



# Spring Budget Submission 2024

The UK's pathway to  
decarbonise industry,  
create jobs and boost our  
economy with CCUS



## Summary

The Carbon Capture, Utilisation and Storage (CCUS) industry has the opportunity to attract **£30 billion in private investment by 2030** as a result of its healthy development pipeline of regional capture projects and storage infrastructure and the UK's mature legislative framework. This pipeline aligns with government targets, aiming to capture 20-30 Million tonnes per annum (Mtpa) of Carbon Dioxide (CO<sub>2</sub>) by 2030 and doubling to 50-60 Mtpa by 2035.

The Carbon Capture & Storage Association's (CCSA) Delivery Plan update<sup>1</sup> revealed a potential pipeline of projects capable of capturing approximately 94 Mtpa of CO<sub>2</sub> annually, which by 2035 could create up to **70,000 new skilled jobs and protect 77,000 existing jobs, mostly in the UK's industrial heartlands** and especially in industries such as cement, chemicals, and other strategically important manufacturing sectors critical to the UK's supply chain security. The UK is in a unique position as a result of our geological advantages and strong domestic capabilities across CO<sub>2</sub> capture, transport (including non-pipeline transport) and storage technologies to benefit significantly from what the Government estimates will be a £235 billion per annum turnover in the global CCUS supply chain.

The UK's current deployment trajectory of capturing and storing 20-30 Mtpa by 2030 and doubling this to 50-60 Mtpa through rapid scale-up between 2030 and 2035 requires urgent private investment today. With the EU and the US committing substantial resources to CCUS, the UK must seize the moment to solidify its leadership in the industry or risk losing out in the race for capital to its competitors. Investor confidence hinges on two things:

- i. **Following through on existing commitments in a timely way; and**
- ii. **Clarifying how future commitments will be funded.**

The competitive application process for the Government's Cluster Sequencing Programme has been underway for two years and has resulted in eight capture projects currently under negotiation across the first two "Track-1" clusters. The Government needs to conclude this process as soon as possible this year to reassure investors that it is serious about moving forward with CCUS. However, those eight projects collectively represent around a third of the Government's 20-30 Mtpa target. Two further CO<sub>2</sub> stores were selected at the end of 2023, along with a commitment to a more streamlined process for selecting which "Track-2" capture projects will connect to them, as well as a "Track-1 Expansion" application process that will select which further capture projects can connect to the first two clusters.

Given the long lead in times for CO<sub>2</sub> stores to develop, (6-7 years) we need to mature the development model to allow new projects to accelerate in parallel with the early phases to meet the storage targets. Investors looking at those projects need to see that the Government is prepared to underwrite the level of deployment required to meet the UK's 6th Carbon Budget. Our analysis shows that the annual commitment required for a maturing industry, in line with the Government's CCUS Vision, is much less than that made available to enable the offshore wind market ten years ago.

The Government has all the policy levers required to achieve a self-sustaining, productive CCUS economy in the 2030s, through delivery of a mature carbon market and carbon border adjustment mechanism, enabling low carbon product standards and export of CO<sub>2</sub> storage services. The industry is working on the development of accreditations for low carbon products, and for many industrial decarbonisation projects we are confident that if these policy mechanisms are in place, then commercial CCUS is likely to become viable pre-2035.

**£2-3  
BILLION**  
annual revenue  
support per year



**£30  
BILLION**  
of private sector  
capital by 2030



1. CCUS Delivery Plan Update - 2023 - CCSA ([ccsassociation.org](https://ccsassociation.org))



# What the CCUS Industry Needs

## Revenue Support Envelope Matched to Government Targets

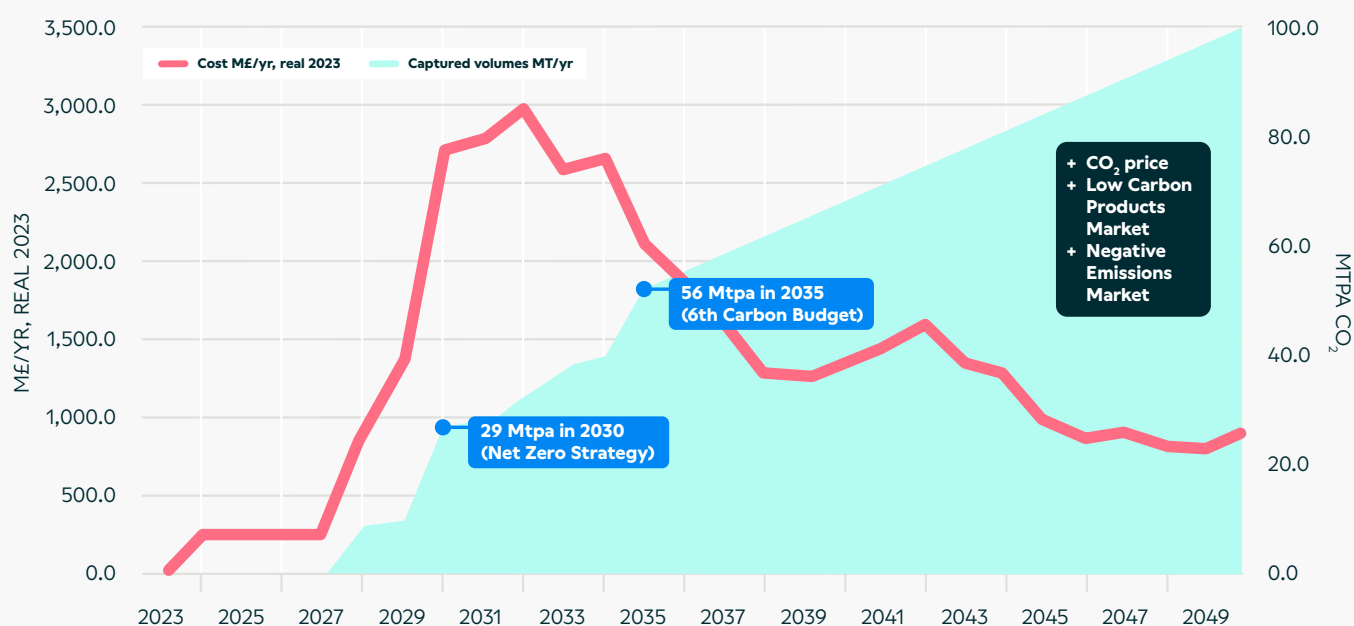
Building upon the CCSA's 2023 Spring and Autumn Budget Submissions, the CCSA emphasises the necessity for an **annual revenue support envelope from 2028 of £2-3 billion**, (including the £1 billion per year already committed in the 2023 Spring Budget for early deployment of CCUS) matched to the Government's deployment trajectory. This investment is significantly lower than the societal cost of carbon and the net cost to the UK economy for unabated emissions. It would aim to repeat the success of the £7.6 billion/year committed in the 2011 Levy Control Framework (LCF) for renewable electricity generation, (now the Control for Low Carbon Levies) which secured private sector investment into the UK's offshore wind development pipeline<sup>2</sup>.

Under the Government's CCUS programme, projects will receive revenue support, which means not a penny is paid out until the project is fully operational. The first projects in the North West and North East of England are aiming to begin construction later this year, meaning that billions of pounds of investment (**£30 billion of private sector capital by 2030**) will flow into those regions over the next few years, however the revenue support payments from the Government will only start once the projects are fully operational from 2028.

Taking the same approach to the rest of the project development pipeline, we have modelled a revenue support envelope, based on estimated future project operational support costs, reflecting market dynamics and changing commodity prices. The modelling assumes that the Government follows through on its recently published CCUS Vision to deliver market reforms for carbon markets and low carbon products.

The modelling demonstrates that **from 2032, annual revenue support will start to rapidly fall**, dropping below £2 billion/yr from 2035. This is because the industry starts to achieve economies of scale, and CCUS Clusters are running at capacity and the carbon price is sufficiently high, both via mandated and voluntary carbon markets. This drives down the marginal cost of additional volumes in the 2030s and extracts the benefits of industrial capture maturity. The industry is already working on developing accreditation for new products such as low carbon cement and carbon removal credits, and we expect that these products will be desirable at a premium, accelerating the commercial deployment of CCUS in the 2030s.

### Annual Support Costs to Deliver 20-30 Mtpa by 2030 and 50-60 Mtpa by 2035



2. Gov.UK (2016) Levy Control Framework. Available at <https://www.gov.uk/government/collections/levy-control-framework-lcf>



## Industry Commitment and Government Support

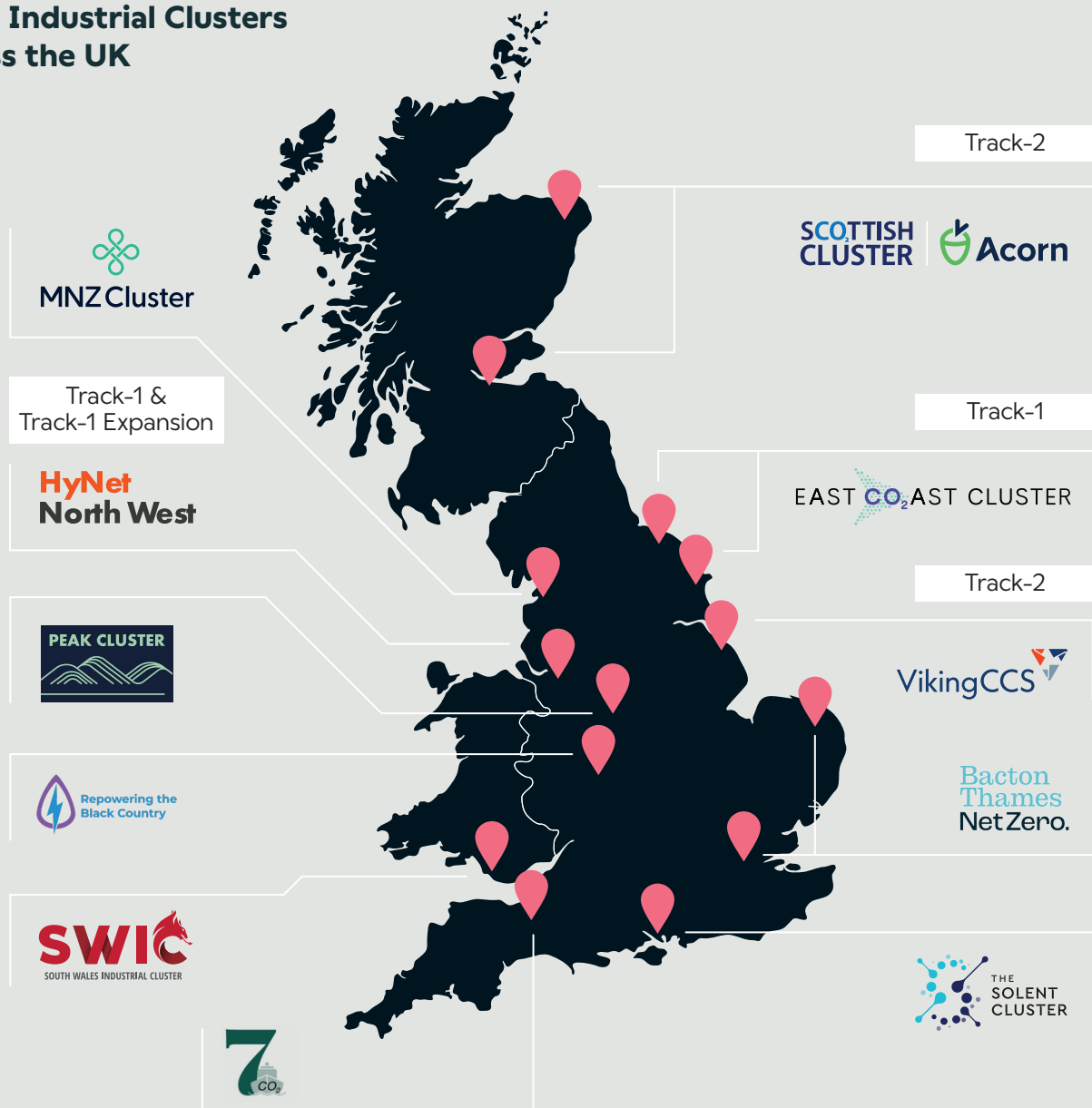
The industry has strongly welcomed the Government's substantial £1 billion/year (£20 billion) commitment for early CCUS deployment and is keen to see contracts signed as soon as possible for the first two clusters in the North West and North East of England. However, investors are urgently seeking further clarity on expansion of these clusters and subsequent clusters and projects, as they are also facing increasing opportunities to invest in CCUS around the world. This clarity also includes relevant transitional arrangements for retrofit projects looking to convert to CCUS.

While important progress has been made in 2023, this submission underlines the urgency of setting out the revenue support envelope that would enable the expansion of the first two clusters (in North West England/North Wales and in Teeside/the Humber) and the next two clusters selected (in

Scotland and the Humber) to move forward with confidence, and maintain investment in the projects required to deploy pre- and post-2030 if we are to meet the 2030 target and the 6th Carbon Budget, as well as secure the UK's domestic supply chain. Failure to move swiftly in such a rapidly accelerating global market carries risks and adds costs to deliver a robust CCUS industry for the UK.

As set out, the future CCUS projects beyond the North West, North East, Humber and Scotland are also progressing at pace under the first carbon storage licencing round, and looking to fulfil the CCUS Vision requirements of 6 Mtpa from 2031 onwards. The regulatory models (including the rollout of non-pipeline transport) for deployment of these projects requires urgent clarity and execution across the Government bodies to enable deployment from 2031 onwards.

## CCUS Industrial Clusters Across the UK



# Benefits of CCUS Deployment

## Investing in the UK

- **Attracting Investment:** Committing to the outlined investment framework aims to achieve capture of 20-30 Mtpa by 2030, positioning the UK to attract substantial private investment, potentially reaching nearly £30 billion by 2030.
- **Leveraging Infrastructure:** The low risk, privately funded UK CO<sub>2</sub> transport and storage infrastructure – that will install 100s of kilometres of pipeline infrastructure across the UK's industrial regions – will attract other industries to the UK to connect to these networks, including low carbon fuels and other low carbon product manufacturers, Greenhouse Gas Removals (GGRs), as well as those wishing to access low carbon hydrogen. This will unlock significant investment opportunities for the UK's industrial regions and increase Gross Domestic Product (GDP).
- **Supply Chain Protection:** Providing access to CO<sub>2</sub> infrastructure can prevent the migration of projects and heavy industries to locations with fiscal regimes without carbon taxes. Access to CO<sub>2</sub> infrastructure and the revenue support for carbon capture, alongside market mechanisms such as the carbon border adjustment mechanism, and the development of voluntary carbon markets, are required to safeguard the nation's supply chain. This reduces dependency on imported, higher-cost low carbon products and creates the opportunity for high value export markets.

## South Wales Industrial Cluster (SWIC)



### JOB CREATION

Anticipates supporting an estimated **94,000 job years**, spanning both construction and operational phases.

### FINANCIAL INVESTMENT

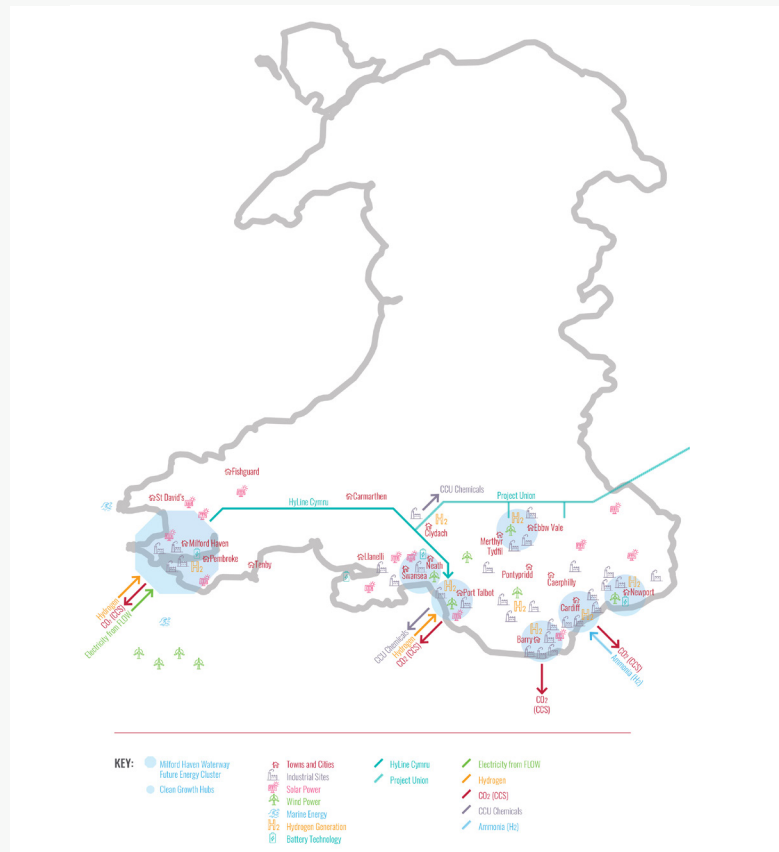
Approximately **£2.4 billion of revenue support funding** is projected to support CCUS infrastructure development in South Wales until 2050.

### FINANCIAL VIABILITY

Despite the upfront investment, only around **32%** of the increased Gross Value Added (GVA) needs recovery for public finances to break even. This aligns with the long-term tax receipts to GVA ratio, which stands at approximately **30%**.

### CONTRACT FOR DIFFERENCE (CfD)

The adoption of a CfD is proposed to spread costs over a defined contract life, providing revenue certainty for investors without necessitating substantial upfront capital expenditure.



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

- **Job Generation:** This approach generates an estimated 70,000 new skilled jobs across the UK, particularly in the UK's industrial regions – areas earmarked for levelling-up, such as Yorkshire & the Humber. The initial wave of emitter projects and supply chain manufacturing could generate a peak of ~15,000 jobs by 2030.
- **Job Retention:** Investment in CCUS can also preserve and protect approximately 77,000 existing industrial jobs, particularly concentrated in regions such as Yorkshire & Humber (21%), Wales (17%), and the North West of England (15%).
- **Skills Development:** Addressing the skills shortage, supporting apprenticeship programmes, and contributing to the levelling up agenda create employment opportunities in historically disadvantaged regions.
- **Competitive Industries:** Facilitating the decarbonisation of key industries enables sustained success and global competitiveness, preventing job losses and the potential migration of industries overseas.
- **Supply Chain Investment:** The global market for industry CCUS & CO<sub>2</sub> transport & storage is worth an estimated £181 billion and £54 billion per annum in turnover by 2050<sup>3</sup>. Investing domestically secures the benefits of a robust CCUS supply chain, allowing the UK to benefit from this large potential global market share.

## CCS Cluster Skills in the Humber and East Coast

EAST CO<sub>2</sub>AST CLUSTER | VikingCCS

### SAFEGUARDING INDUSTRY

The East Coast Cluster and Viking CCS projects could create **thousands of construction jobs** and bring new investments to vibrant decarbonised East Coast industries.

### REGIONAL OPPORTUNITY

These jobs would be **high value local roles** anchored to world class regional industries.

### UK MISSION TO NET ZERO

Workers trained in the Humber and East Coast would be needed across the UK for the energy transition. bp is funding scholarships (aged 16+) for a **bespoke 2-year Clean Energy Technician engineering programme** specialising in green skills for the future.

### INVESTMENT IN THE FUTURE

This would create an ongoing supply of transferrable skillsets needed to meet net zero targets. bp has been working in partnership with the national education charity STEM Learning to improve young people's attainment and engagement in STEM subjects. This has built the capacity of science teachers in 10 primary schools in Teesside, alongside a volunteer programme with bp volunteers in 2022/23, which has reached **582 students** and **187 teachers** across **20 schools** in Teesside.



3. BEIS (2019) Energy Innovation Needs Assessment for CCUS, estimates a global market for industry CCUS and CO<sub>2</sub> transport and storage components of £181 billion and £54 billion per annum in turnover by 2050 respectively. Available at [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/845655/energy-innovation-needs-assessment-ccus.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/845655/energy-innovation-needs-assessment-ccus.pdf)



## Export our Expertise in Low Carbon Products & CO<sub>2</sub> Storage

- **Developing a leading CO<sub>2</sub> Storage Market:** The UK is extremely advantaged in its geological CO<sub>2</sub> storage potential – estimated to be 78 Gt<sup>4</sup>, almost one-third of Europe's equivalent storage capacity and already serving as a centre of excellence for offshore developments and engineering services. The UK's legacy of offshore expertise and a trained workforce acts as a key competitive enabler for safe, reliable and low cost storage.
- **The UK as a world leader in Carbon Removals:** The UK has an opportunity to lead the world in the development of GGR technologies such as BECCS and DAC. The development of these technologies, and associated carbon removals presents a significant economic opportunity for the UK which the National Infrastructure Commission predicts will become a 'major new infrastructure sector' for the UK<sup>5</sup>.
- **Growing Sector:** Investing in CCUS creates a thriving UK CO<sub>2</sub> storage market, positioning the nation as a leader in CCS and hydrogen projects exporting CO<sub>2</sub> storage solutions to European industries seeking to decarbonise. Advancing storage capacity and utilising non-pipeline transport, such as shipping, can result in a sector valued at £30 billion annually in taxable revenues by 2050.
- **Meeting Global Demand:** Focusing on low carbon products positions the UK to meet the growing global demand, potentially increasing exports and securing a share of the low carbon products market. Exporting expertise in low carbon products like cement and lime becomes a strategic opportunity.

### The Peak Cluster & Morecambe Net Zero (MNZ)



#### LOW CARBON PRODUCTS

Initial analysis of key industrial sectors, such as steel, cement, lime, and refining, indicates substantial market potential. The global demand for **low carbon alternatives** is projected to increase significantly **by 2050**. The alternative to making these products in the UK is importing them from overseas at a global market price.

#### THE OPPORTUNITY

The combination of MNZ and the Peak Cluster will **decarbonise 40% of the UK's cement and lime production** and deliver **one billion tonnes of CO<sub>2</sub> storage capacity** accessible by pipeline, shipping and rail, essential for decarbonising hard-to-abate industries.

Through their joint vision, the Peak Cluster will connect up with the MNZ store off the coast of Barrow in Furness, providing an annual economic contribution of at least **£230 million UK GVA**, the creation of a **green energy hub** in the North West and the addition of **250 kilometres of CO<sub>2</sub> transportation infrastructure**, all while protecting and creating thousands of jobs in critical industries.

### Bacton Thames Net Zero (BTNZ)



#### CO<sub>2</sub> STORAGE

**The UK has substantial CO<sub>2</sub> storage potential**, as well as existing infrastructure, services and experience from the petroleum sector. These are key advantages that play a critical role in the UK developing a leading CO<sub>2</sub> storage market as well as meeting global demand for low carbon products.

#### THE OPPORTUNITY

BTNZ is ideally positioned to decarbonise industry in South East England, while making the UK a strong contender in storing sourced carbon from Europe. The adjacent Hewett depleted gas field has a **total storage capacity of 330 Mt** and is optimally located to abate emissions from electricity generation, waste disposal and hydrogen production.

Bacton Energy Hub has the potential to abate **1.6 Mtpa of CO<sub>2</sub> emissions in 2030**, increasing to **17 Mtpa by 2050**, by shifting emissions from burning natural gas to a CCUS-enabled hydrogen plant. Existing infrastructure and interconnecting pipelines between Bacton & Zeebrugge complement the storage potential by enabling the storage of both domestic & international CO<sub>2</sub> and transporting locally produced hydrogen.

4. Zhang, Y et al (2022) European carbon storage resource requirements of climate change mitigation targets. International Journal of Greenhouse Gas Control, volume 114. Available at [https://www.researchgate.net/publication/351963317\\_European\\_carbon\\_storage\\_resource\\_requirements\\_of\\_climate\\_change\\_mitigation\\_targets](https://www.researchgate.net/publication/351963317_European_carbon_storage_resource_requirements_of_climate_change_mitigation_targets)

5. National Infrastructure Commission (2021) Engineered greenhouse gas removals. Available at <http://nic.org.uk/app/uploads/NIC-July-2021-Engineered-Greenhouse-Gas-Removals-UPDATED.pdf>



## Deliver Energy Security

- **Decarbonised Power System:** Investing in CCUS is pivotal for achieving a decarbonised power system by 2035, ensuring flexibility and complementing high levels of intermittent renewable generation.
- **Cost Benefits:** Accelerating the deployment of 5.5 GW of gas CCS capacity between 2028 and 2050 can result in a system-wide cost benefit of £7.5 billion, translating to a consumer cost saving of £280 per household<sup>6</sup>.
- **Net-Negative Power Sector:** Transitioning to a net-negative power sector, supported by the negative emissions produced by power-BECCS projects by 2036, is crucial for overall decarbonisation efforts, supporting jobs, private investment, and enhancing grid security.
- **Hydrogen Production:** Ensuring the success of CCUS-enabled hydrogen projects is vital for meeting the 2030 ambition, and preventing potential job losses and economic risks. Clarity on connecting sustainable aviation fuels to the CO<sub>2</sub> cluster networks is essential for retaining projects originally planned for the UK.

## Peterhead Carbon Capture Power Station



SSE's Peterhead Power Station on the Aberdeenshire coast has been integral to Scotland's energy landscape since 1980. Almost half a century later, **it is the only major thermal power station in Scotland** and plays a critical role in balancing the system. Now, as the station nears the end of its life, there is a clear and present need to replace the existing plant with one that is decarbonised, to ensure that Peterhead can continue to meet the UK's energy needs while contributing to net zero.

### THE OPPORTUNITY

Together with Equinor, SSE is developing a new low carbon plant at Peterhead utilising carbon capture technology. Peterhead Carbon Capture Power Station would be **Scotland's first power station equipped with a carbon capture plant with an electrical output of up to 910 MW**. In total, it could capture up to **1.5 Mtpa of CO<sub>2</sub>** – and is located just a few miles from St Fergus, the heart of the Acorn Project.

Delivering this project through Track-2 will not only **help to power Scotland to net zero** and help ensure a secure British electricity system, it will also secure jobs for the current workforce and **create new opportunities** for people across the region.



6. LCP and SSE (2021) Net zero power without breaking the bank: Cutting the cost of decarbonising electricity in Great Britain. Available at <https://www.lcp.com/energy/publications/net-zero-power-without-breaking-the-bank-cutting-the-cost-of-decarbonising-electricity-in-great-britain>



# Supporting Analysis

The CCSA modelled project revenue support costs for the 2023 Spring Budget. However, in response to the technical maturation of the first-of-a-kind (FOAK) projects, as well as increasing commodity prices, the CCSA has re-modelled the revenue support envelope required to meet the Government's ambitious targets of **capturing 20-30 Mtpa CO<sub>2</sub> by 2030**, escalating to **50-60 Mtpa by 2035**<sup>7</sup>, aligning with the CCUS Vision that emphasises the need for cost reduction in the 2030s.

We estimate that a revenue support envelope matched to the 6th Carbon Budget would unlock around **£30 billion of private sector capital before 2030**, resulting in significant job creation and supply chain stimulation in the UK's industrial regions over the coming years. Much of this investment will be front-loaded, prior to the start of revenue support payments in 2028.

## Funding Scenario (CCUS Vision)

In the CCUS Vision scenario, the modelling shows that, an annual commitment of £2-3 billion (from a mix of exchequer and consumer levies and including the **£1 billion already committed** in the 2023 Spring Budget for early deployment of CCUS) is required to reach the Government's desired levels of deployment in line with its **Net Zero Strategy 2030** target and 6th Carbon Budget<sup>8</sup>:

- **29 Million tonnes of CO<sub>2</sub>/year by 2030**  
- **£2.7 billion/yr in 2030**
- **56 Million tonnes of CO<sub>2</sub>/yr by 2035**  
- **£2 billion/yr in 2035**

In the CCUS Vision scenario, this modelling shows a significant decrease in overall revenue support in the 2030s, **dropping below £2 billion/yr from 2035**. This is achieved as the industry starts to achieve economies of scale and drive down the marginal cost of additional volumes in the 2030s and an increasing use of industrial capture projects and stores that new projects will bring. **CCUS clusters will be full** by this date and the carbon price is sufficiently high.

The industry is already working on developing accreditation for new products such as **low carbon cement**, and we expect that these products will be desirable at a premium, accelerating the commercial deployment of CCUS in the 2030s.

It should be noted, however, that without the assumed trajectory for CO<sub>2</sub> prices, or a negative emissions market in place, this could cost an **extra £1 billion in 2030** and an **extra £3 billion in 2035**. Given the scale of this range in response to policy decisions, it is clear to see why private sector investors alone cannot underwrite the risk of a variation in an unknown cost.

The supporting analysis also shows that to meet the increase in storage volume post-2030, and gain the cost and GVA benefit to the UK, then rapid intervention for regulatory progression of the first round of carbon storage licences and associated capture CfDs needs to be accelerated to completion through 2024.

7. HM Government (2021) Net Zero Strategy: Build Back Greener. Available at <https://www.gov.uk/government/publications/net-zero-strategy>

8. Reuters (2023) Britain pledges 20 billion pounds to capture carbon emissions. Available at <https://www.reuters.com/article/idUSKBN2VC1UH/>





The Carbon Capture and Storage Association (CCSA) is the trade association focused on accelerating the commercial deployment of carbon capture, utilisation and storage (CCUS).

We work with our members, governments and other organisations to ensure CCUS is developed and deployed at the pace and scale necessary to meet net zero goals and deliver sustainable growth across regions and nations.

The CCSA has over 100 member companies who are active in exploring and developing different applications of carbon capture, CO<sub>2</sub> transportation by pipeline, ship and rail, utilisation, geological storage, and other permanent storage solutions, both end-users of the technology and those in the supply chain, as well as members from management, legal and financial consulting sectors.

[www.ccsassociation.org](http://www.ccsassociation.org)