中德能源与能效合作
Energiepartnerschaft
DEUTSCHLAND - CHINA

FACTSHEET

STATE OF CCU/S IN EUROPE 2024/2025

Current state of CCU/S in European countries

In 2024, there were several developments in Europe and Germany around Carbon Capture Utilisation and/or Storage (CCU/S). This factsheet summarises state of political discussions, projects and instruments in the EU and selected Member States.

European Union

The **European Industrial Carbon Management Strategy (ICM)** was published in early **February 2024**. The ICM expects that by **2030**, at least **50 million tons** of CO_2 will be captured each year. The cost of the capture facilities is estimated at **3 billion EUR**. Investments in transport infrastructure are expected to range from **6.2** to **12.2 billion EUR** by **2030**.1

For currently announced CCS projects, a funding gap of around **10 billion EUR** is estimated. Therefore, the ICM emphasises the need for more support from the EU and at national levels (such as Carbon Contracts for Difference (CCfD) by **2030** to develop industrial carbon management solutions. By **2050**, the EU would need to capture up to **450 million tons** of CO_2 to achieve climate neutrality. The required investment needed for transport infrastructure is estimated between **9.3** and **23.1 billion EUR** to meet the objectives in **2040** and **2050**.[1]

The ICM sees CO_2 infrastructure as a key factor. As part of this, an EU-level regulatory package for cross-border, fair CO_2 transport (using pipelines, ships, trains and trucks) is currently being developed. For the first time, an Important Project of Common European Interest (IPCEI) for CCU/S is being planned to support large parts of the process chain, similar to earlier projects for batteries and hydrogen. An investment atlas for potential CO_2 storage sites is expected to be published by **2026**.[2]

The EU **Net-Zero Industry Act (NZIA)** has set targets for CO_2 storage by **2030**. The goal is to achieve an injection capacity of **50 million tons per year** by **2030** through increased investment in storage infrastructure across the EU. The NZIA aims to enhance European manufacturing capacity for net-zero technologies by addressing barriers to scaling up production in Europe.[3]

1 European Commission (2024) – Communication from the commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Towards an ambitious Industrial Carbon Management for the EU, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52024DC0062, accessed on 27/11/2024
2 European Commission (2024) – Questions and Answers on the EU Industrial Carbon Management Strategy, https://ec.europa.eu/commission/presscorner/detail/en/qanda_24_586, accessed on 27/11/2024
3 European Commission (2024) – The Net-Zero Industry Act: Accelerating the transition to climate neutrality, https://single-market-economy.ec.europa.eu/industry/sustainability/net-zero-industry-act_en, accessed on 27/11/2024

Additionally, the **Carbon Removal and Carbon Farming Framework (CRCF)** is developing the first EU-wide voluntary certification system for carbon removals, carbon farming, carbon storage, and carbon storage in products. Long-term carbon removals can be achieved through Direct Air Carbon Capture and Storage (DACCS) and Bioenergy with Carbon Capture and Storage (BECCS). The CRCF serves as the foundation for project implementation and the market scaleup of DACCS and BECCS. The CRCF is expected to come into effect in 2025.[4,5]

Member States

The federal government of **Germany** published the "cornerstones" of its national **Carbon Management Strategy** in May 2024, containing a commitment to enable CCU/S for all emission sources except emissions from coal heating and power plants, with a focus on hard-to-abate industrial emissions. The final strategy is expected to be released in **2025**. In September 2024, the parliamentary process to amend the Carbon Dioxide Storage and Transport Act (KSpTG) began, which will allow CCS and the transport of CO2 by pipeline. In August 2024, a **new funding programme** called "Federal Funding for Industry and Climate Protection (BIK)", open for CCU/S applications, was introduced. Furthermore, CCU/S projects focusing on hard-to-abate emissions can participate in the second auction round of CCfDs in Germany. Currently three projects have received funding from the **EU Innovation Fund** and are in planning:

- **GeZero**, cement industry,
  planned operation: **2029**,
  Captured CO_2: 0.7 million tons per year[6]
- **Lägersdorf**, cement industry,
  planned operation **2028**,
  Captured CO_2: **1.2 million tons per year**[7]
- **Everest**, lime industry,
  planned operation **2029**,
  Captured CO2 (final stage): **1.4 million tons per year**[8]

Austria published its **Carbon Management Strategy (ACMS) in June**. It aims to avoid hard-to-abate emissions using technologies like CCS, CCU and Carbon Dioxide Removal (CDR). The ACMS con-siders these actions necessary to meet the country's climate goals.[9]

In the first phase of the strategy, Austria will remove its ban on geological CO_2 storage and work on developing national and international solutions for CO_2 transport and storage.[9]

The second phase will focus on implementing the action plan, which includes expanding infrastructure, supporting pilot projects and increasing the use of natural carbon sinks.[9]

Denmark, the **Netherlands**, **Norway** and the **United Kingdom (UK)** already have CCS-projects in various stages of construction or operation.

The **Project Greensand, Denmark's** first offshore CO_2 storage initiative, made headlines as the world's first cross-border carbon storage site. It started injection of CO_2 in the North Sea in **2023** and aims to annually store up to **1.5 million tons** of CO_2 by **2026** and up to **8 million tons** by **2030**.[10]

Currently, two projects are being implemented in **the Netherlands: Porthos** and **ARAMIS**. The **Porthos** project is already under construction. It involves building an off-shore pipeline from the Port of Rotterdam to empty gas fields located **20 km** off the North Sea coast, where CO_2 will be stored at a depth of about **3 km**. Starting in **2026**, the project aims to store approximately **2.5 million tons of CO_2** per year.[11] The **ARAMIS** project is focused on building CO_2 transport and storage infrastructure. The final in-vestment decision is expected in **2025/2026**, with storage beginning in **2028/2029**. By **2030**, there are plans to expand the injection capacity to **22 million tons per year**. Currently, Front-End Engineering and Design (FEED) studies are being conducted.[12]

The Netherlands has already established a financial framework for scaling up CCS through its SDE++ subsidy programme, which is also funding the **ARAMIS** project. The programme includes a cap for CCS projects of **9.7 million tons per year** for the industry sector and **3 million tons per year** for the energy sector.[13] The budget for CCS projects of **6.7 billion EUR** is mainly financed by revenues from carbon pricing in the system projects that will use the **ARAMIS**.[14]

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4 European Commission (2024) – Carbon Removals and Carbon Farming, https://climate.ec.europa.eu/eu-action/carbon-removals-and-carbon-farming_en, accessed on 27/11/2024
5 European Council (2024) - Council greenlights EU certification framework for permanent carbon removals, carbon farming and carbon storage in products, https://www.consilium.europa.eu/en/press/press-releases/2024/11/19/council-greenlights-eu-certification-framework-for-permanent-carbon-removals-carbon-farming-and-carbon-storage-in-products/, accessed on 27/11/2024
6 Heidelberg Materials (2024) – GeZero, https://www.heidelbergmaterials.de/de/zement/zementwerke/geseke/gezero-projekt, accessed on 27/11/2024
7 Holcim (2024) – Dekarbonisierung, https://www.holcim.de/nachhaltigkeit/dekarbonisierung, accessed on 27/11/2024
8 Lhoist (2024) – Everest, https://www.lhoist.com/en/everest, accessed on 27/11/2024
9 Bundesministerium Finanzen (2024) – Carbon Management, https://www.bmf.gv.at/themen/klimapolitik/carbon_management.html, accessed on 27/11/2024
10 Greensand (2024) – What is Project Greensand? https://www.projectgreensand.com/en/hvad-er-project-greensand, accessed on 27/11/2024
11 Porthos (2024) – Porthos CO2 Transport & Storage, https://www.porthosco2.nl/en/, accessed on 27/11/2024
12 ARAMIS (2024) – ARAMIS, https://www.aramis-ccs.com/, accessed on 27/11/2024
13 Clean Air Task Force (2024) – Designing Carbon Contracts for Difference, https://www.catf.us/resource/designing-carbon-contracts-for-difference/, accessed on 27/11/2024
14 Independent Commodity Intelligence Services (ICIS) (2024) – Dutch government allocates 6.7 billion EUR to CCS projects, https://www.icis.com/explore/resources/news/2023/04/27/10879919/dutch-government-allocates-6-7bn-to-ccs-projects/, accessed on 27/11/2024

Norway, alongside **Denmark**, is one of the most advanced countries in implementing CCS projects in Europe. The Longship project is set to demonstrate the entire CCS chain and includes several key projects:

- **Northern Lights:** transport and storage, planned operation: **2025**, Stored CO_2 (2025): **1.5 million tons per year**[15]
- **Brevik:** cement industry, planned operation: **2025**, Captured CO_2: **0.4 million tons per year**[15]
- **Hafslund Celsio:** waste-to-energy, planned operation: currently stopped, Captured CO_2: **0.4 million tons per year**[15]

The **Northern Lights Project** will start operation in **2025** by storing CO2 from Yara's ammonia plant in the **Netherlands (0.8 million tons)**, Brevik **(0.4 million tons)**, and in **2026** from Ørsted's two biomass power plants in **Denmark** (around **0.4 million tons** of biogenic CO_2). In the next phase, the Northern Lights Project aims to store **5 million tons per year**.[15]

The **Brevik CCS project** will start operation in **2025**. It is the first cement plant with a large-scale CO_2 capture unit installed in Europe. However, the **Hafslund Celsio project** has been temporarily halted as the expected costs were around **260 million EUR** higher than at the investment decision. The Norwegian government covers approximately **80 percent** of the costs for these projects.

The **UK** government has set an ambitious goal of capturing **20 to 30 million tons of CO_2 per year** by **2030**, with plans for four major CCU/S clusters, supported by up to **22 billion GBP** in government funding:[16,17]

- **HyNet:** capture (hydrogen), transport and storage, planned operation: **around 2030**, Stored CO_2: **4.5 million tons per year**,[18,19]
- **East Cost Cluster:** capture, transport and storage, planned operation: **2027**, Stored CO_2 (2035): 23 million tons per year[20]
- **VikingCCS:** capture, transport and storage, planned operation: **2030**, Stored CO_2: **10 million tons per year**[21]
- **Acorn:** capture, transport and storage, planned operation: **2030**, Stored CO_2: **5 to 10 million tons per year**[22]

Overall, **27** appraisal and storage licences are on the UK Continental Shelf. The **UK** is thus very advanced in scaling up CCS in Europe.[23] However, there have also been some delays regarding the contracts in the state's cluster programme.

15 Gassnova (2024) – Current Status of the Longship Project, https://ccsnorway.com/current-status-of-the-longship-project/, accessed on 27/11/2024
16 GOV.UK (2024) – Government reignites industrial heartlands 10 days out from the International Investment Summit, https://www.gov.uk/government/news/government-reignites-industrial-heartlands-10-days-out-from-the-international-investment-summit, accessed on 15/12/2024
17 GOV.UK (2023) – CCUS Cluster Sequencing Track-2 Market, update December 2023, https://www.gov.uk/government/publications/cluster-sequencing-for-carbon-capture-usage-and-storage-ccus-track-2/ccus-cluster-sequencing-track-2-market-update-december-2023, accessed on 27/11/2024
18 Eni (2024) – HyNet North West, CO_2 capture and storage arrives in Liverpool, https://www.eni.com/en-IT/actions/global-activities/united-kingdom/hynet.html, accessed on 27/11/2024
19 HyNet (2024), What is HYNET? https://hynet.co.uk/about/
20 East Cost Cluster (2024), Project Timeline, https://eastcoastcluster.co.uk/#timeline, accessed on 27/11/2024
21 Viking CCS (2024), Timeline, https://www.vikingccs.co.uk/schedule, accessed on 27/11/2024
22 Acorn (2024) – About Acorn, https://theacornproject.uk/, accessed on 27/11/2024
23 North Sea Transition Authority (2024) – Carbon Capture and storage, https://www.nstauthority.co.uk/the-move-to-net-zero/carbon-capture-and-storage/, accessed on 27/11/2024

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