What's happening in the UK – and how do they make it happen?

CLIMIT Webinar series
19th May 2022

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Carbon Capture and Storage Association

About the CCSA

- The Carbon Capture and Storage Association is unique in its representation of the entire CCUS value chain.
- Our focus is on:
    - Advocating for policy developments in UK, EU and internationally towards a long-term regulatory and incentive framework for CCS
    - Raising awareness of CCS as a vital tool in fighting climate change and delivering sustainable long-term clean growth
    - Driving progress on commercial-scale projects
    - A technology neutral approach (geological storage and utilisation, capture from industry, power, hydrogen, bioenergy, direct air capture and different capture technologies)
- Find out more at www.ccsassociation.org

CCSA Members

CCSA

CO_2 Storage | Power & Industrial | Carbon Capture Developers

Engineering & Equipment | CO_2 Transport & Distribution | Financial, Consulting & Others

2015 – ‘The cancelled competition’

UK government carbon capture £1bn grant dropped

25 November 2015

Peterhead power station was a bidder

The UK government has announced it is axing a £1bn grant for developing new carbon capture and storage (CCS) technology.

Peterhead power station and the White Rose scheme in North Yorkshire were the bidders in the competition.

Shell and SSE are behind the Aberdeenshire plans.

The energy company Drax had announced in September it was **abandoning plans to introduce CCS technology** in North Yorkshire.

Carbon capture and storage (CCS)

UK cancels pioneering £1bn carbon capture and storage competition

Conservative government breaks manifesto promise on project to capture emissions from fossil fuel plants, days ahead of UN climate summit in Paris

Damian Carrington

@dpcarrington

Wed 25 Nov 2015 16.07 GMT

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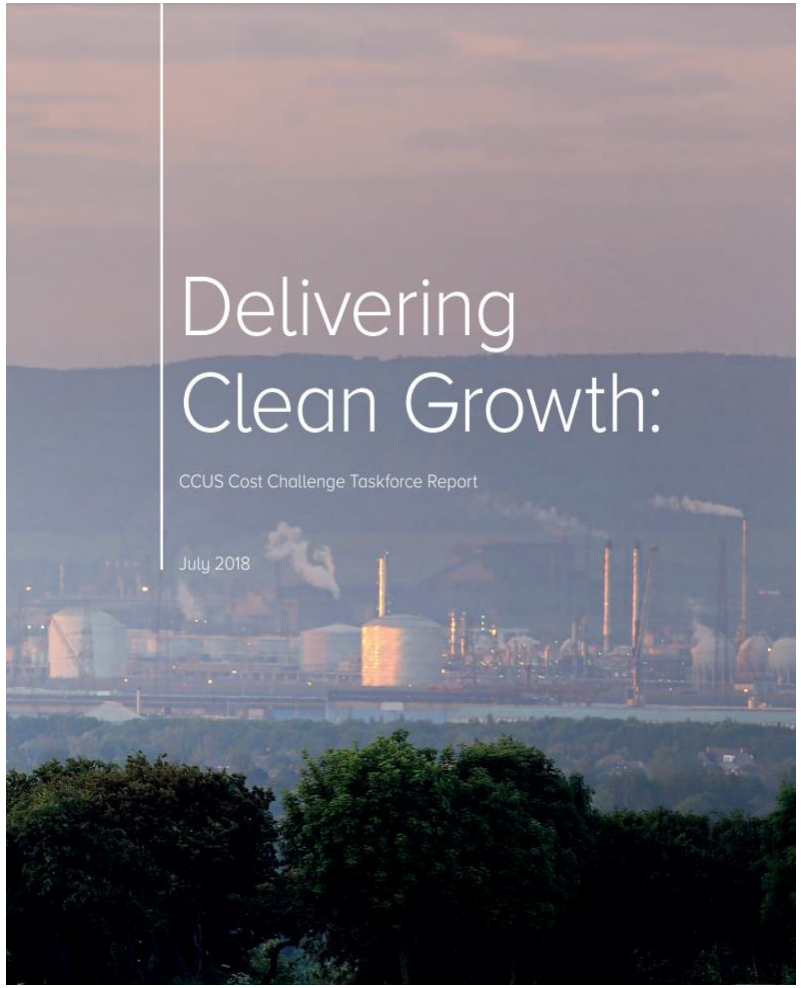
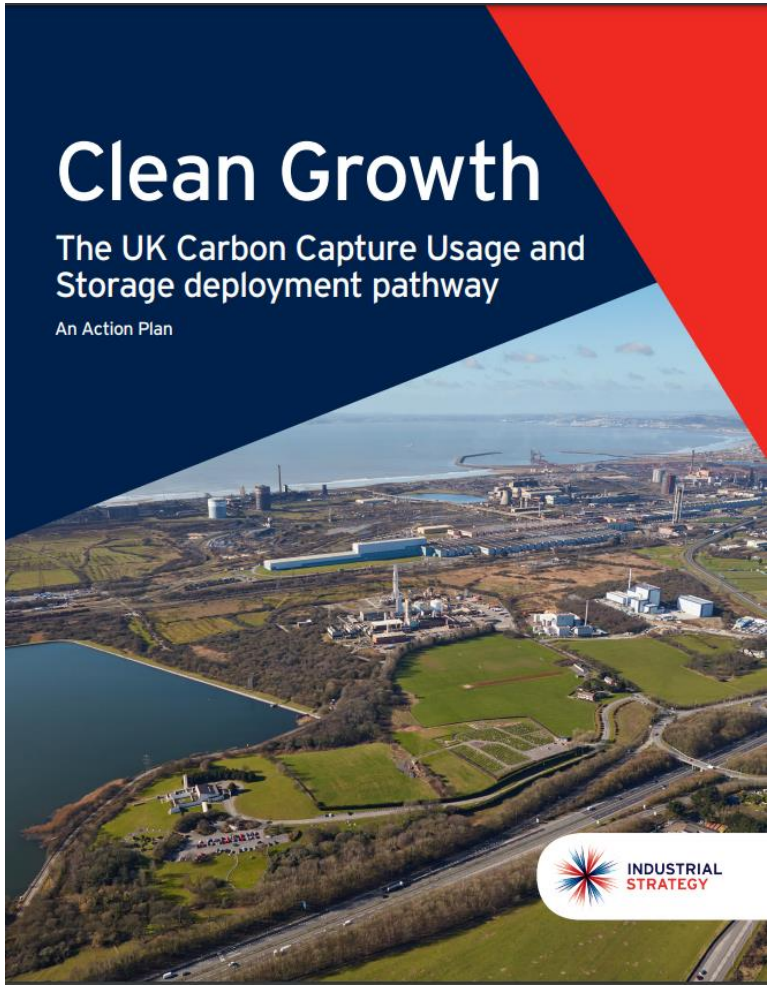
Peterhead Power Station on the coast at Peterhead, Aberdeenshire, Scotland UK Photograph:

2018 – Clean Growth CCUS action plan and cluster focus



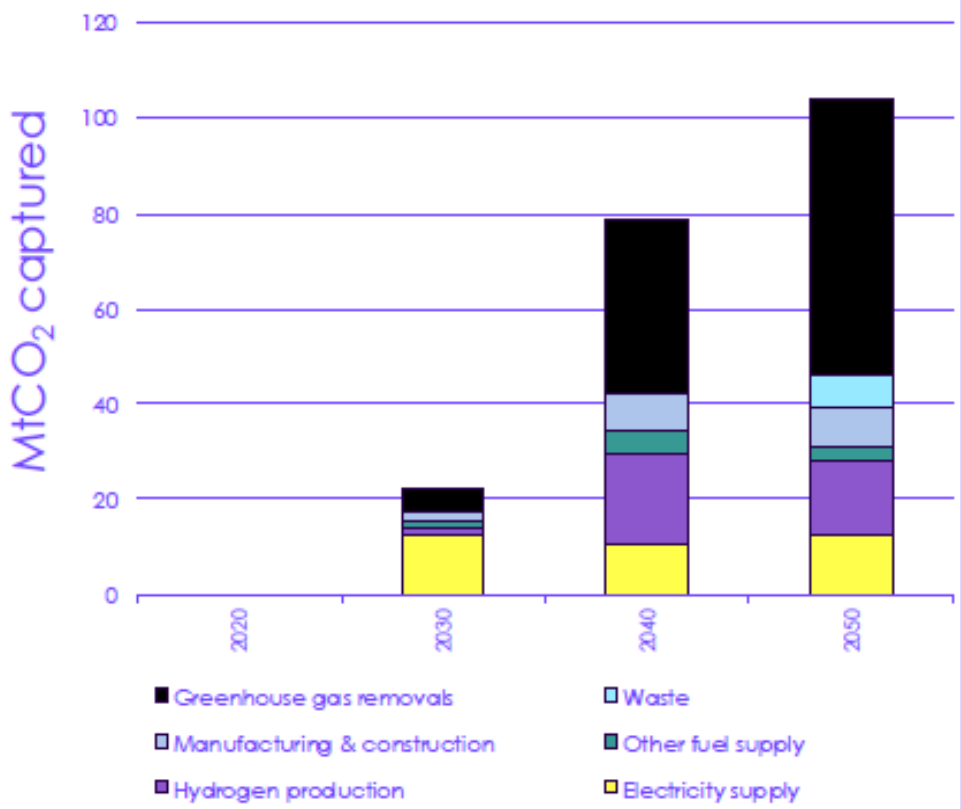


2019/2020 - "CCS is a necessity, not an option"

UK Climate Change Committee, 6th Carbon Budget Advice

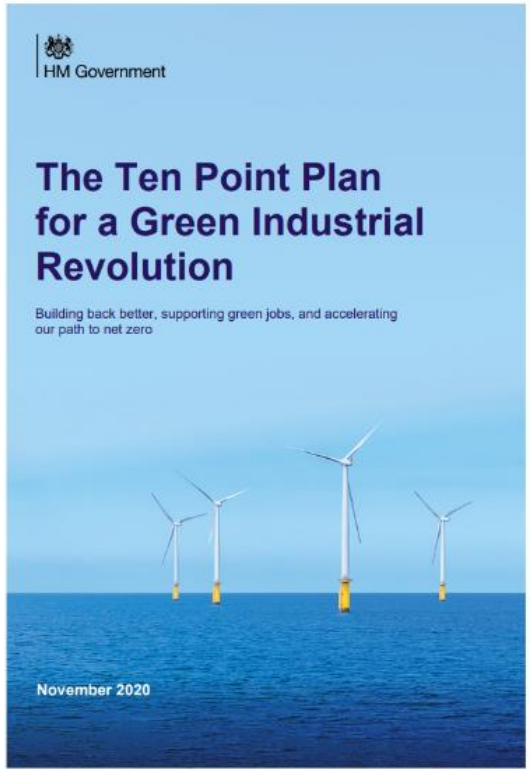
- CCC advised that the UK needs to establish;
  - At least two CCS clusters in the mid-2020s, at least four by the late 2020s, and further clusters around 2030.
  - Commercial scale hydrogen and ammonia production, and GHG removal plants all required.
- In the Balanced Net Zero Pathway, the UK requires **104Mt of CO_2 storage pa by 2050** and **22Mt CO2 storage pa by 2030.**
- Advised the UK Government to adopt 6th Carbon Budget advice into law (including a 78% GHG reduction target by 2035).

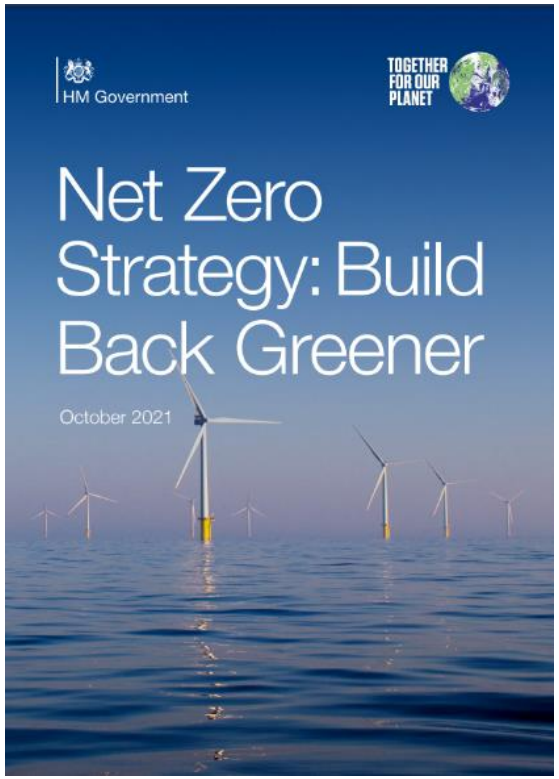
Figure 2.9 Total amount of CO_2 captured in the Balanced Net Zero Pathway



Source: CCC analysis.

2021 – The year of ambition from UK Government

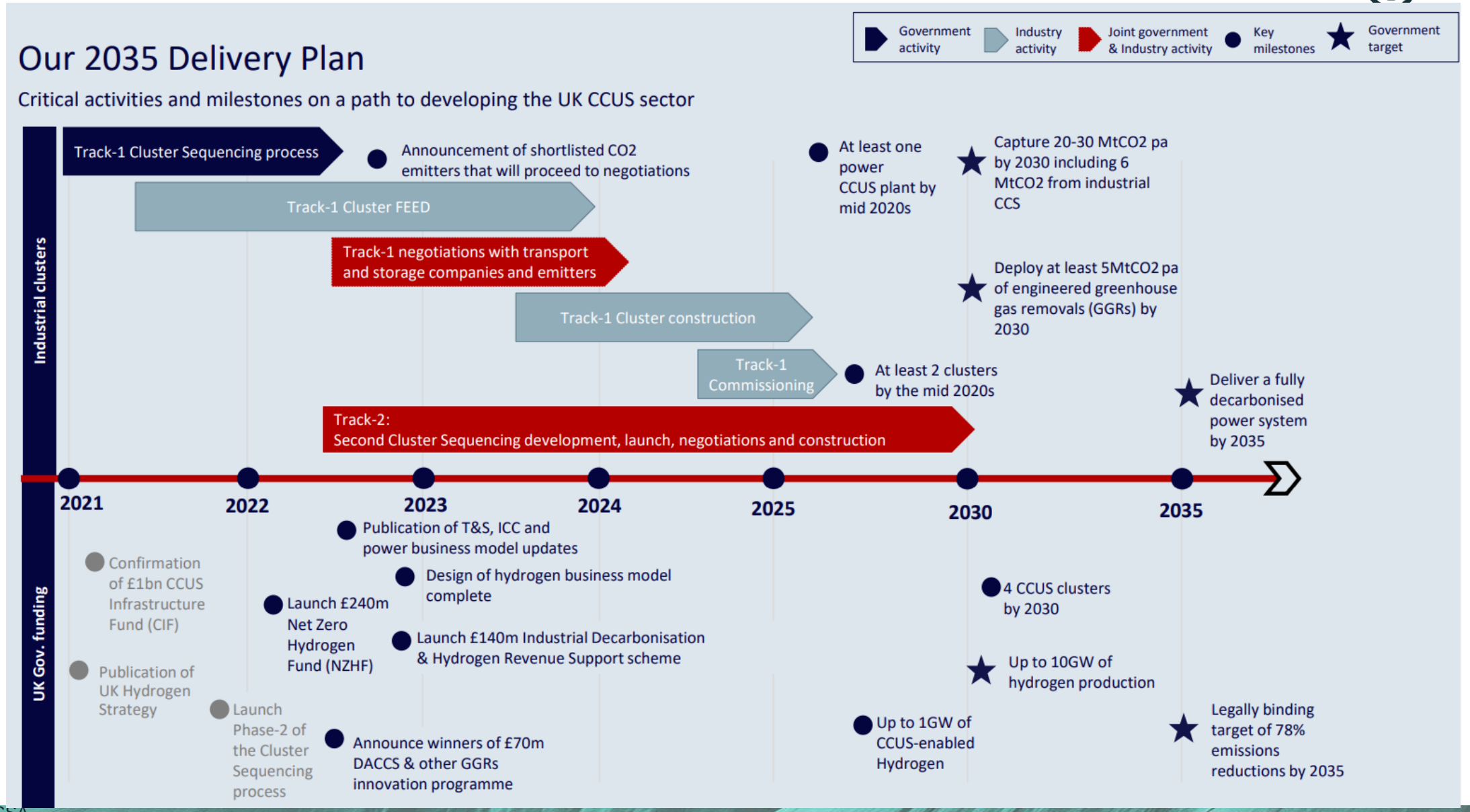




2021 – The year of ambition from UK Government

	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021
Publication	• 10 Point Plan • Updated NDC to 68% by 2030	• North Sea Transition Deal • Industrial Decarbonisation Strategy		• Hydrogen Strategy	• Net Zero Strategy • Biomass Policy Statement
Ambition	• Up to 10Mt pa by 2030 • 5GW H2 capacity by 2030 • **4 CCUS clusters by 2030 - 2 by mid-2020s**	• 3Mt industrial capture by 2030	• 'At least' 2 clusters by mid-2020 • 10Mt pa by 2030	• 'Twin-track' hydrogen approach • 'Hope' for 1 GW H_2 capacity by 2025	• **20-30Mt pa by 2030** • **10Mt pa by 2030 for Track-2** • **5Mt GGR pa by 2030** • **6Mt industrial capture pa by 2030** • **2035 & 2050 pathways and targets**
Delivery	• CCUS Business Models Update #1 • CIF £200m increase (to £1bn)	• All clusters win IDC support • Cluster sequencing announced	• CCUS Business Model Update #2 • CCUS Supply Chain Roadmap • Track-1 Cluster sequencing opened	• ICC & DPA Business Model update #3	• Track-1 clusters announced • Phase-2 opened • EfW confirmed in ICC

2022 – The state of play from UK Government



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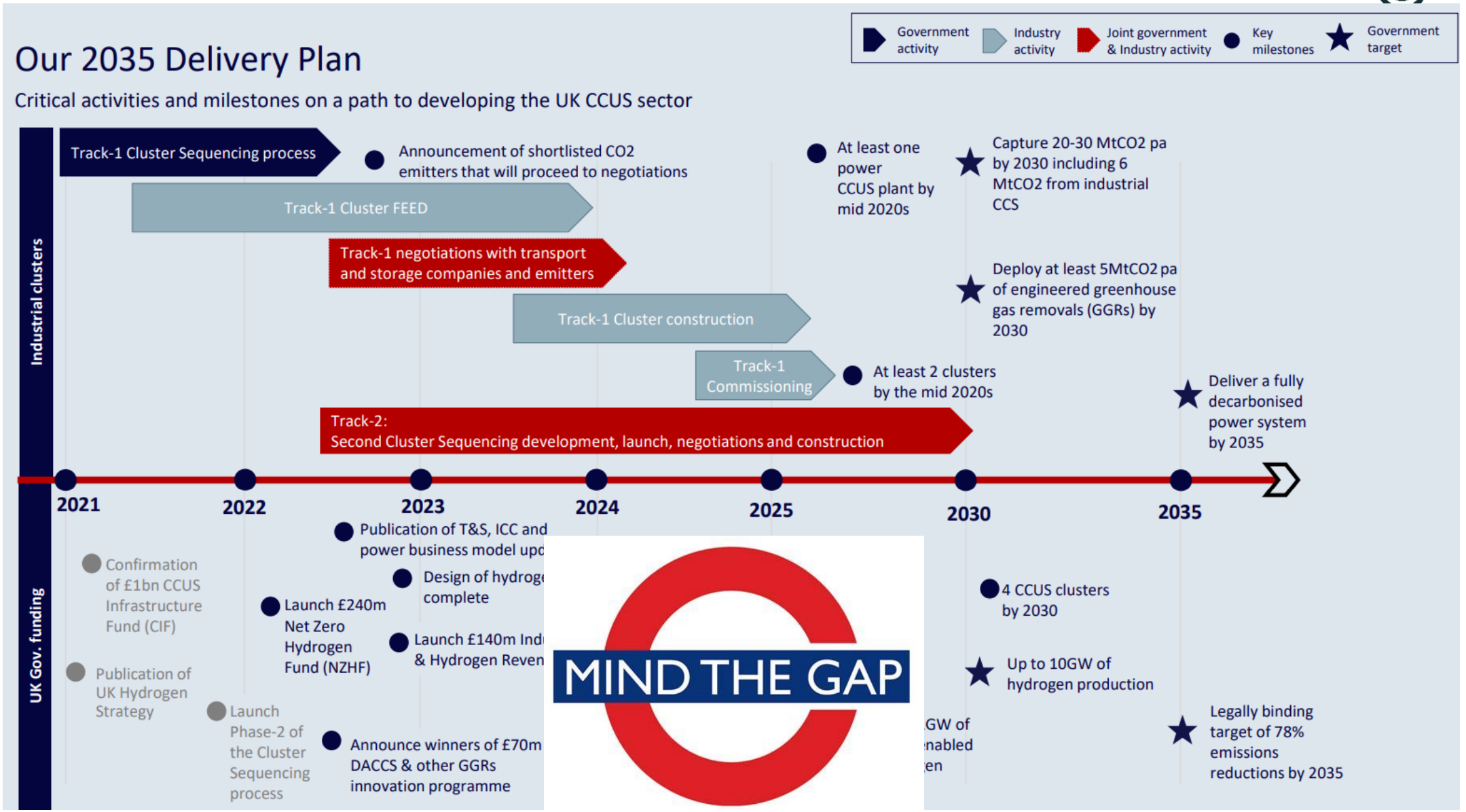
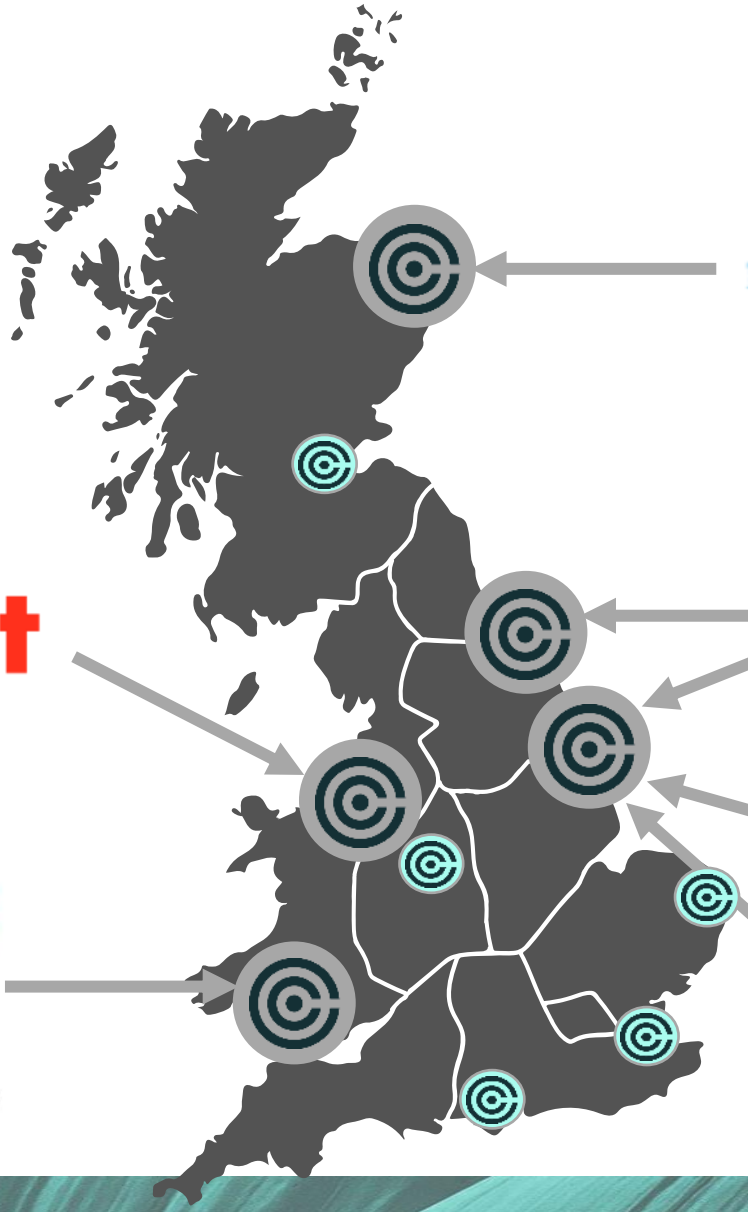


Industry reaction: CCUS Clusters Operating from mid-2020s

Phase-2 Applicants Long-list:
Eligible projects which have applied for Government support (contracts) to access 'Track-1' CO_2 Infrastructure.

Projects aim to be operational by end-2027

Government are due to announce a shortlist of projects 'from July 2022' to enter contractual negotiations



BACK THE SCOTTISH CLUSTER
Track-1 Reserve
5 Phase-2 Applicants

EAST CO_2AST CLUSTER
Track-1
25 Phase-2 Applicants

HyNet
Track-1
11 Phase-2 Applicants

v net zero
HUMBER CLUSTER

DelpHYnus

SWIC
South Wales Industrial Cluster

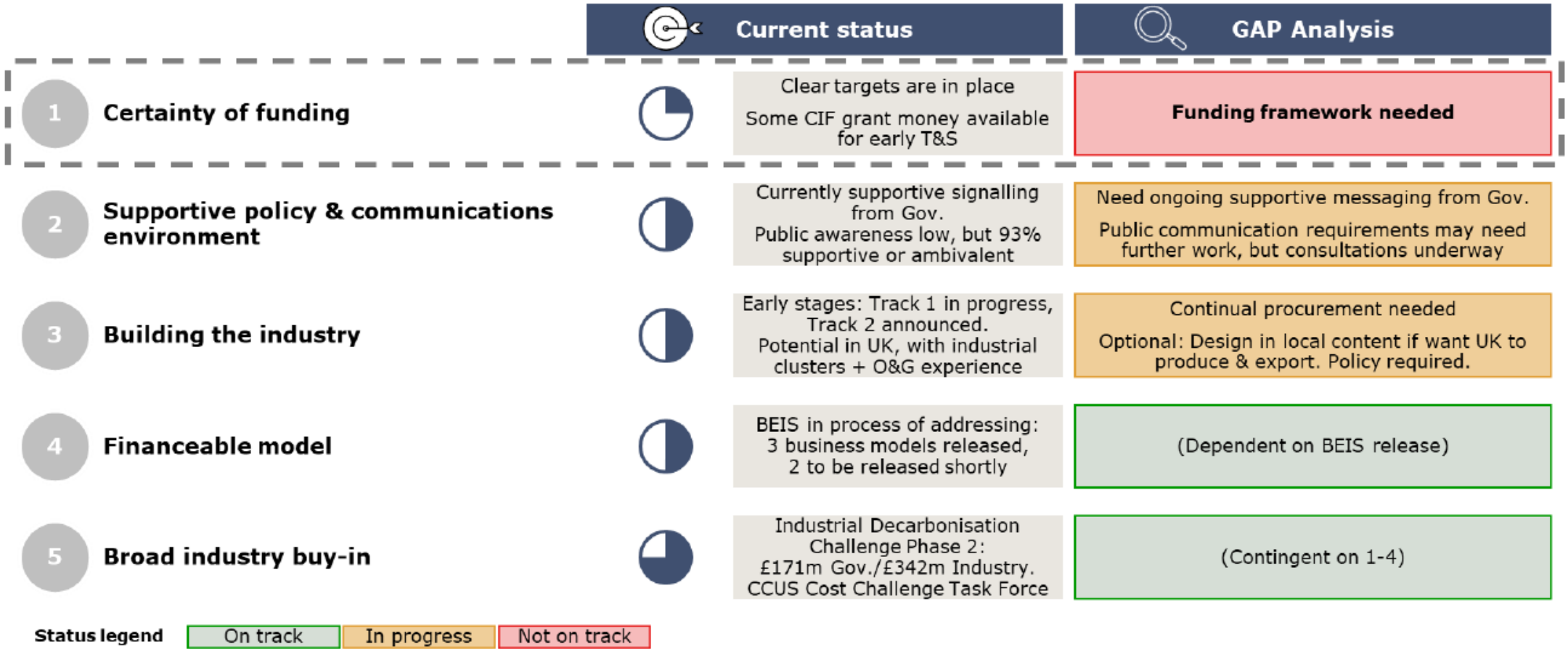
Tall on ambition – but short on substance?

Prime Minister's 10 Point Plan commitment – *"at least two clusters operational by mid-2020s and two by 2030"*

- **Track-1:** Bring forward at least two clusters operational by the mid-2020s
  - Phase-1: Provisionally sequence clusters onto Track 1 (announced November 2021)
  - Phase-2: Determine which carbon capture projects within clusters will proceed into negotiations (shortlist to be announced ~~May~~ 'from July' 2022)

- **Track-2:** Two additional clusters that expected to be operational by 2030
  - Potential selection process **not yet defined**
  - Future phases of access to Track-1 **not yet defined**

Comparison with Offshore Wind in 5 Key Areas



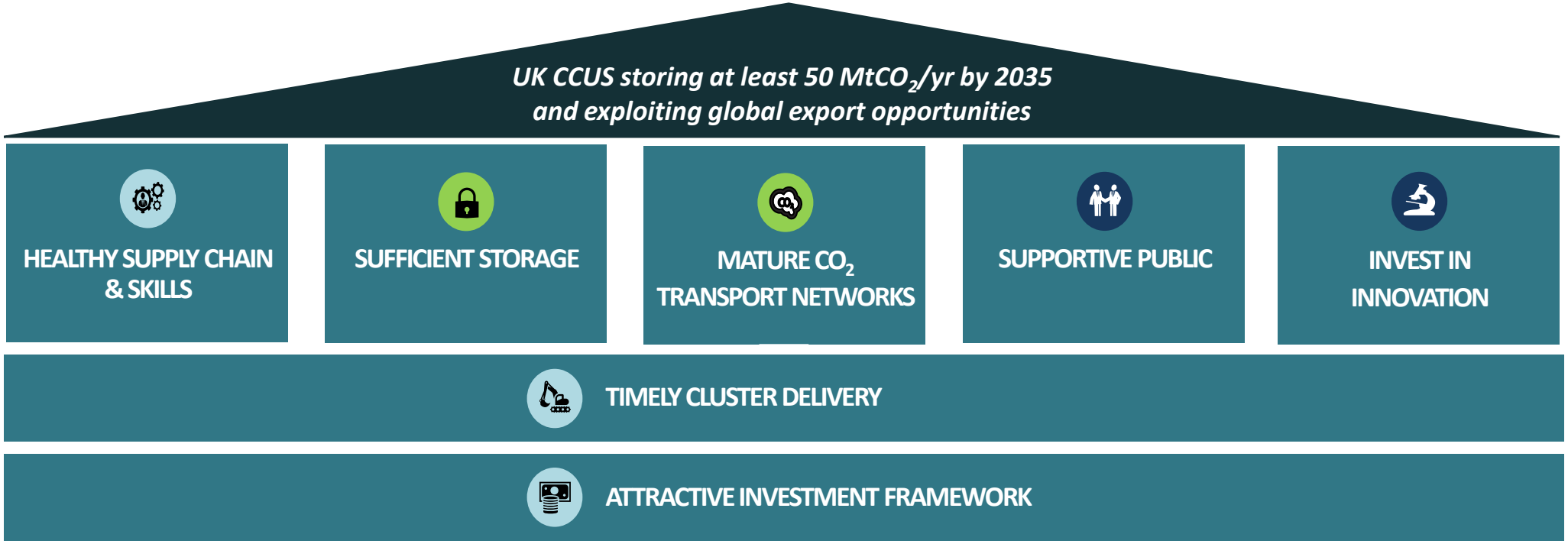
From: Afry for CCSA, 2021. ECONOMIC ANALYSIS OF UK CCUS

Industry recommendations: CCUS Delivery Plan 2035

The report recommends how to best achieve the UK Government's 2035 CCUS ambition, in order to remain on track for Net Zero by 2050

- The project had two strands:
  1. Profiling the recommended build-out rate of CCUS in the UK to reach the government's 2035 ambition; and
  2. Identifying actions required to enable its delivery

- Members, industrial clusters across the UK, and external stakeholders were engaged in a series of workshops to identify the building blocks for a successful industry and the enabling actions required



Delivery Plan 2035 – Selected key actions

1) Hold regular funded contract allocation rounds

Government must provide certainty on frequency and volume of future contract awards for further Transport & Storage and capture projects to enable industry to continue to invest in developing a pipeline of projects that can meet the UK Government's 2030 and 2035 ambitions

2) Finalise business models across the value chain

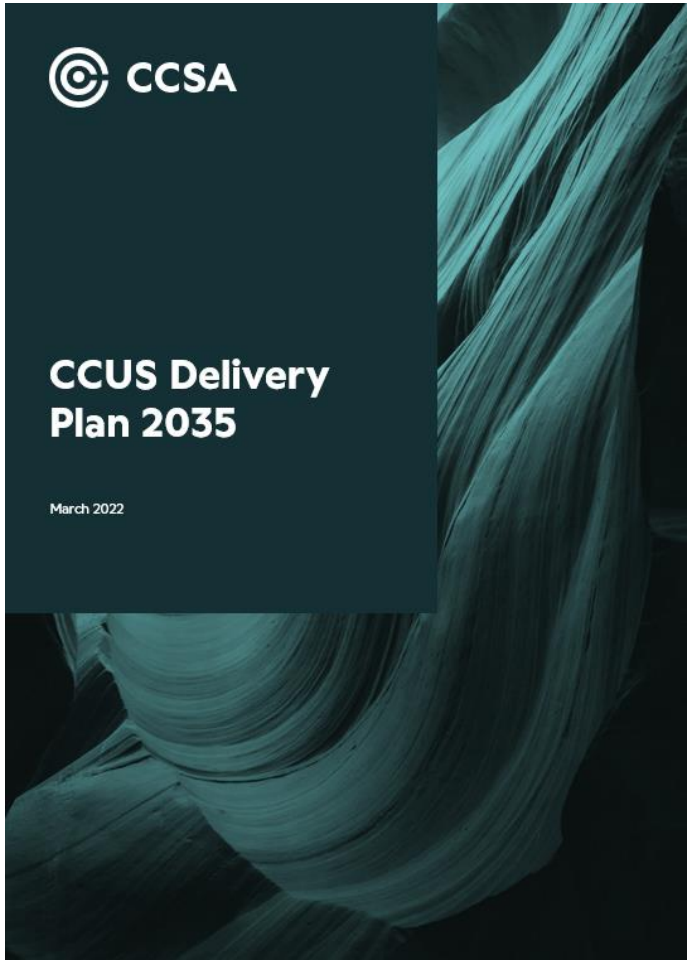
Significant progress has been made towards business models that are financeable and attract investment. Government must now finalise contract terms for industrial and power capture projects, hydrogen, and Transport & Storage, with urgent attention on Greenhouse Gas Removals (GGRs) and recognition of shipping

3) Launch of the next cluster selection process in the first half of 2022

Government should continue building confidence for deployment of further clusters by providing the process and timeline for Track-2 cluster selection; and on the basis of this, industry to continue to invest in developing further clusters

4) Legislate a policy framework to enable projects to develop at pace

Government must provide timely legislation to ensure; all delivery bodies have the necessary powers and funding to deal with projects in a timely way, permitting is streamlined and there is a legislative basis to execute business models, including GGRs valued in an evolved UK Emissions Trading System (ETS)



Questions?

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Annex

Additional Slides on the UK CCUS Business Models

CCUS Advisory Group – Final Business Models

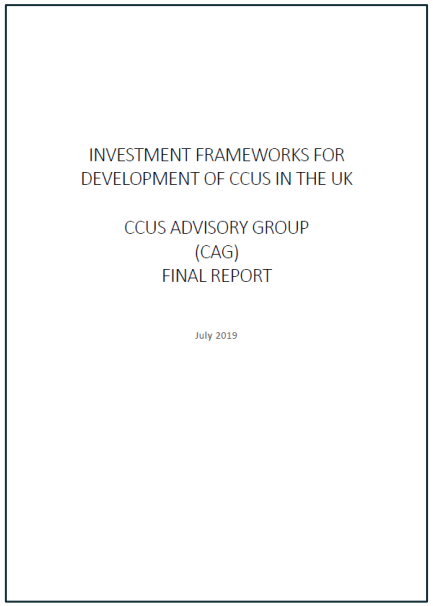
CCUS Council January 2018

CCUS Council

The purpose of the CCUS Council is to review progress and priorities on carbon capture, usage and storage (CCUS). It is also the primary forum for engaging the CCUS sector on CCUS issues.

Enabled a forum for industry, the Minister for Clean Growth in BEIS, and civil servants to discuss progress, set challenges to both industry and HMG

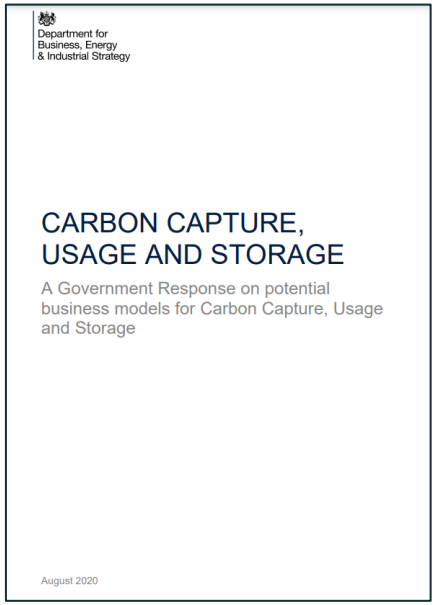
Jan-Jun 2019



Industry/Government Group to work on business model options

Regular – weekly meetings with industry commitment

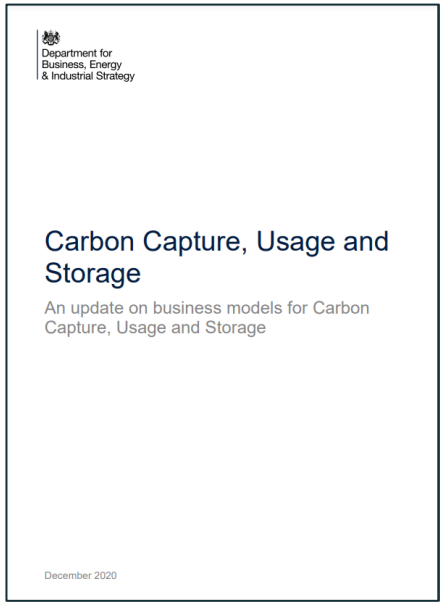
September 2019



Established an 'Expert Group' process for power, industry and T&S

Regular ~ monthly discussions with industry

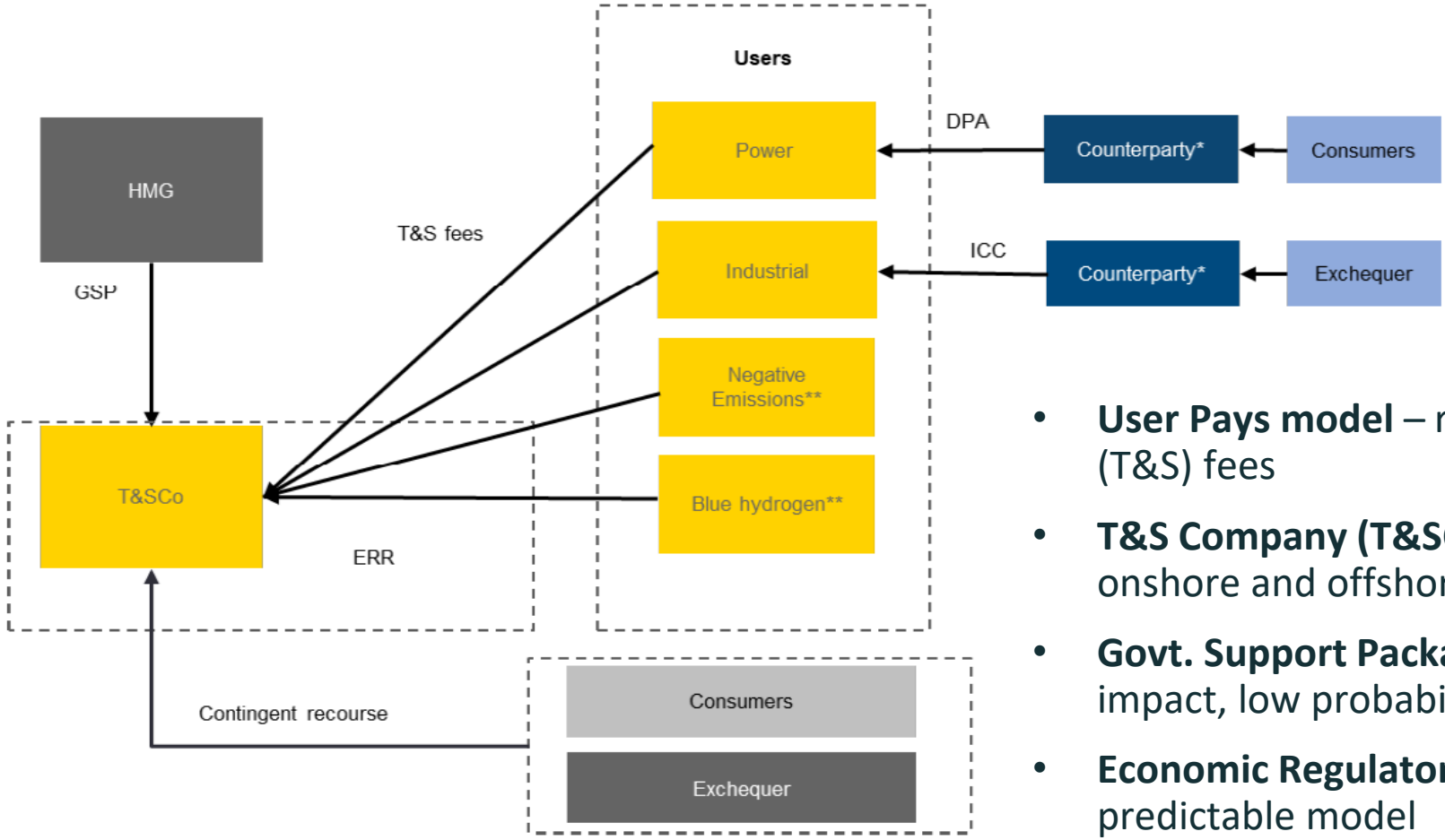
December 2020



Continued to use the expert groups, and established a hydrogen group.

4 subsequent updates have been published Finalisation in 2022/23

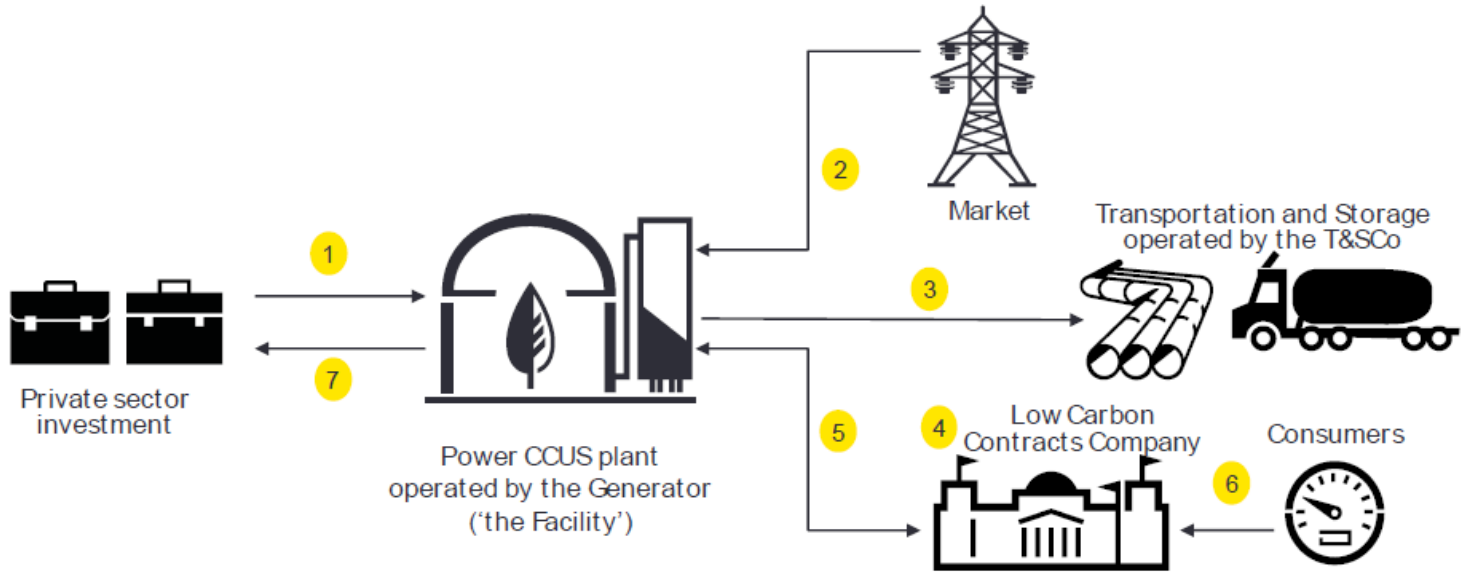
CO_2 Transport and Storage Regulatory Investment Model



- **User Pays model** – revenues from Transport and Storage (T&S) fees
- **T&S Company (T&SCo)** – owns and operates both the onshore and offshore network
- **Govt. Support Package (GSP)** – offers protection for high impact, low probability risks
- **Economic Regulatory Regime (ERR)** – transparent, predictable model

Dispatchable Power Agreement (DPA) for power CCUS

1. Private sector investment and construction of facility with carbon capture technology
2. The Power CCUS Plant provides dispatchable, low carbon power at the market price in the wholesale and balancing markets and provides ancillary services to the Electricity System Operator
3. The Generator pays T&SCo T&S fees for captured carbon
4. LCCC acts as counterparty to the DPA
5. DPA provides the Generator with payments comprising of an availability and variable payment
6. Consumer subsidy funds availability and variable payment
7. Return on investment back to private sector



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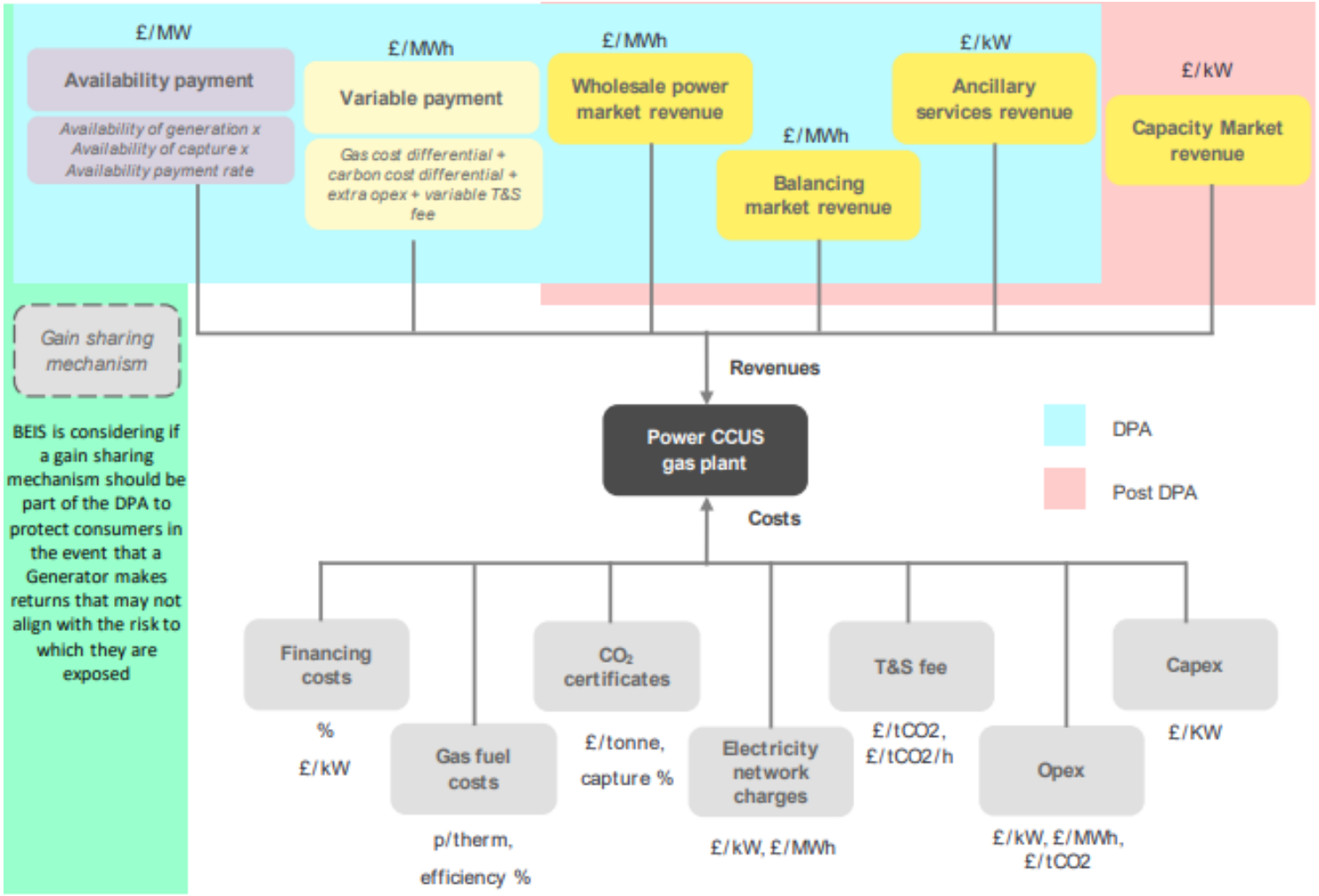
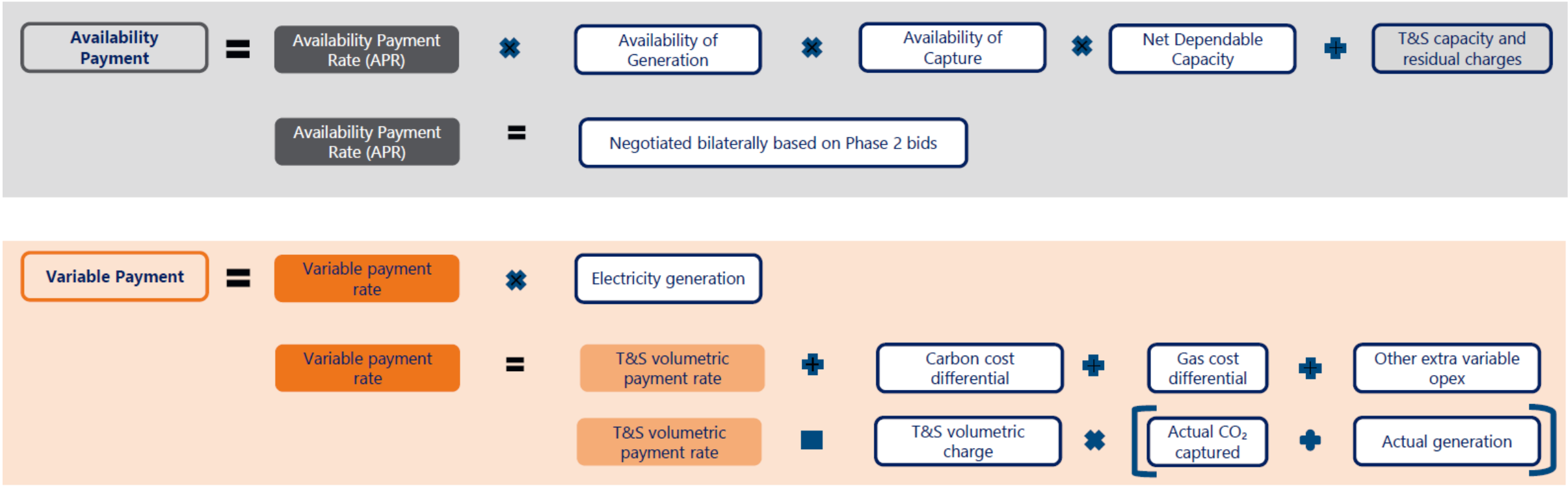


From BEIS Business Model Update 2020

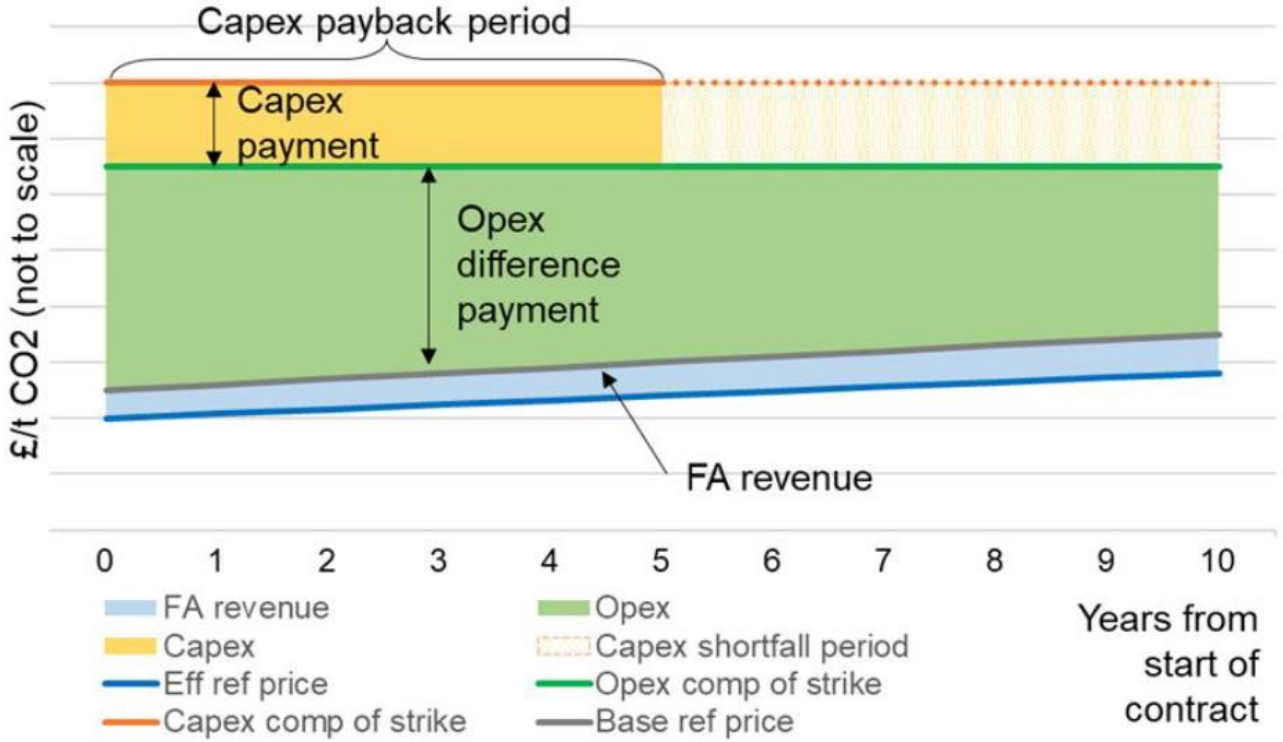
Dispatchable Power Agreement (DPA) for power CCUS



From BEIS 2022

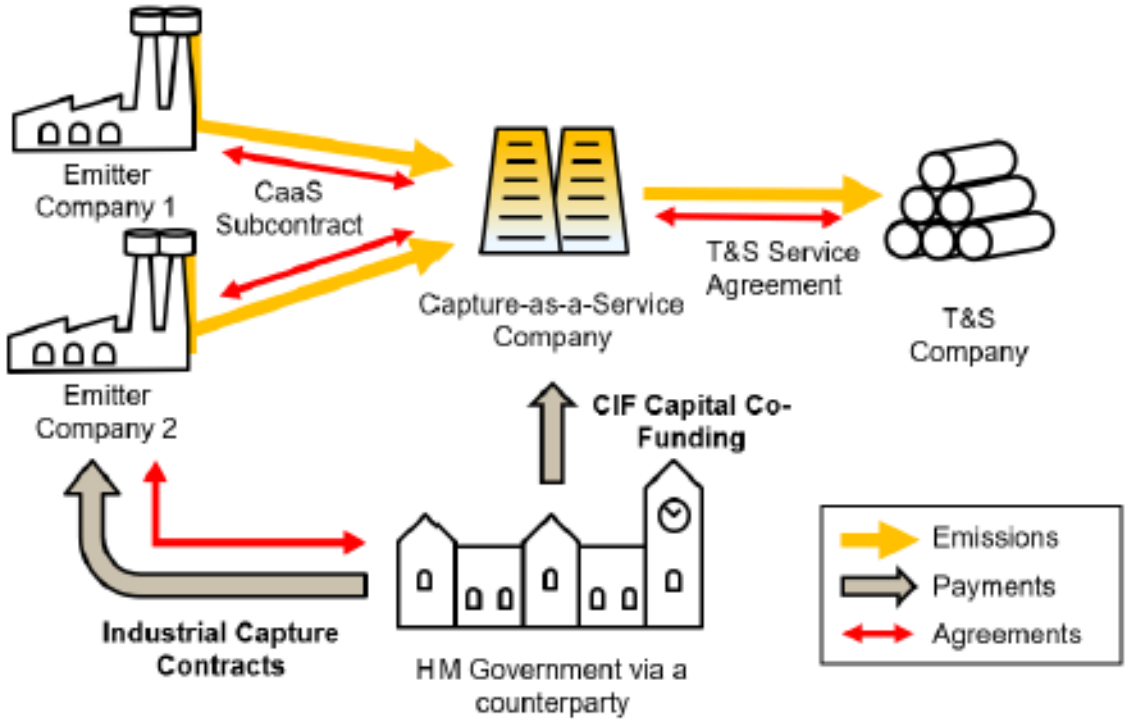
Industrial Carbon Capture (ICC) contract

- ICC contract – overall duration of 15 years possibly profiled (10 + 5 yrs)
- Negotiated bi-laterally for initial projects
- Govt. capital co-funding available for the initial projects
- Subsidy reduces as carbon prices rise and low-carbon product markets emerge
- Reference price set at a fixed trajectory, based on an assumed increase in CO2 price.
- Energy-from-Waste assessing an adapted ICC model which works for the sector



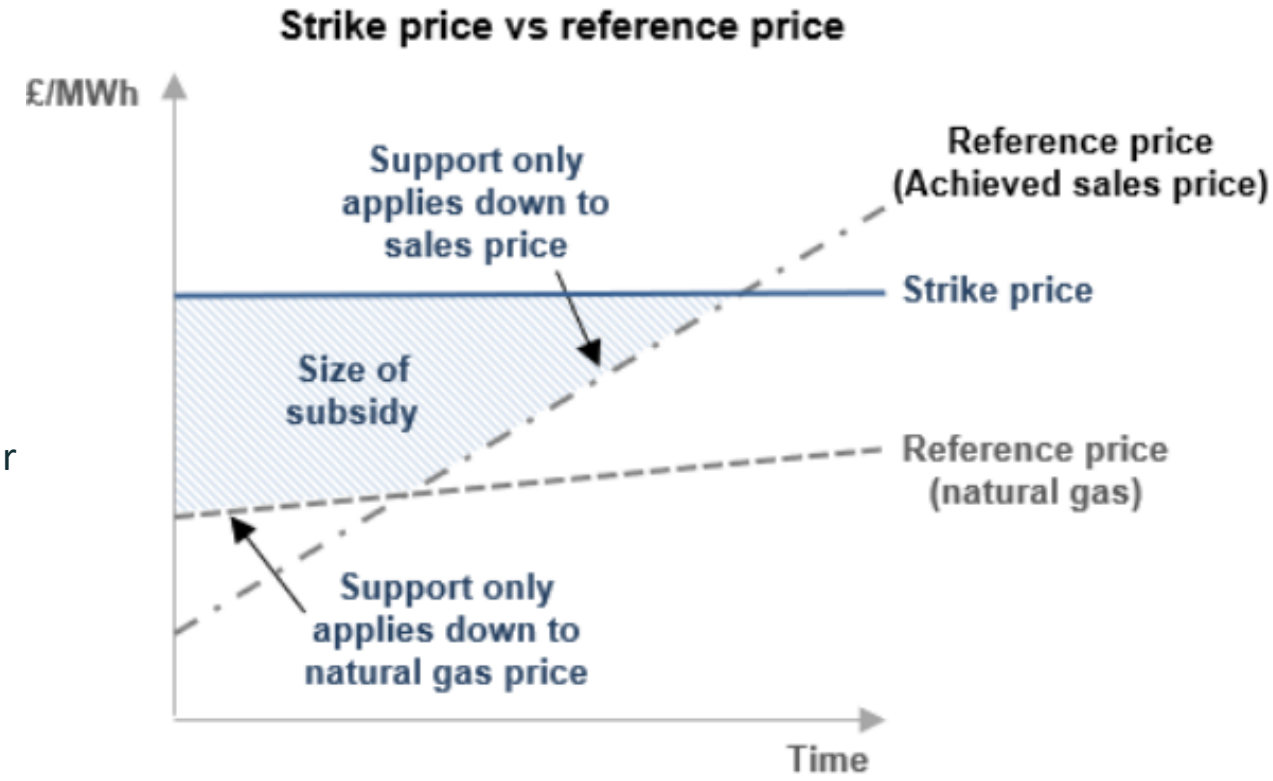
Carbon Capture as a Service (CaaS)

- Categorised under the Industrial Carbon Capture Business Model
- Allows a single capture company to provide a capture service ahead of interaction with the Transport and Storage operators
- An attractive proposition for medium/smaller emitters who may not have the expertise or funding to deploy carbon capture independently
- Development of Non-Pipeline Transport of CO2 a key enabler of the deployment of CaaS across the UK at coastal and dispersed CO2 sources.



Hydrogen Production CfD

- Production method agnostic (Green and Blue)
- Reference price is the natural gas price
- BEIS considering how to introduce an achieved sales price incentive
- Volume risk is still being considered by BEIS. How do you design a mechanism to cover the issue of early network over production?
- BEIS are proposing a volume risk 'sliding scale', which may not suit the characteristics of CCUS enabled hydrogen production well.
- Finalisation of hydrogen business models in 2022

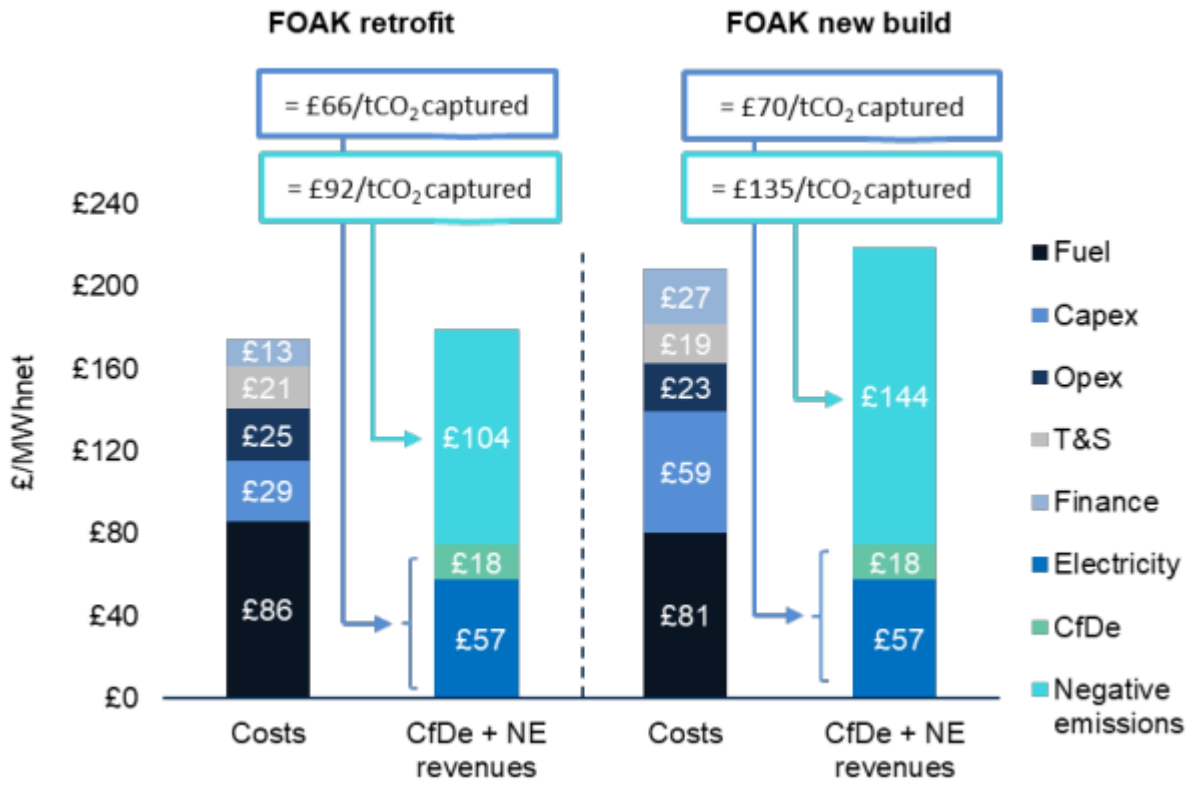


Indicative not official policy

Greenhouse Gas Removals (GGRs) – BECCS and DACCS

- BEIS envisage early market exploration to be done by power BECCS projects (such as biomass fired power stations)
- CCSA envisage a negative emissions payment mechanisms enabling early projects, which over time will move to a Carbon CfD
- Uncertainty on negative emissions in the UK ETS scheme

Electricity CfD with negative emissions revenues



From Element Energy & VividEconomics 2021 report for BEIS on Investable commercial frameworks for Power BECCS