

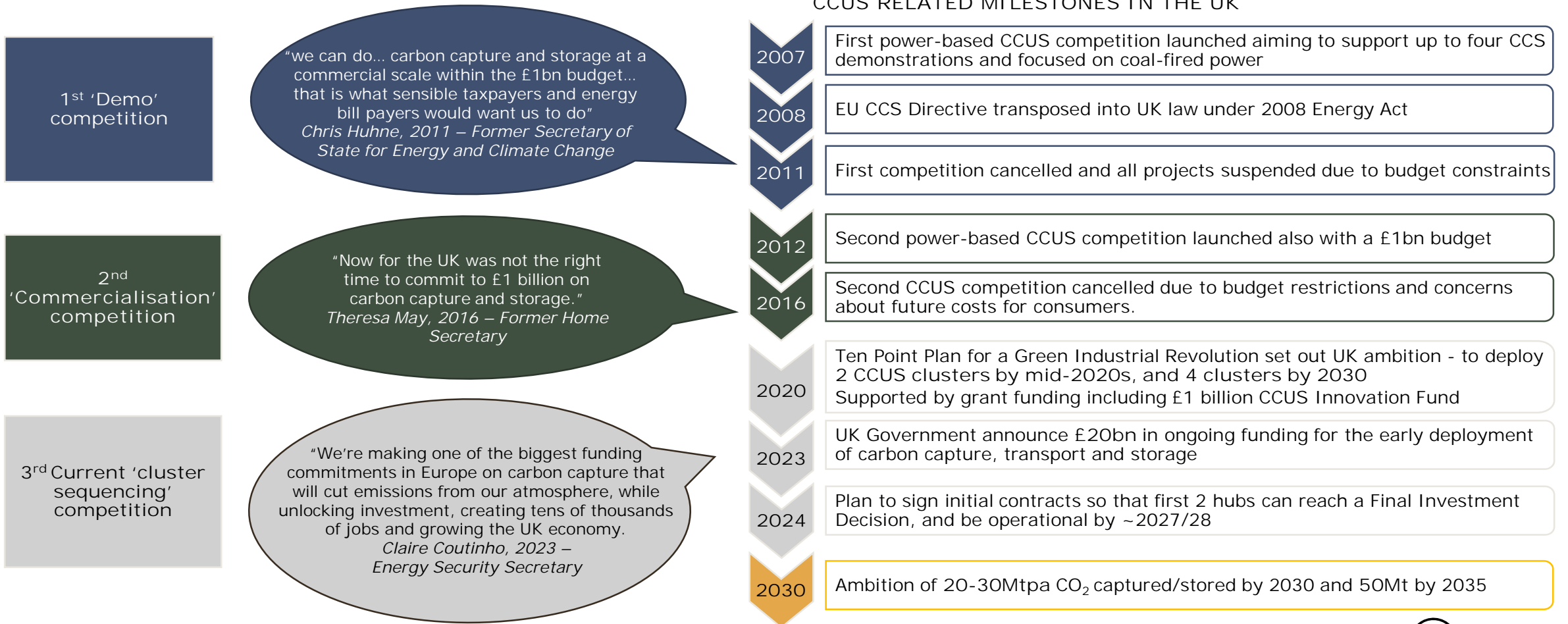


# UK CCUS Clustering approach and business models

CESISIP Webinar


STUART MURRAY - 22 MARCH 2024

# UK has seen multiple CCUS competitions cancelled, but now finding success in a 'cluster sequencing' approach to support ambitious CCUS targets of 20-30Mt by 2030







# Series of risks, market barriers and market failures recognized by UK government as justifying a significant government intervention in CCUS

## GENERAL RISKS AND BARRIERS TO EARLY-STAGE INDUSTRIES

1. Technology, construction and performance risks  
Principally applies to capture and storage, and drives higher costs of capital and required contingencies
2. Capital market restrictions   
Limited availability of equity and debt finance for early-stage industries /new-technologies such as CCS. Less of an issue than it used to be if the risk allocation is acceptable
3. Policy instability risk  
Causes developers to shorten investment horizons and unwilling to finance follow up or more speculative projects.
4. Public perception risk  
Lack of public knowledge and acceptance can create significant delays to obtaining licences, consents, and local approval.

## SPECIFIC BARRIERS AND MARKET FAILURES FOR CCS

1. Emission externalities   
CO<sub>2</sub> price faced does not reflect damage to other parties, leaving insufficient economic incentive to reduce emissions
2. Coordination failures   
Firms depend on other firms to successfully operate, leaving cross-chain and volume risks
3. Imperfect or asymmetric information  
Insufficient or confidentially held information (e.g. storage geology) does not allow effective competition
4. Knowledge creation externalities   
Firms can be reluctant to take the first step – particularly where they could instead wait and learn from the actions of other firms
5. Natural monopoly industries   
Transport and storage will have significant localised market power with no real competition for auctioning network expansions
6. Missing markets  
No established markets for CO<sub>2</sub> transport/storage makes financing of elements hard so only integrated projects develop

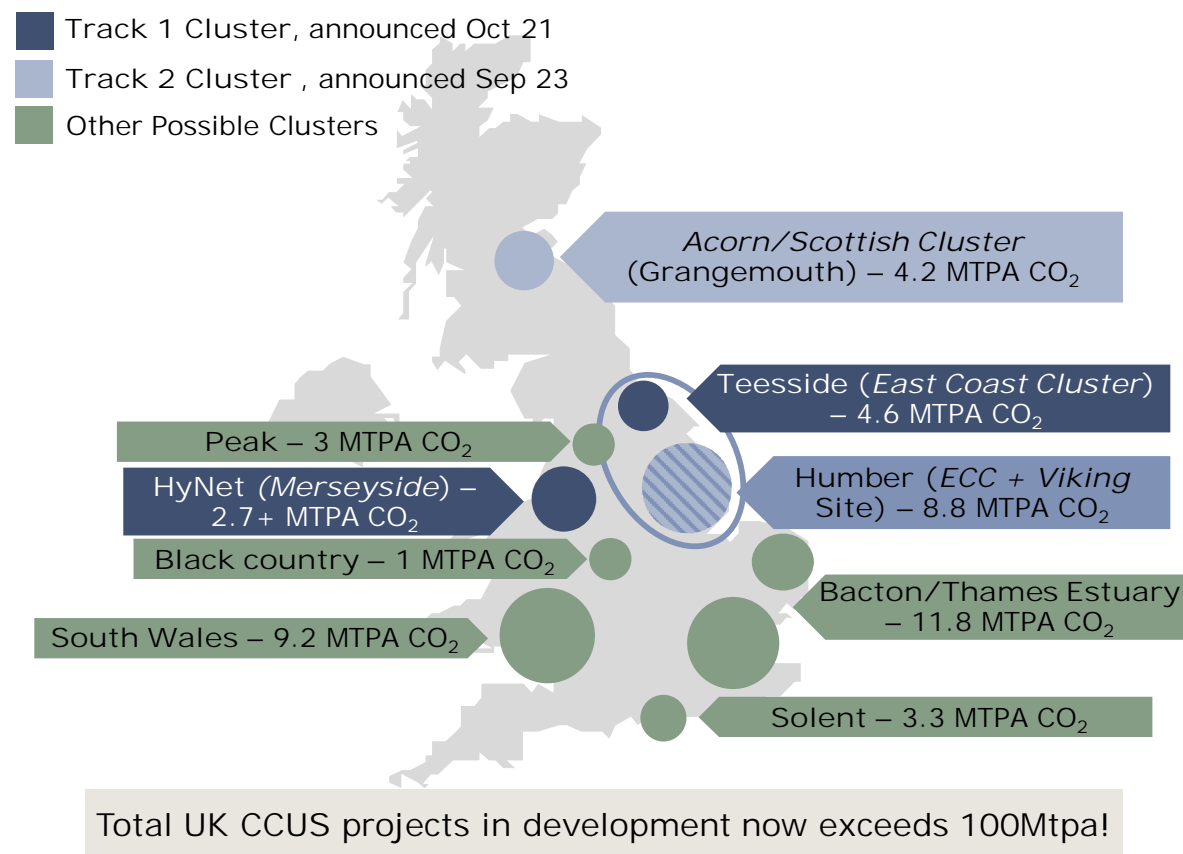
 Specifically stated by UK government as a justification for intervention

# Contracts for UK CCS hubs allocated via a Phase / Track process – large pipeline of ~100Mtpa of capture projects and >10 hubs in development

## CLUSTER SEQUENCING PROCESS OVERVIEW

- Tracks are a set of projects progressing to a defined time-table, with Track 1 progressing before Track 2 etc
- Each Track has 2 phases:
  - Phase 1: Assigns contracts to transport and storage (T&S) hubs
  - Phase 2: Assigns contracts to capture projects within T&S hubs
- To date UK government has announced:
  - Track 1 hubs as Hynet (Northwest Egnland) and the East Coast Cluster (Northeast England)
  - Track 2 hubs as Viking (Humberside in England) and Acorn/Scottish cluster (Eastern Scotland)
- A distinct package of government support is offered for each individual CCUS application, including direct grants and ongoing revenue support via a negotiated Contract for Difference arrangement (known as business models)
  - Contracts negotiated but competitively allocated
  - Covered in more detail on next slide

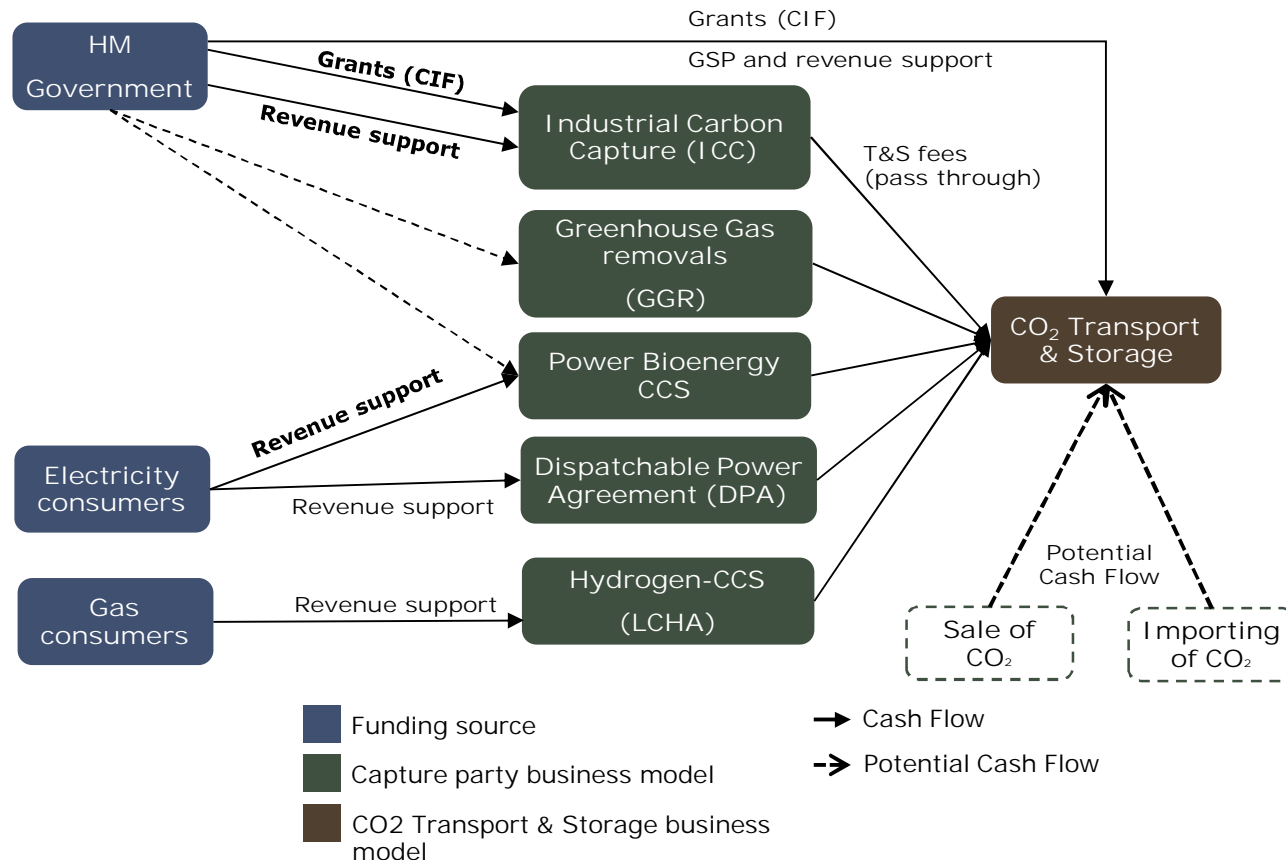
## MAJOR UK INDUSTRY CLUSTER EMISSIONS



Sources: Cluster sequencing Phase-2: shortlisted projects (power CCUS, hydrogen and ICC), Aug 2022, BEIS. The Carbon Capture and Storage Infrastructure Fund: an update on its design, BEIS, Dec 2022. Conclusion of the CCUS Cluster Sequencing Track-2 expression of interest, Jul 2023, BEIS. Map: CCSA & CCUS Net Zero Investment Roadmap, 2023, BEIS.

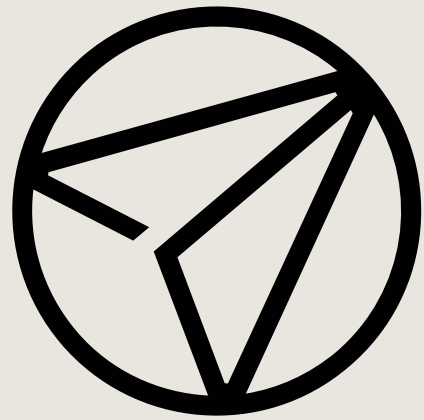
# UK business model varies by contracting approach across the 5 capture sectors (Industry, Hydrogen, Power, BECCS, GHG Removals) and T&S

## BUSINESS CASES IN THE UK



## COMMENTARY

- Capture projects have 5 distinct contract types, for different industries receive financial support in the form of:
  - Capital support from the UK government: such as the Carbon Capture and Storage Infrastructure Fund (CIF) and the Net Zero Hydrogen Fund (NZHF),
  - 'Competitively allocated' Revenue Support: based on 10-15 year support contracts covering capex + opex costs, which vary by industry for Hydrogen, Power, Industry, BECCS, and Greenhouse Gas Removals (GGR)
  - Plan to gradually allow market mechanisms to take over from 2030 onwards, as e.g. UK carbon price increases and risks decrease
- CO2 Transport and storage is funded by partial grant from the government then fees from the CCUS users.
  - Fees charged are based on Transport and Storage (T&S) Regulatory Investment (TRI) Model i.e. an agreed rate of return on Regulated Asset Base model
  - Ofgem (the gas and electricity market regulator), will also be the regulator for CO2 transport and storage
  - T&S may also raise revenue from sale of CO2 for utilization and/or importing of CO2 from other European countries.



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