

BUSINESS MODELS AND BUILDING VIABLE COMMERCIAL CCS PROJECTS IN THE UK

THE STATUS OF CCS IN THE UK – A SERIES

17 NOVEMBER 2023



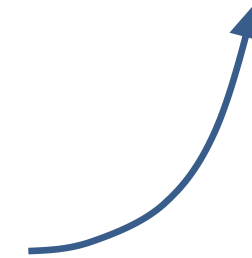
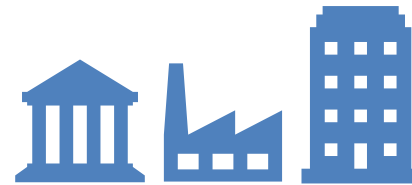
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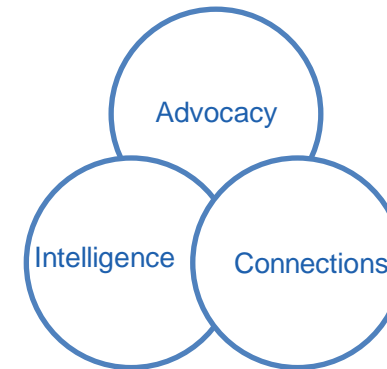
Backed by
governments,
businesses and NGOs



Mission: To accelerate
deployment of CCS

200+ MEMBERS

8 locations



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INSTITUTE

Speakers

Chris Thackeray – UK Department For Energy Security And Net Zero, Deputy Director -
Power CCUS

Oliva Powis - Carbon Capture And Storage Association, UK

Dr Nick Richardson - North Sea Transition Authority, Head Of Exploration And New Ventures

Professor Niall Mac Dowell - Faculty Of Natural Sciences, Centre For Environmental Policy,
Imperial College London

Ellina Levina - Global CCS Institute, Senior Manager, Finance And European Affairs
(Moderator)



Department for
Energy Security
& Net Zero

CCUS Business Models and Building Viable CCUS Projects

Chris Thackeray
17th November 2023





This talk covers the UK government's approach to CCUS policy

- 1) The UK government programme is delivering CCUS through an industrial cluster approach**
- 2) We have a policy framework in place to incentivise investment in CCUS projects**
- 3) Over 15 years of policy making we have learned useful lessons**
- 4) We are making progress and momentum is building for the next steps**



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The UK Government CCUS Programme



The UK has the potential to be a leader in CCUS

Our **2050 Net Zero Strategy** emphasised the importance of decarbonising industry and energy, generating hydrogen and negative emissions

All industrial clusters need to be decarbonised to achieve net zero

Industrial CCUS clusters can be the starting point for a new **carbon capture industry** with a **sizeable export potential**

CCUS 'Clusters' take advantage of the fact that many **emissions-intensive facilities are located in tight geographical clusters** and would be able to connect to a large-scale CO₂ storage site using shared infrastructure

~78 billion tonnes of theoretical CO₂ storage, one of the largest potential capacities in Europe



Location of clusters and 2018 emissions



Our ambition



Reach net zero emissions by 2050



Store 20 – 30 million tonnes of CO₂ a year by 2030 with at least 10Mtpa of CO₂ by 2030 in Track-2



Support CCUS in at least two industrial clusters by the mid-2020s and a further two by 2030 while supporting 50,000 jobs in 2030



Bring forward at least one power CCUS plant in the 2020s



Up to 1GW of CCUS-enabled hydrogen in the 2020s and 10GW of low carbon hydrogen production capacity by 2030



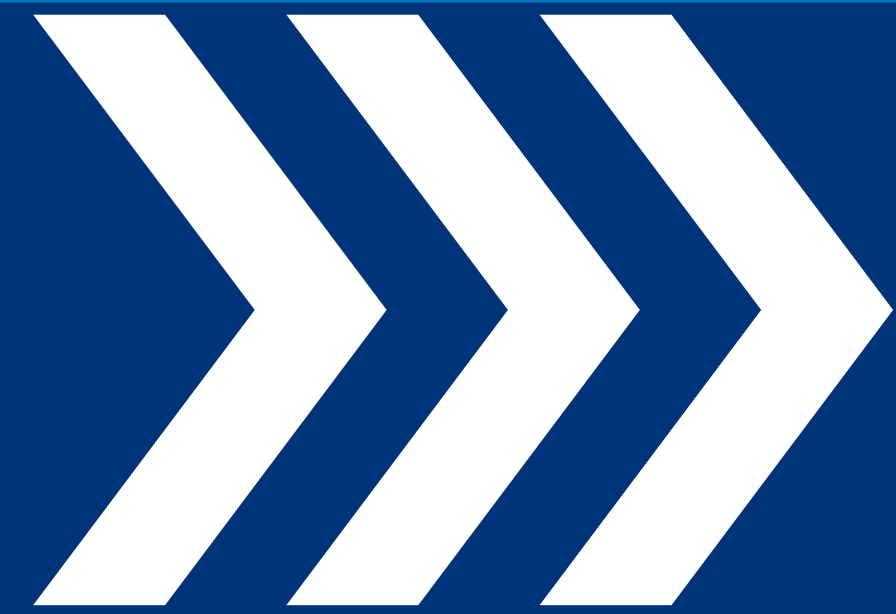
Capture up to 3 MtCO₂/yr of industrial carbon capture by 6 MtCO₂ per year by 2030 and 9 MtCO₂ per year by 2035



5MtCO₂ engineered Greenhouse Gas removal by 2030



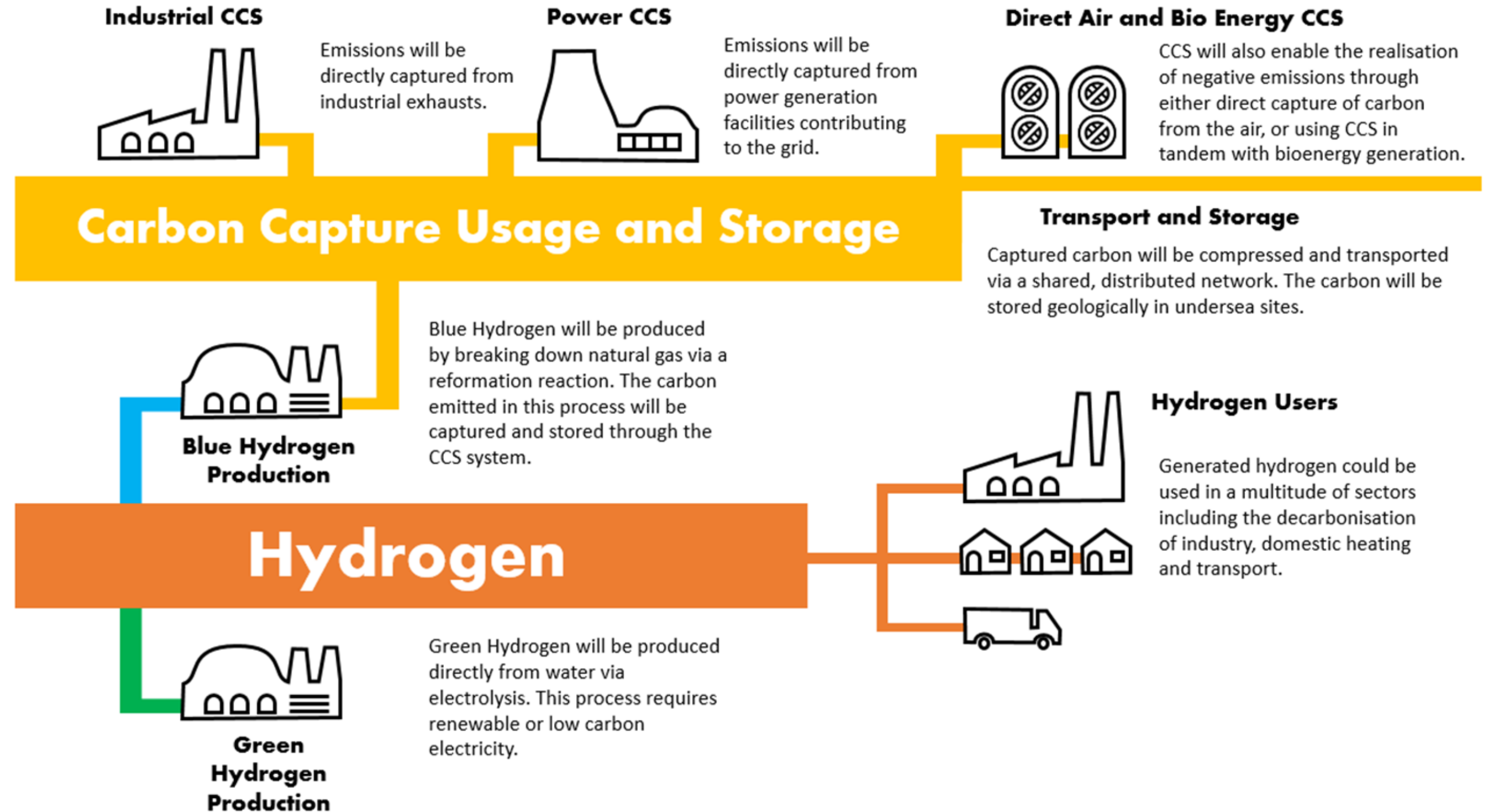
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The UK's CCUS Investment Policy Framework



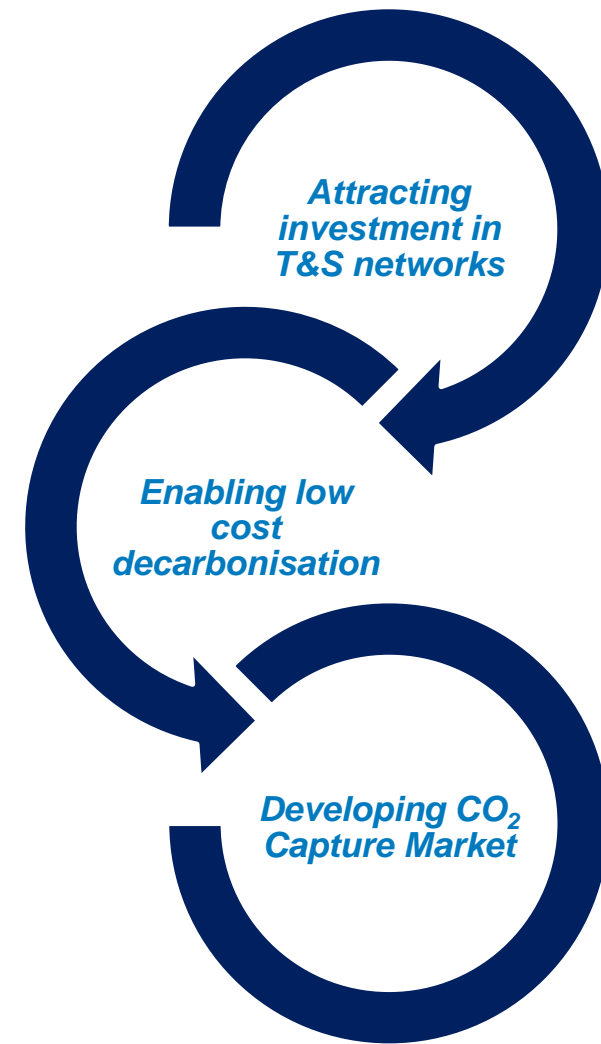
CCUS business model framework allocates funding and risk appropriately across the value chain



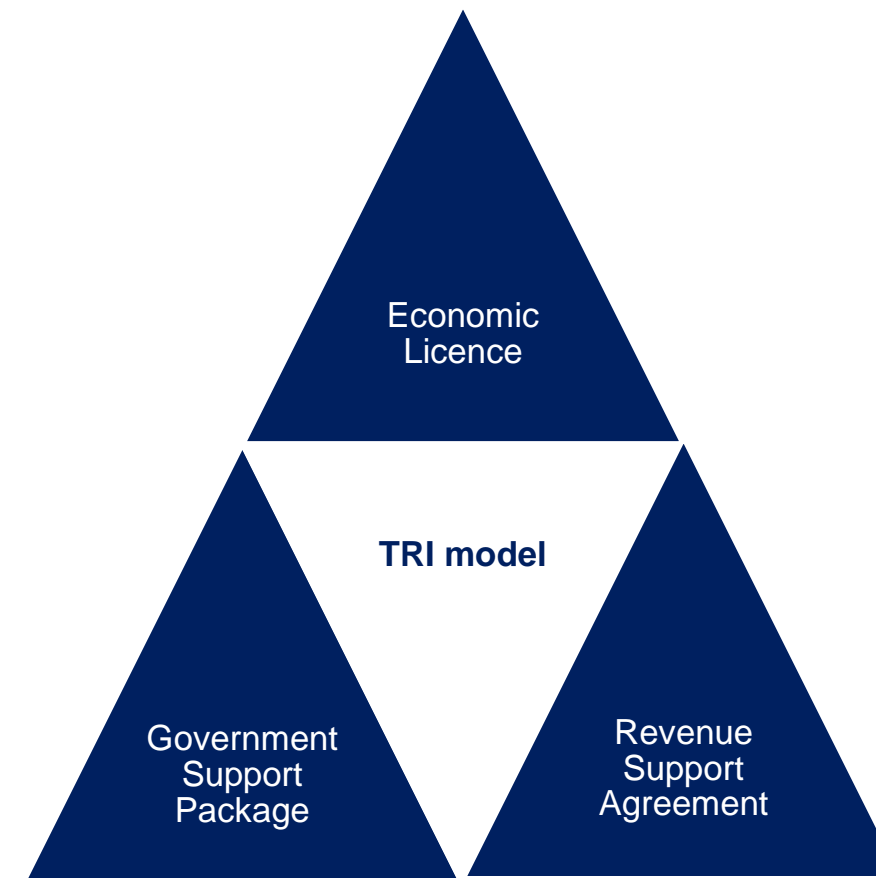
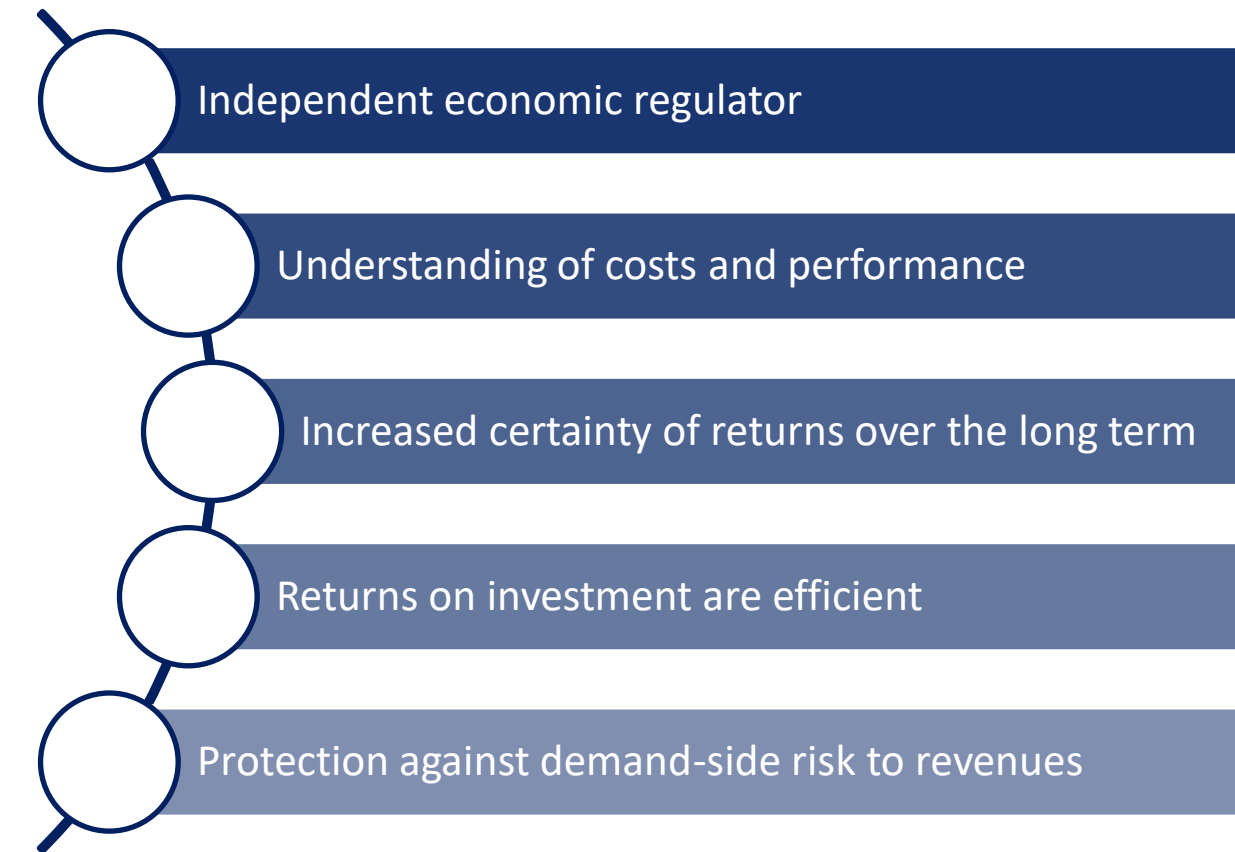


The Transmission and Storage Regulatory Investment Model

Objectives of the TRI model



What does *this* mean for the model design?



Key components of the TRI-model



The Industrial Carbon Capture Model

Our objective for developing a business model is to incentivise:

1. **Existing industrial facilities** who have a viable future in the UK to invest in carbon capture to decarbonise, whilst ensuring emissions are not offshored and delivering value for money for the taxpayer.
2. Investment in **new industrial facilities** in the UK, supporting our ambition to level up the economy.

There are two types of ICC business model: the ICC business model (for the industrial sector) and the Waste ICC business model (for the waste management sector). The Industrial Carbon Capture (ICC) business models incorporate:

- A private law contract of up to 15-years (the 'ICC Contract')** between emitter and counterparty:
 - Pays emitter per tonne of captured CO₂, to cover the additional costs of deploying carbon capture.
 - Offers risk protections in specific circumstances (e.g., T&S outages, legal changes) if obligations are met.
- Capital grant co-funding** for a portion of the capital cost of capture projects:
 - Available for initial projects only.
 - Helps mitigate against certain risks associated with these projects.

Contracts will be funded from the exchequer via the IDHRS scheme*, with capex co-funding from the CCS Infrastructure Fund.





Hydrogen Production Business Model (HPBM)

Objective

The HPBM provides revenue support to incentivise investment in new low carbon hydrogen production and encourage users to switch to low carbon hydrogen by making it a price competitive decarbonisation option.

Contractual approach

The HPBM is delivered through the Low Carbon Hydrogen Agreement (LCHA), which is a 15-year private law contract between a hydrogen producer and a government counterparty.

Delivery partner

The government counterparty is anticipated to be the Low Carbon Contracts Company (LCCC), subject to successful completion of administrative and legislative arrangements.

Allocation of contracts

The first LCHAs will be allocated through:
Track-1 Phase-2 for CCUS-enabled hydrogen projects
Hydrogen Allocation Round 1 (HAR1) for electrolytic hydrogen projects.

Key features

The subsidy is paid for each qualifying unit of hydrogen produced and sold.
Hydrogen must meet the Low Carbon Hydrogen Standard to be qualifying.
The main cashflow is a Difference Amount (variable premium).
The LCHA expires when the producer reaches the agreed sales cap (MWh).

Funding

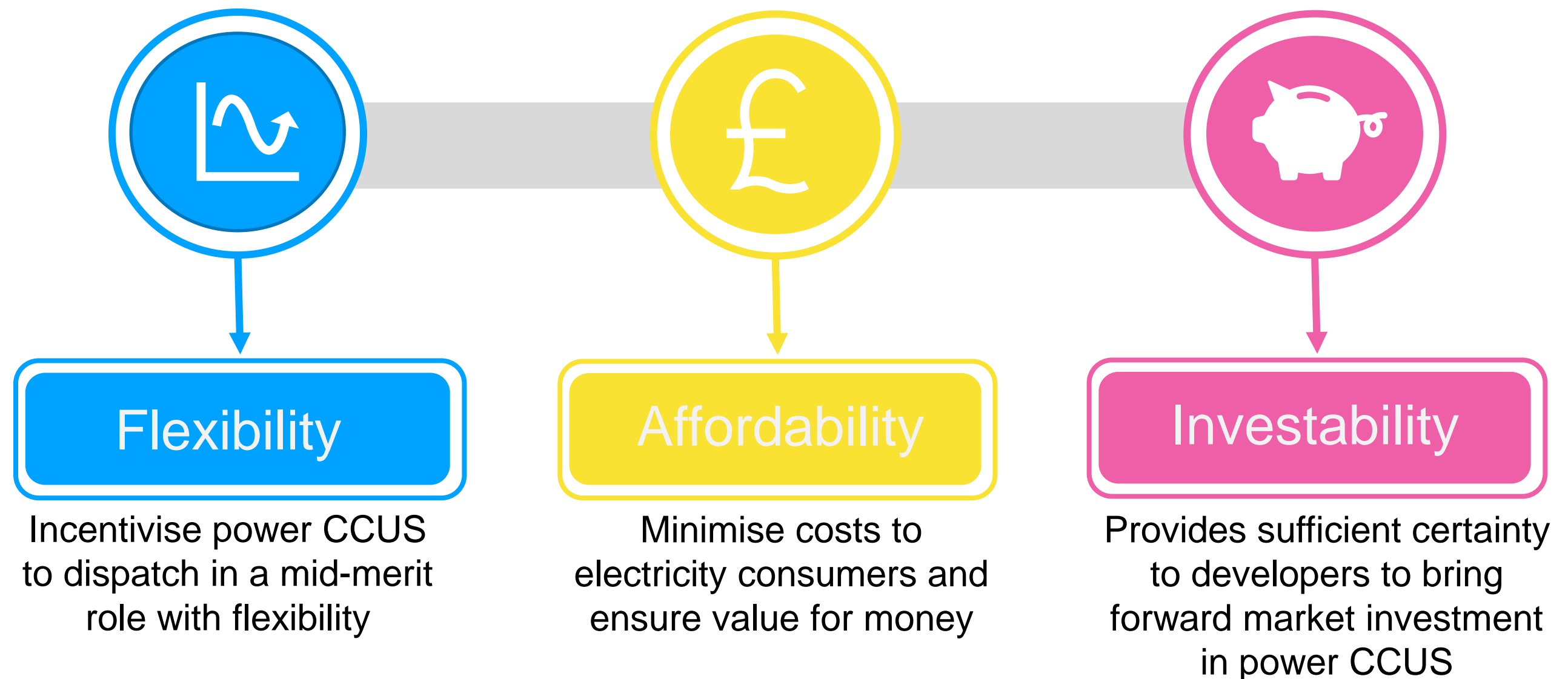
Revenue support for low carbon hydrogen production will initially be funded by the exchequer, with the intention to transition to levy funding, subject to consultation and legislation being in place.



The Power CCUS Dispatchable Power Agreement

To help deliver emissions reduction and achieve the Carbon Budget 6 targets. To do this we will implement the Dispatchable Power Agreement (DPA), a **private law contract of up to 15-years** funded by the Supplier Obligation.

Objective: to bring forward at least one power CCUS plant in the mid 2020s through the CCUS Cluster Sequencing Process.





Greenhouse Gas Removals Business Model

We intend to proceed with the **development of a Negative Emissions Contract for Difference (CfD)**, which we consider to be the most effective approach to deliver our policy objectives.

This will provide **revenue stability for project developers through a fixed ‘strike price’**, with the government providing the difference between the strike price and a market ‘reference price’ which will be determined in due course.



- ✓ Strike price to provide revenue stability
- ✓ Market reference price to maximise vfm and reduce government support over time
- ✓ Investor confidence due to track record in low-carbon sectors
- ✓ Ability to draw on precedents in other schemes modelled on contracts for difference

We intend to design the GGR Business Model in a way that **can harness the potential benefits of the UK ETS, high-integrity Voluntary Carbon Markets, and Article 6**, subject to further policy development.

UK Emissions Trading Scheme



The Authority will aim to carry out a further consultation on the inclusion of engineered and nature based GGRs in the UK ETS.



Voluntary Carbon Markets

Govt will consult later this year on specific steps and interventions needed to develop high-integrity VCMs and protect against greenwashing.



Article 6

Rules for international carbon trading under Article 6 of the Paris Agreement remain under development.



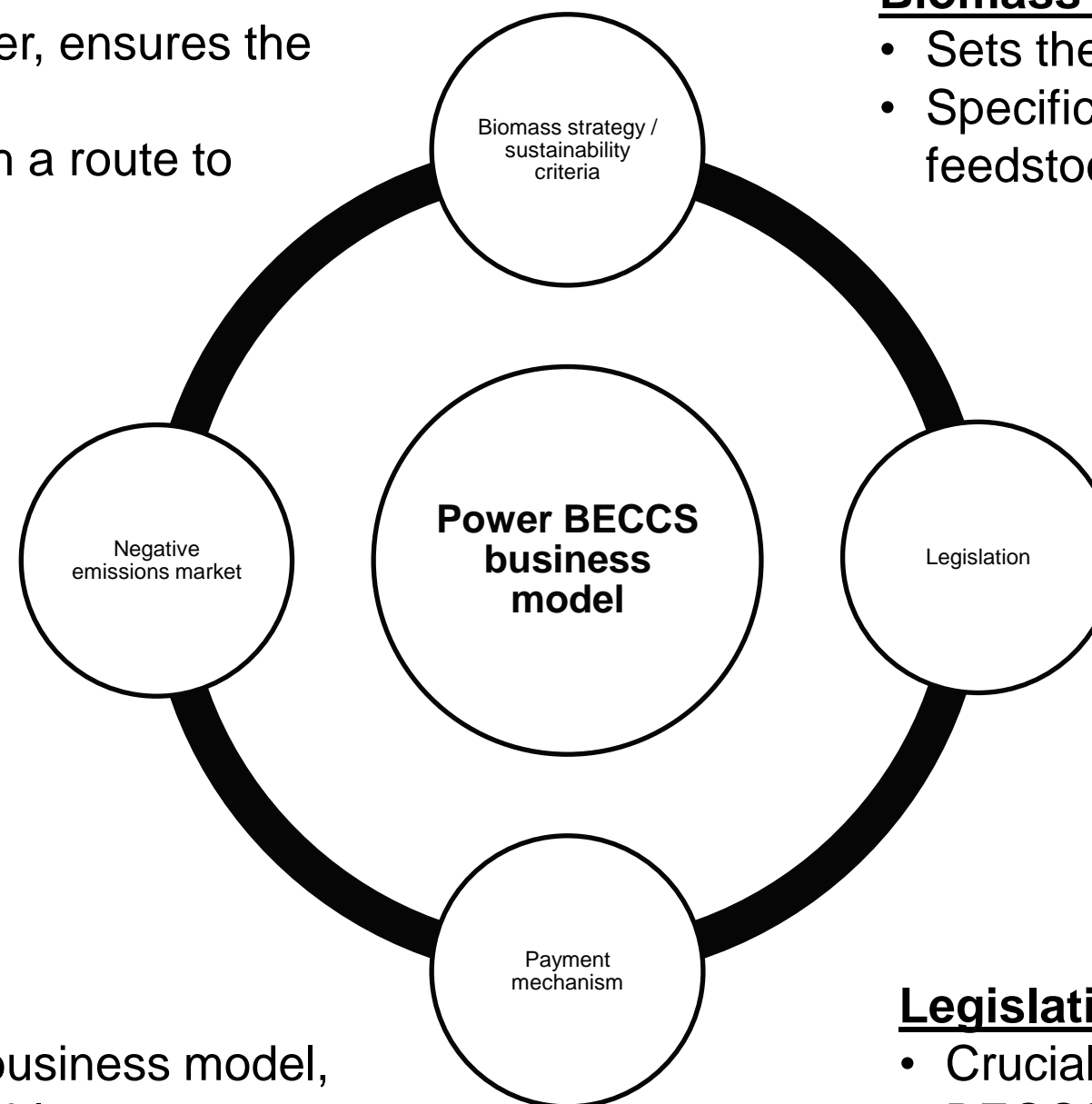
Power BECCS business model

Negative emissions market

- Important factor for developer, ensures the model is investable
- Would provide investors with a route to market

Biomass strategy / sustainability criteria

- Sets the supply chain emissions target
- Specific sustainability requirements on the feedstock used



Payment mechanism

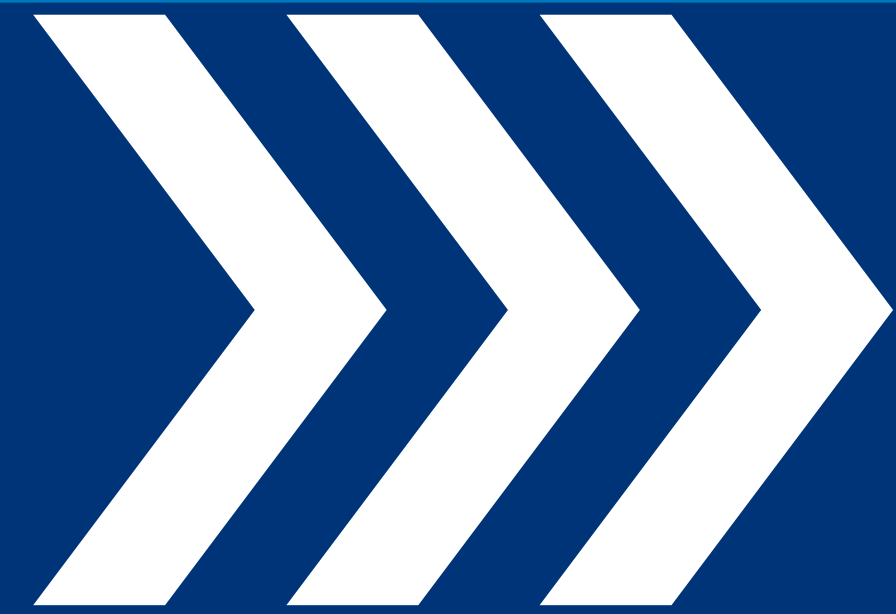
- Fundamental aspect of the business model, ensures the model is investable
- Provides industry with certainty around their returns and operation requirements
- Enables HMG to guard against specific risks

Legislation

- Crucial for the deployment of the power BECCS business model
- Ability for SoS to empower a contract counterparty to sign the contract with a developer



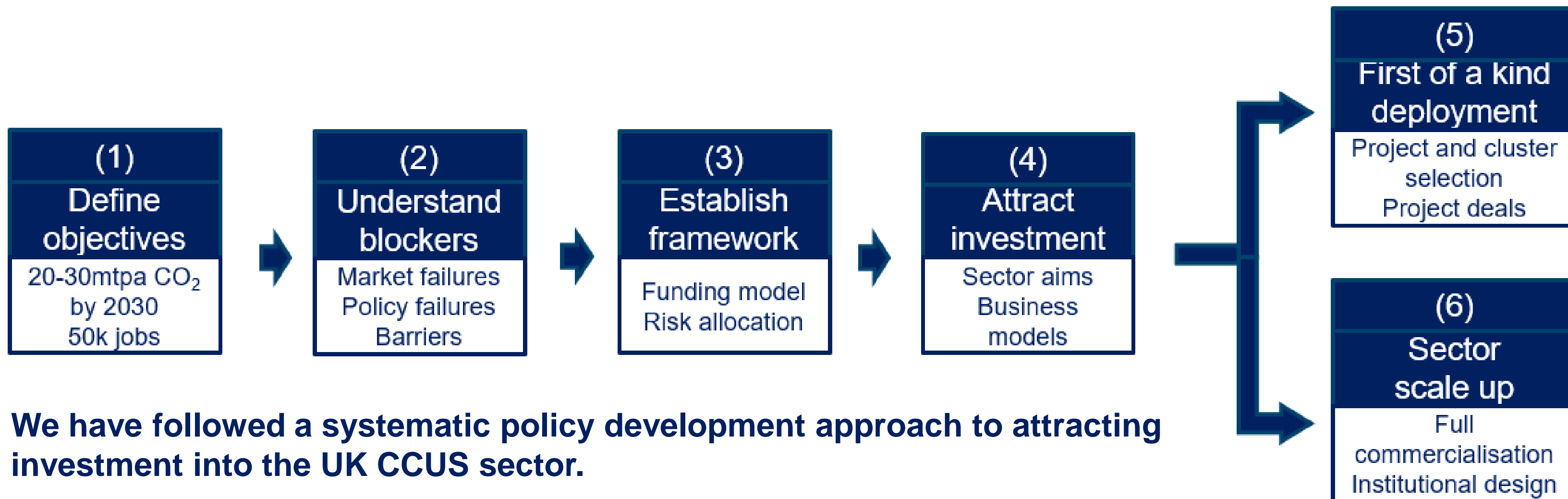
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What did we learn?



How did we get to where we are today?





What have we learned?

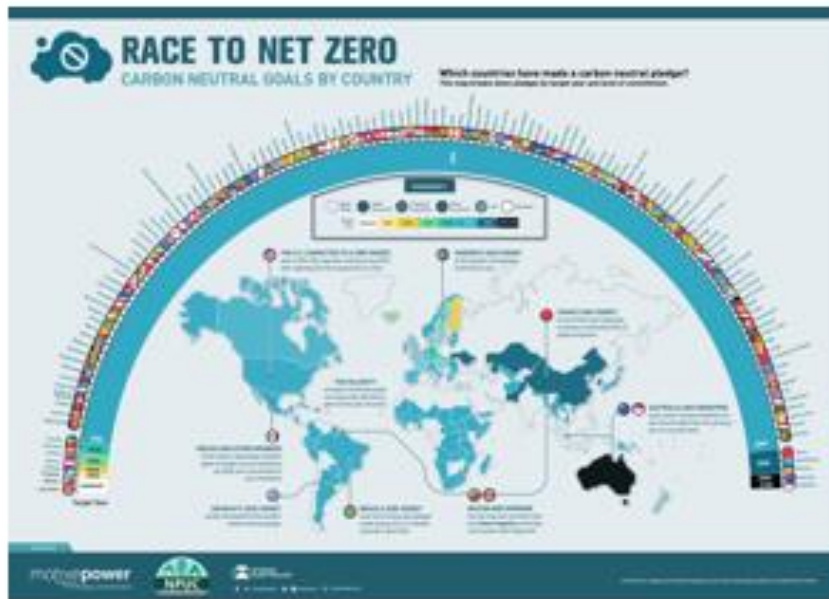
To get CCS built...



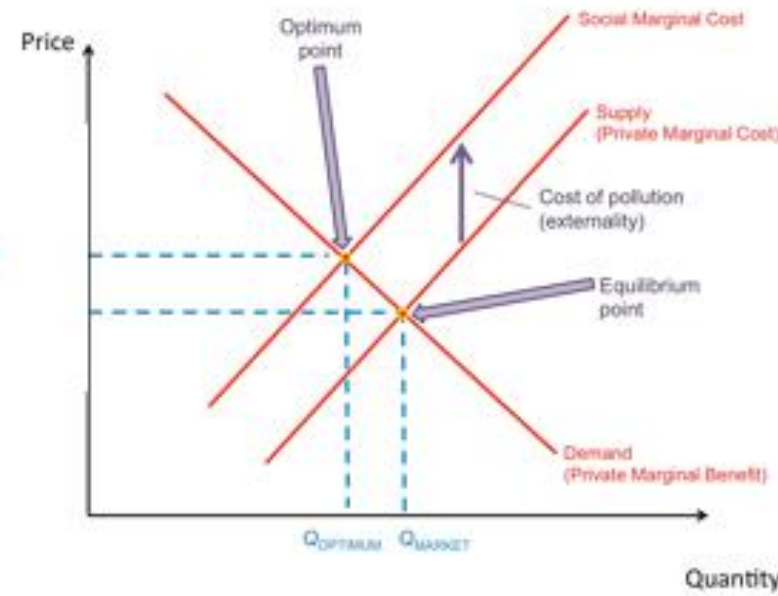
We need...



The right context...



...to address all the market failures...

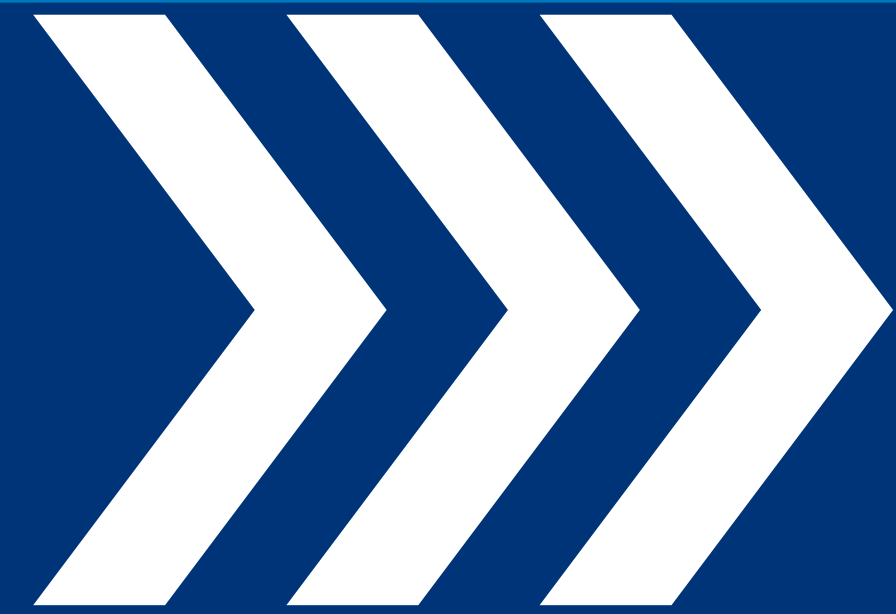


...the will and capacity to succeed.





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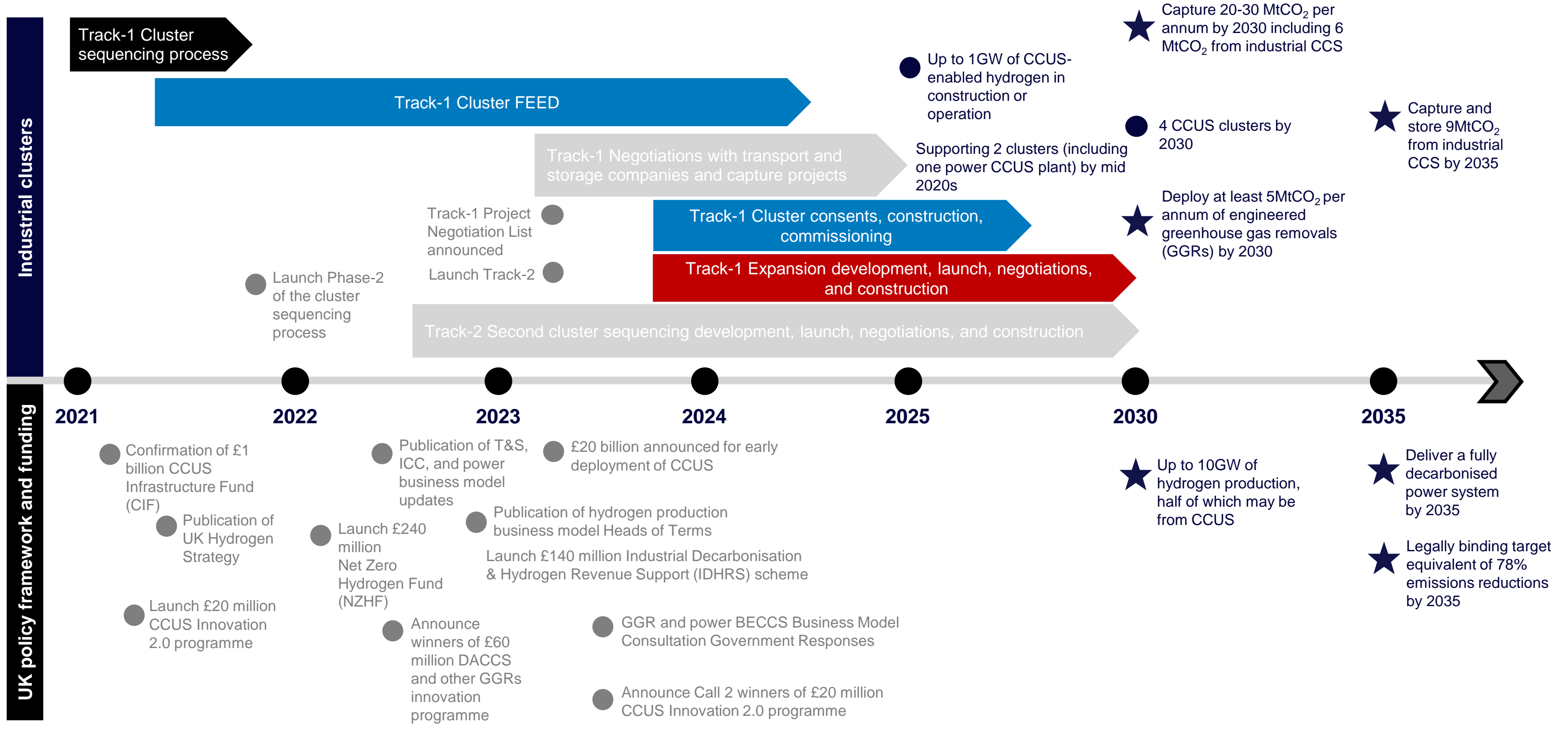


What's next?

Our 2035 Delivery Plan



Critical activities and milestones on a path to developing the UK CCUS sector





Takeaways

- **The UK government sees CCUS as essential for net zero and is delivering it through an industrial cluster approach.**
- **We have a policy framework in place to incentivise investment in CCUS projects.**
- **It's working. There are 8 capture and two T&S projects in negotiation. FID expected next year.**
- **Over 15 years of policy making we have learned useful lessons. Crucial to success is allocating risk appropriately between parties.**
- **Momentum is building. We have the funding, the policy and the projects to kickstart the sector. The next step will be expanding the number and size of clusters.**

Speakers

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