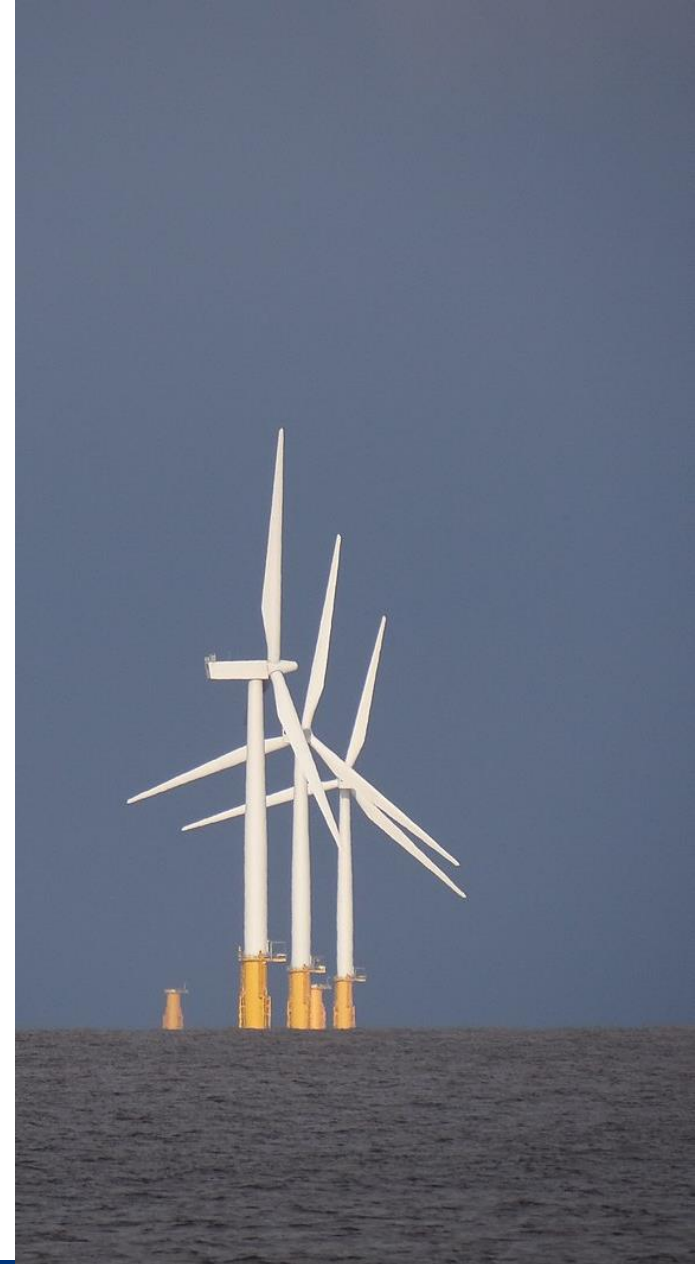
To ensure that the transmission connections for offshore wind generation are delivered in the most appropriate way, considering the increased ambition for offshore wind to achieve net zero. This will be done with a view to finding the appropriate balance between environmental, social and economic costs.

Multi Organisation Review

Cooperation with industry partners and experts to deliver a wide reaching multi-output review programme which delivered impact across the connection and transmission process for offshore wind in the UK.

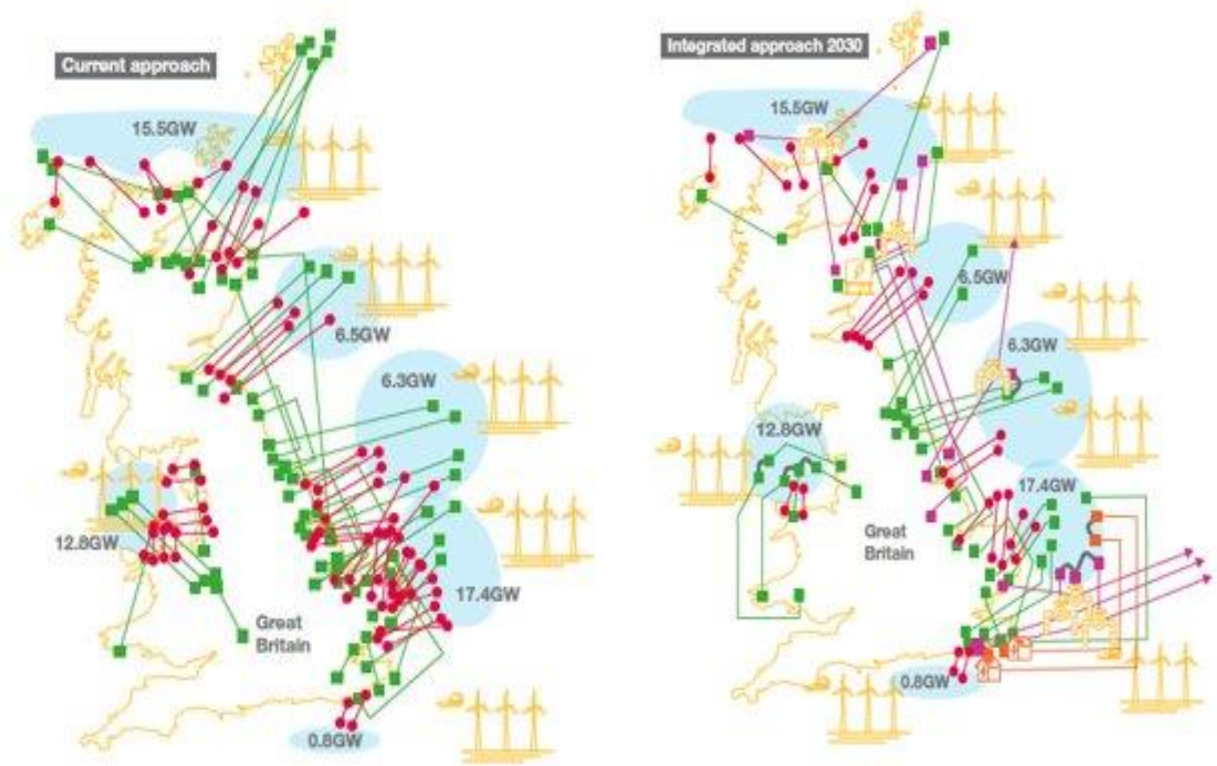
Transformative impact on delivery of offshore wind

Enabling the delivery of coordinated offshore wind transmission and connection to meet our national aims of decarbonisation, lower consumer energy costs and greater energy security, while at the same time reforming our approach in the medium and long term to develop a transmission network which is fit for the decarbonised energy system of the future.



Offshore transmission & connection pre OTNR

- At the launch of OTNR the regime incentivised developers to connect their projects to the onshore grid using **individual point-to-point connections**.
- Each individual connection point requires landing infrastructure and substations to connect to the grid.
- Conception to connection journey for offshore wind projects was lengthy (c13 years) and complex.
- This approach was designed when offshore wind was a nascent sector, with expectations for 10GW by 2030 seen as ambitious.



The Holistic Network Design

Scope:

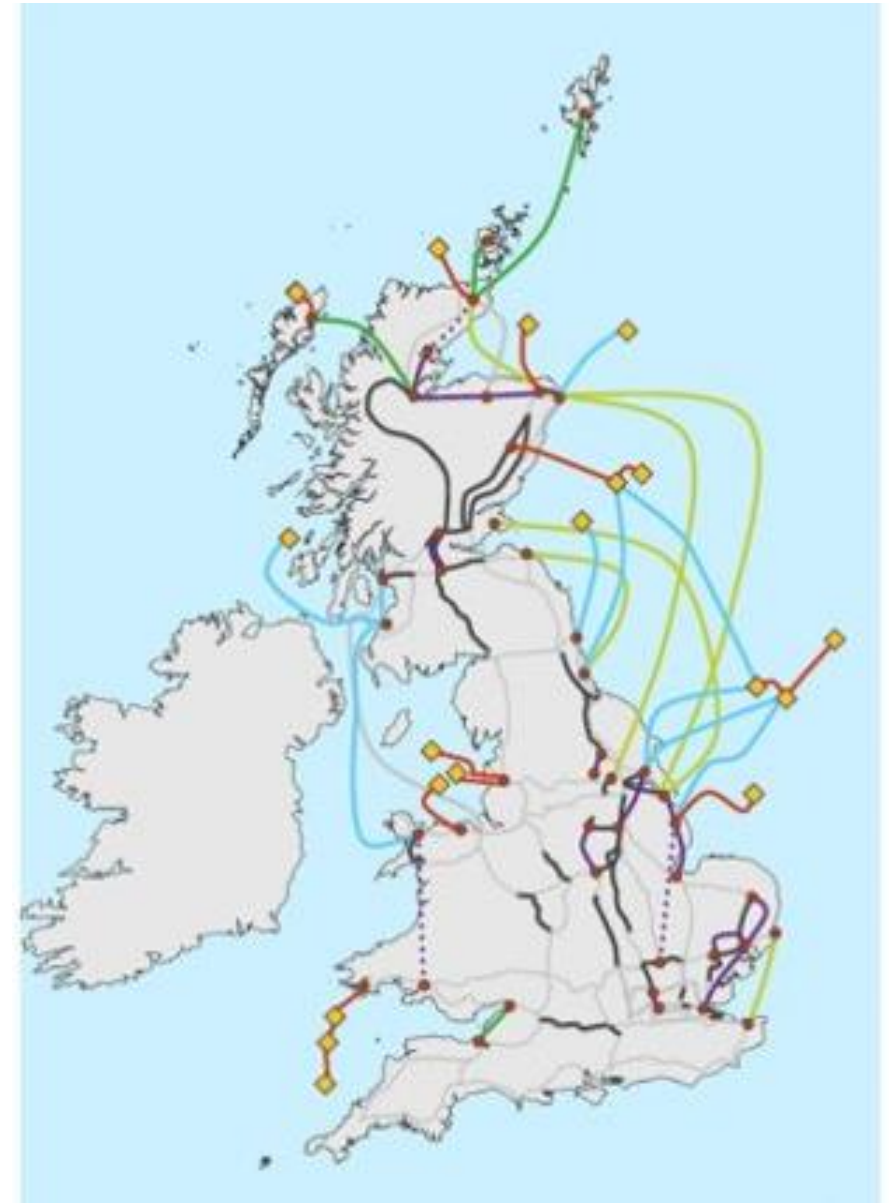
- Connections for the included wind-farms
- Onshore reinforcements required to transport the power to where it will be used
- Offshore transmission routes used where needed
- Balance of consumer costs, environmental and community impacts

Design objectives:

- Economic and efficient
- Deliverable and operable
- Considers impact on the environment
- Considers impact on communities
- Exploring use of MPIs

Scale:

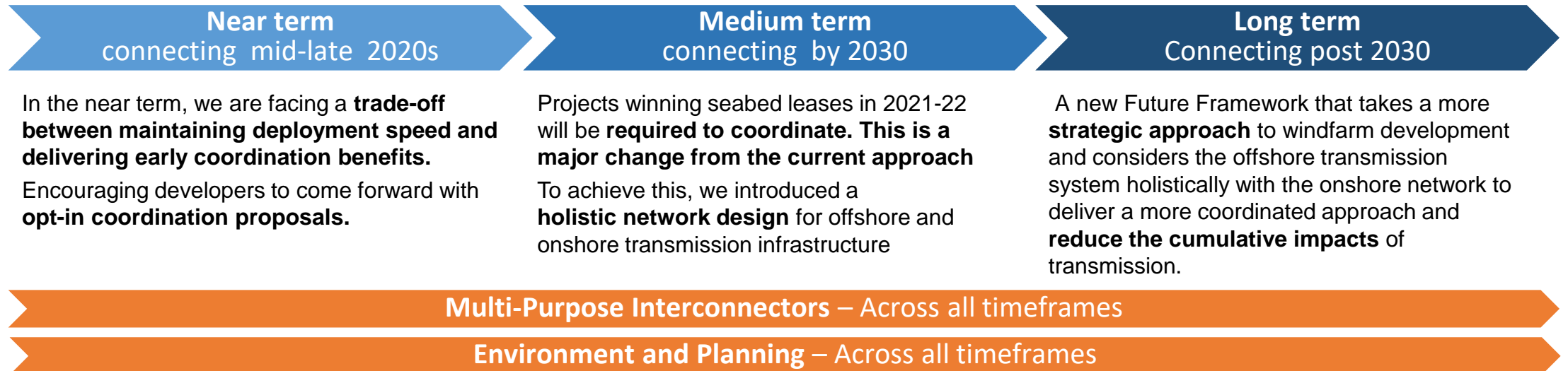
- £54bn worth of investment
- Second design to follow later this year.



OTNR Workstreams

The British energy security strategy was published in April 2022, which increased the UK's ambition for offshore wind capacity to 50GW by 2030. We likely need 100GW+ by 2050. This has put more emphasis on the immediate success of the OTNR. We will do this through:

- A **more strategic approach** to the siting of generation and transmission infrastructure
- **Holistic planning** for a more coordinated onshore-offshore network
- Continued use of **competition** to drive efficiencies and reduce cost to consumers
- **Embedding consideration of environmental and community impacts** at an early stage



The Challenges the OTNR Responds to

Delivery Bottlenecks

- ONTR seeks to accelerate the delivery of offshore wind and supporting infrastructure to meet UK climate goals and reduce consumer bills as quickly as possible.

Future-Blind Development

- OTNR aims to develop a regime which anticipates and works towards future offshore wind expansion. Creating expandable and efficient frameworks for a long term market.

Community Impacts

- OTNR aims to work with communities to reduce overall offshore connection infrastructure through coordination. It also places the assessment of community impacts at the core of decision making.

Environmental Impacts

- An overall reduction of planned infrastructure through the OTNR is environmentally beneficial. Planning changes will include an environmental net gain requirement for future projects.

