Offshore Transmission Network Review (OTNR): Offshore Co-ordination

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Offshore Coordination Project

Offshore power and its associated infrastructure is a key part of the Government's ambition for 40GW of offshore wind by 2030 as well as net zero greenhouse gas emissions by 2050. The ESO Offshore Coordination Project forms part of the Department of Business, Energy and Industrial Strategy (BEIS) Offshore Transmission Network Review (OTNR).

Our workstreams feed into the OTNR workstreams and encompass technical and commercial work across three timeframes: Early Opportunities for coordination; Pathway to 2030; and the Enduring offshore regime; with an overarching Strategy workstream.

Strategy		
Develop long term ESO Offshore Coordination objectives, ensure all workstreams align with strategic direction from OTNR, agree ESO role in the enduring offshore transmission regime.		
Early Opportunities (connections between 2025 and 2030)	**Pathway to 2030 (how to achieve 40GW offshore wind with as much coordination as possible by 2030)**	**Enduring Regime (post 2030)**
Identify and deliver early coordination opportunities for inflight connections, to support the transition between the current state and an enduring integrated offshore regime.	Deliver a high-level holistic design onshore and offshore and progress assessment and changes to industry codes, standards and processes that are required to deliver the Pathway to 2030 regime.	Publish and deliver an industry-agreed roadmap, establishing the necessary changes to codes and frameworks to facilitate offshore integration. Establish the approach to network planning in the enduring regime.
Multi-Purpose Interconnectors (MPIs)		
The MPI workstream is currently only applicable to Early Opportunities and Enduring Regime		

Offshore Coordination Project - Update

- Ofgem published an OTNR consultation in July 2021 on Early Opportunities and Pathway to 2030 workstreams, including 6 concepts.
- BEIS have recently published a consultation on the Enduring Regime workstream.
- NGESO have commenced looking into the 6 concepts that Ofgem has outlined as offshore coordination and reviewing the enablers and challenges it may have on the technical codes, across the two workstreams.
- We would like to engage and work with the industry on the possible challenges to offshore coordination in the technical codes and to prioritise topics that require detail discussion and assessment.
- Dedicated sessions are planned to be arranged in late November to discuss this further. Invitations to follow.
- The purpose of the session is to:
  - Engage and work with the industry on identifying and prioritising the challenges to the technical codes.
  - Share our current thinking on the impacts to the technical codes, that may be subject to the outcome of Ofgem's OTNR consultation.
  - To identify any code modifications that may be required to enable any of the 6 concepts.

Offshore Co-ordination Phase 1

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Phase 1 Key Findings

£6 billion (18%) potential savings by 2050 if integration starts from 2025

The number of assets could be reduced by 50% creating significant environmental & social benefits

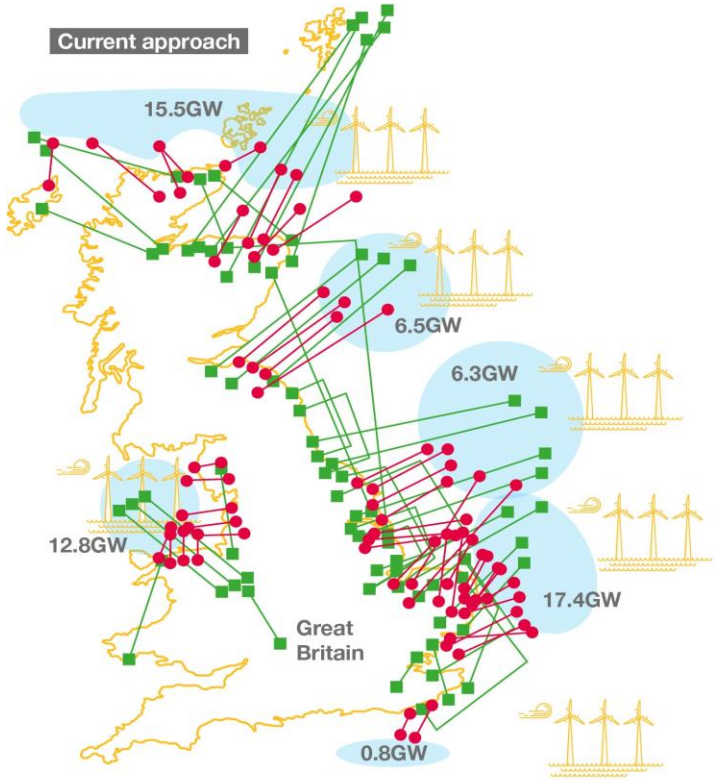
Benefits are reduced the later integration begins – by half if integration starts in 2030.

Flexibility is needed to deliver projects in train without putting their delivery and the 2030 offshore wind target at risk

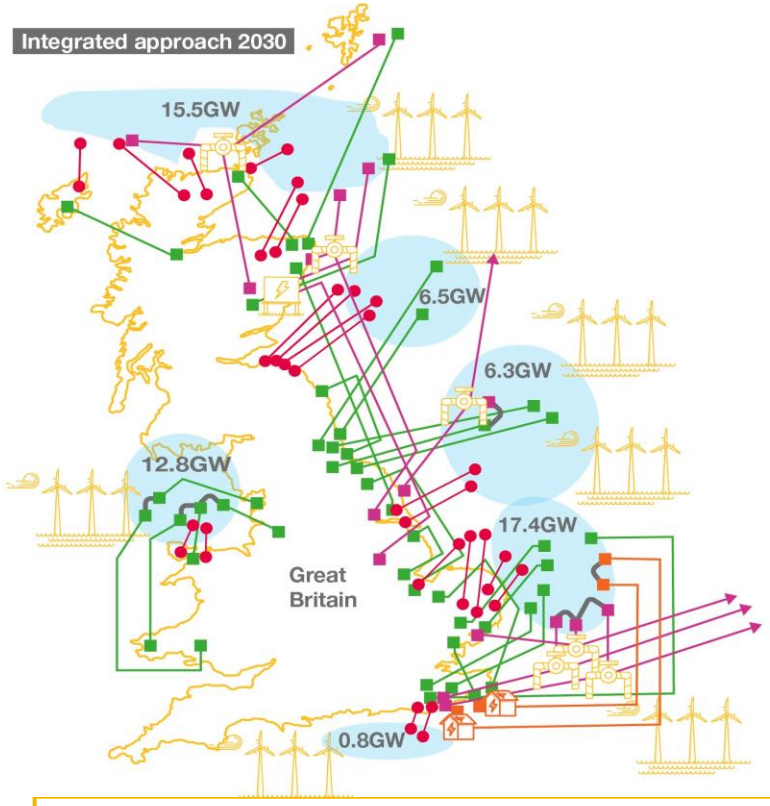
Support for commercial deployment is needed to deliver all of the required technology

Additional onshore infrastructure is required to connect wind, however integration can minimise the overall increase in infrastructure

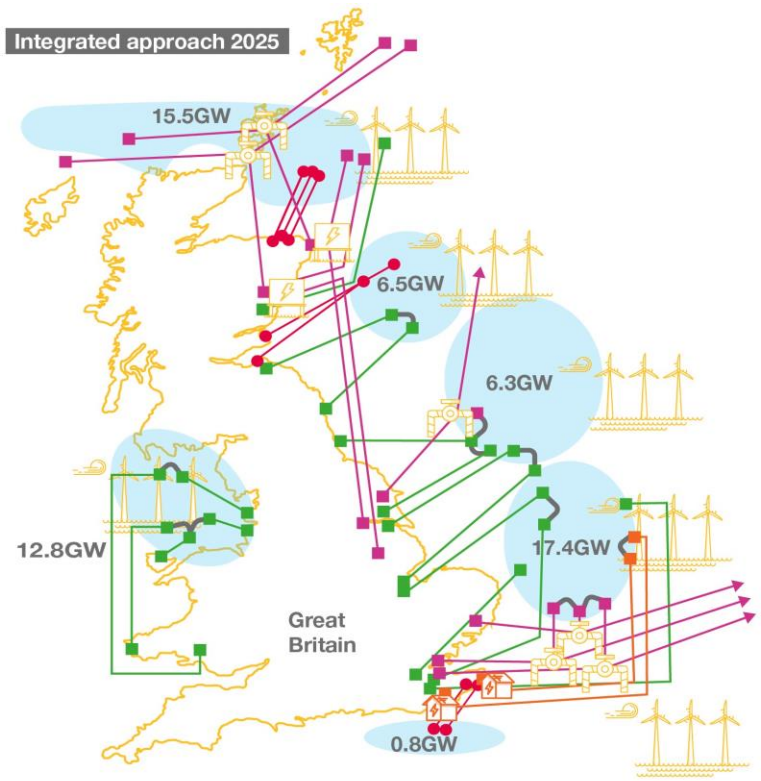
How it could look in 2050



Capex Cost: £29 billion
Total Assets: 330
Total Landing points: 105



Capex Cost: £27 billion (-8%)
Total Assets: 40% reduction
Total Landing points: 60



Capex Cost: £23 billion (-18%)
Total Assets: 70% reduction
Total Landing points: 30

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Offshore Co-ordination Phase 2

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Phase 2

We are working with stakeholders, including the other project partners, within the BEIS-led Offshore Transmission Network Review.

We have structured Phase 2 of our Offshore Co-ordination Project to align with the Offshore Transmission Network Review structure.

Early Opportunities

We are working with opted-in developers to explore potential opportunities for co-ordination of in-flight projects.

Pathway to 2030

We are starting to explore holistic network design opportunities to help facilitate the achievement of 40GWs of offshore wind by 2030.

Enduring Regime

We are considering our views in relation to what an enduring regime might look like in future.

Multi-Purpose Interconnectors (MPIs)
IC -Led

This concept involves the connection of an offshore generator in the GB market to transmission infrastructure that classified as an interconnector. This concept like the one below emphasises the reduction in landfall points required to connect a given amount of generation and interconnection to the wider system.

Multi-purpose interconnector (interconnector-led model)

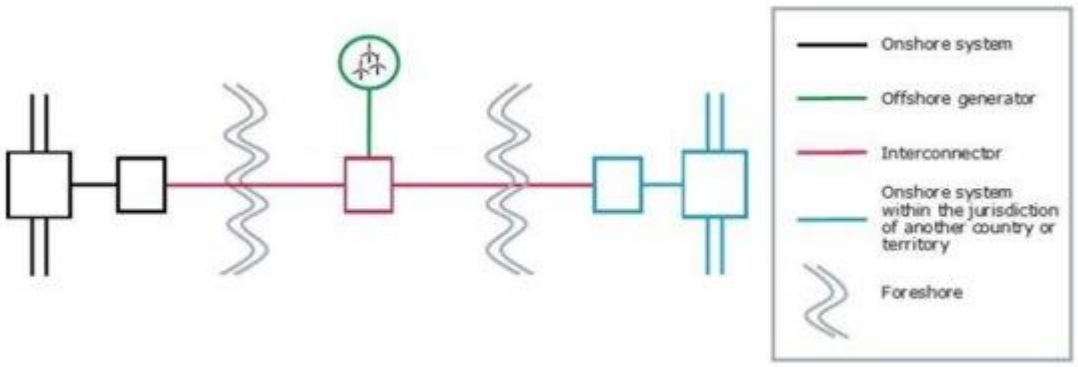

Figure 6 Multi-purpose interconnector (interconnector-led model) concept between Great Britain and a place within the jurisdiction of another country or territory

Multi-Purpose Interconnectors (MPIs) OFTO-Led

This concept involves the connection of an offshore generator to transmission infrastructure comprised of distinct elements that are classified differently. One element is classified as an interconnector, and the other is classified as an offshore transmission system.

Multi-purpose interconnector (OFTO-led model)

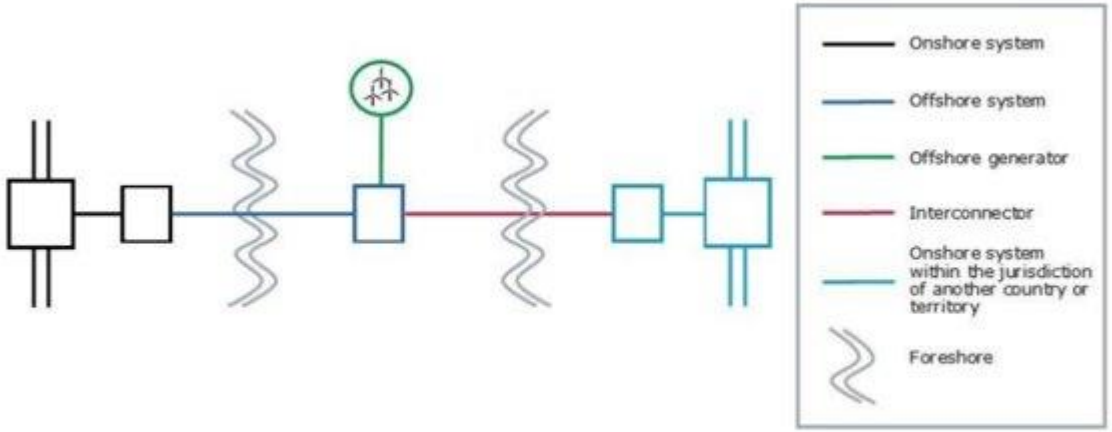

Figure 7 Multi-purpose interconnector (OFTO-led model) concept between Great Britain and a place within the jurisdiction of another country or territory

Shared offshore transmission system

This concept involves multiple generators using a single offshore transmission system. This concept emphasises a reduction in landing points and the number of substations compared to the business as usual radial links.

Shared offshore transmission system

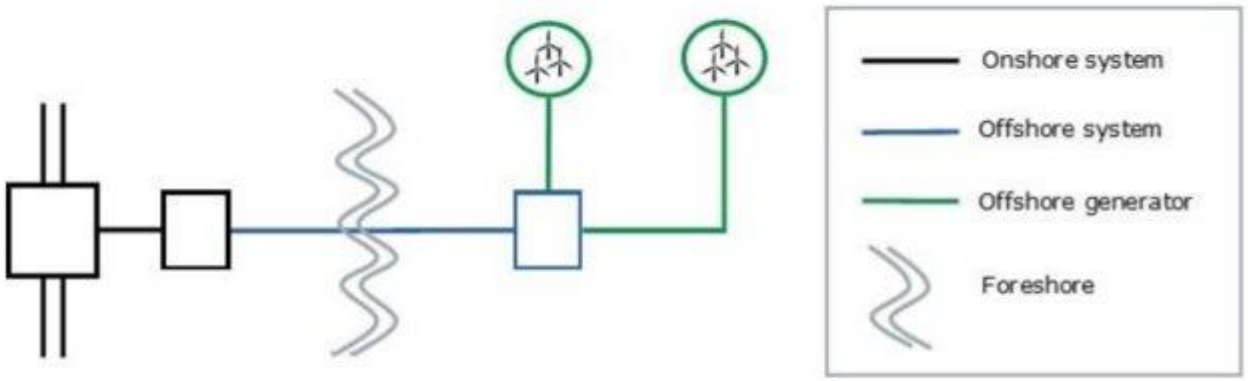

Figure 4 Shared offshore transmission system concept

Quasi Bootstrap

This concept involves the installation of a circuit between the respective offshore substations of two offshore generators, where the offshore substations are not connected to a single common onshore substation. This concept emphasises the potential to provide wider system benefits by reinforcing the onshore system in the form of a quasi-bootstrap. It would not reduce infrastructure or landing points, but is an example of coordination.

Quasi bootstrap

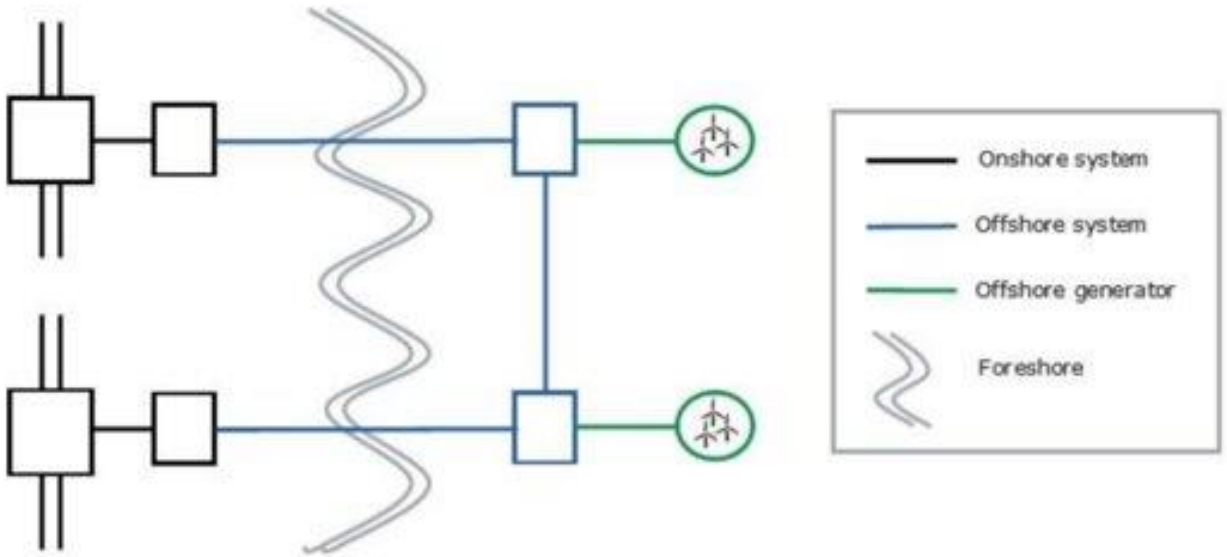

Figure 5 Circuit which connects two (or more) offshore substations that are not connected to a single common substation

Connection to a TO Owned Bootstrap

This concept involves the connection of an offshore generator to a subsea electricity link between two points in the onshore transmission system, which is owned by a TO. These onshore to onshore links are known colloquially as ‘bootstraps’. This concept emphasises the reduction in landing points and infrastructure required to connect generation to shore.

Connection to a TO owned bootstrap

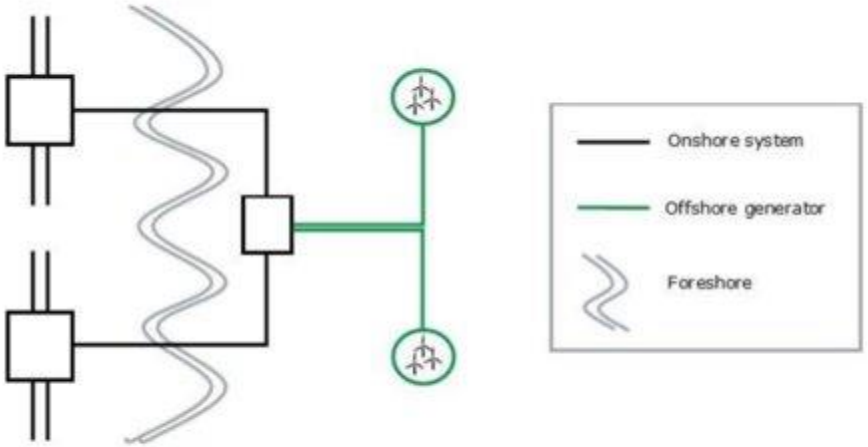

Figure 8 Connection of an offshore generator to infrastructure that is located offshore and owned by a Transmission Owner (TO)

Connection of storage or demand to OFTO

This concept may involve the connection of electricity storage or a demand customer such as an electrolyser to the onshore or offshore elements of an offshore transmission system. The principle could also allow for the electrification of oil and gas platforms. This would allow for coordination across energy vectors, not only of electricity transmission infrastructure.

Connection of electricity storage or a demand user to an offshore transmission system

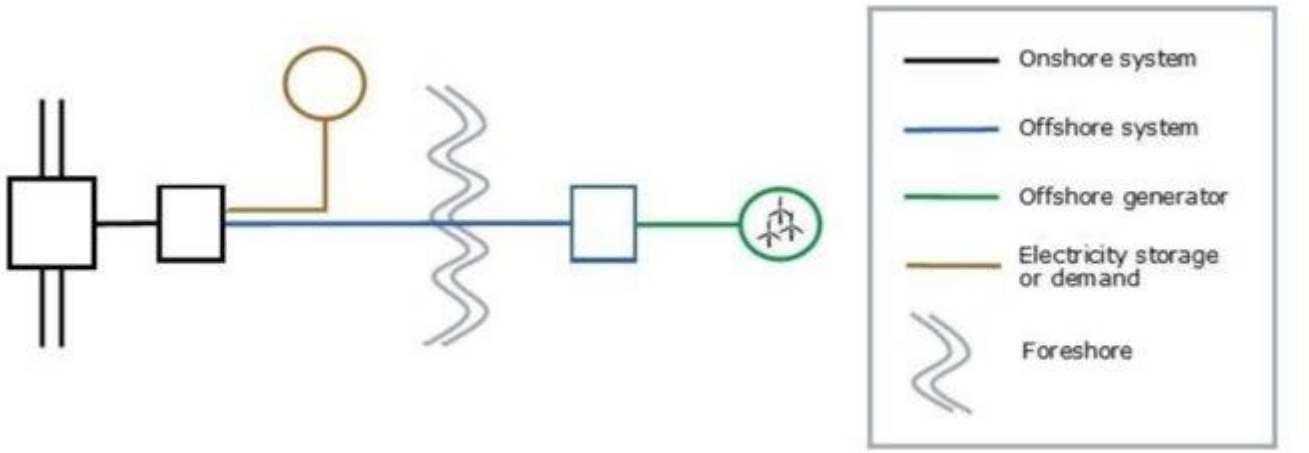

Figure 9 Connection of electricity storage or a demand customer to an offshore transmission system