



LookNorthH2 – North Sea Offshore Energy Hubs Regulation & Market Design

SIF Discovery – Show & Tell

03rd June 2024



Outline

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North-Sea Energy Hubs could accelerate offshore wind rollout and support the development of a hydrogen economy.

Problem Statement

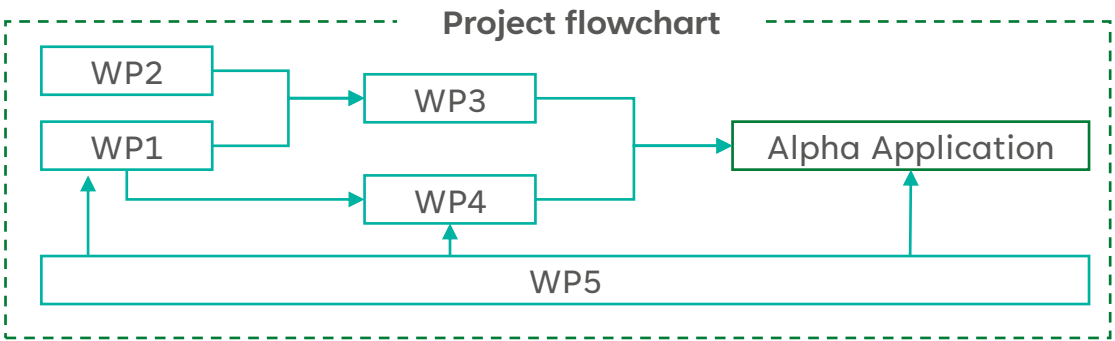
The creation of **Offshore Energy Hubs (OEH)** could further stimulate the deployment of UK offshore wind and support the development of a hydrogen economy.

It is yet uncertain:

- **What are the benefits** and costs of developing Offshore Energy Hubs for the UK energy transition and energy security.
- What **commercial models and market designs** are needed to successfully integrate offshore energy hubs into the whole energy system.
- What **level of coordination** would be required **between the UK and other European countries** on codes and regulations to enable the development of cross-country Offshore Energy Hubs.

Key to unlocking these benefits is designing how best to harmonize and coordinate the development and operation of offshore electricity and hydrogen systems through Offshore Energy Hubs

#	Work Packages Description
WP1	Data collection and previous study assessment
WP2	UK Offshore Energy Hubs location assessment
WP3	UK Offshore Energy Hubs CBA
WP4	Market and regulatory gap assessment
WP5	Stakeholder Engagement
WP6	Project Management and reporting



Stakeholder engagement with different parties provided valuable insights and strengthened project's positioning

Networks



Industry



Policy & Regulation



North Sea
Transition
Authority



Department for
Energy Security
& Net Zero

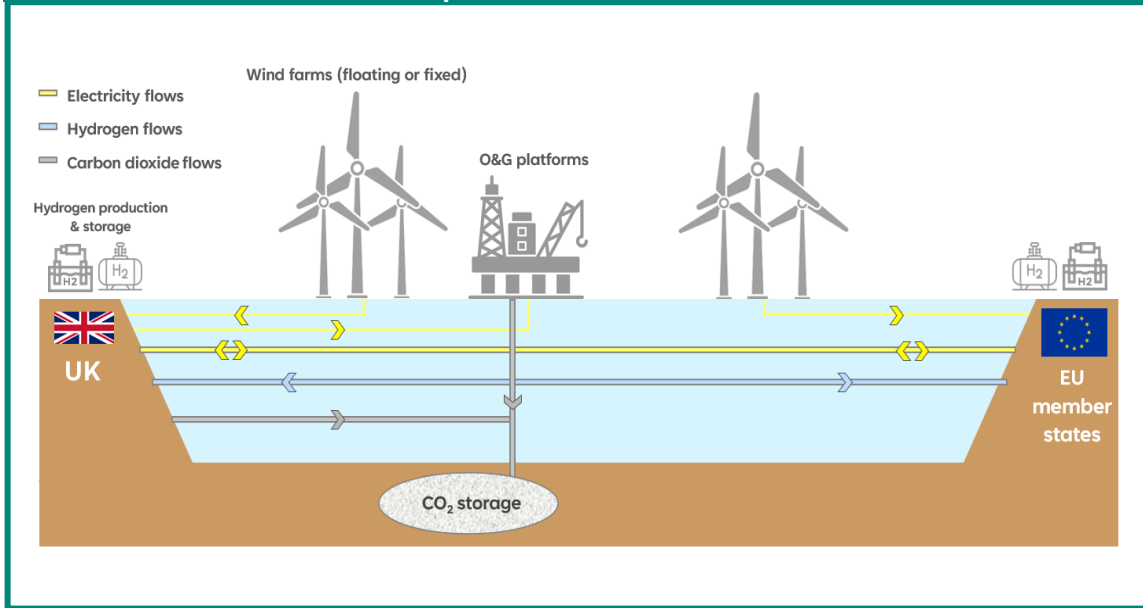


The LookNorthH2 concept explores the repurposing of O&G infrastructure for hydrogen production and carbon capture

Optimising energy production is key to achieving the 2050 net zero target at the lowest cost for consumers. The UK is set to rely on offshore wind for most of its final power and energy use. A centralised offshore energy hub concept may be able to provide significant socio-economic and environmental benefits by integrating use cases.

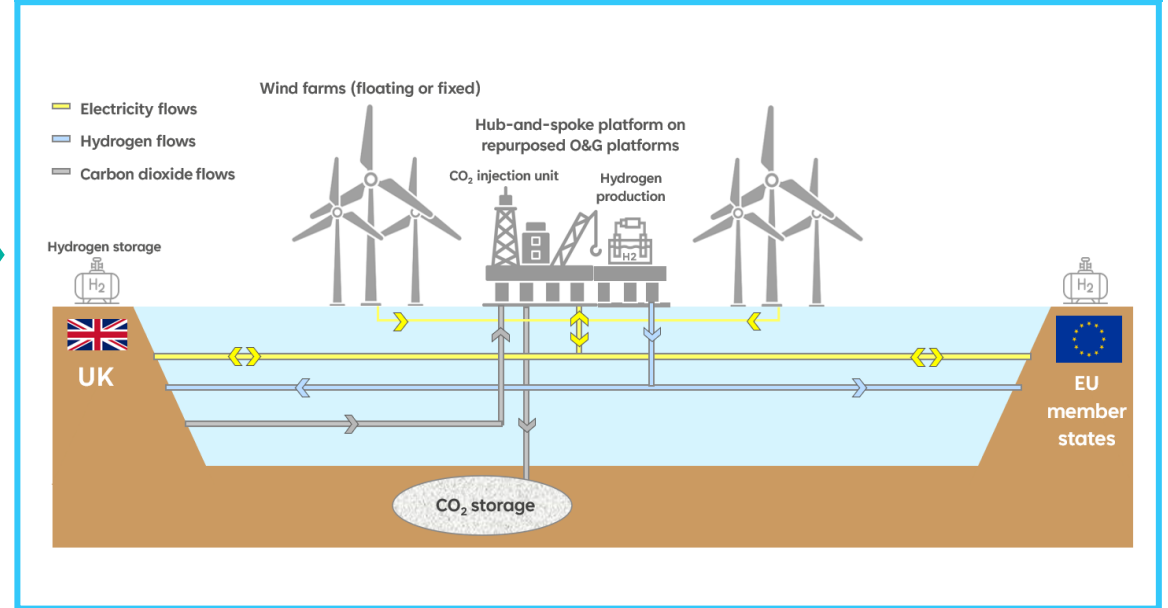
Counterfactual

BAU - Decentralised electricity production & electrolyser location for hydrogen production onshore



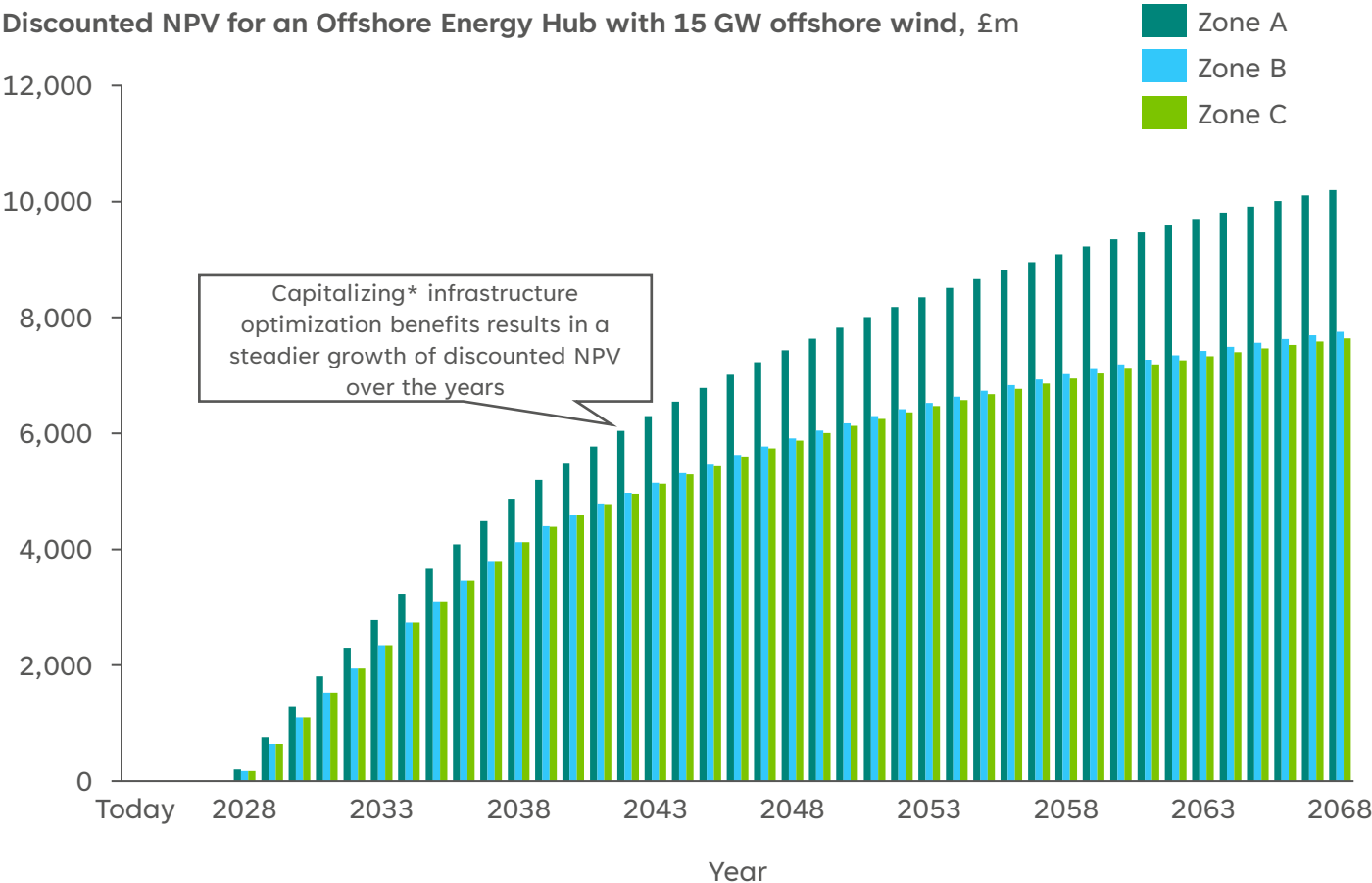
Factual

LookNorthH2 - Centralised electricity & hydrogen production offshore



All hub configurations and zones report financial benefits, with most occurring when the hub is developed far from shore

Cumulative discounted net financial benefits – 15 GW of connected offshore wind



Up to

£10,197m

of cumulative discounted net financial benefit in the most optimal configuration (Zone A) by 2068

2028

is the year the first benefits are obtained through infrastructure optimisation

>9MtCO₂

of GHG emissions saved through the larger phase-out of natural gas in the system by 2068

3,740

jobs maintained /created

£1.1bn

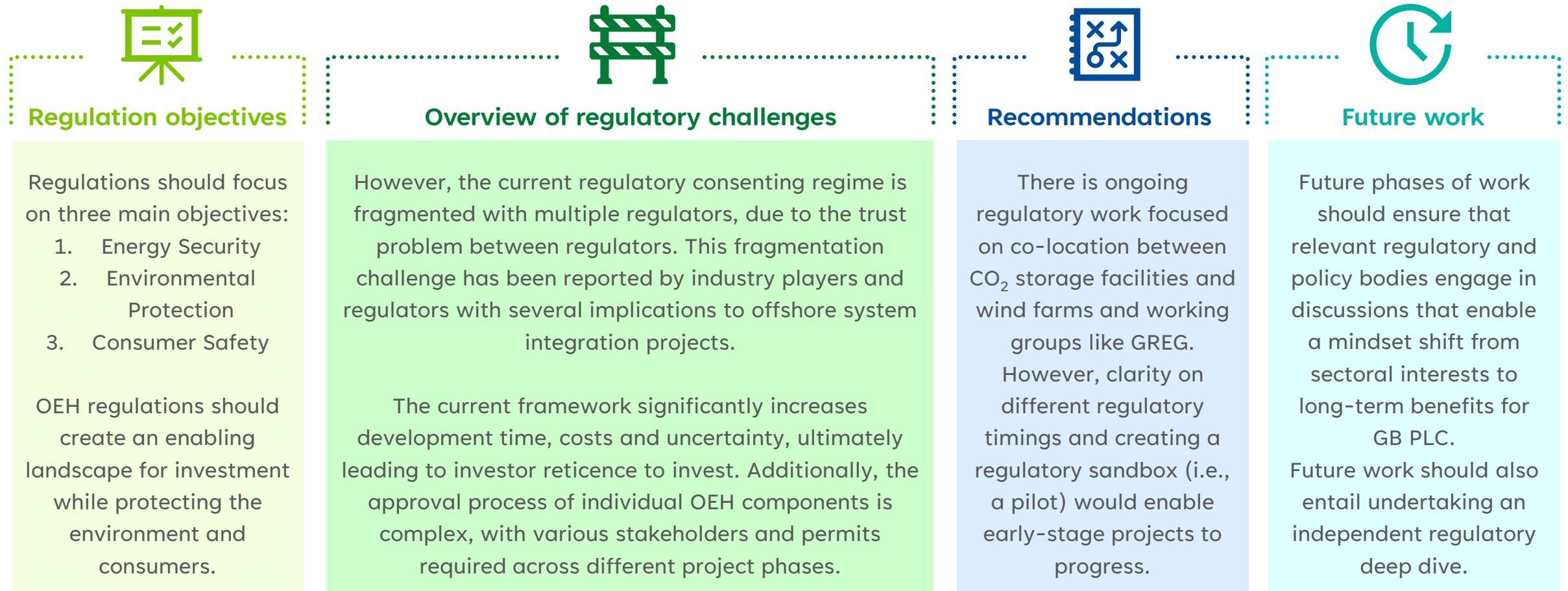
of undiscounted costs associated with platform development

Note: For high-level overview of each location characteristics please refer to the Appendix.

Note: Discounted NPV – Is the absolute NPV expressed as a differential between the factual and counterfactual

Note: Capitalized costs are depreciated or amortized over time instead of being expensed immediately.

To realise these benefits, OEHs require more integrated regulations and increased alignment with relevant regulators



To achieve market design objectives, the ESO, Ofgem, DESNZ and industry should make concrete decisions in multiple areas



Market arrangements including home market or offshore bidding zone (OBZ) configuration

OBZ with implicit trading market arrangements is currently the preferred offshore market configuration but this could pose price and volume risks for the OSW farm. Work focused on cross-border subsidies and contracts is required to conclude whether this design is well suited when including offshore offtakers.



Balancing and operability of Offshore Energy Hubs

OHA can provide extensive cost savings through ancillary services as expected. However, MPIs built in the South of the UK could increase network constraints costs across the network. Additionally, flexibility could also be provided by the offshore H₂ developer by fluctuating outputs based on demand signals.



Interaction with European markets and European network planning

With a combined 2050 target of ~290GW and an initial offshore grid acknowledged by all North Sea TSOs, coordination with European markets is crucial. Agreeing on cost and benefit rules, linking trading schemes and setting up dedicated funds are required to realise this collaboration.



Capacity, charging, metering and support schemes

UK interconnectors may need to be adapted to fit EU flow-based target capacity calculation methodology (CCM). Regarding support schemes, using the OBZ market price as the CfD reference price would prevent developer price risks. Additionally, offshore H₂ production facilitates Guarantee of Origin (GO) certification as producers can be considered BTM. Finally, the appropriate charging methodology for both MPIs and H₂ interconnectors must ensure that there is sufficient incentive for developers to develop offshore.



Contractual arrangements including the Industry Codes and Standards to be applied.

Additions and changes to codes and contracts may be required to include new OEH interactions; such additions should facilitate synergy of the different energy vectors and international coordination.

Discovery highlighted the needs case but more work is required to identify the solution design that would deliver most benefit

Why is a next step needed

1

Offshore Energy Hubs could help **save GB consumers significant costs** through curtailment reduction – but more accurate analysis needs to confirm which design would best deliver these benefits.

2

Despite the UK offshore wind ambition, **offshore integration is currently lagging in the country**. By comparison, many North Sea European countries have made significant progress towards the development of OEHs.

3

Our stakeholder engagement approach and research has highlighted clear **persisting regulatory, market design and commercial framework gaps**, hindering OEHs concept development

Thank you!

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