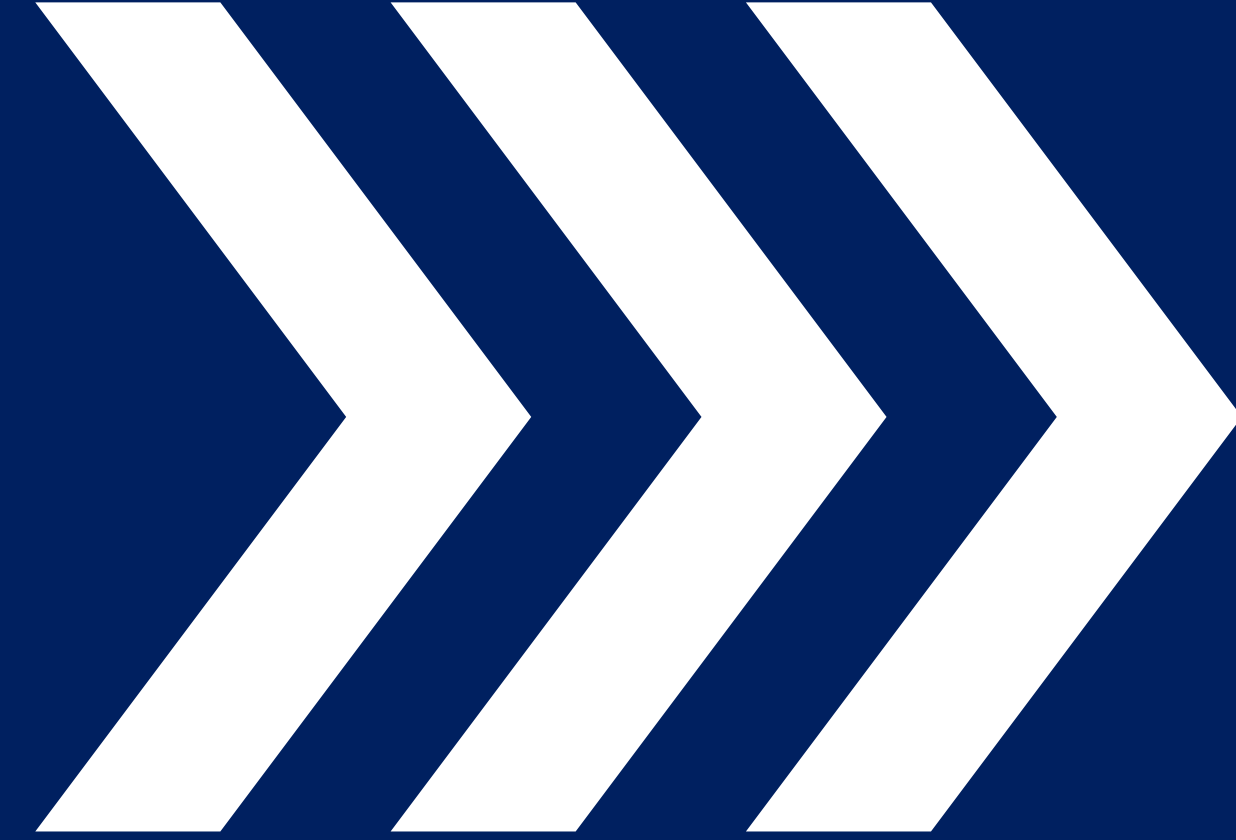




Department for  
Energy Security  
& Net Zero



# CCUS Policy Landscape: UK Government Perspective

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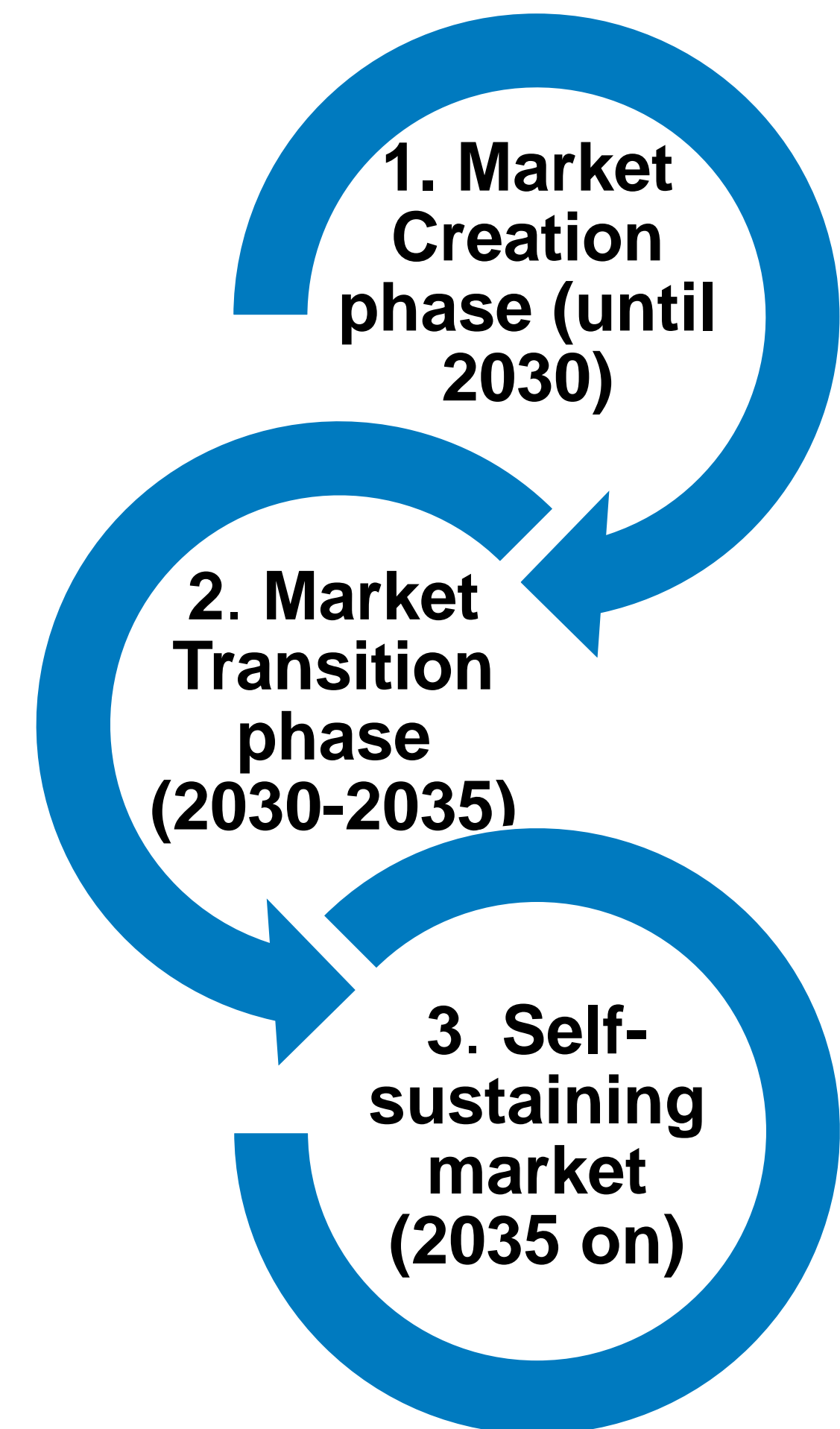
# Strategic Case for CCUS

- DESNZ 2050 Net Zero Strategy emphasised the importance of decarbonising industry using CCUS technologies. This has the added benefit of long-term UK energy security and growth.
- CCUS represents the only feasible method of decarbonisation for some hard-to-abate sectors (e.g. cement production), and is currently the least-cost method of decarbonisation for various others (e.g. dispatchable power).
- The UK has theoretical potential to store more than **78 billion tonnes of carbon dioxide (CO<sub>2</sub>)** in its continental shelf which is one of the largest potential storage capacities in Europe.
- CCUS exports could support **£4-5 billion in Gross Value Added (GVA)** & has the potential to support up to **50,000 jobs** as the sector matures into the 2030s.



Map of UK clusters.  
Source: CCSA May  
2023.

# Moving Forward: Towards a Self-Sustaining CCUS Sector



# Development of the UK CCUS Market

## Market Creation Phase

- First CCUS clusters are established with a small number of first-phase emitters connected by pipeline, with a 25-year asset life
- Developers benefit from high levels of financial support and risk-bearing from HMG
- Deployment demonstrates the feasibility of commercial-scale CCUS in the UK

## Self-Sustaining Market

- T&SCos and emitters able to deploy without any direct backing from HMG
- Non-pipeline CO<sub>2</sub> transportation deployed at scale, unlocking import/export opportunities and decarbonisation for dispersed emitter sites
- Deployment patterns dictated by market forces rather than HMG allocation processes

## Market Transition Phase

- Expansion of the industry through addition of new clusters and expansion of existing ones, via regular competitive auction-style processes
- Key market enablers continue to develop (e.g. insurance market, availability of low-cost financing, etc.)
- HMG support and financial intervention is gradually phased out over time

# Market Failures and Barriers to Entry



There are several market failures that currently inhibit the deployment of CCUS in the UK. These include:

- **Investment coordination failure** preventing the development of a fully functioning CCUS network;
- **A first mover disadvantage** due to high start-up costs;
- **UK industry at risk of carbon leakage**, as they compete in international commodity markets.
- **The UK ETS market price** for carbon providing an insufficient market signal to incentivise CCUS deployment;
- **Scarcity of viable revenue streams** – e.g. low carbon product sales or GGR revenues – associated with CCUS.

In addition, there are commercial barriers that will hinder deployment of CCUS, such as:

- **CCUS Risks:** The first CCUS clusters are first of a kind and have not been commercially demonstrated at scale. Insurance markets are also insufficiently developed to accommodate these risks.
- **Investor Uncertainty and Regulatory Risk:** The private sector is reluctant to invest without a clear regulatory landscape and the ability to earn a return on their investments.

# UK Business Models for CCUS Deployment: Track-1

We have designed a series of **CCUS business models** to provide clear, long-term sight of revenue models and a stable investment environment.

- The development of the first CO<sub>2</sub> Transport and Storage Networks in the UK is being supported by a **Transport and Storage (T&S) Regulatory Investment (TRI) Model**, which is based on the successful regulated asset base model. This includes mechanisms to address and mitigate First-of-a-Kind (FOAK) risks associated with developing T&S Networks.
- The **Dispatchable Power Agreement (DPA)** will incentivise the mobilisation of private finance to enable power CCUS to play a valuable mid-merit role in our generation mix.
- **Industrial Carbon Capture (ICC) Business Models (including the Waste ICC Business Model)** are designed to incentivise the deployment of carbon capture technology for industrial users who often have no viable alternatives available to achieve deep decarbonisation.
- The **Hydrogen Production Business Model (HPBM)** will provide support for the development of both CCUS-enabled and electrolytic hydrogen production.



## We have made significant progress on delivering CCUS in the UK

In October, the UK government announced **up to £21.7 billion of funding** available over 25 years for the development of the first two CCUS clusters, HyNet and East Coast Cluster (“Track 1”).

This is a monumental step forward - by making funding available to industry based on the deals that have been negotiated, this government is equipping industry with the tools they need to kickstart the CCUS and hydrogen industries, delivering clean energy investment and jobs.

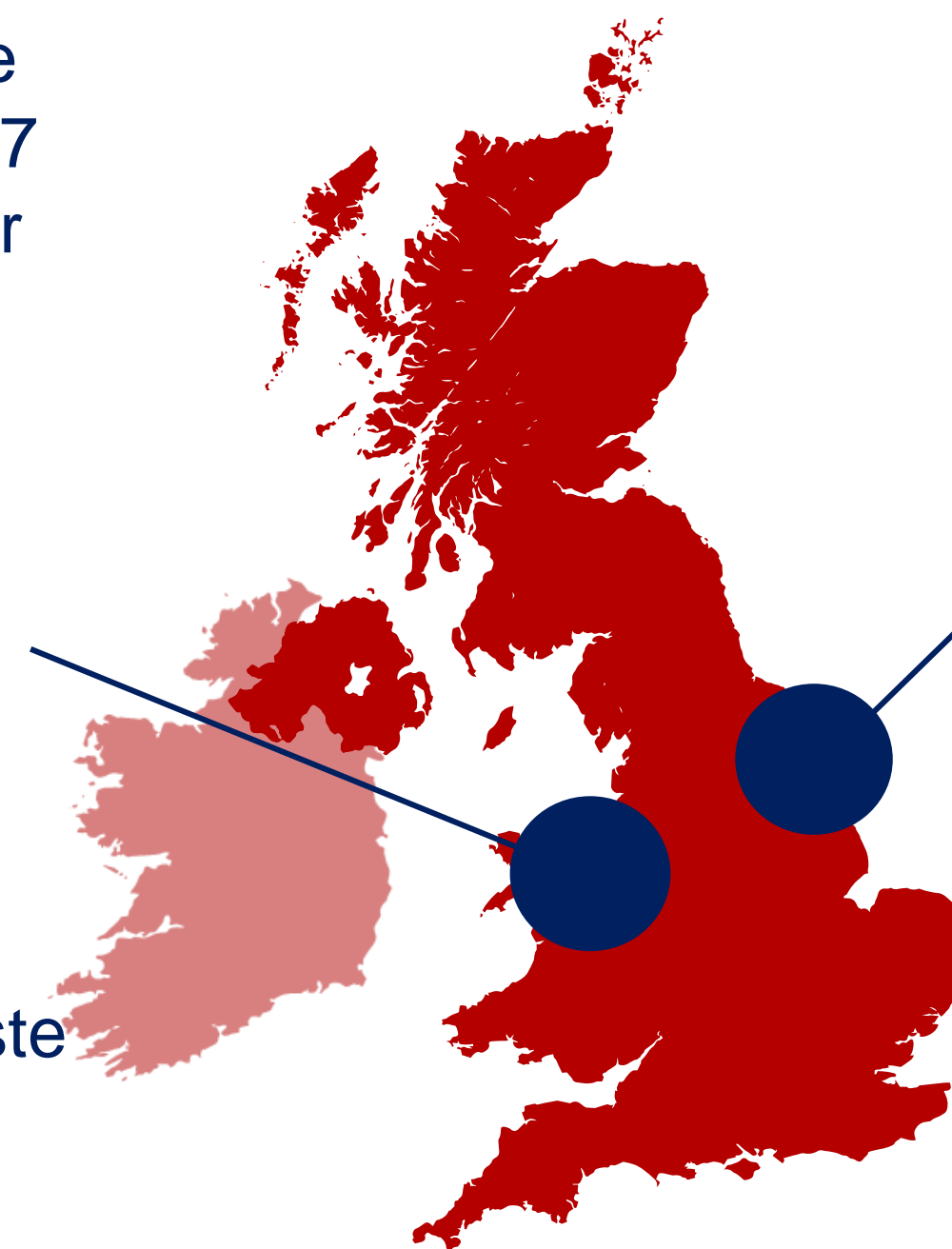
### **HyNet:** Transport and Storage Company

**ENI:** Eni’s network will have the capacity to transport of up to 4.7 million tonnes of CO<sub>2</sub> each year to deep geological storage in Liverpool Bay.

#### Capture Projects

**Protos Energy Recovery Facility:** One of the UK’s first CCUS-enabled Energy from Waste facilities, treating up to 400,000t of non-recyclable waste whilst generating enough electricity to power 80,000 UK homes.

**EET Hydrogen (HPP1):** UK’s first CCUS-enabled (blue) hydrogen plant at scale with 350MW of hydrogen production capacity.



### **East Coast Cluster:** Transport and Storage Company

**Northern Endurance Partnership (NEP):** NEP’s network will have the capacity to transport up to 4 million tonnes of CO<sub>2</sub> each year from Teesside to geological storage under the North Sea.

#### Capture Projects

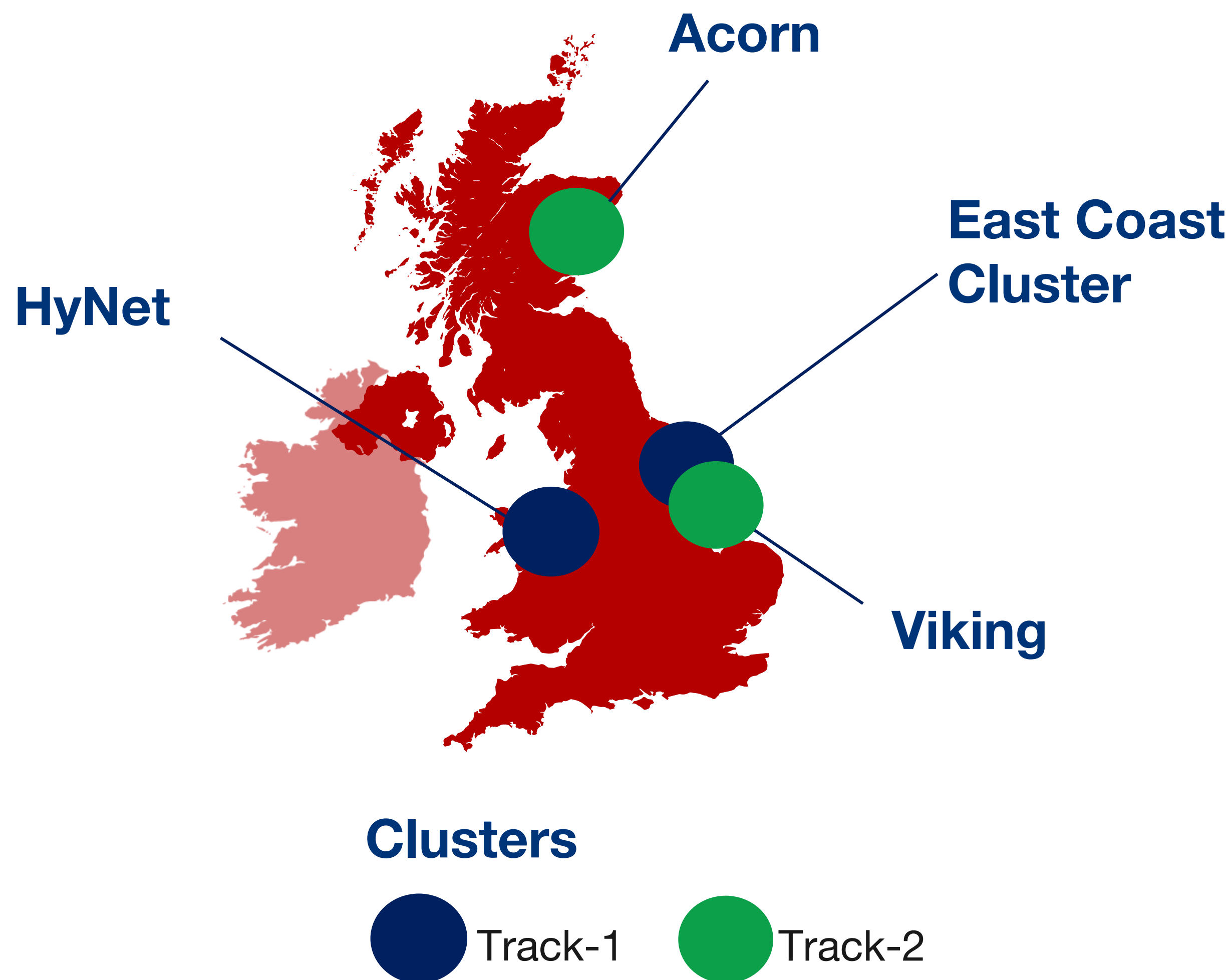
**Net Zero Teesside Power (NZT):** UK’s First of a kind gas CCUS power plant will provide 0.74 GW of low carbon flexible generation from 2028.

## Next steps: Track 1 Expansion and Track 2

The next stage of the CCUS programme includes further building out of the first two Track-1 clusters (“Track-1 Expansion”).

Under Track-1 Expansion and Track-2, we will also offer support for projects delivering negative emissions, including power bioenergy and carbon capture (BECCS) and other technologies.

The first-of-a-kind **Power Bioenergy CCS (BECCS)** business model will incentivise private finance enabled projects that will provide negative emissions and firm low carbon electricity.

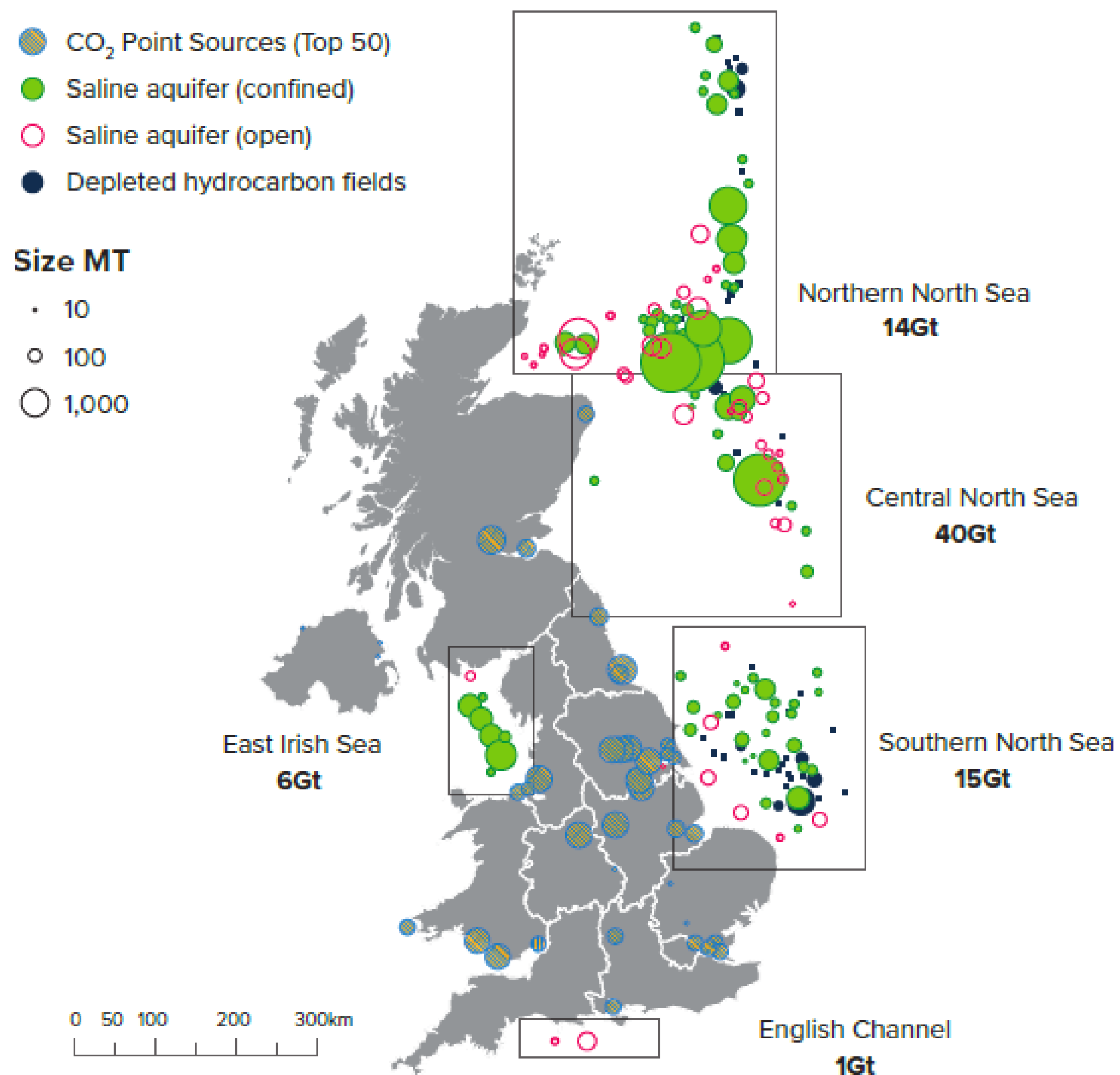


The **Greenhouse Gas Removals (GGRs)** Business Model is being developed to attract private investment in a portfolio of engineered GGR technologies including Direct Air Carbon Capture and Storage (DACCS).



# Market Transition and UK CO<sub>2</sub> Storage

The UK can be a world leader in the provision of CO<sub>2</sub> transport and storage services.



An estimated 78 billion tonnes of theoretical CO<sub>2</sub> storage capacity in the UK continental shelf

One of the largest potential CO<sub>2</sub> storage capacities in Europe

UK emissions needing storage between now and 2050 equating to just 2-3% of theoretical storage potential.

Growing interest in developing CO<sub>2</sub> storage in the UK. 21 new carbon storage licences were awarded in the last carbon storage round, with a total of 27 licenced areas now on the UK continental shelf.

# Establishing Cross-Border Networks

## Why we value cross-border CO<sub>2</sub> networks

Import Potential: Maximises UK storage capacity and opens new markets for CO<sub>2</sub> storage services

Export Potential: Increases resilience of UK domestic CO<sub>2</sub> storage by offering cross border options

Supports regional decarbonisation efforts by offering optionality and flexibility to regional emitters. UK stores can provide cost effective storage due to size and proximity of stores

Helps provide new supply chain opportunities (i.e. for import/export terminals, CO<sub>2</sub> vessels).

Can lower costs for UK CCUS industry, expedite deployment (e.g. of storage sites), improve network resilience and reduce HMG support

# Regulatory Barriers to Cross-Border Networks

## Emissions Trading Schemes (ETS) – UK/EU

Parties will need to recognise CO<sub>2</sub> captured from an ETS installation under one scheme being stored in another system's storage sites to ensure emitters do not have to surrender allowances.

## CCS Directive

Establishes EU legal framework for environmentally safe geological storage of CO<sub>2</sub>, including provisions for site selection, storage permit requirements, monitoring, and financial security. Mutual recognition of UK and EU frameworks required.

## The London Protocol (LP)

International treaty prohibits dumping of waste materials, except for possible acceptable wastes (CO<sub>2</sub> exemption). Bilateral agreements/arrangements need to be entered into to enable cross-border CO<sub>2</sub> movements.

## Carbon Trading

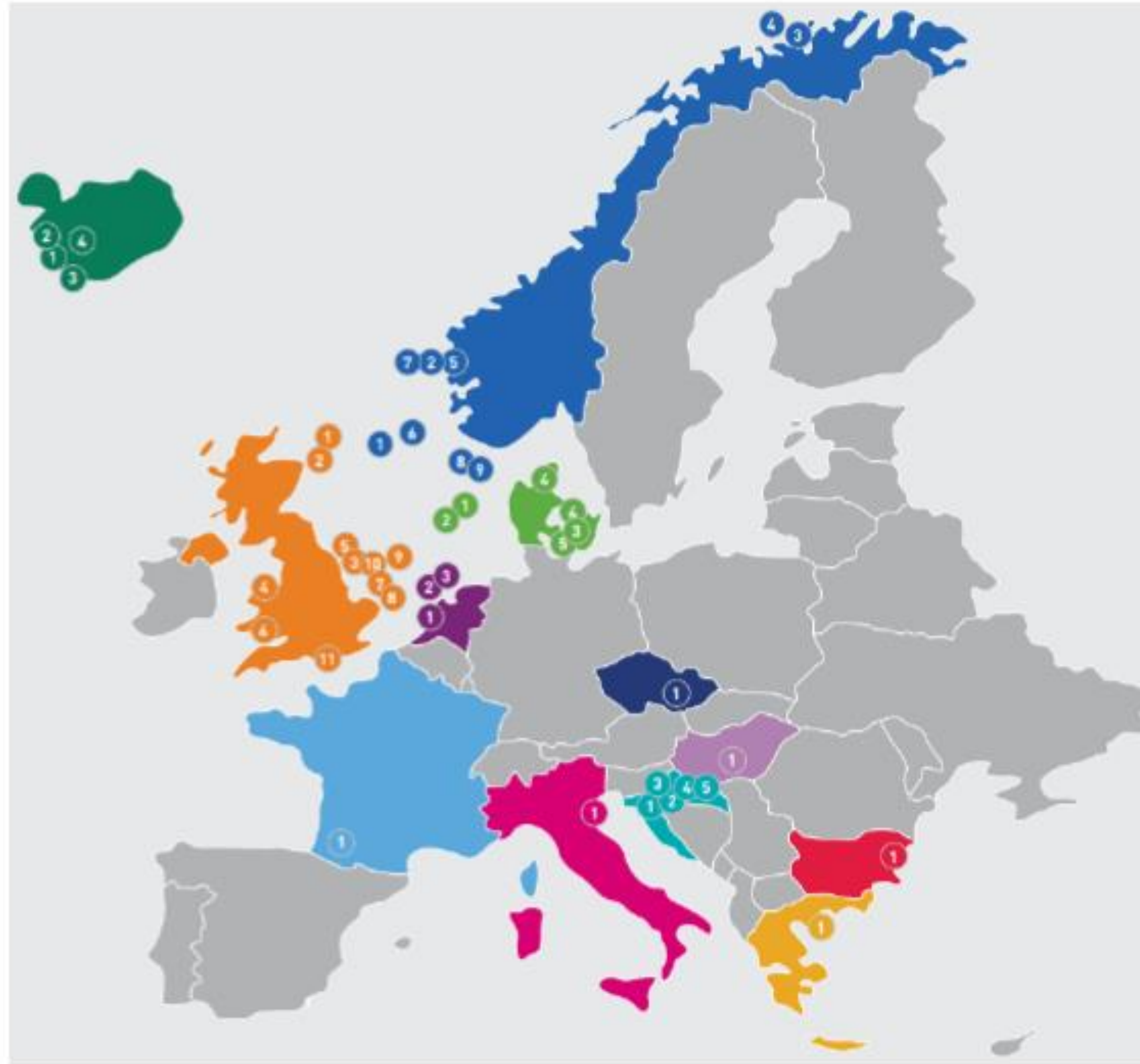
Under Paris Agreement (Art.6), countries can transfer carbon credits earned from the reduction of GHG emissions to help one or more countries meet their climate targets. Arrangements for CO<sub>2</sub> T&S need to be agreed.

## Interoperable CO<sub>2</sub> Specifications

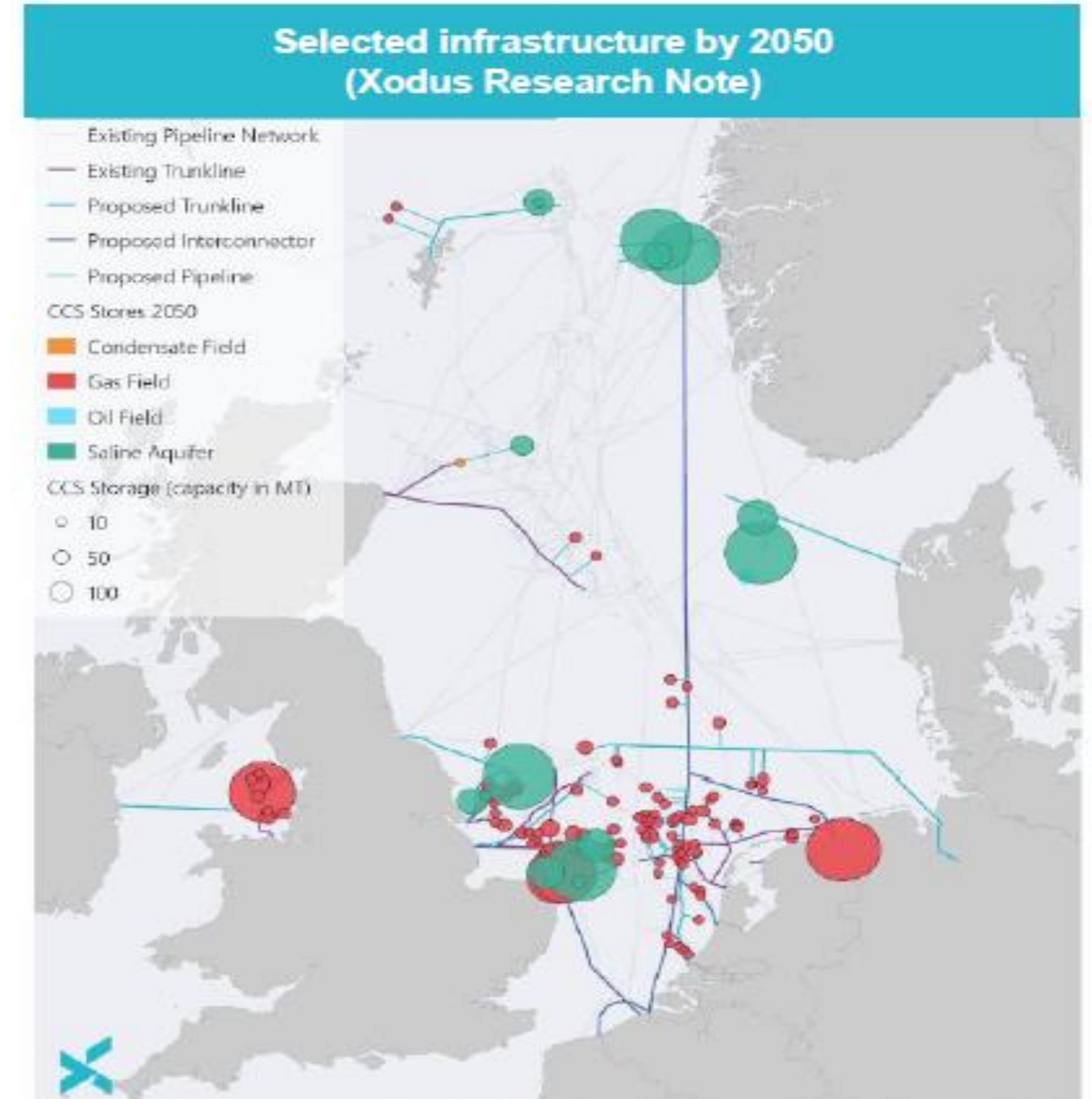
Both transport and storage will require CO<sub>2</sub> spec alignment to ensure efficient and safe transport and storage.



# CCUS – A Regional Opportunity



IOGP Map of CO2 Storage Projects in Europe (2024)



Xodus Analysis, Extract from "Forecasting the North Sea CCUS Infrastructure by 2050"

