CCSA Regulation & Policy Working Group Meeting

12/12/2024
11:00 (GMT)
12:00 (CET)

CCSA

Agenda

	Time (GMT)	Time (CET)	Topic	Speaker
1.	11:00	12:00	Introduction & CCSA competition law policy notice	Co-Chair, Jenny Sutcliffe
2.	11.10	12.10	Updates on key UK CCUS activity	CCSA
3.	11.35	12.35	Industrial Strategy Update	DESNZ
4.	12.00	13.00	CCUS Programme Update	DESNZ
	12.30	13.30	Lunch	
5.	13.30	14.30	CCSA Projects Update - Status Update - Cost Reduction Findings - Spring CSR Project Plan	CCSA KPMG AFRY
	14.45	15.45	Break	
6.	14.50	15.50	Updates on key EU CCUS Activity	CCSA
7.	15.05	16.05	Task Subgroup Updates	CCSA
9.	15.25	16.25	Conclusions and AOB	Co-Chair, Jenny Sutcliffe

House keeping & Introductions

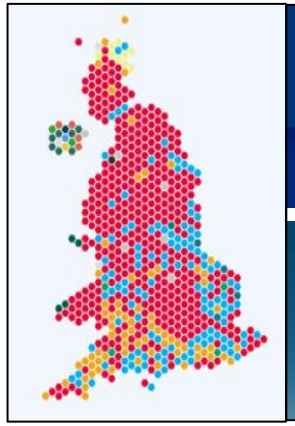
- Slides & Recording will be available for members after the meeting
- CCSA Competition Law Policy notice is attached to the meeting invite and available on the CCSA website
- If you are not speaking please mute your microphone
- Please **raise your hand** if you wish to comment, you will be invited to come off of mute, if you can also turn on your camera
- Please also pose any **comments in the chat** and these will be picked up by the secretariat
- **Introductions** of any new members joining the call
- Approval of September minutes

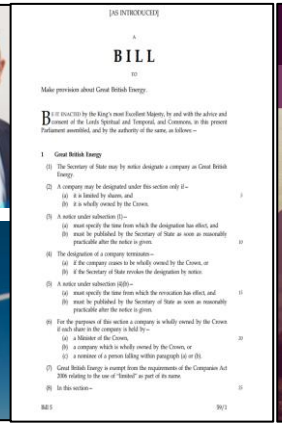
Updates on key UK CCUS activity

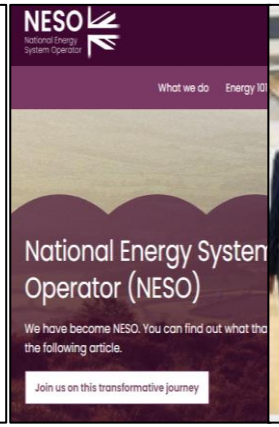
CCSA Secretariat

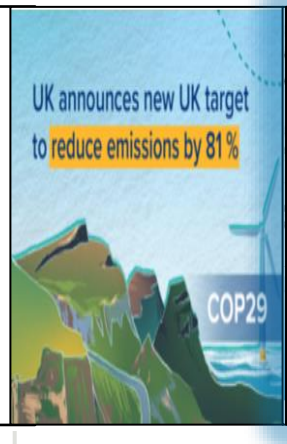
CCSA

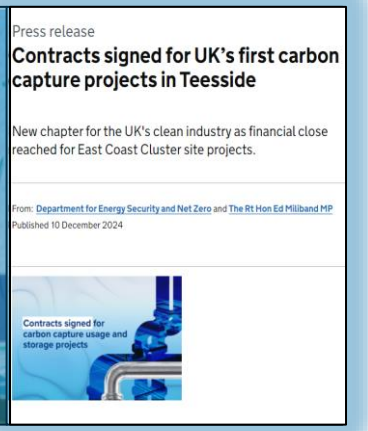
Key developments since the change of government











4 July: 2024 General Election – Labour majority of 411 seats.

9 July: Chris Stark appointed to **lead Mission Control for Clean Power by 2030.** **National Wealth Fund** launched - align the UK Infrastructure Bank and the British Business Bank.

25 July: GB Energy Bill introduced, GB Energy partnership with The Crown Estate. National Wealth Fund, SAF, Planning and Infrastructure, Skills England

1st October : Official launch of the NESO and development of Clean Power 2030 plans

4th October: £21.7bn funding committed to first CCUS projects

14th October: Industrial Strategy; Invest 2035 at the International Investment Summit

30th October Autumn Budget and pretext to Spending Review: Spring 2025 *and* New UK target to reduce emissions by 81% by 2035 @ COP29 (incl.CCUS)

10th December Net Zero Teesside Power (NZT Power) and the Northern Endurance Partnership (NEP) have reached financial close and now move into execution phase

International CCUS –CoP29

Nationally Determined Contributions (NDCs)

- New NDCs will be submitted by February 10, 2025 and will incorporate the Global Stocktake agreed at COP28.
    - CCS was explicitly mentioned as a climate mitigation solution to be used in NDCs at the Global Stocktake last year.
- The UK and Brazil have paved the way with ambitious NDCs announced at COP29 ahead of the deadline.
    - UK 2035 NDC emissions reduction target of at least **81%** below 1990 levels.

New Collective Quantified Goal (NCQG)

- New collective climate finance goal to support climate action in developing countries post-2025.
    - **$300bn** per year by 2035.

Update on Article 6 :

- **Adoption of standards** on methodology requirements and standards for activities involved in removals with a positive signal to markets to utilise the Paris Agreement Crediting Mechanism.
    - These standards are designed to ensure consistency and credibility for carbon removal projects, providing a structured pathway for various removal methods, including durable carbon removals such as DACCS and BECCS with permanent geological sequestration of CO2.
- Adoption of a **Sustainable Development Tool** that requires Parties to identify, evaluate and mitigate potential environmental and social impacts associated with removal projects.
- Adoption of an **Appeals & Grievances Procedure** to ensure the necessary checks and balances in the operation of the mechanism.
- Further work to be done on detailed standards and guidance for different types of removal activities.

State of play across the CCUS business models

Near final

- CO_2 Transport & Storage (TRI):
  - Regulated Model
- Dispatchable Power Agreement (DPA)
  - Adapted CfD
- ★ Industrial Carbon Capture (ICC):
  - CfD

Near Final/Advanced

- ★ Industrial Carbon Capture (EfW):
  - Adapted CfD
- Low Carbon Hydrogen Production:
  - CfD

Early phases

- ★ Engineered GGRs:
  - CfD
- Power BECCS:
  - 'Dual' CfDc (carbon) & CfDe (electricity)
- Hydrogen Transport (RAB)
- Hydrogen Storage (Revenue Floor)

Not started

- ★ Non-Pipeline Transport
- CCU
- Dispersed Sites

There are calls for feedback on proposals for 4 of the business models through DESNZ's industry / expert groups.

For further information, please contact the CCSA Secretariat:

- ICC & Waste ICC: Beth Hebditch (beth.hebditch@ccsassociation.org)
- GGRs: Despoina Tsimprikidou (despoina.tsimprikidou@ccsassociation.org)
- NPT: Charles-Albert Bareth (charles-albert.bareth@ccsassociation.org)

Consultations

Code	Recently completed consultations (x9)	Date
MHCLG	Proposed reforms to the National Planning Policy Framework	24 Sep
Regulator Committee	Skills Inquiry	27 Sep
Gold Standard	Engineered CDR Activity Requirements	04 Oct
Ofgem	Regional Energy Strategic Plan Policy Framework	08 Oct
DBT	UK Industrial Strategy	24 Nov
PAC	CCUS PAC Inquiry	28 Nov
NESO	Connections Reform	02 Dec
DESNZ	Capacity Market	10 Dec
DESNZ	Capacity Market – proposals to maintain security of supply and enable flexible capacity to decarbonise	10 Dec

Code	Open consultations (x9)	Date
Ministry of Justice	Judicial Review and NSIPs	30 Dec
ESNZ Committee	Workforce Planning to deliver clean, secure energy	13 Jan
NESO	Strategic Spatial Energy Plan draft methodology	20 Jan
NESO	Centralised Strategic Network Plan high-level principle	20 Jan
NESO	Transitional CSNP2 Refresh methodology,	20 Jan
DfT	RTFO Statutory Review & future of scheme	27 Jan
ETS Authority	Inclusion of NPT in the UK ETS	23 Jan
HMT	UK Green Taxonomy	06 Feb
Welsh Government	Preferred Policy on CCUS	24 Feb

Code	Overdue or expected consultations (x7)	Date
EA	EALs for CCS	Q3-23
HMT	Secondary legislation on ETS cap	2024
DESNZ	Biomass Sustainability Criteria	2024
NESO	Strategic Spatial Energy Plan Methodology	2024
HSE	Requirements for HSE regulation development to facilitate CCUS and Hydrogen deployment	2024
HMT / DESNZ	Steps for high integrity VCM market	Q1-25
DESNZ	Third Party Access	Q1-25

40

Consultations, calls for evidence and parliamentary inquiries responded to in 2024

Industrial Strategy Update

Hugo Jones, DESNZ

CCSA

CCUS Programme Update

Matt Taylor & Paul Dyer,
DESNZ

CCSA

Lunch *[1 hour]*

Meeting reconvenes at 13.30 GMT / 14.30 CET

Accelerating a Europe-wide CO_2 Storage Market

CCSA

Resources

- The Cross-Border CO_2 Transport and Storage Study was carried out by Xodus, a Subsea7 company, on behalf of the CCSA.

- The findings of the study underpin the paper "*Accelerating a Europe-wide CO2 storage market*", published by the CCSA in December 2024.

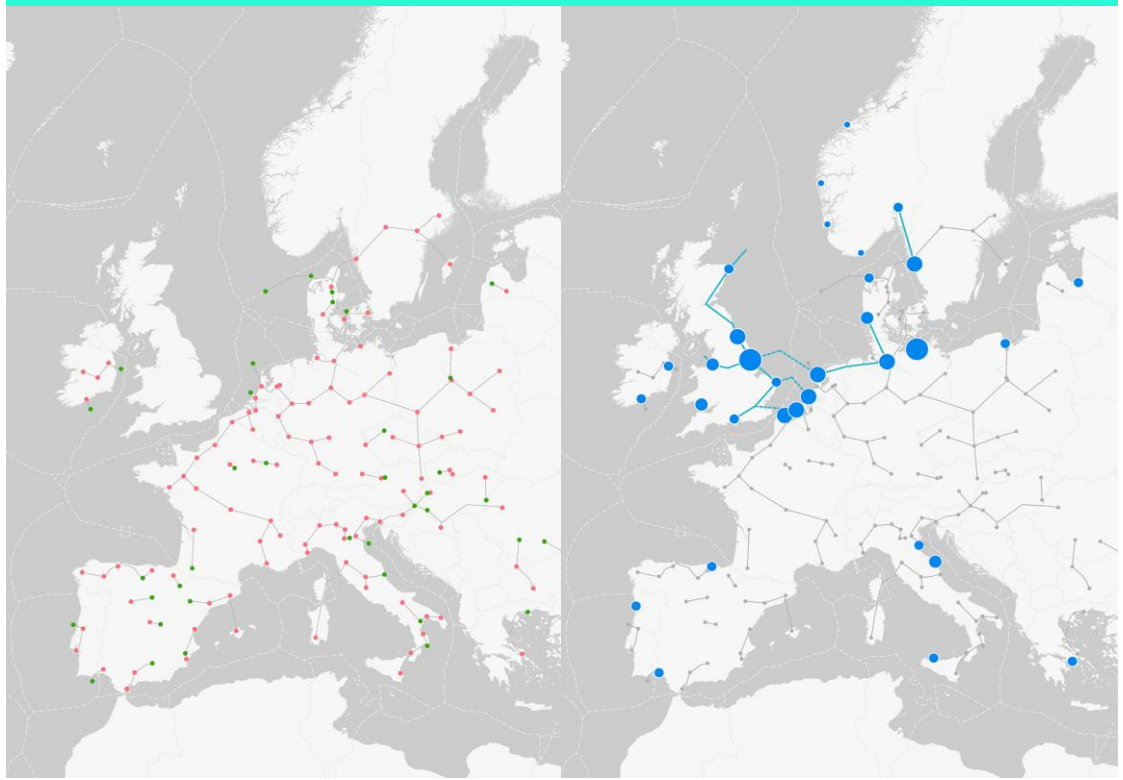
- You can explore the tool used in the study, and read about the methodology used, at this dashboard.

Download the report at:

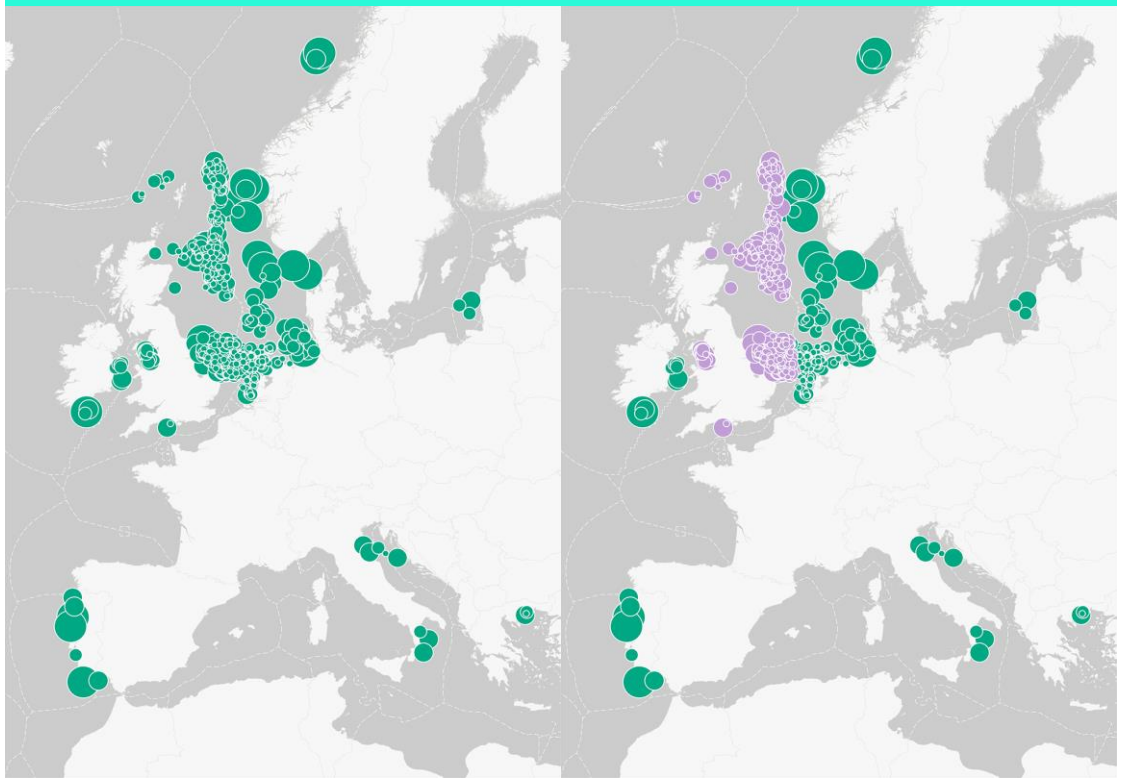
For the detailed methodology for this study, and full outputs, see the dashboard at:

Optimising CCUS Transport & Storage Infrastructure

Demand - 243 MTPA by 2040



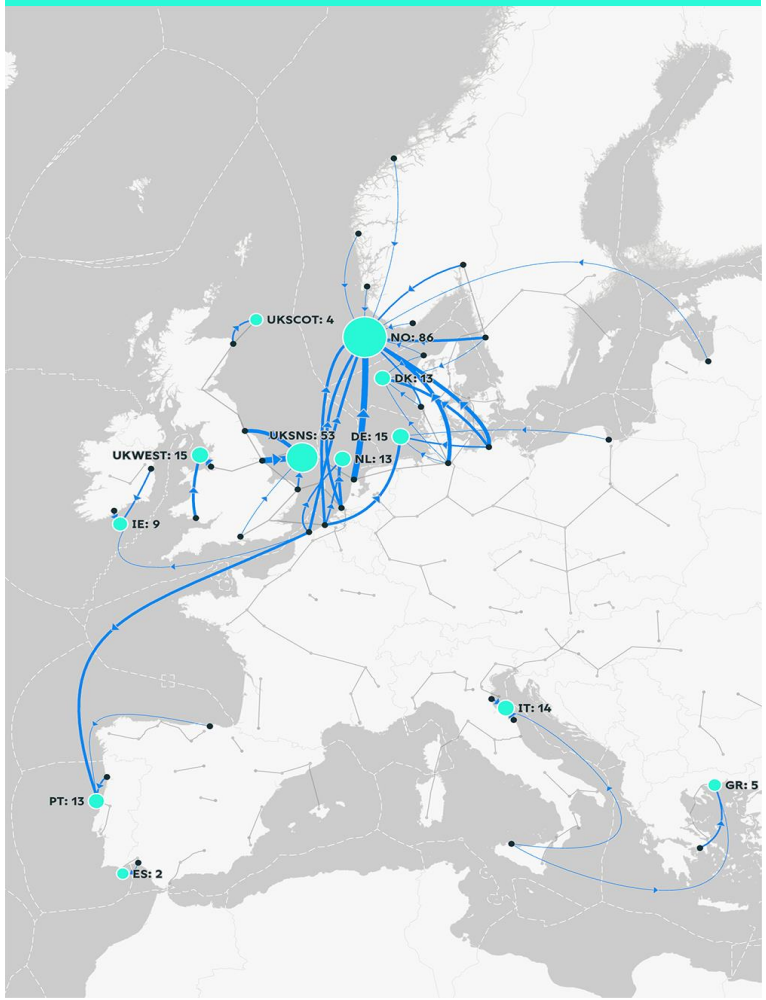
Supply - 506 offshore storage options



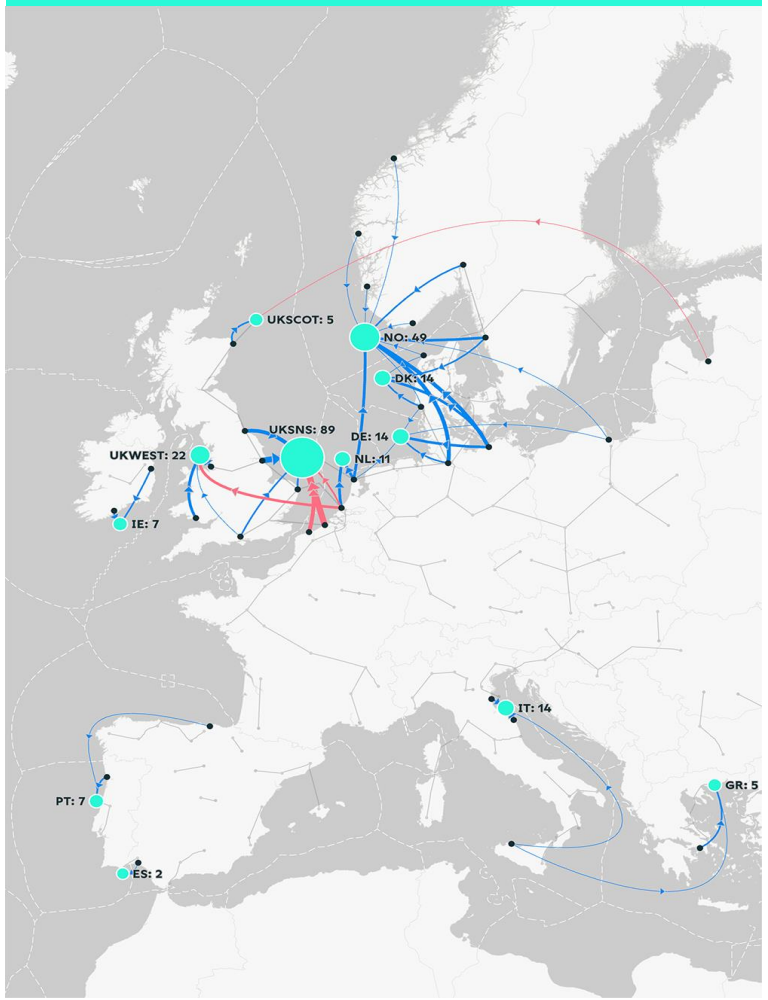
Source – JRC

Economic Model Output in 2040 – CO2 Flows

No Cross Border - €52 per tonnes



Cross Border - €41 per tonnes



Report findings

01

Emitters in Europe using offshore CO_2 storage would benefit from a **20% cost saving (€11/t)**

02

Emitters in the **EU-27 countries** could, on average, benefit from a **28% (€16/t) reduction in T&S of CO_2**

03

The UK would benefit from lower CO_2 storage costs for its emitters due to CCS projects with a higher scale factor

04

Reduction in transport and storage costs for NWE emitters are shown to be greater than average (28%)

05

Any delay in enabling this storage market would lock emitters into higher-cost storage

Recommendations

01

EU-UK Trade and Cooperation Agreement

Equivalence or recognition of the CCS permitting regimes

Supplementing agreement under the TCA to contain CCS regime minimum criteria, Governance Body and Dispute resolution mechanism

02

EU and UK legislation – ETS

ETS Directive - Article 12(3a)

Amend the Monitoring and Reporting Regulation

Changes to UK legislation

03

Further legislative considerations

CO_2 stream specification standard

CO_2 metering standards

Third-party access Infrastructure and facilities between the UK and the EU

04

London Protocol

Procedural formality to overcome

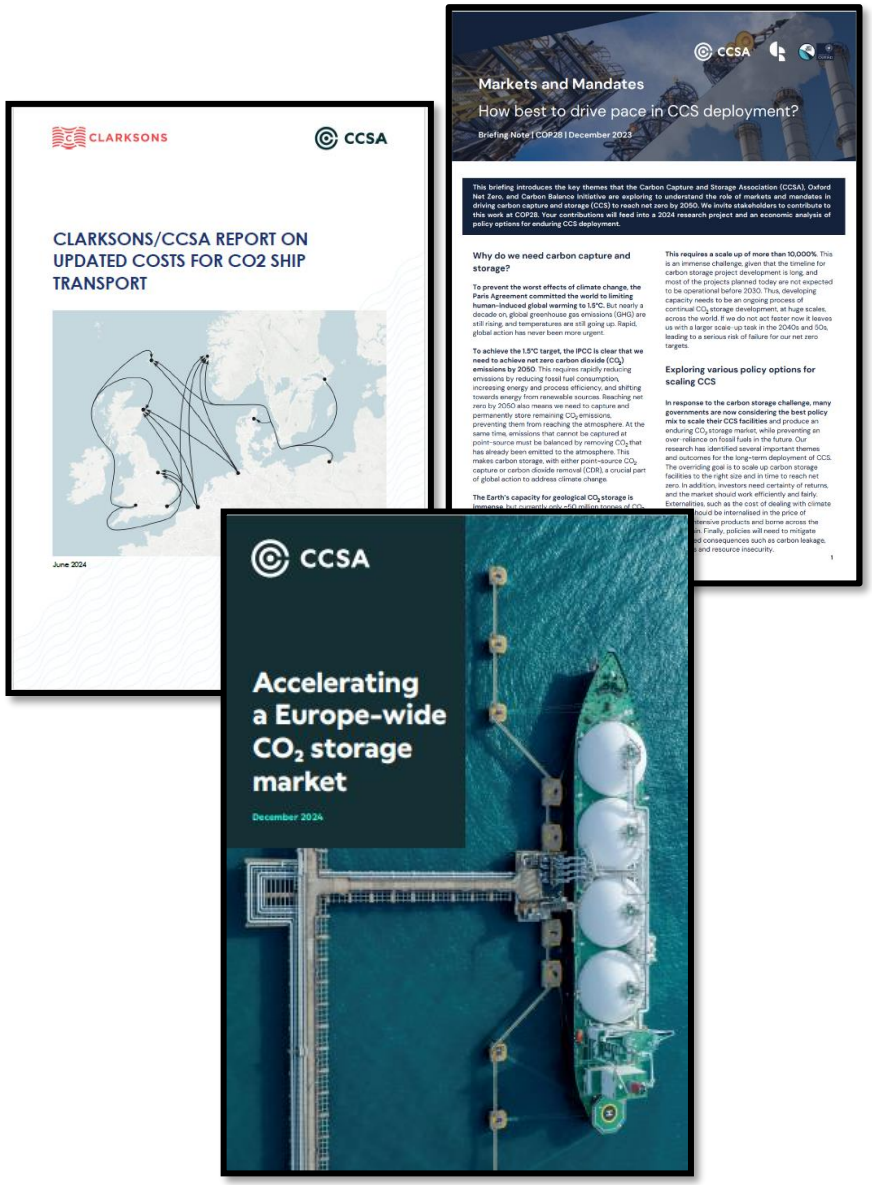
Notifications and agreements or arrangements

CCSA research and projects update

Rebecca Bell & Beth Hebditch (CCSA)
Samuel Levin and Piers Johnston (KPMG)
Stuart Murray, Alan Oldham and Michael Gravanis (Afry)

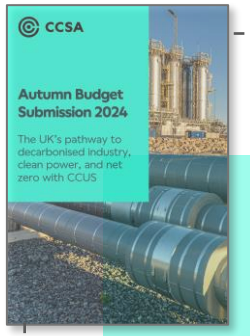
Research and Projects - Towards a Market Framework

- **Budget and CSR submissions: Autumn 2024, Spring 2025**
- **Delivery Plan update 2025**
- **Potential future allocation frameworks (with Baringa)**
  - Two member workshops
  - Survey
  - Baringa currently drafting the analysis
  - Third workshop TBA
  - Will feed in to CSR submission
- **Markets and mandates**
  - Focusing on a UK carbon takeback obligation
  - Member and stakeholder workshops and 1-2-1s
  - Several rounds of member comments on the draft reports
  - Report currently being finalised
  - Publication early 2025
- **Cross-border CO2 transport and storage**



Recap of key workstreams: today's focus

This afternoon's update:



Workstream 1

Autumn Budget submission 2024

Status: complete

- The immediate sector and policy **priorities for 2025/26**
- High-level narrative illustrating **cost reductions** associated with increased and/or accelerated CCUS deployment
- Showcase the potential additive role of **GB Energy** and the **National Wealth Fund** in deploying the industry at scale

Workstream 2

Cost reduction analysis

Status: final stages

- **Workshops with CCSA members** to explore the key areas of potential cost reduction for CCUS
- Working with AFRY to **quantify elements of the cost reduction analysis**
- Summarising **findings and policy levers for government** to support a cost-effective and self-sustaining CCUS industry in the UK

In progress

Workstream 3

Spring Budget submission 2025

Status: underway

- An update of the total **revenue support envelope** using latest cost and project data
- **Quantified ranges for cost reduction potential** associated with CCUS deployment and government levers to deliver cost reductions (including GB Energy and National Wealth Fund)
- Outline of the **growth opportunities and benefit to UK Plc and HMG,** with case studies

Delivery Plan Update 2025

- Updating our understanding of the UK CCUS landscape
- Gathering data from members on capture and storage projects
- Anonymising data and feeding into Afry modelling, as well as CCSA's own analysis

Project update – Cost Reduction

CCSA
KPMG

Agenda

1. Recap of the cost reduction workstream
2. Cost drivers for CCUS deployment
3. Opportunities for cost reductions across the value chain
4. Recommendations for government to deliver these cost reductions

Recap

CCSA

The cost reduction analysis framework

1. Scope of analysis

This analysis conducted research and stakeholder engagement from across the CCUS value chain. Engagement included written input, multiple interviews with specific organisations, CCSA working groups, and three bespoke workshops.

Carbon capture

- Industrial capture
- Gas power CCS
- Removals
- Hydrogen

Transport & storage

- Transport & storage

2. Identification of cost drivers and opportunities

The analysis looks to identify cost divers and potential opportunities for cost reduction across a comprehensive range of topics

Cost area	Topic
Reducing cost to deploy CCUS	Supply chain
	New technologies and innovation
	Contracting and procurement
	Permitting and planning
	Finance and insurance
	Funding allocation frameworks
	Skills
Reducing level of government subsidy	Carbon market frameworks
	Supporting low carbon power
	Cross-border markets
	Hydrogen markets

3. Outputs

1. **Cost drivers for CCUS deployment:**
   Cost drivers across 1) project deployment and 2) policy and market frameworks that contribute to high commercial risk and CCUS deployment costs

2. **Opportunities for cost reductions across the value chain:**
   How the cost drivers can be addressed and create opportunities for cost reduction across the CAPEX, OPEX, and WACC of deployment cost, quantified at a high level

3. **Recommendations for government to deliver these cost reductions:**
   Recommendations for government to achieve these cost reduction opportunities in the near term

Cost drivers for CCUS deployment

CCSA

Cost drivers for project deployment

Cost driver	Description

Risk allocation in supply chain contracting	• The Track-1 process incentivises traditional competitive and fixed-cost contract to drive value for money. This can drive cost increases through:
	  • **Risk allocation:** fixed cost contracting approaches result in risks being costed into each part of the supply chain.
	  • **Barriers to information sharing:** non-collaborative approaches prevent information sharing that could deliver efficiencies in how the project is designed and developed

Restrictive performance guarantee penalties and technical requirements	• **Rigid performance standards** enforced through payment suspensions passes significant risk onto developers. This can result in:
	  • Over-designed and specified equipment and processes,
	  • Increased financing costs, and
	  • Disincentivised deployment of novel technologies

Uncertainty and delays in permitting & planning	• Projects are facing extended planning and permitting process timelines of up to three years or more, this can result in:
	  • Delays to project timelines and FIDs
	  • Potentially unrealistic or overly conservative design assumptions to avoid the risk of permitting delays
	  • Significant additional cost (time and money) spent on large project teams and consultancy fees

Cost drivers from policy and market frameworks

Cost driver	Description

Lack of stable carbon price and market frameworks	• **The uncertainty in the UK ETS carbon price and policy changes** has direct impacts on:
	  • **Investor confidence** in the sector and long term investment decisions
	  • **The level of subsidy** required to deploy CCUS

Barriers to full value chain collaboration	• The Cluster Sequencing process is currently unable to leverage benefits from **full value chain cluster optimisation** • Individual project designs cannot include potential efficiencies from system level choices, and prevented knowledge sharing and collaboration between different parts of the value chain
Limited access to T&S networks	• Storage access is currently limited to emitter projects connected via pipeline and selected through the Cluster Sequencing process • The small user base creates significant network utilisation risk and liabilities for UK Government • Lack of merchant access to stores, and clear policy for broadening the user base may miss an opportunity to lower overall levelised cost of abatement for UK Plc
Uncertainty in the value of negative emissions	• The value of negative emissions remains uncertain to developers until business model designs and ETS policy is progressed • Negative emissions present a potentially significant source of revenue for emitter projects which could reduce subsidy and help stimulate growth of new markets

Opportunities to reduce costs

CCSA

Opportunities to reduce costs

Value chain segment

- Industrial capture
- Gas power CCS
- Removals
- Hydrogen

Cost area	Opportunities for cost reduction	2030 reduction (%)	2035 reduction (%)
CAPEX	• Collaborative contracting • Cross-value chain collaboration • Technology improvements and innovation • Learning by doing • Equipment specifications	~10-25%	~15-30%
OPEX	• Technology improvements and innovation • Cross-value chain collaboration	~5-10%	~5-25%
WACC	• Sector maturity and delivery at scale • Improved risk allocation frameworks • Collaboration with insurers	Potential to bring down to core-plus infrastructure rates (to 5-10%)	

- Transport & storage

Cost area	Opportunities for cost reduction	2030 reduction (%)	2035 reduction (%)
CAPEX	• Collaborative contracting • Cross-value chain collaboration	~5-20%	~10-25%
OPEX	• Learning by doing	~5-10%	~5-10%
WACC	• Sector maturity and delivery at scale • Improved risk allocation frameworks • Collaboration with insurers	Potential to bring down to core-plus infrastructure rates (to 5-10%)	

Recommendations for government

CCSA

Primary recommendations for government

1 Refine the approach to funding allocation

Learning from Track-1, the funding allocation process should remain consistent but be updated for Track-2 to improve the risk sharing between parties and drive greater full value chain optimisation. Supporting recommendations include:

- Incentivise full value chain collaboration
- Reduce the performance risk place on emitters

This evolution for Track-2 should then also help inform the design of the regular funding allocation rounds that will be needed beyond Track-2 and that are necessary to give industry confidence to invest.

2 Accelerate delivery of comprehensive carbon markets both in the UK and internationally

There are existing proposals for the expansion of the UK ETS, implementation of a CBAM and development of cross-border CO_2 transport and storage markets.

These proposals should be implemented in an efficient and timely manner to give long-term economic signals, stimulating investment and accelerating commercialisation of the sector.

3 Deploy public finance through GB Energy and National Wealth Fund

Targeted public finance mechanisms can overcome the commercial challenges facing first-of-a-kind projects, including to help mitigate risk and address public liability issues.

This use of public finance can help optimise the use of government money for CCUS deployment, ensuring a sustainable funding approach that can be iterated over multiple allocation rounds. This, in turn, will derisk financial decision and enable more private finance to enter the sector in the medium to longer term.

These recommendations are supported by a number of implementing actions for government and industry

Introduction to the CSR & delivery plan update

CCSA

CCSA

Introduction: framing the CSR submission

- The CCSA will be making a submission into the Spring 2025 Comprehensive Spending Review
- The CCSA's Spring Budget 2024 submission was framed around 4 key themes, with case studies to support each
- The CCSA is updating these themes to reflect the priorities communicated by the new government

Spring Budget Submission 2024: recap

Investing in the UK

Create High-Quality Jobs, Protect our Industries, and Secure the UK Supply Chain

Export our Expertise in Low Carbon Products & CO2 Storage

Deliver Energy Security

Change of government

CSR submission 2025: reframing

Economic growth opportunities & multiplier impacts

Make Britain a clean energy superpower (CP30)

Driving cost reductions through mobilising private capital (GB Energy, National Wealth Fund)

Protecting and repurposing our existing offshore skilled workforce

Export expertise in low carbon products, manufacturing & CO2 Storage

Delivery Plan

Summary

- Over the summer we carried out a light touch update of the key data in our Delivery Plan, which fed into the Autumn budget submission.
- We are now kicking off the data gathering for our 2025 update.

Next steps

- Data collection survey to all members
- One-to-one meetings with cluster leads
- Aiming for as full coverage as possible

All information provided to the CCSA will be stored securely and anonymised

Anonymised data from the Delivery Plan update will feed into the CSR modelling

Member involvement

- When requested, please provide data on your projects
- If you have responded before, we will ask you to update your previous response
- If you want a meeting to discuss, let me know

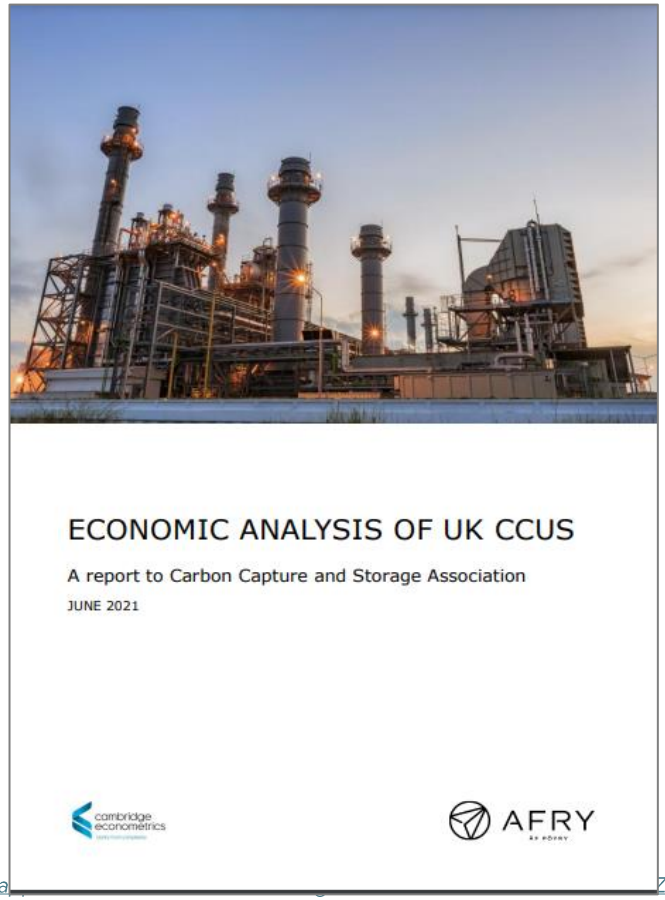
Overview of AFRY model and data gathering

AFRY

CCSA

Introduction to UK CCUS econometric and cashflow model

- In 2021, CCSA engaged AFRY and Cambridge Econometrics to develop a public report including an econometric and cashflow model of UK CCUS development
- The key aims were to:
  1. Understand the value of CCUS development to UK plc
     - GDP, industrial GVA, jobs
  2. Calculate the potential envelope of cost commitments to support the roll-out of CCUS in the UK
  3. Highlight some areas where CCSA members felt that continued progress was needed to maximise the success and benefit of the clustering program
- The process that was followed involved:
  - Taking CCSA member data as core input to costs
  - 3 meetings with BEIS team to check modelling of cashflows, and 2 separate meetings to deliver key results
- This analysis has been updated annually for the CCSA delivery plan, and for submission in budget 2023 and budget 2024 to account for:
  - Evolving assumptions on business model design, although not a full rework
  - Input up to date assumptions on roll-out volumes, commodity prices, costs



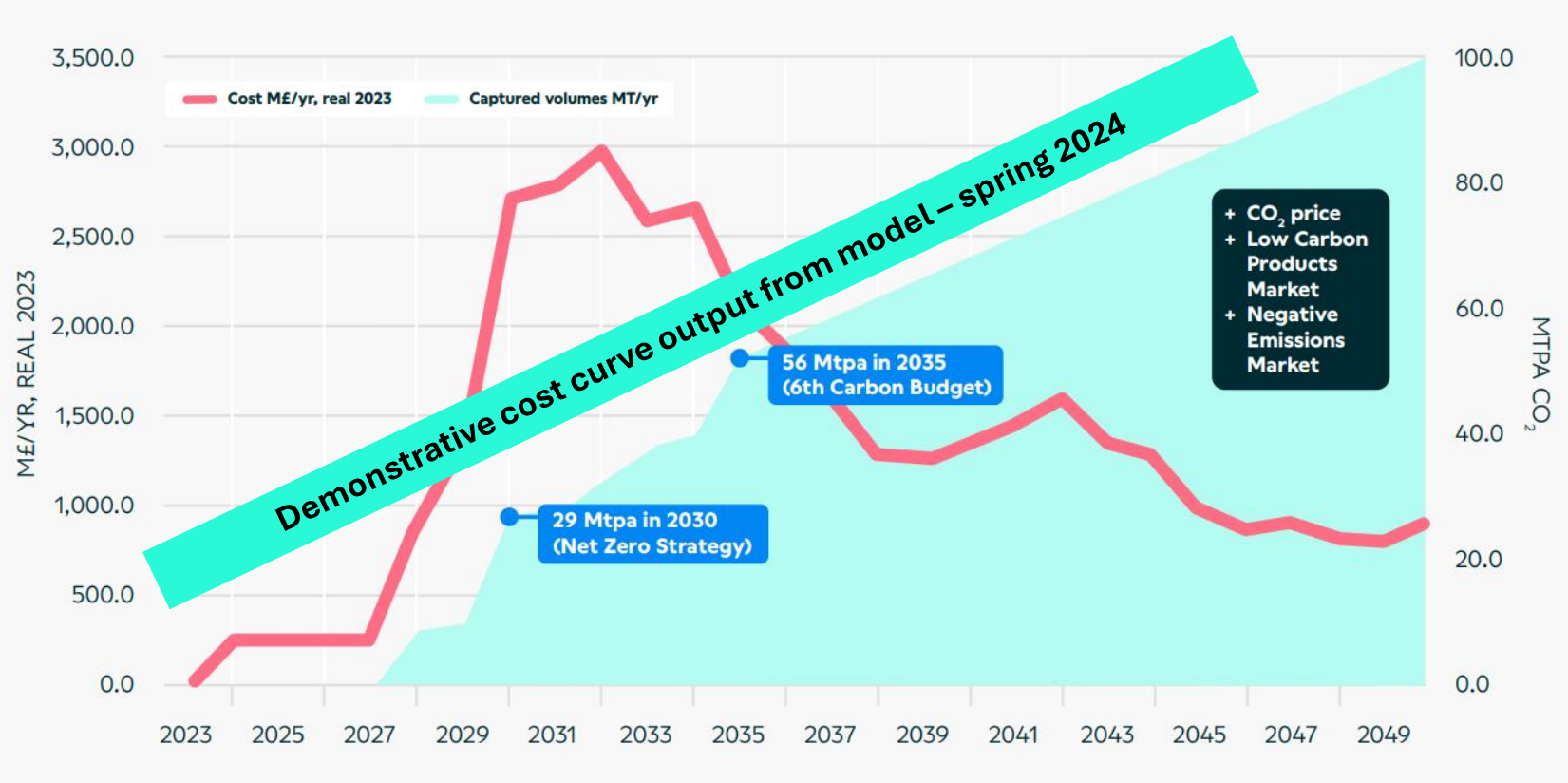
https://seors.unfccc.int/a... Z0F8H0J68GCU07Z1YB JZMDLG

Example output curve: Net annual support costs for government & energy consumers

Spring Budget **Submission** 2024 – Annual Support Costs to Deliver 20-30 Mtpa by 2030 and 50-60 Mtpa by 2035

m£/year, real 2023

To be updated for Spring 2025



Autumn 2024 budget updates:

- CCSA gathered data from a range of cluster leads and project developed person roll-out
- Cost estimates were increased, driven by wider economic conditions, supply chain issues and increasing commodity prices
- Updated market and policy assumptions (mitigated this increase)

Spring CSR 2025:

- Comprehensive update now underway for upcoming CSR in Spring 2025
- Incorporate KPMG cost-reduction results into model

Key inputs and assumptions into model

1 2 3 4 5

1

Business model and policy assumptions

a. We assume different carbon capture business models for industry, BECCS, electricity and hydrogen. Potential to add in separate business models for EfW and removals
b. There are different policy assumptions that can be used as levers to explore impact on required support costs

2

Capture capacity roll-out rate and split across the various capture models

a. As discussed previously - CCSA development plan to match Government stated targets, to be updated with latest commissioning dates from cluster leads
b. This is a key input into the AFRY model, informing timeline of capacity roll out and the split by capture technology type

3

Capex/Opex costs for various capture types

a. Capex and opex costs to be updated with input from cluster leads and key emitters. We have identified **updating BECCS and hydrogen cost assumptions as a focus for this submission**
b. Results from **KPMG cost reduction work** to be incorporated into model

4

Market Commodity prices

a. Carbon prices – DESNZ, Updated in Spring 2024 Submission. An additional carbon price better reflecting **voluntary CDRs** to be added
b. Gas prices – DESNZ, Updated in Autumn 2024 Submission
c. Electricity prices – DESNZ, Updated in Autumn 2024 Submission

5

Transport and storage roll-out and utilisation assumptions

a. We received cost input into our T&S assumptions in Autumn 2024 submission and incorporated NPT costs into model
b. Current modelling based on commercialised T&S transport, i.e. spare capacity used for imports and and projects continue to use T&S network on a commercial basis after business model contracts expire

Business model and policy assumptions

General business model assumptions

Sector	Model for support	CfD against[1]	Support term (years)	CfD direction
Industry	ICC CfD	Carbon price	5 (Capex) 10 (Opex)	1-way[2]
Power BECCS	CfD and negative emissions payment	Electricity price Carbon price	15	2-way
Electricity	Dispatchable CfD (DPA)	Reference plant cost	15	2-way
Hydrogen	CfD	Gas price Hydrogen Price Carbon price	15	2-way
Transport & Storage	Regulated Asset Model	n/a	15	n/a

**Option to update model to incorporate specific EfW and GGR business models – currently bundled with Industry + Power BECCS*

- T&S fees a pass-through in all models
- Technical performance meets expected performance
- No distinction between expected prices and outturn prices

1. All CfDs are assumed to be indexed to inflation, 2. But assume an over-recovery in Opex return period allows assets to bid-down upfront costs

CCUS infrastructure fund

- In previous updates following capital CIF grants were assumed:
  - £200m for industry deployed in 2028
  - £800m for T&S deployed in 2028

Example policy assumptions and levers

Power price obtained by electricity producers
Able to reflect an increase in the value of firm dispatchable low-carbon power, i.e. electricity producers receive an uplift over baseload power prices

BECCS revenue from CDRs
Power BECCS plants can receive revenue from selling CO_2 removal credits for the carbon captured. For this update, we plan to incorporate a separate, higher, carbon price in the model to better capture **voluntary CDR prices**

Hydrogen price
Can modify the price at which hydrogen producers can sell hydrogen, e.g. full UK ETS saving vs natural gas price only

Other

CCUS capacity and roll-out rate
To be covered in section 2

Transport & Storage
To be covered in section 5

Capture capacity roll out

- **The CCSA delivery plan update process has previously been covered**
- The results of which are a key input into our model that provides the timeline of capture project roll out, the planned capacity and the capture technology type (e.g. Industrial, Gas Power CCS, Hydrogen, etc.)
- In previous submissions we have chosen to accelerate project roll out and add in additional capture capacity to meet scenario targets. For example, we did this for our Net-Zero Power by 2030 scenario in the Autumn 2024 submission
- The requirement for 2.7 GW of gas CCS and hydrogen to power capacity by 2030 are cited in NESO's Clean Power 2030 report.
    - For the Spring CSR 2025 submission, the capacity roll out as per the updated CCSA delivery plan will be sufficient to not require modification to reach these 2030 targets

CAPEX and OPEX costs for different capture types

- Original CAPEX/OPEX costs came from anonymous member contributions in 2021
- In Autumn 2024, we updated some of our cost assumptions following feedback from members via the CCSA
- This update, we have identified our BECCS and hydrogen costs assumptions for update, given the rapidly evolving market
- As mentioned in section 2, we are exploring incorporating EfW and removals as separate technologies
- Input from members into our cost assumptions, via the CCSA, would be very useful. This could be via direct input into the CAPEX and OPEX assumption or directing us towards third-party publications with “reasonable” numbers

Confidentiality disclaimer

- Information only to be used in AFRY’s modelling to estimate funding envelope commitment associated with decisions required in 2025/26
- Any underlying information provided would not be included in the submission
- Modelled costs would not be presented in any way that would enable them to be disaggregated and attributed to a particular project
- Would only be used for the purpose of compiling funding envelope cost estimates for the CSR submission and would only be shared with relevant officials

CAPEX and OPEX assumptions in cashflow model

Identified as focus area for update → Removals

Identified as focus area for update → Hydrogen

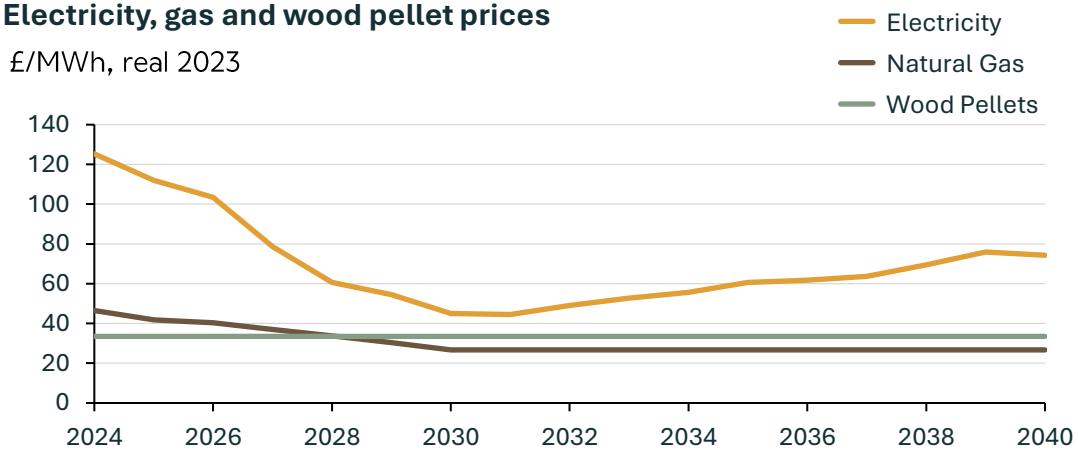
	Sector	Scope	Unit CAPEX	Unit OPEX
CAPTURE	Industrial capture	CC unit only	Unit CAPEX £/tCO_2 captured	Unit OPEX £/tCO_2 captured
CAPTURE	Gas Power CCS	Whole plant		
CAPTURE	Removals	Bio-energy CC unit only		
CAPTURE	Hydrogen	Whole plant		
T&S	Transport & Storage	Pipeline and storage	Unit CAPEX £/tCO_2 network capacity	Unit OPEX £/tCO_2 network capacity
T&S		Non-pipeline transport		

Market and commodity prices

- Commodity prices have been updated to reflect latest government views as best as possible
- Prices were last updated for the autumn budget submission in 2024.
- Notably, baseload electricity prices reach £60/MWh in 2035, natural gas prices reach £27/MWh and UK ETS carbon prices reach £121/tCO_2
- DESNZ requested a low carbon price sensitivity in the Spring 2024 update (shown)
- We are planning to incorporate a separate carbon price within the model that better represents the higher value of voluntary CDRs relative to the UK ETS price

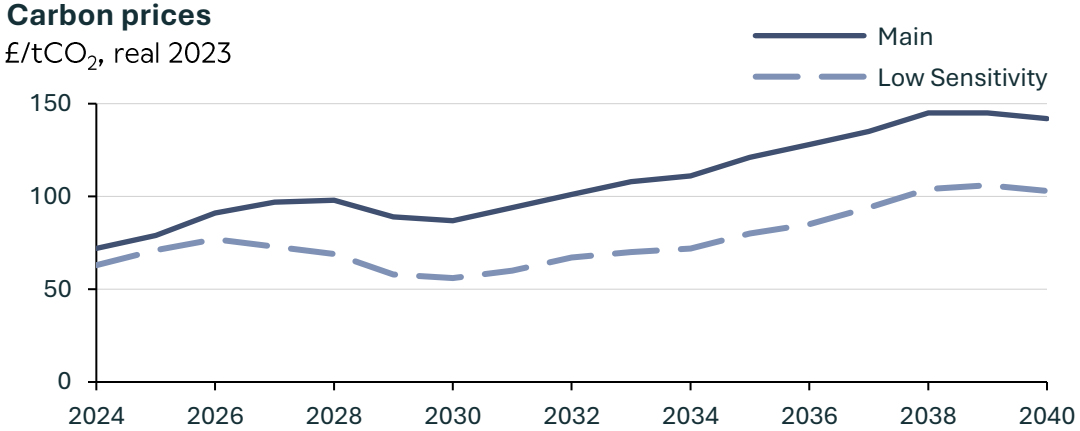
Electricity, gas and wood pellet prices

£/MWh, real 2023



Carbon prices

£/tCO_2, real 2023



Transport and storage roll-out and utilisation assumptions

- We received good input on T&S in last update, which has resulted in higher T&S costs assumptions. These costs have increased faster compared to general capture costs.

- We added in non-pipeline transport (NPT) CAPEX and OPEX into our model for Autumn 2024 submission

- In that submission, Hynet and Teesside ECC cluster transport costs were separated out as these were **already considered funded**, the focus was on T2 T&S and beyond

- In our base case scenario for the modelling, we currently assume a 'commercialised T&S' situation where:

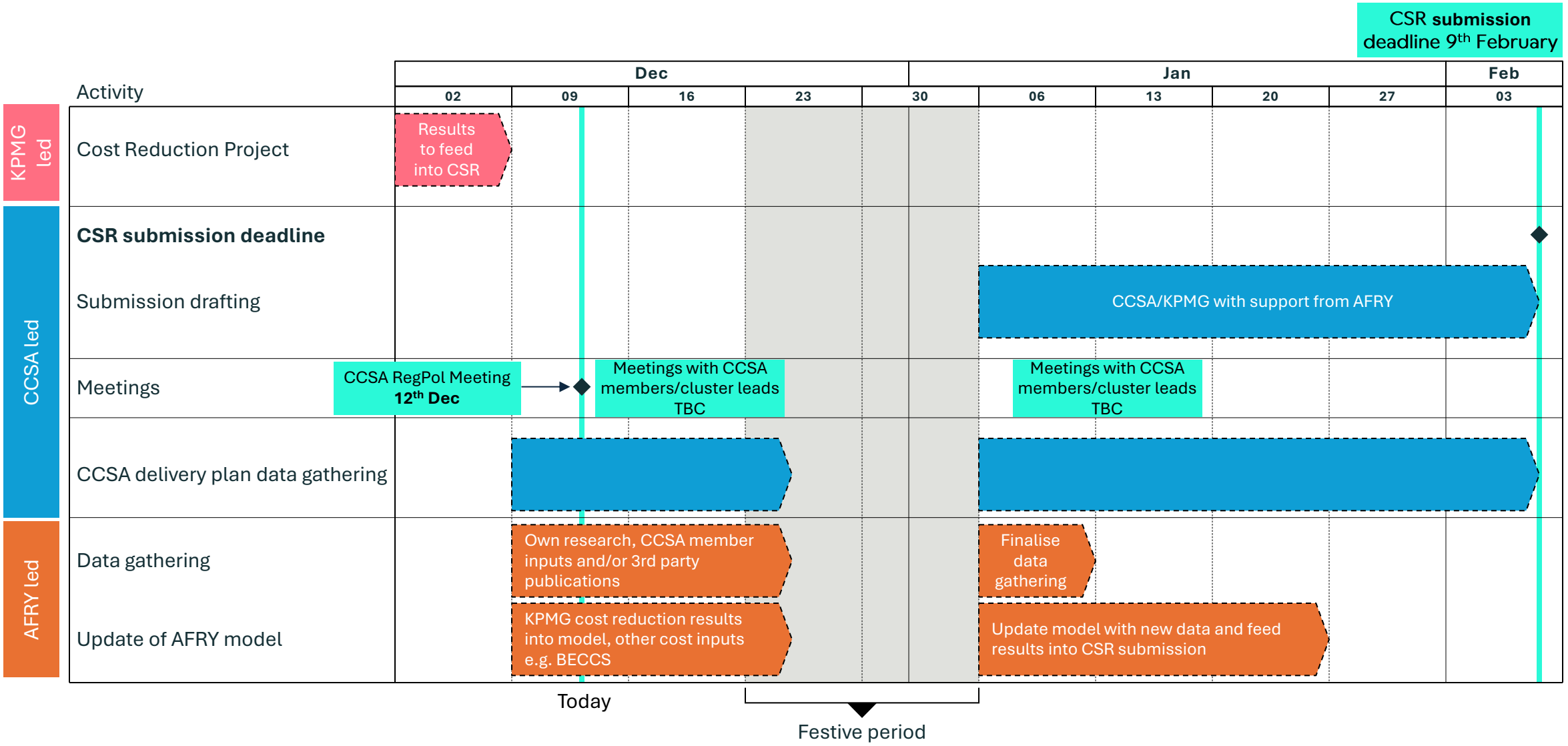
  1) After the 15-year capture support period, each capture project would contract commercially with the T&S network, removing the need for government support for those volumes

  2) By 2035 all 'spare' T&S capacity is being sold commercially (implicitly for CO_2 imports), such that the government does not have to pay to support the spare capacity

CSR process timeline

CCSA

CSR submission 2025 – Timeline



Discussion points and way forward

1. Alignment on the reframing of the CSR 2025 submission

2. CCSA delivery plan data gathering (member responses via email and meetings with CCSA)

3. Update of inputs into AFRY cashflow model (e.g. CAPEX, OPEX, business model)

4. Timeline of CSR 2025 process

CCSA EU Policy Updates

CCSA Secretariat

CCSA

New College of Commissioners 2024 - 2029

Maroš Šefčovič
Executive Vice-President European Green Deal, Interinstitutional Relations and Foresight

➢ DG TRADE, relations with the UK

Teresa Ribera Rodríguez
First Executive Vice-President for Clean, Just and Competitive Transition

➢ DG COMP

Wopke Hoesktra
Commissioner for Climate, Net Zero and Clean Growth

➢ DG CLIMA & DG TAXUD

Stéphane Séjourné
Executive Vice-President for Prosperity and Industrial Strategy

➢ DG GROW

Dan Jørgensen
Commissioner for Energy and Housing

➢ DG ENER

Von der Leyen II: Clean Industrial Deal

Competitiveness Compass

- closing the innovation gap with the US and China
- joint plan for **decarbonisation** and competitiveness
- increasing security and reducing dependencies

EU budget 2028-2034

- Proposal around 1 July 2025
- Increase in overall budget?
- Joint borrowing?
- New funds? European Competitiveness Fund?

Von der Leyen II: Clean Industrial Deal

Clean Industrial Deal

- *"in the first **100 days** of the mandate"*
- *"competitive industries and quality jobs"*

Industrial Decarbonisation Accelerator Act

- *"channel investment [...] in particular for **energy-intensive** sectors"*
- *"prioritise investment in [...] **storage** capacity and **transport** infrastructure for captured CO2"*
- *"speed up planning, tendering, and permitting"*

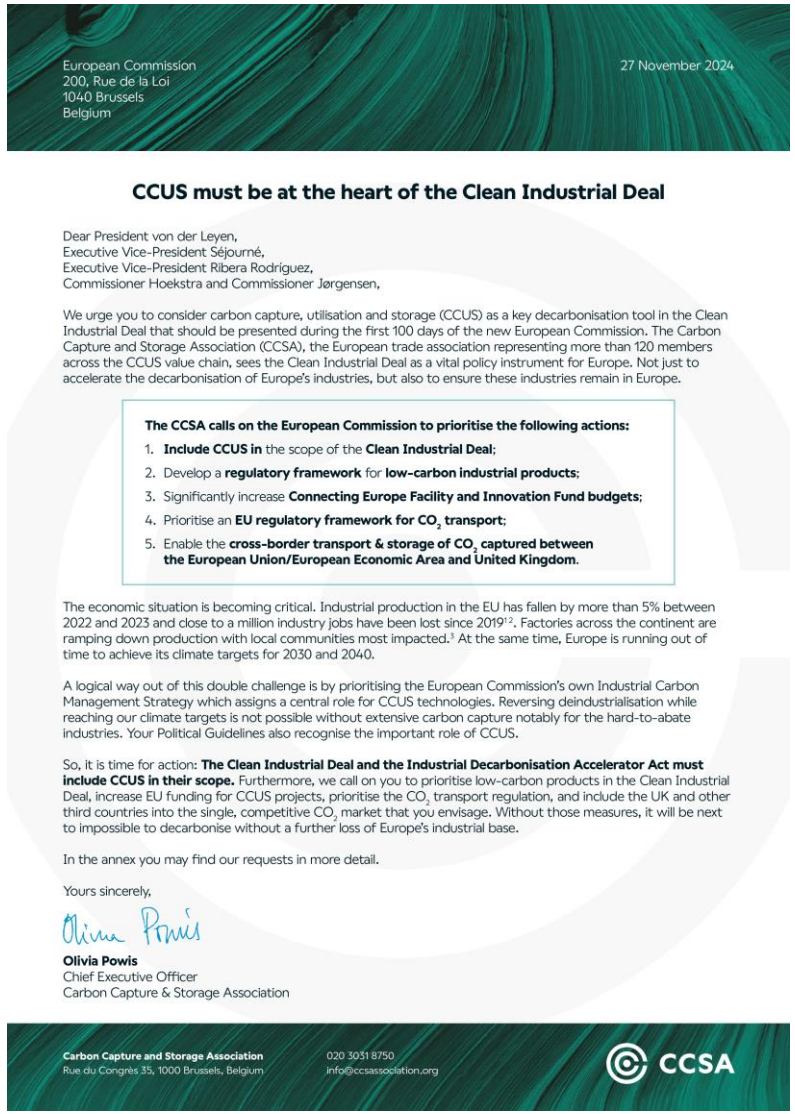
CCSA Open Letter & MEPS letter

EC Recipients

- European Commission President Ursula von der Leyen
- Executive Vice-Presidents Ribera and Séjourné
- Commissioners Hoekstra and Jørgensen

MEPs also received the CCSA Open Letter

5th December: **30 MEPs** sent a letter to European Commission President Ursula von der Leyen, **asking to include CCUS technologies in the Clean Industrial Deal,** defining them as "essential to ensure the competitiveness of European industries and to meet climate neutrality by 2050"



European Commission
200, Rue de la Loi
1040 Brussels
Belgium

27 November 2024

CCUS must be at the heart of the Clean Industrial Deal

Dear President von der Leyen,
Executive Vice-President Séjourné,
Executive Vice-President Ribera Rodríguez,
Commissioner Hoekstra and Commissioner Jørgensen,

We urge you to consider carbon capture, utilisation and storage (CCUS) as a key decarbonisation tool in the Clean Industrial Deal that should be presented during the first 100 days of the new European Commission. The Carbon Capture and Storage Association (CCSA), the European trade association representing more than 120 members across the CCUS value chain, sees the Clean Industrial Deal as a vital policy instrument for Europe. Not just to accelerate the decarbonisation of Europe's industries, but also to ensure these industries remain in Europe.

The CCSA calls on the European Commission to prioritise the following actions:

1. **Include CCUS in** the scope of the **Clean Industrial Deal**;
2. Develop a **regulatory framework** for **low-carbon industrial products**;
3. Significantly increase **Connecting Europe Facility and Innovation Fund budgets**;
4. Prioritise an **EU regulatory framework for CO_2 transport**;
5. Enable the **cross-border transport & storage of CO_2 captured between the European Union/European Economic Area and United Kingdom**.

The economic situation is becoming critical. Industrial production in the EU has fallen by more than 5% between 2022 and 2023 and close to a million industry jobs have been lost since 2019[1][2]. Factories across the continent are ramping down production with local communities most impacted.[3] At the same time, Europe is running out of time to achieve its climate targets for 2030 and 2040.

A logical way out of this double challenge is by prioritising the European Commission's own Industrial Carbon Management Strategy which assigns a central role for CCUS technologies. Reversing deindustrialisation while reaching our climate targets is not possible without extensive carbon capture notably for the hard-to-abate industries. Your Political Guidelines also recognise the important role of CCUS.

So, it is time for action: **The Clean Industrial Deal and the Industrial Decarbonisation Accelerator Act must include CCUS in their scope.** Furthermore, we call on you to prioritise low-carbon products in the Clean Industrial Deal, increase EU funding for CCUS projects, prioritise the CO_2 transport regulation, and include the UK and other third countries into the single, competitive CO_2 market that you envisage. Without those measures, it will be next to impossible to decarbonise without a further loss of Europe's industrial base.

In the annex you may find our requests in more detail.

Yours sincerely,

Olivia Powis

Olivia Powis
Chief Executive Officer
Carbon Capture & Storage Association

Carbon Capture and Storage Association
Rue du Congrès 35, 1000 Brussels, Belgium
020 3031 8750
info@ccsassociation.org
CCSA

Other policy and project developments

EU policy

- EU CRCF regulation entering into force on 26 December
- CO_2 transport package in 2026
- Potential EU-wide carbon removal purchasing program in 2025
- Possible EU CBAM revision in 2025

National policy

- Revision of Germany's CO_2 storage law currently in Parliament
- German federal elections expected on 23 February 2025
- Greensand took FID in Denmark

Harbour and partners to move forward with carbon capture project

Denmark's Greensand Future scheme aims to be European union's first operational CO2 storage facility

Ineos and Harbour Energy Danish carbon storage project gets go ahead

INEOS and Harbour Energy make a final investment decision on Denmark's Greensand carbon storage facility.

11/12/2024, 11:37 am

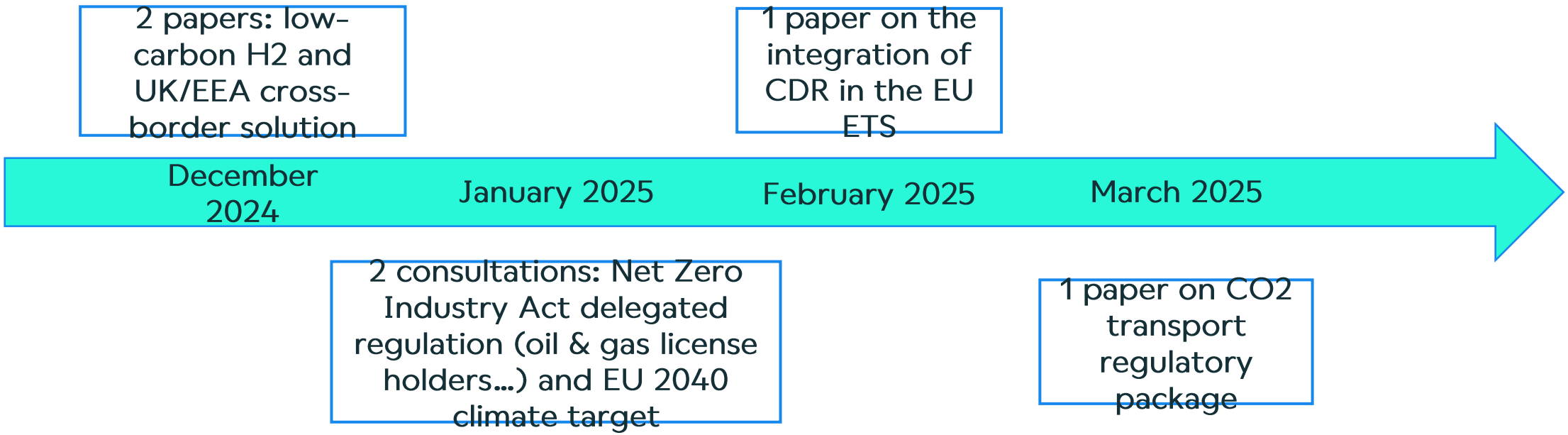
Denmark's Greensand CCS project, which enabled the first major cross-border transport and storage of CO2 in Europe.

INEOS takes FID on Europe's first full-scale CCS facility

Render of INEOS' Greensand CCS project

Danish utility INEOS, together with Harbour Energy and Nordsøfonden, has taken a Final Investment Decision (FID) on the first commercial phase of Project Greensand, paving the way for more than $150 million to be invested in carbon capture and storage (CCS). Storage operations are scheduled to begin at the end of 2025, or in early 2026.

Upcoming papers and consultations



Position paper on low-carbon hydrogen

Guiding principles framed under Clean Industrial Deal

In contact w DG ENER C.2 to set up meeting 1st half of January

Webinar/focus session with members and EC later in Q1 2025

Next steps:

- Final version for info to members this week
- Publication w/c 16/12

EU Policy Task Subgroup

Group convenors: No convenor - welcoming volunteers

Focus:

- CCSA positioning at EU level
- EU policy developments
- Member States CCUS strategies

Previous meeting: 10 December

Current priorities:

- Clean Industrial Deal
- Net Zero Industry Act
- Regulatory package on CO2 transport
- …

Next meeting: tbc

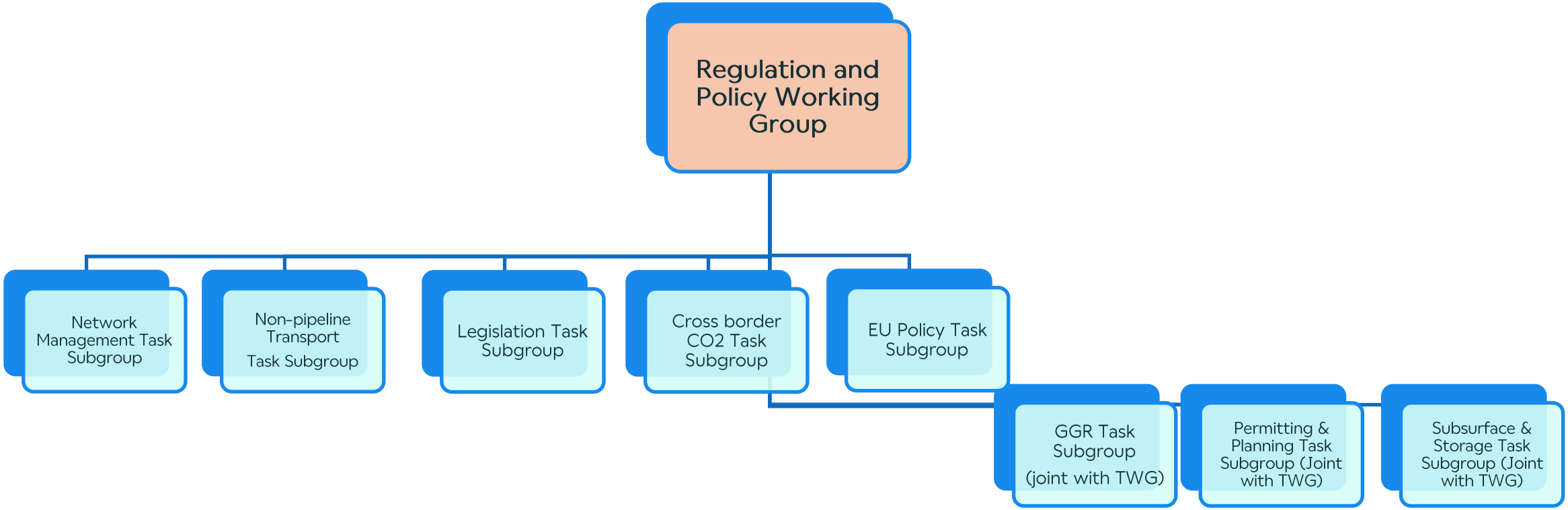
If you would like to be involved in this task subgroup please reach out to the CCSA Secretariat

CCSA – other task subgroup updates

CCSA Secretariat

CCSA Task Subgroup Activity

CCSA Lead: Beth Hebditch
Co-Chairs: Nicola Cocks (Storegga), Oliver Moir (Slaughter & May), Jenny Sutcliffe (P66), Ben Willis (RWE)



If you would like to be involved in task subgroups please reach out to the CCSA Secretariat

Non-Pipeline Transport Task Subgroup

Group Convenors: Paul Davies (7CO2), Matt Wilson (Navigator Terminals), Roger Brandwood (Uniper)

Focus: Development of non-pipeline transport of CO2, including shipping, rail and road

Previous Meeting: 20 May
- DESNZ/CCSA NPT & Cross border CO2 call for evidence engagement session

Current priorities & activity:
- NPT and Cross border networks call for evidence – submitted
- 2 UK ETS consultations
  - *UK ETS scope expansion: maritime sector*
  - *UK ETS scope expansion – CCS: non-pipeline transport of carbon dioxide*
- Deadline for the consultations: **23 January**

Next meeting: 13 December

Cross Border CO2 Task Subgroup

Group convenors: Ayan Battacharjii (interconnector), Els Jooris (Shell)

Focus: advocacy for cross-border transport and storage of CO2 to develop a Europe-wide storage market

Previous meeting: 8 October 2024

Current Priorities:

- Report's continued advocacy strategy:
  - Narrative to reinforce across EU/EEA & UK
  - Target Member States to influence
  - Roundtable discussion in the UK – beginning of Q1 2025

Next meeting: date TBC

Legislation Task Subgroup

Group convenors: James Quinn (Interconnector), Kathryn Emmet (Slaughter and May)

Focus: Assessing and influencing the legislative process, and the legal texts related to policy and regulations.

Current priorities: Great British Energy Bill – engaging with friendly MPs & Peers, with the CCSA & Hydrogen UK aligned on MP/Peer outreach.

- Baroness Winterton: Highlighted risks of restricting CCS in the Bill's definition of "clean energy."
- Lord Naseby: Proposed amendments to include CCUS & CCS-enabled hydrogen
- Lord Hunt confirmed Government's commitment to CCUS & CCS-enabled hydrogen for net zero.
- Lord Hunt has reached out to Olivia Powis asking to discuss the Bill - scheduled to meet for 07/01/24
- Broader Peer Support: Lord Howell: CCS vital for residual emissions, & Viscount Trenchard: Acknowledged CCS in energy transition strategy

Baroness Liddell & Baroness Winterton to table amendments relating to the definition of clean energy at Report Stage (date TBC). Baroness Lidell to speak on behalf of the CCSA at Committee Stage - 17th Dec

Next Meeting: TBC early 2025

Monitoring for introduction next year:

1. National Wealth Fund Bill
2. Sustainable Aviation Fuel (SAF) Bill
3. Planning & Infrastructure Bill
4. Skills England Bill

Baroness Winterton

Lord Naseby

Subsurface and Storage Task Subgroup *Joint with the Regulation & Policy Working Group*

Group Convenors: Mark Weldon and John Ford (Petrostrat)

Previous group-wide meeting: 10th September 2024 on the new CCS directive Guidance Documents

Storage Developer Task & Finish Group: submitted industry-wide response to the SEAA

Next subgroup meeting: early January

- STF paper discussion: importance of storage project appraisal activities and carbon budget objectives

Next steps and key priorities for the subgroup

- ✓ Continue to align industry, including external taskforces, with TCE
- ✓ Supporting the BGS project to develop a UK-focussed review of containment risks for CO2 storage to inform the insurance industry

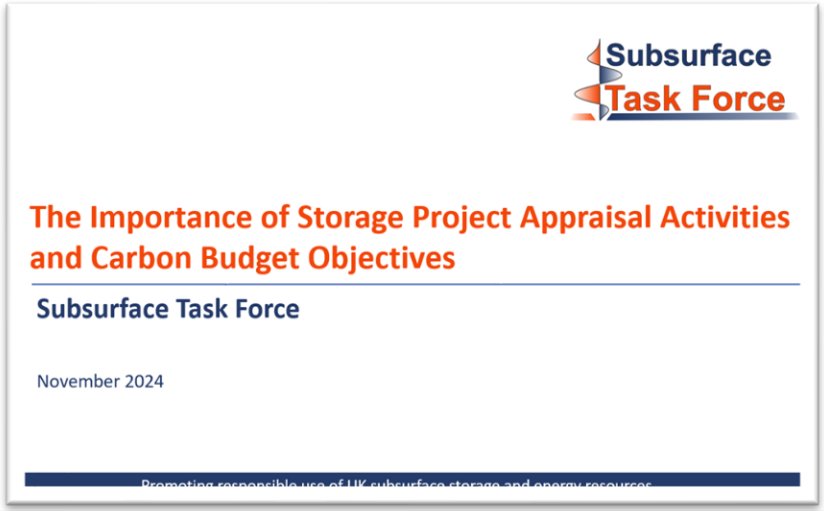

CCSA

Industry response to The Crown Estate's proposal for a Storage Exploration and Appraisal Agreement (SEAA)

30th October 2024

The CCSA brings together a wide range of specialist companies across the spectrum of Carbon Capture, Utilisation and Storage (CCUS) technology, as well as a variety of support services to the energy sector. The CCSA exists to represent the interests of its members in accelerating the commercial deployment of CCUS in the UK, EU and internationally through advocacy and collaboration to achieve net zero emissions by 2050.

The CCSA submits this industry-wide position on behalf of storage developers, with support from the Subsurface Taskforce (STF).


Subsurface Task Force

The Importance of Storage Project Appraisal Activities and Carbon Budget Objectives

Subsurface Task Force

November 2024

Permitting & Planning Task Subgroup

Joint with the Technical Working Group

Group Convenors: Matt Brown (RWE), Nicola Smith (SSE), Aleks Dragicevic (Viridor)

Focus: Provide clarity on the planning regimes for different projects; Establish coordinated tendering and permits procedure; Expedite permitting process; Provide clarity on the EU planning regime.

Current priorities:

- CCSA Capture Rate Efficiency Position Paper published here.
- EALs: 6 Draft EALs proposed/shared with members → consultation to be published **early 2025**, 7 EAL dossiers to be consulted on in total.
- Solvent Disclosure
- ELVs

Previous Meeting: 8th July 2024 - EA/CCSA permitting teach-in session (materials available here)

Recent & Upcoming activity:

- Environmental Capacity in Industrial Clusters Phase 3 report published here.

+ Regulator Engagement

- Previous Meeting: 9th December
- CCSA/EA/Industry meeting on latest updates from the EA on CCUS work, as well as discussions on EALs, ELVs, cumulative impacts, and solvent disclosure issues.
- The meeting minutes will be shared in due course.

Next Meeting: January 2025 (tbc)
will discuss EAL consultation, pre-operational conditions, venting update, monitoring requirements for CO2 capture performance.

GGR Task Subgroup

Joint with the Technical Working Group CCSA

Group Convenors: Greg Williams (Evero Energy)

Previous meeting: 2nd December 2024

- Purpose: COP29 & Article 6 Updates, VCM Updates, GGR Industry Group Discussion Recap

Next steps:

- Will feed back to DESNZ on GGR Business Model Design.
    - Price Discovery Incentive
    - Fair Market Value Principles
    - Offtaker Risk
- Awaiting Government response on the Integrating GGRs in the UK ETS consultation.
- Feeding into DESNZ consultation on creating high integrity VCMs (early 2025).
- Aligning messaging on the inclusion of NPT in the UK ETS consultation.

Next meeting: end of January/beginning of February 2025

AOB & Conclusions

- Review actions arising from meeting
- Next Working Group Meeting
- AOB