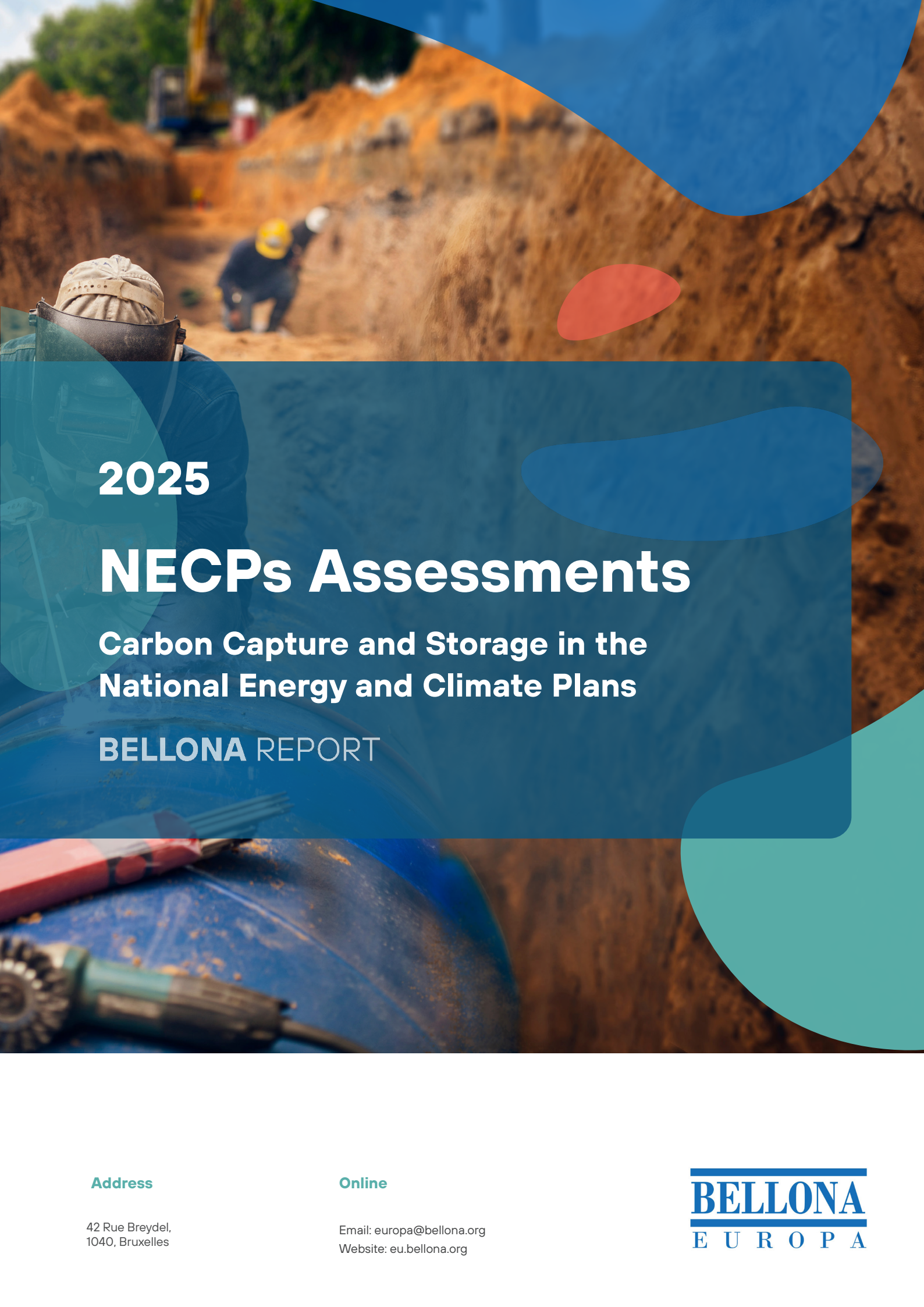




2025

NECPs Assessments

**Carbon Capture and Storage in the
National Energy and Climate Plans**

BELLONA REPORT

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Introduction

December 30th, 2025 marks one year and a half after the deadline for Member States to publish their final updated National Energy and Climate Plans (NECPs), outlining each country's pathway to decarbonisation in line with the EU's 2030 energy and climate objectives. They describe the energy and climate policies that countries have foreseen to reach their national targets. At time of writing, 25 out of the 27 Member States have published these documents.

Spanning the period from 2021 to 2030, the Plans are meant to reflect an increased ambition in alignment with evolving geopolitical and strategic developments. They require increased ambition in transitioning away from carbon-intensive activities towards decarbonisation as a result of the COVID-19 pandemic and Russia's invasion of Ukraine. These Plans are meant to provide long-term investment predictability, boosting green investments and accelerating Europe's efforts towards achieving 55% emission reductions by 2030 and reaching the net-zero emissions target by 2050.

The final updated NECPs are meant to improve upon their draft updated versions following the European Commission's assessment, which included specific recommendations for each Member State. This feedback was particularly justified for Carbon Capture and Storage (CCS), which, while key to decarbonising industrial activity, received limited attention from the majority of Member States¹. CCS is currently the only available and scalable technology that can effectively tackle process emissions in harder-to-abate industries that cannot otherwise be addressed through electrification, efficiency improvements or fuel switching.

Building on the recommendations provided by the European Commission (EC), Bellona Europa has analysed the published NECPs against the following 6 criteria:

	 Fulfilled	 Partially Fulfilled	 Unmet
Implementation plan	Concrete implementation plan	Plans for roll-out, stand-alone projects, facilitating measures	No concrete plans/ vague commitments
CO₂ capture	Projection/ assessment on process emissions	Aggregated information, projections of point source emissions	No information on emissions to be tackled through CCS
CO₂ storage	Reports on CO ₂ storage capacity to be made operationally available annually	Plans to explore the subsurface for the purpose of CO ₂ storage	No information on CO ₂ storage
CO₂ transport	Reports on planned CO ₂ transport infrastructure	Plans to explore possibilities for CO ₂ transport infrastructure	No plans for transport infrastructure
Public funding	Public funding earmarked for CCS deployment	Funding/ support instruments available for industrial decarbonisation	No funding available



The analysis looks at whether and to what extent the European Commission's recommendations have been addressed in each draft NECP, allocating to each criterion a preliminary colour code of green, amber or red signalling whether that criterion has been met, partially met, or unmet/unaddressed re-

The NECPs must provide specific and detailed plans for CCS deployment in line with the European Commission's recommendations, ensuring comprehensive coverage of the entire CCS value chain. This includes robust public support, cross-border collaboration, and a clear understanding of the climate benefits to guide informed policy decisions. Planning, reporting, and regulatory support are critical to overcoming barriers and ensuring the timely and effective development of CCS. The NECPs should not only acknowledge the importance of CCS but must also explicitly outline strategies for the deployment of capture, transport, and storage infrastructure. It is crucial that these Plans outline the need for capturing CO₂ from specifically process emissions. Additionally, the Plans should identify the storage potential that can be commercially developed, as well as planned transport infrastructure ensuring a comprehensive approach to the entire CCS value chain. This level of specificity is essential for effective climate change mitigation and the successful implementation of CCS technologies.

Here are the key takeaways from our assessment:

- The majority of final updated NECPs improve upon their draft versions in one or more areas showing an increased consideration for CCS in Member States' climate policies.
- Only a handful of Member States have an implementation plan for CCS deployment, some have partial plans and a majority have none.
- Reports on CO₂ capture, transport and storage volumes are lacking in the majority of NECPs; those that do provide figures show varying levels of precision and depth in their assessments.
- Few countries are planning funding or derisking measures to support CCS deployment, often relying on EU programmes like the Innovation Fund to provide co-financing.
- Other aspects of the NECPs that require improvement are a further differentiation between CCS and CCU, prioritising high climate value applications for CCS and enhancing regional cooperation between Member States.

AUSTRIA



Criteria	Performance	Score
Implementation plan	Published its Carbon Management Strategy aimed at lifting geological CO ₂ storage ban and establishing a supportive policy and regulatory framework to establish a domestic CCS value chain.	
CO₂ capture	Reports on capture volumes for different industrial and biogenic emissions. Total emissions from hard-to-abate industries to be captured estimated at 8-12 Mt between 2030 and 2050.	
CO₂ storage	Estimated both total theoretical and practical CO ₂ storage capacity in depleted oil and gas fields at 465 Mt and 118 Mt respectively. Ongoing work on assessing storage capacity of individual fields. Vague statement on storage in saline aquifers.	
CO₂ transport	Conducted feasibility study with different scenarios for comprehensive CO ₂ collection, transport and storage cross-country networks with interconnections to international off-takers.	
National government funding	Allocated more than €3 bln to industrial decarbonisation measures; CCS projects being eligible. Plans to limit CO₂ storage to hard-to-abate industries with constant revaluation of eligible sectors.	
Other relevant initiatives	Introduced climate dialogue with industry stakeholders.	

DISCLAIMER | *The NECP was published under Austria's previous government coalition, formed by the conservative ÖVP and the Greens. Following the federal elections at the end of 2024, the far-right FPÖ emerged as the strongest party in parliament and is presently in coalition talks with the ÖVP. Although regional factions of the FPÖ have expressed support for CCS, the party fundamentally opposes spending on climate protection measures¹. Therefore, the future of the Austrian Carbon Management Strategy (CMS) under the incoming government remains uncertain.*

CCS IMPLEMENTATION PLAN

Austria's approach to implementing CCS is outlined comprehensively in its Carbon Management Strategy (CMS), which has been referenced in its NECP. Since 2011, the domestic geological storage of CO₂ has been restricted exclusively to research purposes. However, the government considered Carbon Capture and Storage (CCS) to become a "significant cornerstone" of Austrian climate policy and suggested revoking the ban by mid-2025, as it recognised that the initiation of CO₂ storage by the mid-2030s the latest is critical to meet its climate objectives.

The strategy proposes an elaborate action plan aimed at making the legal amendments necessary for a lift of the ban and establishing a supportive policy and regulatory framework to cultivate a domestic CCS value chain. Among the goals are fostering research, demonstration plants, feasibility studies, and first mover projects. Furthermore, a one-shop-stop shall be established to streamline all permitting procedures and manage subsidies efficiently, improving administrative efficiency, uniformity and legal certainty. Moreover, experts and stakeholders shall proactively work to improve public acceptance through engagement and transparency, focussing on the necessity of CCS for achieving climate goals.

Criteria will be developed for the prioritisation of projects of competing uses in the subsurface, such as storage of H₂ or thermal energy. As domestic storage may be limited for time to come, Austria further plans to engage in international cooperation, which involves the development of uniform technical standards and market design for CO₂ transport, entering long-term contracts to secure storage abroad, ensuring non-discriminatory access to a European transport and storage network, as well as participation in transnational research and the EU's Strategic Energy Plan (STEP) for Carbon Capture, Utilisation and Storage (CCUS). Furthermore, Austria intends to engage in international exchange on best practices in the areas of sector ramp-up, subsidy and incentive design, as well as public engagement.

CO₂ CAPTURE

Austria's CMS emphasises that cost-effective emission reduction measures should remain a priority for decarbonisation, and that CCS should only be an option for hard-to-abate industries. Carbon capture should tackle emissions that cannot be avoided despite optimisation of the processes, and where there are no viable alternative processes, products or resources available for the same use case. The list currently encompasses cement, limestone, glass, pulp and paper, iron and steel, refractory materials, waste incineration, and biomass energy production. However, it is dynamic and will be periodically reassessed by a scientific advisory board to reflect technological advances and emerging alternatives.

The NECP projects annual emissions savings of 0,5 Mt of CO₂ by 2030 via carbon capture. Industrial CO₂ emissions to be captured are projected to range between 4,4 and 12,1 Mt per year by 2040, with an additional 1-2 Mt of CO₂ from the combustion of biomass. More detailed figures were provided in a feasibility study, commissioned by Austria's Ministry of Climate Action and Energy. As the study assumes a yearly injection rate of 5,9 Mt, Austria's domestic storage is unlikely to suffice for its captured volumes, and the country will likely rely on cross-border CO₂ transport to store their captured CO₂ outside of their territory.

Source of CO ₂ to be captured	Volume 2030	Volume 2040	Volume 2050
Cement, lime, refractory material	3,4 Mt/a	3,9 Mt/a	4,0 Mt/a
Waste incineration (fossil part)	0,9 Mt/a	1,4 Mt/a	1,3 Mt/a
Other industry	3,8 Mt/a	6,8 Mt/a	4,8 Mt/a

Table 1: CO₂ projected to be captured by source.

Source: https://www.bmk.gv.at/damjcr:0186ff45-1e58-4cc8-8f62-9ad19b7bded2/CO2Netz_Bericht_241007.pdf, p.

CO₂ TRANSPORT

The aforementioned feasibility study outlines several scenarios for a CO₂ transport network, each considering varieties in the scope of industries participating, the availability of domestic storage, and storage demand covered for CCU applications. By 2040/50, the transport network models are projected to span up to 1,400 km, connecting industrial clusters to potential storage sites or international off-takers in the most-efficient way. Cost projections suggest that pipeline transport could cost approximately €35-50 per ton of CO₂. When integrating the expenses associated with capture, transport, and storage, the total costs are expected to fall between €150-250 per ton of CO₂.

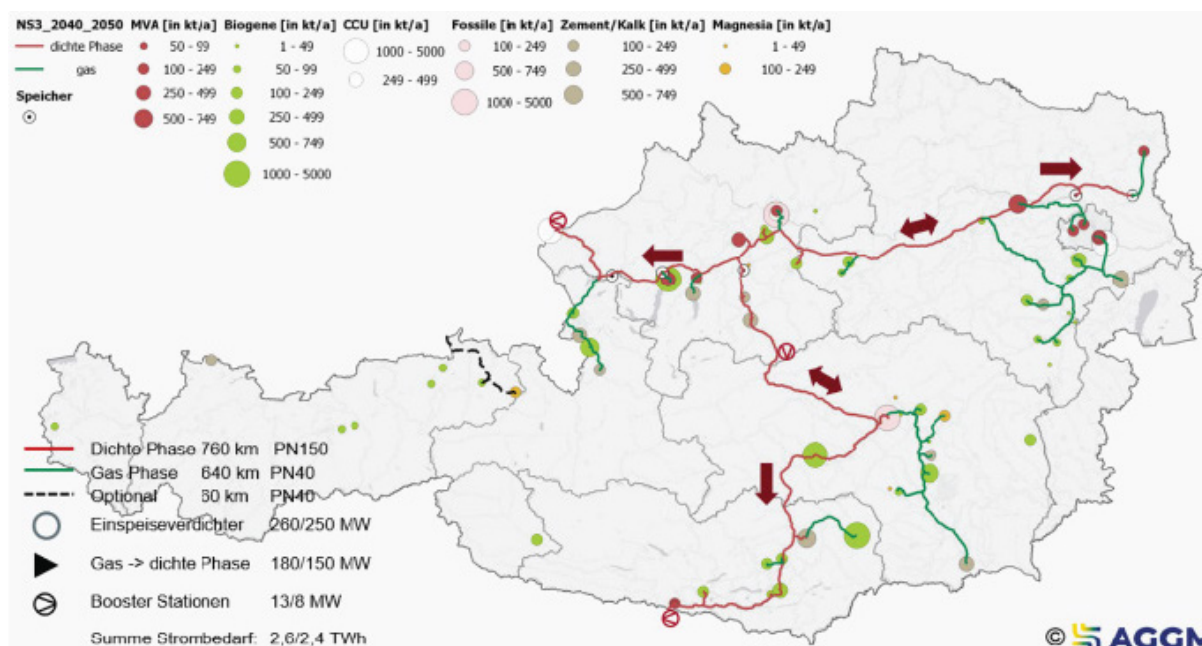


Figure 1: Scenario for Austrian CO₂ transport network in 2040/50 Source: Feasibility Study on a CO₂ Collection and Transport Network in Austria,

https://www.bmk.gv.at/damjcr:0186ff45-1e58-4cc8-8f62-9ad19b7bded2/CO2Netz_Bericht_241007.pdf, p. 58

CO₂ STORAGE

An evaluation report of Austria's Ministry of Finance identified 200 depleted oil and gas fields as well as 30 saline aquifers that may be viable for CO₂ storage. According to the CMS, the oil and gas fields alone have a total estimated capacity to store between 150 and 250 Mt of CO₂. Further detailed

assessments in the feasibility study estimated the maximum theoretical storage capacity across all oil and gas fields at 465 Mt. Under consideration of technological and economic constraints, practical estimations are reduced to 118 Mt. Currently, evaluations of these storage capacities are ongoing, with the largest fields assessed each having a capacity of up to 45 Mt. It is projected that those fields that can be technically and commercially developed might offer an annual injection capacity of 6 Mt, potentially commencing from 2030.

Meanwhile, the saline aquifers, which could hold storage capacities in the gigaton range, remain largely unexplored. Given the extensive exploration and development required, beginning the commercial use of these aquifers for storage before 2035 is not foreseen.

NATIONAL GOVERNMENT FUNDING

Austria's CMS recognises the financial risk of misaligned investments and stranded assets. The strategy calls for the identification of investment needs for CCS projects and the analysis of potential efficient cost-bearing systems and market structures.

The NECP itself mentions the following financial resources earmarked for industrial decarbonisation: The National Industrial Transformation Support Instrument allocates €2,975 million for the period between 2023 and 2030. This funding is intended to facilitate co-financing arrangements with EU funds, such as the Innovation Fund, and is designed to cover both investment and operational costs. The Domestic Environmental Fund provides an additional €620 million available until 2026. This fund is specifically directed towards investment costs and includes provisions for pilot and demonstration plants. CCS is listed among the eligible technologies for both funds, although its application is restricted to process emissions with no alternative abatement technology. The National Recovery and Resilience Plan contributes a further €100 million dedicated to the transformation of the industrial sector. Compared to the last draft of the NECP, the total volume of available funds has not increased.

In 2022, Austria introduced a national CO₂ price for emissions stemming from fossil energy carriers for all industries currently not covered by the EU-ETS. The price will increase by a fixed rate before it transitions to a market-based model without free allocations in 2027. This sets another financial incentive to abate emissions, in certain cases potentially via CCS, if the respective industries are included in the scope of hard-to-abate sectors eligible for the technology.

OTHER RELEVANT INITIATIVES

The NECP references the 'Climate-Neutral Industry Austria' dialogue process, which was conducted with 11 representatives from the most emissions- and energy-intensive industrial companies and the industrial associations. The initiative aims to foster long-term mutual understanding on the path to climate-neutrality. This will be achieved through continuous and occasion-specific exchange formats.

One notable initiative on the ground is the "Carbon2ProductAustria" (C2PAT) project, where cement producer Lafarge, oil and gas company OMV, energy company Verbund and chemicals producer Borealis are collaborating on the development of a carbon capture facility. The goal is to capture nearly all of the 700,000 tons of CO₂ annually emitted by Lafarge's cement plant in Mannersdorf by 2030.²

Another initiative is the CCUpScALE project, a collaboration between RHI Magnesita and technology provider MCI Carbon – the first carbon capture facility for refractory material production. This pioneering project is set to capture 50,000 tons of CO₂ by 2028.

RECOMMENDATIONS

Since its draft NECP, Austria has made great progress in formulating a comprehensive strategy addressing essential components for effective CCS deployment. Recognising the current limitations of CCU technology in offering significant climate benefits, Austria is committed to developing both domestic storage capabilities as well as a transport network providing access to storage sites abroad. Bellona highlights the need for the following measures.

1

SET UP A NATIONAL AND REGIONAL WORKING GROUP TO DEVELOP AN IMPLEMENTATION PLAN FOR CCS DEPLOYMENT

It is imperative for the incoming government to continue acknowledging the necessity of CCS for Austria's climate policy. Given the recent political shifts, fortifying the legal and regulatory framework promptly is essential. Incorporating CCS goals in legislation could ensure the necessary support for CCS initiatives to contribute towards Austria's climate goals.

3

INTRODUCE DEDICATED CCS FUNDING SCHEMES

While there are several funds available to support industrial decarbonisation measures, Austria should nevertheless establish funding schemes earmarked for CCS deployment. Particularly in the early stage, CCS technologies require substantial upfront investments. Targeted financial support would enable CCS to effectively contribute to Austria's climate goals, tackling emissions that cannot otherwise be addressed.

2

STRENGTHEN REGIONAL COOPERATION

Foster closer ties with neighbouring countries such as Slovenia, Italy, and Hungary, all of which are advancing CCS projects.

4

ENSURE THE ENVIRONMENTAL INTEGRITY AND CLIMATE BENEFITS OF BECCS/BIO-CCS:

Develop and adhere to robust accounting rules, certification standards, liability frameworks, and sustainability requirements for BECCS/Bio-CCS to guarantee its environmental integrity and net climate benefits. This includes comprehensive Monitoring, Reporting, and Verification (MRV) systems that account for all greenhouse gas emissions—both direct and indirect—across the entire value chain, domestically and internationally where applicable. These systems should employ conservative estimation methods and ensure that biomass sourcing prioritises sustainability, minimises lifecycle emissions, and achieves a net-negative balance.



BELGIUM



Criteria	Performance	Score
Implementation plan	While Belgium does not have a concrete, federal-level CCS implementation plan, Flanders has a strategic CCUS concept note, at the regional level. The federal government only commits to enabling actions (removing legal barriers, concluding bilateral agreements, facilitating access to EU funding), but no nationwide plan, timeline, or strategy exists	●
CO ₂ capture	The NECP provides quantitative projections of CO ₂ capture in Flanders (5 Mt by 2030) and qualitative capture expectations for Wallonia, along with emissions data (≈6 Mt of process emissions). However, Belgium does not quantify national capture needs nor specify how much of industrial emissions is expected to be tackled through CCS.	●
CO ₂ storage	Belgium claims no cost-effective domestic storage, but the NECP includes plans to further explore this: Wallonia will assess onshore potential (policy 776), and external assessments (EC, CO ₂ GeoNet) indicate geological formations exist.	●
CO ₂ transport	Belgium reports on three bilateral agreements (DK, NL, NO), MoU on Zeebrugge-Norway pipeline, and detailed transport infrastructure developments such as the Antwerp@C export hub and Ghent Carbon Hub. Flanders has a 2024 CO ₂ Transport Decree, already designating operators.	●
National government funding	Belgium offers multiple relevant support mechanisms: federal 40% green investment deduction (including CCS), removal of EU funding restrictions, CRM adjustments considered; Flanders' TRACKS CfDs pilot with possible CCS expansion; Wallonia's PRW earmarking €127 million for decarbonisation including CCS/CCU. Some of this is directly earmarked for CCS, and much of it applies to broader industrial decarbonisation.	●
Other relevant initiatives	Belgium's NECP refers to international cooperation on CO ₂ transport and storage, including new bilateral agreements with Denmark, the Netherlands and Norway. It also highlights the growing role of blue and low-carbon hydrogen linked to CCS and notes continued coordination between federal and regional authorities, industry and infrastructure operators.	

CCS IMPLEMENTATION PLAN

Belgium's commitment to CCS as an essential component of its climate strategy is reaffirmed in the final NECP. Its regions and the federal government all recognise the technology's role in decarbonising hard-to-abate sectors, though the scope and depth of planning differ substantially across governance levels. The federal level assigned itself an enabling role rather than providing and following a comprehensive national CCS deployment strategy. Federal actions focus primarily on removing remaining regulatory obstacles, especially for cross-border CO₂ transport, concluding bilateral agreements for CO₂ transport and storage, facilitating access to EU funding, derisking private investments, and "organising contacts" and monitoring CCS developments. Beyond these enabling functions, the federal government does not set out any strategic plan, roadmap, implementation plan with milestones, or sectoral prioritisation for CCS deployment.

The regions, therefore, remain the central actors responsible for CCS implementation. Flanders continues to build on its 2021 CCUS concept note¹, which functions as its strategic vision for carbon capture, utilisation and storage, and includes an assessment of the technologies' potential, revisions to the current legislative framework and various policies to support CCS deployment in the region. This strategic document remains present in the final NECP, and the region has since operationalised elements of it through the 2024 CO₂ Transport Decree, introducing regulated third-party access, tariff approval by the Flemish Energy Regulator and legal and operational separation between CO₂ transport infrastructure and capture activities. The designation process for transport system operators has already begun. Wallonia intends to update its legislative framework to support CO₂ value chains, including measures to develop a CO₂ transport roadmap and a future assessment of onshore storage potential.

Compared to the draft NECP, however, the final document removes or shortens several elements of the earlier conceptual framing. First, the draft's description of Flanders' CCUS "potential to capture tens of millions of tonnes", supported by references to its industrial cluster, ports, and logistical advantages, is no longer included. While the final NECP still acknowledges Flanders' strategic position, it drops the more explicit quantitative ambition framing. Second, the draft provided more elaborate operational detail on the Klimaatsprong (Industrial Transition Programme) CCUS working groups, including their role in identifying infrastructure needs, studying potential pipeline routes, and coordinating with pipeline operators. The final NECP retains the general intent but presents it in a more concise form, omitting the organisational detail found in the draft. Nonetheless, the core strategic reference, the 2021 CCUS concept note, remains present in both documents.

As in the draft NECP, the final NECP still does not clearly distinguish between CCU and CCS in terms of their climate-mitigation impact, and CO₂ utilisation is often presented as inherently beneficial. However, under the EU Emissions Trading System (ETS) Directive, only a very limited subset of CCU pathways can actually deliver verifiable emission reductions. For most utilisation cases, including the synthetic fuel production that Wallonia aims to develop, the CO₂ is ultimately re-emitted during combustion, meaning these applications do not provide net climate benefits nor help industries avoid ETS compliance costs. Relying on CCU without ensuring that it results in permanent CO₂ storage therefore risks overstating its mitigation potential and does not offer a credible decarbonisation pathway for the involved sectors.

1 [Conceptnota - visie op CCUS - koolstof opvang hergebruik en opslag 2021 wcj9ao.pdf](#)

CO₂ CAPTURE

Flanders estimates that 61% of industrial process emissions could be reduced by 2030 compared to 2005, in large part coming from planned CCS projects in the region, **Up to 5 Mt of CO₂ can be captured annually by 2030, and the NECP considers Belgian industry well-placed to deploy this capacity.** However, they do not specify what share of these would be process emissions. The final NECP gives particular attention to capturing emissions from **waste-incineration plants**, which **could reduce emissions by around 0,5 Mt CO₂ by 2030**; if proven successful, the region aims to further support modular capture units for smaller emitters.

Wallonia is aiming for a reduction of 47% in non-ETS greenhouse gas emissions by 2030 compared to 2005, and one of the measures to achieve it is the development of carbon capture technologies. **Wallonia views capture as essential for lowering emissions from its concentrated industrial base**, specifically in cement, heating, glass and chemicals, but does not quantify expected capture volumes.

At the same time, the NECP provides emissions data that imply roughly 6 Mt of annual industrial process emissions across ETS and non-ETS sectors in Wallonia. However, this figure is not translated into a capture target, nor does the plan specify how much of any future reduction would rely on CCS as opposed to CCU.

CO₂ TRANSPORT

Belgium's lack of cost-effective domestic storage potential, as described in the draft NECP, continues to make **transport infrastructure fundamental to strategic CCS deployment in the country.** In the final NECP, Belgium confirms three bilateral agreements under the London Protocol: Denmark (2022), the Netherlands (2023), and Norway (2024), the latter accompanied by a memorandum of understanding to develop an offshore CO₂ pipeline connecting Zeebrugge to Norwegian storage sites.

Federal and regional authorities also intend to deepen cooperation with the UK, France, Germany, and other North Sea countries. **Flanders seeks to leverage its central industrial position and proximity to North Sea storage**, implementing its 2024 CO₂ Transport Decree and continuing to advance infrastructure under open-access principles. The CO₂ Pipeline Decree introduced in 2024 aims to balance legal certainty, third-party access and economies of scale for network operators. In practice, the Decree requires the legal and operational separation of CO₂ transport infrastructure from capture activities and mandates that CO₂ transport operators submit tariff proposals to the Flemish Energy Regulator for approval. The process for designating transmission system operators (TSOs) has already begun under this framework for the industrial cluster in the Antwerp port area.

Wallonia concludes that its process emissions (around 6 Mt CO₂ annually) could be fully transportable by 2050, through policies 395 and 396 it plans to establish the necessary regulatory framework, create a roadmap for CO₂ transport in the region and cooperate closely with gas system operators to coordinate investment.

Several major projects are highlighted, including the Antwerp@C CO₂ Export Hub, supported by €144,6 million through the Connecting Europe Facility for Energy (CEF-E), which will provide intra-port pipelines, liquefaction, buffer storage, and marine loading capacity for export.

Another notable project is the pipeline connecting Zeebrugge to offshore storage sites in Norway with a planned to have a transport capacity of 20 to 40 Mt of CO₂ per annum³. EU funding has also been awarded to the Ghent Carbon Hub project⁴ and CO₂ncrEAT CCU project⁵.

Although Belgium maintains in the NECP that it lacks cost-effective domestic CO₂ storage potential, this is now juxtaposed with European Commission and CO₂GeoNet assessments indicating that suitable geological formations do exist but require further characterisation.⁶ No domestic storage development is planned besides a Walloon plan to analyse onshore storage potential in the future (policy 776), and cross-border storage remains the priority in Belgium.

Figure 1: CO₂ storage units in Belgium.
Source: [CO2StoP database](#) (accessed November 2025)

2 [Air Liquide, Fluxys Belgium and Port of Antwerp-Bruges awarded EU funding for building the Antwerp@C CO₂ Export Hub](#)
3 [Fluxys and Equinor launch solution for large-scale decarbonisation in North-Western Europe](#)
4 [Fluxys Belgium, North Sea Port and ArcelorMittal Belgium receive EU funding for Ghent Carbon Hub project, a key step](#)
towards decarbonizing Belgium
5 [Prefer, Fluxys Belgium, Lhoist and Orbix selected by EU Innovation Fund for their innovative joint project to capture, trans-](#)
port and reuse CO₂ in Hermalle (CO₂ncrEAT)
6 [CO₂GeoNet \(2021\): State-of-play on CO₂ geological storage in 32 European countries – an update, CO₂GeoNet Report,](#)
325 p.; DOI: 10.25928/co2geonet_eu32-o21u – see p.40

While not mentioned in the NECP, three CO₂ storage traps have been identified in Flanders by national gas operator Fluxys. However, these only reach a readiness level of 2 out of 9.⁷

NATIONAL GOVERNMENT FUNDING

Public support mechanisms have also evolved. **The Belgian government aims to facilitate EU financial support for CCS (and CCU) projects by lifting the current restrictions on European funding for those projects. Belgium is also adapting its Capacity Remuneration Mechanism (CRM)⁸ to further incentivise the reduction of emissions from existing production installations through carbon capture is also considered. Finally, the federal government will simplify and make it easier to access a fiscal deduction for green investments, including CCS, harmonising it at 40%.**

In Flanders, a pilot project of Contracts for Difference (CfDs) scheme named “TRACKS” is being developed, which may later extend to CCS and CCU. In addition, the region aims to channel EU funds towards CCS and CCU projects and leverage them with its own co-financing.

Wallonia’s “Plan de Relance” (PRW) maintains its €127 million allocation for decarbonisation, including (in Axis 2) CCS and CCU pilot projects, and further support is expected through the Just Transition Fund.

OTHER RELEVANT INITIATIVES

Other relevant developments include a stronger focus on hydrogen. The federal government highlights international cooperation on hydrogen infrastructure, particularly in the case of blue hydrogen where linked to CCS. At the federal level, the government wants to increase international cooperation on transport infrastructure. **Flanders indicates its intention to support blue hydrogen in energy-intensive sectors such as steel and fertilisers**, consistent with its 2024–2029 Government Agreement. **Wallonia similarly plans to develop low-carbon hydrogen alongside CCU**, in particular through applied research (policy 393), with deployment supported through the PRW and EU Just Transition Fund.

The federal government also describes regular engagement with regional authorities, Belgian stakeholders, like businesses and infrastructure operators to stay informed of CCS developments.

RECOMMENDATIONS

Compared to the draft, the final Belgian NECP makes measurable progress on creating the conditions for CCS deployment, especially through new bilateral CO₂ transport agreements and the adoption of Flanders’ CO₂ Transport Decree. The plan now includes more concrete infrastructure developments, such as the Antwerp@C CO₂ Export Hub, and gives additional attention to capture options

⁷ [EGDI – CO₂ Storage Traps](#) (accessed November 2025)

⁸ Belgium’s CRM is a support scheme designed to ensure security of electricity supply by financially rewarding power plants (or other capacity providers) for being available during periods of high demand. It complements the energy-only market by guaranteeing sufficient generation capacity, especially as the country phases out nuclear and integrates more renewables.

Find more info here: <https://economie.fgov.be/en/themes/energy/electricity-market/capacity-remuneration>

like waste-incineration CCS. Wallonia's role is somewhat clearer, though still without defined capture targets. At the federal level, enabling measures have advanced, but a comprehensive national CCS strategy remains absent. Overall, the final NECP strengthens the regulatory and infrastructural groundwork, even if full deployment planning is still fragmented across governance levels. Against this backdrop Bellona therefore recommends the following measures:

1 DEVELOP A NATIONAL CCS IMPLEMENTATION PLAN

Because CCS is inherently cross-regional and cross-border, Belgium would benefit from a coherent federal strategy that complements and supports regional plans. A federal framework would provide consistent guidance across regions, ensure coordinated infrastructure planning, and offer greater clarity and confidence to investors and project developers.

2 CLOSE THE GEOLOGICAL STORAGE KNOWLEDGE GAP

Belgium should build on existing assessments and support further research into its geological CO₂ storage potential. Improving the evidence base would clarify the feasibility of domestic storage options, strengthen strategic planning, and better inform decisions on long-term reliance on cross-border storage.

3 CLARIFY BELGIUM'S CO₂ CAPTURE NEEDS

Belgium should assess and transparently communicate its expected CO₂ capture needs across sectors and regions. A clear indication of anticipated capture volumes would help send a strong, predictable demand signal to the nascent market of technological CO₂ abatement. This would reduce cross-chain risks, support coordinated investment across capture, transport and storage actors, thus enabling more efficient planning of shared infrastructure.

4 ENSURE ROBUST ASSESSMENT OF CCU

Ensure that CCU products are assessed based on their full lifecycle emissions to ensure clear climate benefit.

5 PRIORITISE PUBLIC FUNDING FOR HIGH-CLIMATE-VALUE CCS APPLICATIONS

With no or fewer scalable alternatives and where CCS offers a higher mitigation potential and therefore the highest climate value.⁹ Targeted policy instruments and support mechanisms need to be developed to incentivise CCS deployment, specifically addressing cross-chain risks inherent to CO₂ transport and storage and offer sufficient derisking potential to drive private investment.

BULGARIA



Criteria	Performance	Score
Implementation plan	Does not plan concrete implementation of CCS but does acknowledge its role in industrial decarbonisation and has created a legal framework to support CCS projects. Bulgaria will also host to the first full-chain CCS project in Eastern Europe (ANRAV).	●
CO2 capture	Does not report on process emissions to be abated with CCS.	●
CO2 storage	Does not report on geological CO ₂ storage capacity.	●
CO2 transport	Does not report on planned CO ₂ transport infrastructure.	●
National government funding	Does not foresee the allocation of national funding for CO ₂ capture, transport or storage.	●
Other relevant initiatives	Does not mention any additional measures to support the deployment of CCS.	

CCS IMPLEMENTATION PLAN

Bulgaria's NECP recognises the necessary role that CCS plays in industrial decarbonisation, specifically to reduce process emissions in hard-to-abate sectors, but has no strategy for its deployment, despite a legal framework being in place that allows for the development and operation of CCS projects.

Following several stakeholder consultations, recommendations were made for further exploration of CO₂ storage sites in Bulgaria, as well as economic incentives and de-risking schemes for future CCUS projects. While the NECP does not commit to implementing the recommendations, the NetZero Industry Act's transposition allows for improved permitting procedures and priority support for investment in decarbonisation technologies like CCUS, which the NECP acknowledges.

Although CCS is only briefly mentioned in the NECP, Bulgaria is host to the first full-chain CCS project in Central and Eastern Europe, the ANRAV project. Its aim is to link a HeidelbergCement plant in the coastal region of Varna through a pipeline system with offshore permanent storage under the Black Sea. ANRAV is projected to start operations in 2028, capture 800 MtCO₂ annually, and develop a CO₂ storage site that is to become available to industries in the region.¹

CO₂ TRANSPORT

Bulgaria does not report on planned CO₂ transport infrastructure, even though emission sources are dispersed and generally far from identified storage sites², making a coordinated plan all the more necessary.

CO₂ STORAGE

Bulgaria does not report on geological CO₂ storage capacity. The country is currently assessing potential onshore storage sites, but these are not mentioned in the Plan.

Independent analyses have found storage capacity of 2.6 GtCO₂ in saline aquifers under the Black Sea and several onshore geological formations potentially suitable for CO₂ storage.³

A new storage project, Beli Net Zero, was also launched under the Innovation Fund in 2024. It aims to be the first onshore carbon storage site in Eastern Europe and allow for the storage of CO₂ imports from third countries.

NATIONAL GOVERNMENT FUNDING

Bulgaria does not foresee the allocation of national funding for CO₂ capture, transport or storage. The NECP only mentions EU funding that could support the deployment of CCS projects, such as the Innovation Fund and InvestEU programmes.

1 Anrav Project - About

2 CATF - Carbon Capture & Storage in Bulgaria

3 CO₂ pull market analysis - ConsenCUS

RECOMMENDATIONS

The final Bulgarian NECP makes little progress compared to the draft version in addressing the role of carbon capture, transport and storage in the country's decarbonisation strategy. While Bulgaria acknowledges the role that CCS can play in reducing industrial CO₂ emissions, the technologies remain largely marginal in the country's long-term climate policy. Bellona therefore encourages the Bulgarian government to:

1 **DEVELOP A CCS IMPLEMENTATION PLAN**

In collaboration with industry, academia, and civil society, build upon existing research and data to establish a comprehensive strategy for deploying CCS to enable the full decarbonisation of its hard-to-abate industries. It must take a holistic approach to the entire CCS value chain clearly identifying CO₂ capture needs—primarily to address process emissions; mapping CO₂ transport infrastructure; assessing national CO₂ storage potential; and specifying how much of that storage can be made commercially available and by when. A medium to long-term, comprehensive plan will send a strong signal to stakeholders driving private investments and encouraging and facilitating the engagement of civil society and academia in the debate around CCS development and deployment.

2 **ENGAGE WITH EXISTING RESEARCH AND CCS PROJECTS**

Build on the momentum of ongoing CCS projects across Europe and incorporate insights from current research institutions and lessons learned from Bulgaria's first-mover project into a national implementation plan for CCS.

3 **DEVELOP APPROPRIATE SUPPORT MECHANISM AND PRIORITISE PUBLIC FUNDING FOR HIGH-CLIMATE-VALUE CCS APPLICATIONS**

With no or fewer scalable alternatives and where CCS offers a higher mitigation potential and therefore the highest climate value⁴. Targeted policy instruments and support mechanisms need to be developed to incentivise CCS deployment, specifically addressing cross-chain risks inherent to CO₂ transport and storage and offer sufficient derisking potential to drive private investment.

4 **STRENGTHEN REGIONAL COOPERATION**

Enhance cooperation with neighbouring countries like Romania and Greece to accelerate regional decarbonisation efforts while leveraging Bulgaria's large offshore storage capacity.

CROATIA



Criteria	Performance	Score
Implementation plan	Policy measure MS-5 "Development and implementation of CO ₂ collection, transport and storage projects (CCS)" covers research and implementation of a CO ₂ storage and a CCS pilot project.	
CO₂ capture	Does not report on process emissions to be abated with CCS.	
CO₂ storage	Estimates that 144 MtCO ₂ could be stored onshore and 2600 MtCO ₂ in offshore saline aquifers.	
CO₂ transport	Does not report on planned CO ₂ transport infrastructure but will conduct a study to evaluate the potential of connecting Croatia's CO ₂ transport system to other EU countries.	
National government funding	Plans to allocate €14M for the pilot CCS project mentioned in policy measure MS-5 and €237M for the KODECO net-zero project.	
Other relevant initiatives	Plans to encourage joint scientific and research work in clean technology, including CCS, notably as part of the European Strategic Energy Technology Plan (SET).	

CCS IMPLEMENTATION PLAN

Croatia's NECP acknowledges the role that CCS plays in decarbonising industrial processes, particularly in hard-to-abate sectors like cement and steel, as well as others like chemical and petrochemical industries. Croatia has the necessary legal framework to implement CCS through the Act on Exploration and Exploitation of Hydrocarbons, which allows CO₂ storage on its territory.

The NECP includes a dedicated policy measure for CCS: MS-5 "Development and implementation of CO₂ collection, transport and storage projects (CCS)". It covers research into CO₂ storage potential in Croatia, the implementation of geological storage projects, an impact assessment of said storage on the environment and the launch of a pilot CCS project by the end of 2026. The Ministry of Economy also commits to annual monitoring of the stored CO₂ and to informing the public about CCS technologies more generally.

CO₂ CAPTURE

While the NECP does not report on process emissions that need to be abated with CCS, the Plan still mentions that Croatia will host the KODECO net-zero project, a full-chain CCS project based around the Holcim cement plant in Koromačno. By 2028, it is projected to capture 367 ktCO₂ per annum to be stored under the Mediterranean Sea.¹

KODECO net-zero is currently in its engineering, design and permitting phase until the end of 2025, after which it will begin procurement and construction with a projected entry into operations at the end of 2028. The project has an estimated cost of €237 million co-funded by Holcim, the Innovation Fund and the Just Transition Fund.²

Another CO₂ capture project is CO₂NTESSA, located at the NEXE cement plant in Našice, that aims to capture 0.6 MtCO₂ per annum in its first phase. It is one of the largest industrial projects in Croatia with a planned investment volume of €400 million.³

CO₂ TRANSPORT

The NECP does not report on planned CO₂ infrastructure, however Croatia plans to conduct a National Feasibility Study for each part of the CCS value chain as part of policy measure MS-5. This includes CO₂ transport and will also evaluate the potential of connecting Croatia's CO₂ transport system to other EU countries.

The Geothermal CCS project, selected on the first list of EU Projects of Common Interest, aims to transport and store up to 16 MtCO₂ over 25 years from emitters in Croatia and Hungary located along the border of the two countries.⁴ Notably, the project offers synergies with CO₂NTESSA as it would allow transport of the captured CO₂ to the nearby Bockovci onshore storage site.

¹KODECO net zero CONTRIBUTION TO THE 1ST MEDITERRANEAN STORAGE BENEFITING INDUSTRIES IN ALL MEDITERRANEAN COUNTRIES

² EU Innovation Fund Info Day conference 25th of January 2024 Ljubljana, Slovenia.pptx

³ CO₂NTESSA

⁴ Geothermal CCS | Croatian Hydrocarbon Agency

CO₂ STORAGE

The Plan reports that Croatia has significant CO₂ storage potential in depleted oil and gas reservoirs and saline aquifers. The government estimates that 144 MtCO₂ could be stored in the Sava and Drava depressions, and 2600 MtCO₂ in deep saline aquifers. A more detailed assessment is planned as part of its National Feasibility Study.

The NECP recalls that CO₂ injection was and is still used for the extraction of oil and gas, which it claims to have given useful experience data on injecting carbon dioxide into geological structures.

NATIONAL GOVERNMENT FUNDING

Croatia plans to allocate €14M for the pilot CCS project mentioned in policy measure MS-5 and €237M for the KODECO net-zero project. Funding sources include its State budget but also EU funds like the Recovery and Resilience Fund, the Innovation Fund and the Modernisation Fund, but the NECP does not specify the respective contributions of each.

OTHER RELEVANT INITIATIVES

Croatia wants to encourage joint scientific and research work in clean technologies, including CCS, notably as part of the European Strategic Energy Technology Plan (SET-Plan). It also organised stakeholder consultations, which led to proposals for conducting applied research in areas like CCS.

RECOMMENDATIONS

The final Croatian NECP improves upon the draft around CO₂ storage by reporting on the available storage volumes on its territory, despite not making mention of volumes that could be made commercially available within certain timeframes. It also maintains its commitment to conducting further studies into the feasibility of CCS on its territory and providing financial support for pilot projects, which are important first steps to achieving large-scale deployment of CCS. However, the NECP still fails to specify to what extent Croatia will rely on CCS to tackle its process emissions in terms of need for carbon capture technologies and transport infrastructure. Bellona therefore encourages the Croatian government to:

1 DEVELOP AND IMPLEMENT A COMPREHENSIVE CARBON MANAGEMENT STRATEGY

Croatia should develop its Carbon Management Strategy and swiftly move from planning to implementation. The strategy must take a holistic approach to the entire CCS value chain, with particular attention to: clearly identifying CO₂ capture needs, primarily to address process emissions; mapping CO₂ transport infrastructure and specifying how much of the country's CO₂ storage potential can be made commercially available and by when. The drafting process should actively involve stakeholders across the board, including industry, academia, and civil society, and should build upon existing research, data, and technical expertise.

2 ENGAGE WITH EXISTING RESEARCH AND CCS PROJECTS

Build on the momentum of ongoing CCS projects across Europe and incorporate insights from current research institutions and lessons learned from Croatia's first-mover projects into a national implementation plan for CCS.

**3**

DEVELOP A CO₂ TRANSPORT INFRASTRUCTURE DEPLOYMENT PLAN

Establish a comprehensive plan for an open-access and multimodal CO₂ transport infrastructure deployment connecting capture sites and storage facilities, providing clarity on associated timelines, funding, and support mechanisms. This is particularly important given the large storage potential across the country and its location in Southern Europe, which are strategically important for the decarbonisation of Croatian and other Central-Eastern and Southern European hard-to-abate industries.

4

STRENGTHEN REGIONAL COOPERATION

Enhance cooperation with neighbouring countries, like Italy that's making significant strides in CO₂ storage development to advance regional efforts in CCS deployment.

5

PRIORITISE PUBLIC FUNDING FOR HIGH-CLIMATE-VALUE CCS APPLICATIONS

With no or fewer scalable alternatives and where CCS offers a higher mitigation potential and therefore the highest climate value.⁵ Targeted policy instruments and support mechanisms need to be developed to incentivise CCS deployment, specifically addressing cross-chain risks inherent to CO₂ transport and storage and offer sufficient derisking potential to drive private investment.

⁵ [CCSL_briefing.pdf](#)

CZECHIA



Criteria	Performance	Score
Implementation plan	Published its CCUS Action Plan with several measures and concrete timelines for establishing a policy and regulatory framework supportive to a CCS value chain.	
CO2 capture	Reports on projections of volumes to be captured by sector from 2035 on. Identifies a capture volume of 7.1 Mtpa by 2050. .	
CO2 storage	Reports to have a theoretical storage potential of up to 1.2 Gt. Aims to fund research for determining realistic storage capacity.	
CO2 transport	Has concrete plans for establishing a cross-border CO ₂ transport network, with ongoing research projects to that goal.	
National government funding	Does not foresee the allocation of national funding for CCS deployment.	
Other relevant initiatives	Plans to found National Platform for CCS, tasked with fostering social acceptance.	

CCS IMPLEMENTATION PLAN

Czechia's National Energy and Climate Plan (NECP) references its national [CCUS Action Plan](#), published in 2025 by the Ministry of Environment, as the central document guiding the country's approach to deploying Carbon Capture and Storage (CCS). The Action Plan outlines a series of political, regulatory, financial, scientific, and knowledge-sharing measures, each tied to specific deadlines between 2025 and 2027.

One key measure is the establishment of a dedicated national platform for CCS, scheduled for 2025. This Platform will function as an advisory body to the government and shall include representatives from the Czech Geological Survey, Ministry of Environment, Ministry of Industry and Trade, gas transmission company NET4GAS, the CO₂ Czech Solution Group Platform, industry associations, and non-governmental organisations. The Platform's core tasks will involve forming specialised working groups tasked with addressing specific topics and practical implementation challenges. It will conduct a comprehensive analysis of existing legislation, identifying areas requiring amendment to enable effective CCS deployment. This review process will integrate insights and lessons learned from other countries' CCS regulatory experiences.

Czechia also intends to integrate CCS development into broader national strategic frameworks and policy documents. Furthermore, the country explicitly commits to active participation in European legislative initiatives related to CCS, such as standard-setting or cross-border CCS collaboration.

CO₂ CAPTURE

Czechia's NECP references the use of CCS for applications in both industry and power generation. It particularly highlights the potential role CCS could play if limitations in electricity grid infrastructure slow down further expansion of renewable energy sources. Unabated fossil fuel use in primary energy consumption shall be reduced to 50% by 2030 and down to 0% by 2050.

The Plan includes projections for captured CO₂ volumes from 2035 to 2050, taking additional climate measures into account, developed by the Centre for Environmental Issues at Charles University. However, the Action Plan makes clear that these figures are solely based on modelling exercises rather than representing a firm governmental commitment.

According to the presented model, captured volumes are set to rise from approximately 2.9 Mt CO₂ per year in 2035 to around 7 Mtpa by 2050. The majority of these emissions are anticipated to originate from cement, lime, biomass, and natural gas combustion processes. Additionally, residual emissions from the steel industry contribute marginally to the total volume, although the NECP notes considerable uncertainty regarding the industry's future in Czechia.

Capture volumes (in Mtpa)	2035	2040	2045	2050
Cement	1	2.5	2.5	2.5
Lime	0.7	0.7	0.7	0.8
Biomass	0	0	1.2	2.2
Natural Gas	1.2	1.4	1.4	1.5
Steel	0.03	0.03	0.03	0.03
Total	2.9	4.6	5.9	7.1

Notably, the chemical sector was not included in the primary modelling scenarios due to insufficient data availability. The Czech Chemical Industry Association independently estimates a need for CO₂ capture in their sector ranging between 3.3 and 8.7 Mtpa by 2050. This adds up to another 2 Mtpa of residual emissions that would require compensation through other measures.

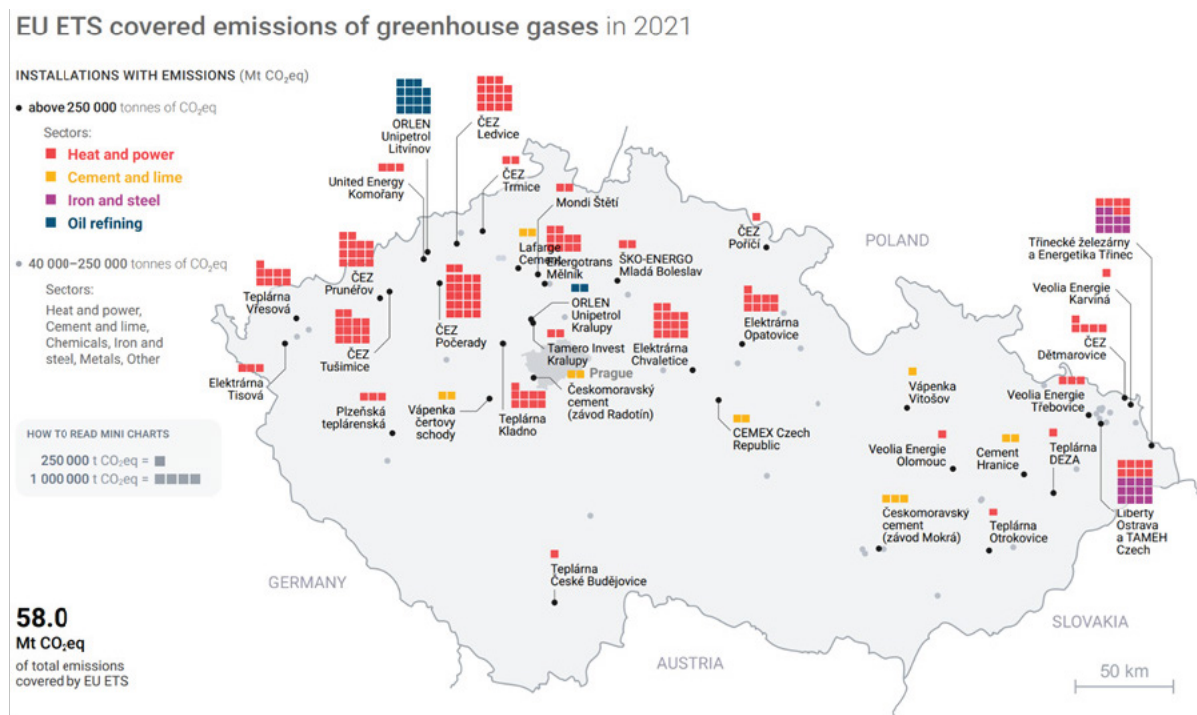


Figure 1: Emissions from industry and power generation

Source: Fakta o Klimatu, www.ccs4cee.eu

The CCS Moravia project of oil and gas company MND and cement producer Heidelberg Materials represents Czechia's first full value chain CCS initiative. It encompasses CO₂ capture at the Mokr cement plant, followed by pipeline transport and geological storage in the southeastern Morava aquifers. The project, which has applied for funding from the Innovation Fund, aims to store up to 800 ktpa CO₂ starting from 2034, with a total projected capacity of 20 Mt. No similar project is planned before 2030.

CO₂ TRANSPORT

Czechia envisions becoming an important transit hub for CO₂, linking Central and Eastern Europe with storage sites in Northern Europe. Existing gas pipeline infrastructure is planned to be preserved and repurposed to enable CO₂ transport. Initial plans identify storage opportunities predominantly in the North Sea, with the Baltic Sea mentioned as another possibility.

Czechia intends to collaborate closely with neighbouring countries on the development of cross-border CO₂ transport infrastructure. This cooperation would include actively engaging in diplomatic dialogues aimed at establishing strategic CO₂ transport networks and possibly utilising storage sites outside Czech borders. To formalise this collaboration, a joint study with neighbour-

ing states is planned, with a target completion year set for 2026. While pipeline-based transport is actively being developed, the Czech strategy expresses reservations regarding road and rail solutions, primarily due to environmental risks associated with potential transport accidents.

The Czech gas transmission operator NET4GAS is already engaging in discussions regarding cross-border CO₂ transport with neighbouring countries' transport system operators. These include Germany's OGE, Slovakia's eustream, and Austria's GCA. The outcomes from these consultations, combined with developments in neighbouring countries, will feed into the future design of Czechia's CO₂ transport network. They may also influence the development of potential applications for Projects of Common Interest involving Czechia.



Figure 2: Map of Gas Transmission System

Source: NET4GAS, <https://www.net4gas.cz/en/transmission-system/>

Additionally, Czechia intends to map out industrial CO₂ emission clusters by 2027. This mapping aims to facilitate coherent planning for transport infrastructure and helps identify decarbonisation priorities. A detailed feasibility study examining the necessary capacity for CO₂ transport routes, along with an environmental impact assessment, is scheduled for completion within the same timeframe.

CO₂ STORAGE

The Czech Geological Survey estimates a theoretical domestic CO₂ storage potential of approximately 1.2 Gt, 95% of which in saline aquifers. Despite this estimate, Czechia maintains that domestic commercial storage capacity will remain limited, making it necessary to export captured CO₂ for storage abroad. At present, no active licenses, pilot projects, or demonstration sites for CO₂ storage exist in Czechia. The Action Plan explicitly addresses the need to establish financial security re-

for prospective applicants seeking storage licenses. Furthermore, the Czech government is exploring options to establish a suitable support mechanism to facilitate targeted geological surveys for determining realistic storage capacity.

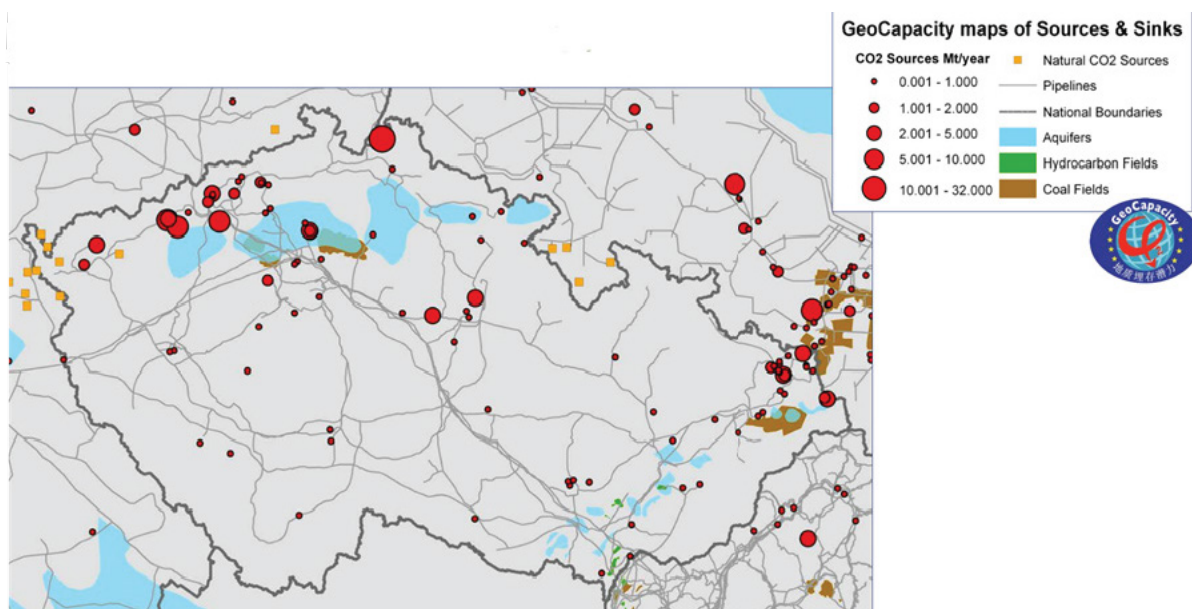


Figure 3: Map of Emitters and potential CO₂ storage sites Source:

CO₂-SPICER, based on EU GeoCapacity EU-FP6 project, <https://co2-spicer.geology.cz/sites/default/files/2022-02/pdf3-konf-BeePartner.pdf>

An important related initiative is the CO₂-SPICER research exercise, which examined the Zar-3 oil and gas reservoir near Hodonín in South Moravia for CO₂ storage suitability.¹ This project investigated injecting 70kt of CO₂ into the reservoir. With an overall estimated capacity of around 1 Mt however, this reservoir is inadequate for large-scale commercial storage. CO₂-SPICER received funding of €2.32 million under the KAPPA programme, co-financed by the Norway Grants and the Technology Agency of the Czech Republic. The project consortium comprised of the Czech Geological Survey, MND, the College of Mining at the Technical University of Ostrava, the Geophysical Institute of the Academy of Sciences of the Czech Republic, and the Norwegian research centre NORCE. Initially, the CO₂-SPICER project aimed to pave the way for a subsequent pilot scheme titled CCS Moravia. However, plans for a pilot-scale injection remain unresolved, mainly due to the current absence of available sources of captured CO₂.

NATIONAL GOVERNMENT FUNDING

Czechia relies on EU funding sources to support CCS deployment. The country plans to utilise its share of the Modernisation Fund. Czechia identifies the I+ Innovative and Comprehensive Projects programme as an possible option to promote CCS projects that were not selected through the Innovation Fund but makes no clear commitment.

Additionally, Czechia is considering modifying the scope of its SMARTNET programme, originally meant to modernise energy systems, so that it covers support for CO₂ transport infrastructure development.

1 CO₂-SPICER - CO₂ Storage Pilot in a Carbonate Reservoir. <https://co2-spicer.geology.cz/en>

Despite expressing interest in the financial instrument of Carbon Contracts for Difference, the Czech government has not indicated any plans to allocate additional national funding specifically for the deployment of CCS technologies beyond available EU funding.

OTHER RELEVANT INITIATIVES

As part of the Czech CCS strategy, the Action Plan foresees for the national Platform to enhance social acceptance. Recognising the necessity of public support, the strategy includes collaboration with regional and local governments as well as non-governmental organisations to inform and engage communities directly impacted by CCS projects. Further actions encompass providing expert information and educational resources, informing about successful examples and economic benefits, and openly communicating about potential risks and environmental impacts.

One significant initiative is the planned establishment of a CO₂ hub in Southeastern Moravia and transport backbone network. This project is part of the COREu project, which is funded by Horizon Europe.² Key participants in this initiative include the Czech Geological Service, MND, and UNIGEO. This hub is intended to become a central point in the emerging CO₂ backbone network within Czechia.

RECOMMENDATIONS

Czechia has made notable progress in its final NECP compared to the draft, particularly in clarifying how and to what extent CCS will contribute to the country's decarbonisation strategy. The government has put considerably more effort into outlining its approach through the CCUS Action Plan, identifying CO₂ capture needs, and exploring potential transport routes for a future cross-border CO₂ network. However, key gaps remain in identifying commercially viable CO₂ storage capacity in Czechia and in establishing the support mechanisms needed to enable timely deployment of CCS technologies. These steps are essential to decarbonise hard-to-abate industries at the pace required.

Against this backdrop, Bellona Europa recommends the Czech government to:

1 **DEVELOP APPROPRIATE SUPPORT MECHANISM AND PRIORITISE PUBLIC FUNDING FOR HIGH-CLIMATE-VALUE CCS APPLICATIONS**

With no or fewer scalable alternatives and where CCS offers a higher mitigation potential and therefore the highest climate value.³ Targeted policy instruments and support mechanisms need to be developed to incentivise CCS deployment, specifically addressing cross-chain risks inherent to CO₂ transport and storage and offer sufficient derisking potential to drive private investment.

2 **ENSURE THE ENVIRONMENTAL INTEGRITY AND CLIMATE BENEFITS OF BECCS/ BIOCCS:**

As the Action Plan foresees a potentially high share of BECCS deployment, Czechia should develop and adhere to robust accounting rules, certification standards, liability frameworks, and sustainability requirements for BECCS/ Bio-CCS to guarantee its environmental integrity and net climate benefits. This includes comprehensive Monitoring, Reporting, and Verification (MRV) systems that account for all greenhouse gas emissions— both direct and indirect—across

² Horizon Europe. COREu EU Project. <https://coreu.eu/>
³ CCSL_briefing.pdf



the entire value chain, domestically and internationally where applicable. These systems should employ conservative estimation methods and ensure that biomass sourcing prioritises sustainability, minimises lifecycle emissions, and achieves a net-negative balance.

3

CONDUCT DETAILED ASSESSMENTS OF THE CZECH REPUBLIC'S CO₂ STORAGE CAPACITY

Not only to determine the overall potential, but also to identify how much can be made operational and by which year.

DENMARK



Criteria	Performance	Score
Implementation plan	Established a national Roadmap for Capture, Transport, and Storage of CO ₂ and put into place several policy instruments to provide support and incentivise the development and deployment of CCS in Denmark, to enable the full decarbonisation of industrial process emissions amongst others, and to achieve negative emissions. Access the full list on page 34-35 of the Plan.	●
CO₂ capture	Aims to capture 15,3 Mt CO ₂ by 2030 from domestic point sources, including emissions from industrial processes.	●
CO₂ storage	Estimated the total CO ₂ storage capacity in saline aquifers to be between 12,000 and 22,000 Mt. In addition, there is potential for CO ₂ storage in volcanoclastic deposits and end-of-life oil and gas fields.	●
CO₂ transport	Does not report on planned CO ₂ transport infrastructure. However, it references an agreement to prepare a future regulation for pipeline transport, which could incentivise infrastructure deployment by eliminating regulatory uncertainties.	●
National government funding	More than DKK 39 billion has been allocated to implementing CCUS as a climate tool (see Table 3).	●

Other relevant initiatives

- Established the National Bioeconomy Panel to provide expert advice on CCS technologies to policymakers, the INNO-CCUS partnership to develop CCUS solutions between private sector and academia, and 'business lighthouses' to mature green technologies in several areas including CCS.
- Granted exploration permits for offshore and onshore CO₂ storage.
- Maintains a 20% state ownership of storage licences.

CCS IMPLEMENTATION PLAN

Denmark's NECP reflects a strong commitment to deploying CCS and recognises it as an important decarbonisation tool for achieving its legally binding 70% greenhouse gas (GHG) reduction target by 2030. Denmark's 2020 *Climate Agreement for Energy and Industry* facilitated large public investments in the deployment of CCS and foreshadowed several measures enabling the rapid development of CCS in Denmark.

CO₂ CAPTURE

Denmark aims to capture 15,3 Mt CO₂ from domestic point sources by 2030, a significant increase from the 5,4-10,8 MtCO₂ target outlined for 2040 in the draft NECP. The draft Plan provided annual estimates for 2025, 2030 and 2040, whereas the final version includes estimates only for 2030. This surprising omission of interim milestones could prove problematic for the transparent and effective tracking of Denmark's progress.

The CO₂ emissions Denmark aims to capture originate **from industries, waste incineration, power generation and biogas plants, with an estimated 11Mt of the 15,3 Mt CO₂ expected to come from biogenic sources.** To ensure the environmental integrity and overall climate benefits of BECCS/Bio-CCS, it is crucial to account for the full lifecycle emissions of biogenic sources. This includes ensuring that the CO₂ stored across the whole value chain of the BECCS project is greater than the CO₂ emitted from the activity, achieving a net-negative balance. A thorough evaluation of biomass sourcing and processing is essential to align with climate goals.

The Plan does not differentiate between CO₂ capture potential in industries that currently lack viable alternatives to CCS for decarbonisation and emitters with alternative, more efficient decarbonisation pathways. This lack of differentiation could pose challenges for public acceptance, if CCS is applied to processes where more cost-effective and sustainable solutions are available.¹

CO ₂ capture potential (Mtpa)	
Waste incineration	3,1
Heat and electricity	6,4
Industry	4,4
Biogas upgrade	1,5
TOTAL	15,3
Fossil and Process	4,4
Biogenic	11

Table 1: Estimates of Danish CO₂ capture potential

Source: *Denmark - Final updated NECP 2021-2030 (submitted in 2024) - European Commission* (p. 35)

¹ C4U project, 2024, Policy brief on how to incentivise CCUS in a societally acceptable way in industrial clusters, <https://c4u-project.eu/wp-content/uploads/2024/07/C4U-D7.4-WP5-Societal-Readiness-Brief.pdf>

CO₂ TRANSPORT

The draft Plan indicated that projects currently under development envisioned a **multimodal CO₂ transport infrastructure, with decisions on the national transport network, its ownership, and related aspects still to be made. However, this section is absent in the final NECP, which instead references an agreement to prepare a future regulation for pipeline transport.** Once realised, this regulation has significant potential to incentivise CO₂ transport infrastructure deployment by clarifying CO₂ specifications and questions relating to ownership and liabilities, thus removing much of the prevailing uncertainty and helping to de-risk CO₂ infrastructure deployment.

CO₂ STORAGE

In 2021 Denmark declared in its *Roadmap for Capture, Transport and Storage of CO₂* the aim to become a European CO₂ storage hub. Since then, Denmark has granted exploration permits for the purpose of offshore CO₂ storage in the North Sea as well as for onshore storage, demonstrating tangible progress in CCS storage development. To date, three licenses for offshore exploration and storage have been awarded in Denmark (two to TotalEnergies EP Denmark A/S and one to the INEOS & Wintershall consortium) **and three exploration licenses for onshore storage** (to Wintershall Dea International and INEOS E&P, to CarbonCuts A/S, and to a consortium consisting of Equinor Low Carbon Solutions Denmark and Ørsted Carbon Solutions). Another licensing round for onshore storage in one predefined area closed on 11 November 2024.²

The Geological Survey for Denmark and Greenland (GEUS) estimates the total CO₂ storage capacity in saline aquifers to be between 12000-22000 Mt. In addition, there is potential for CO₂ storage in volcanoclastic deposits and end-of-life oil and gas fields.

Name of the structure	Capacity (mean, MtCO ₂)
Porvnsø (Gassum Fm)	306
Gassum (Gassum Fm)	585
Thorning (Gassum Fm)	295
Stenlille (Gassum Fm)	N/A
Rødby (Bunter Fm)	209
Inez (Gassum Fm) Inez (Hal-dagerFm)	178 3,1
Lisa (Gassum Fm)	29,3
Gulf of Jammergt	N/A

Table 2: The expected storage capacity of the 8 structures provisionally identifies by

Source: *Denmark - Final updated NECP 2021-2030 (submitted in 2024) - European Commission* (p. 36-37)

² Licenses for exploration and storage of CO₂, including environmental consultation rounds | The Danish Energy Agency

Denmark maintains a 20% state ownership stake in storage licenses, which helps mitigate financial risks associated with CO₂ storage. This shared ownership reduces the uncertainty for private investors, making the CCS value chain – from capture to transport to storage – more attractive and encouraging further investment in each stage.

NATIONAL GOVERNMENT FUNDING

Denmark is investing significantly in CCS development and deployment. Through political agreements, more than DKK 39 billion has been allocated to the implementation of CCS until October 2024.

The Technology Development and Demonstration Programme (EUDP), the National Innovation Fund, as well as private foundations also contribute to supporting CCS in Denmark.

	CCUS Fund	NECCS fund	CCS fund
Eligible sources of CO₂	Fossil, process, bio-genic	Biogenic, atmospheric	Fossil, process, bio-genic, atmospheric
Contract period	Up to 20 years per contract	Up to 8 years per contract	Up to 15 years per contract
First year of reduction	2025/26	2025	2029
Support period	2025-2049	2025-2032	2028-2043
Budget (2023 prices)	DKK 8 billion	DKK 2,6 billion	DKK 28.7 billion ³

Table 3: Overview of CCUS funds

Source: *Denmark - Final updated NECP 2021-2030 (submitted in 2024) - European Commission (p. 37-38)* and *Danish Energy Agency presses the start button for billion-dollar tendering procedure for carbon capture and storage | The Danish Energy Agency*

³ Danish Energy Agency presses the start button for billion-dollar tendering procedure for carbon capture and storage | The Danish Energy Agency

Since the final NECP was published in July 2024, the CCS fund was launched in October, with its total funding increased to DKK 28.7 billion.

EU funding is also available for CCUS in Denmark, through the EU Innovation Fund, the REACT-EU programme and the EU Just Transition Fund. Funding from the EU Just Transition Fund has been awarded to the development of local value chains for CCUS onshore in North and South Jutland, as well as to develop a CCS hub at the Port of Hirtshals in North Jutland. These funds aim to mitigate the potential negative impacts of the transition to a net-zero economy on vulnerable regions and communities, safeguarding local jobs and creating growth opportunities for the broader society.⁴

Several Danish CCUS projects are among those selected by the EU Innovation Fund, including for CCS on process emissions from lime/cement production using infrastructure onshore in North Jutland, and for developing CO₂ storage capacity.⁵

OTHER RELEVANT INITIATIVES

Denmark established the **National Bioeconomy Panel** to seek expert advice on the use of biological resources in green transition solutions, including CCS, to inform policymaking.

Denmark pursues cross-border collaboration on CCS within **the Nordic Council of Ministers**, which includes the Nordic countries and works closely with the Baltic states, including in an ad-hoc working group on CCS and CCUS. **The North Sea Basin Task Force (NSBTF)** which includes Denmark, Flanders, France, the Netherlands, Norway, the UK, and Germany, also collaborates on cross-cutting issues in relation to CCS.

Denmark also launched the **INNO-CCUS partnership** between industry and academia, which aims to contribute to achieving climate objectives by developing solutions for effective capture and storage of CO₂, as well as the development of methods to reuse CO₂ as building blocks for new materials.

In 2022, Denmark established eight **'business lighthouses'** aimed at maturing green technologies in several areas including CCS. A total of DKK 1 billion is invested in the local business lighthouses, in which state authorities contribute to the development of the eight partnerships with businesses, municipalities, universities, etc.

⁴ Denmark – Final updated NECP 2021-2030 (submitted in 2024) – European Commission; 14-million-euro-grant-for-Northern-Europes-largest-CO₂-hub-in-the-Port-of-Hirtshals.pdf

⁵ Innovation Fund projects – European Commission

RECOMMENDATIONS

Denmark's NECP reflects quite a comprehensive strategy to support CCS, encompassing a roadmap for CCS deployment, research and innovation, international cooperation, political support, government funding, and positioning the country as a leader in CCS deployment in the EU. Against this backdrop, Bellona encourages the Danish government to:

1

STRENGTHEN REGIONAL COOPERATION

Enhance cooperation with neighbouring countries, especially Poland, the Baltic countries, Sweden and Finland, which are making significant strides in CCS deployment. Denmark's considerable CO₂ storage capacity positions it to support regional decarbonisation efforts, fostering economic opportunities for Denmark and reaping climate benefits across Europe.

2

DEVELOP A CO₂ TRANSPORT INFRASTRUCTURE

Establish a comprehensive plan for an open-access and multimodal CO₂ transport infrastructure deployment connecting capture sites and storage facilities. Providing clarity on associated timelines, funding, and support mechanisms, in addition to the pipeline regulation that has been agreed upon for development.

3

PRIORITISE PUBLIC FUNDING FOR HIGH CLIMATE-VALUE

With no or fewer scalable alternatives and where CCS would come with a higher mitigation potential and therefore the highest climate value.⁶

4

ENSURE ROBUST ASSESSMENT OF CCU

Ensure that CCU products are assessed based on their full lifecycle emissions to ensure clear climate benefit.

5

ENSURE THE ENVIRONMENTAL INTEGRITY AND CLIMATE BENEFITS OF BECCS/BIO-CCS

Develop and adhere to robust accounting rules, certification standards, liability frameworks, and sustainability requirements for BECCS/Bio-CCS to guarantee its environmental integrity and net climate benefits. This includes comprehensive Monitoring, Reporting, and Verification (MRV) systems that account for all greenhouse gas emissions—both direct and indirect—across the entire value chain, domestically and internationally where applicable. These systems should employ conservative estimation methods and ensure that biomass sourcing prioritises sustainability, minimises lifecycle emissions, and achieves a net-negative balance. Bellona recommends the separation of CDR targets into emissions reductions, land-based sequestration and permanent carbon removals, to enhance clarity on climate goals. This would ensure anthropogenic biogenic based removals are not deterring emission reductions.

⁶ Bellona Europa & E3G, 2023, Carbon Capture and Storage Ladder: Assessing the climate value of CCS applications in Europe, https://network.bellona.org/content/uploads/sites/3/2023/07/CCSL_briefing.pdf

ESTONIA



Criteria	Performance	Score
Implementation plan	Does not have a concrete implementation plan for CCS, however CCS is identified as a solution to tackle emissions for the oil shale power industry.	●
CO2 capture	Mentions the possibility of CO ₂ capture application in the oil shale power sector.	●
CO2 storage	Report on the lack of suitable geological CO ₂ storage.	●
CO2 transport	Does not report on planned CO ₂ transport infrastructure.	●
National government funding	Does not refer to funding for CCS. However, some funding has been made available for CCU.	●
Other relevant initiatives	Does not mention any other measures to support the deployment of CCS.	

Estonia's 2030 National Energy and Climate Plan (NECP) notes that, based on current geological assessments, the country lacks suitable formations for permanent CO₂ storage within its borders. As a result, any domestic deployment of CCS would require cross-border CO₂ transport for permanent storage. Estonia is currently assessing the feasibility of CCS in its energy-intensive sectors, particularly in oil shale power plants. A study led by Tallinn University of Technology (2019–2021) examined potential CCS implementation scenarios tailored to the Estonian oil shale industry, a major CO₂ emitter. The study concluded that while CCS is technically feasible, it may not be financially viable under current EU ETS price levels and in the absence of public support.

Estonia's NECP does not currently explore CCS deployment as a pathway to decarbonize hard-to-abate industries, such as cement production.

RECOMMENDATIONS

Estonia's final NECP do not provide improvement towards addressing the need for CCS deployment, compared to its initial draft. As major gaps remain in regulation, planning and implementation, Bellona encourages the Estonian government to:

1 SET UP A NATIONAL AND REGIONAL WORKING GROUP TO DEVELOP AN IMPLEMENTATION PLAN FOR CCS DEPLOYMENT

This working group should facilitate development of industrial transformation plans, aligning infrastructure development actions, processes and a funding strategy to reach climate targets in close consultation with municipalities, private sector and civil society stakeholders. The working group should survey CCS needs for the largest emitters taking into account existing and planned short, medium, and long-term investments in production assets. Different modes of transport (pipelines, ships, trains, trucks) should be considered and the planning of infrastructure should allow for potential expansion to connect to other industrial clusters further inland and in neighbouring countries (Latvia, Lithuania and Finland). Government should ensure transparent regulation of the infrastructure to ensure open access, prevent monopolies, and enable its potential future use for purposes such as CDR solutions to achieve nega-

2 DEVELOP A LEGAL FRAMEWORK

Ratify the London Protocol and consider international and/or bilateral agreements for the transport of CO₂ across borders. Advocate for relevant amendments in the Helsinki Convention to enable safe and permanent CO₂ storage in the geological sub-seabed structures of the Baltic Sea.

3 PROVIDE THE NECESSARY FUNDING FRAMEWORK

Provide CCS support programs for hard-to-abate industries to reduce CO₂ emission.. Prioritise public funding for high-climate-value CCS applications with no or fewer scalable alternatives and where CCS would come with higher mitigation potential and therefore the highest climate value. Ensure funding mechanism at the local, national, and regional level to address development of national and cross-border CCS hubs and clusters in the BSR, CO₂ infrastructure needs, with public and private funding and/or co-financing. Define industrial sectors eligible for funding and ensure that CCS solutions are used where other forms of emission reductions (such as electrification) is not technically possible or realistic, and CCS does not hinder the phaseout of fossil fuels.

FINLAND



Criteria	Performance	Score
Implementation plan	Does not plan concrete implementation of CCS.	●
CO2 capture	Does not report on process emissions to be abated with CCS.	●
CO2 storage	Notes that there are no suitable geological formations for CO2 storage.	●
CO2 transport	Does not report on planned CO ₂ transport infrastructure. Refers to transport by ship to storage in the North Sea for potential projects.	●
National government funding	Does not refer to funding for CCS. However, some funding has been made available for CCU.	●
Other relevant initiatives	Does not mention any other measures to support the deployment of CCS.	

CCS IMPLEMENTATION PLAN

In its NECP Finland acknowledges the role of CCS in reducing emissions, by capturing CO₂ from fossil fuels, from biofuels (bio-CCS or BECCS) or from the atmosphere through direct air capture (DACCS). A stakeholder consultation conducted for the draft NECP found that “the different technologies including the capture of carbon dioxide (CO₂) and the storage and utilisation can play a key role in reaching climate targets.” Still, there is little detail in the final NECP on present or future plans for CCS in Finland. The only CCS project specifically referenced in the NECP is a blue hydrogen project by Neste, which was cancelled when Russia’s full-scale attack on Ukraine brought an end to natural gas imports to Finland from Russia.

The NECP states that in a longer-term perspective, Finland is looking for technical sinks with storage or CO₂ binding in longer-lasting goods, including concrete. Still, there are no references to national implementation plans or other policy frameworks for CCUS in the NECP.

While noting the potential of CCUS and BECCS for reducing emissions from the energy system, the NECP fails to mention the one waste-to-energy CCS project currently under development in Finland: the Finnish urban energy company Vantaa Energy’s plans to capture and store CO₂ from all its waste-to-energy plants. The company announced its advancement to the environmental impact assessment, zoning, permitting, commercial negotiations and partner procurement phases in September 2024, after the publication of the final NECP. Final Investment Decision (FID) is expected in 2027.¹

After the NECP was submitted, the Finnish Industrial Policy Strategy was published in December 2024. It includes objectives and recommendations regarding biogenic CO₂ and industrial hubs.² In 2025, the Finnish Energy and Climate Strategy will be updated. The policy scenarios for the update include estimates on carbon capture.³

CO₂ CAPTURE

The NECP states that Finland lacks large fossil CO₂ point sources with long-term emissions, seemingly understating the need for CCS. The only CO₂ point source identified in the NECP with the potential for long-term emissions is the Raahen steel plant. The plant is slated for conversion to green steel production by its owner, SSAB, and CCS has so far not been mentioned as part of the plan. The NECP however does not mention Finnish cement producers in this context, including Finnsementti which is currently cutting emissions by 40% by reducing the clinker factor of the cement. Still, a significant amount of CO₂ remains to be abated.

The NECP does not include any estimates on Finnish capture potential. However, a study by the state-owned research institute VTT and Finnish bioenergy association Bioenergia from 2024 includes data on Finland’s industrial carbon dioxide emission sources. A total of 45 MtCO₂/year was emitted from the examined industrial facilities in 2022, of which 30.1 MtCO₂/year was biogenic. The report shows how 25.2 MtCO₂/year, of which 21.0 Mt biogenic, could be collected for CCU or CCS from nine potential CO₂ hubs in Finland.⁴

- 1 Vantaa Energy’s carbon dioxide capture project advancing - Vantaan Energia
- 2 Industrial Policy Strategy has been published - Finnish Government
- 3 <https://www.carbonneutralfinland.fi/fi-FI/REPower/KEITOhankeyhteisty>
- 4 PUBLIC-SUMMARY-REPORT-CO2-LOGISTICS_Bioenergiary-VTT-04-10-2024.pdf

With its large share of biogenic emissions, Finland refers to BECCS as an option in the NECP, while pointing to challenges including the lack of economic benefits for the emitter or for the state. There is strong research in Finland on BECCS including from universities VTT, and Bioenergia. Still, the NECP stakeholder consultation identified the promotion of BECCS technologies as a polarising issue, calling for evaluation of the sustainability of biomass and the impact of its use to natural sinks, to avoid increasing emissions through irresponsible energy use of biomass.⁵

Partially due to the estimated high costs of CO₂ storage,⁶ CCU is in focus in Finland. Several projects that combine CO₂ mainly from biological origin with clean hydrogen to make synthetic methane for the transport sector will be operational from 2024, according to the NECP.

Bioenergia and partners have produced a map showing completed and planned bio-CCUS and biochar investments, as well as carbon dioxide treatment projects and terminals. In March 2025 the map featured over 30 projects.⁷

CO₂ TRANSPORT & STORAGE

With no geological storage potential identified in Finland, the North Sea is presented as the nearest option for permanent CO₂ storage. The NECP refers to transport by ship for potential CCS projects. VTT points to the need for Nordic cooperation to facilitate storage of Finnish CO₂ in Norwegian sea areas.⁸

The NECP points to the challenge of transporting biogenic CO₂ from sources inland to harbours for CCS. However, the Finnish Climate Change Panel estimates that close to half of the emissions from the largest biogenic CO₂-emitting facilities in Finland could be captured from facilities on the coast.⁹

The 2024 report by VTT and Bioenergia on CO₂ logistics for CCUS in Finland identified nine potential regional CO₂ hubs and three scenarios for a possible future CO₂ logistics system in Finland. Two trunkline scenarios allow for transport between the hubs, ensuring higher capacities and providing greater coverage to regions outside the larger CO₂ hubs. The report shows that using existing railway infrastructure for CO₂ transport is economically sensible. Pipelines are considered economically viable for transporting CO₂ over shorter distances if the capacity is sufficiently high. If capacity drops under 1 MtCO₂/year, pipelines start to lose their advantage over transport by rail and road, the report finds.¹⁰

5 [Finland - Final updated NECP 2021-2030 \(submitted in 2024\) - European Commission](#)

6 [PUBLIC-SUMMARY-REPORT-CO2-LOGISTICS_Bioenergiary-VTT-04-10-2024.pdf](#)

7 [Bio-CCUS & biochar – Bioenergia ry](#)

8 [Technological carbon sinks under discussion in | VTT News](#)

9 [Opportunities provided by technological carbon sinks and the means for their advancement Finland – Ilmas-to-paneeli](#)

10 [PUBLIC-SUMMARY-REPORT-CO2-LOGISTICS_Bioenergiary-VTT-04-10-2024.pdf](#)

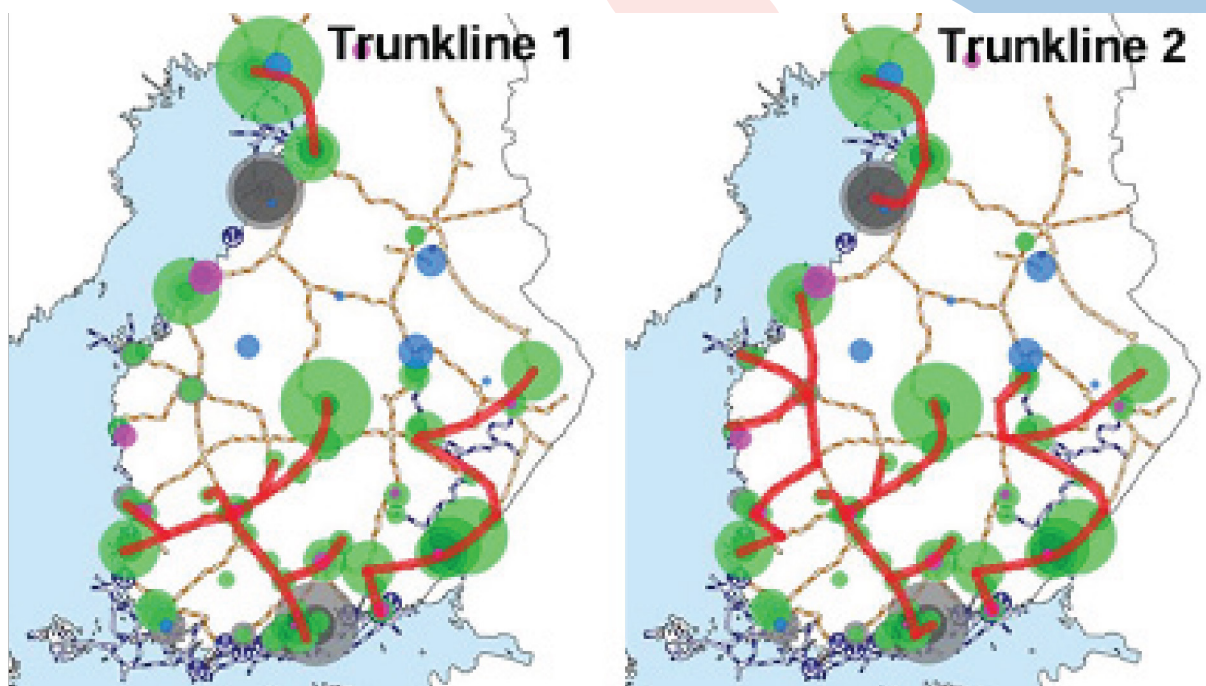


Figure 1: Transport routes of Trunkline 1 and Trunkline 2 scenarios.

Source: Outlook of CO2 logistics in Finland for CCUS, 2024., BIOENERGIA, VTT, https://www.bioenergia.fi/wp-content/uploads/2024/10/PUBLIC-SUMMARY-REPORT-CO2-LOGISTICS_Bioenergiary-VTT-04-10-2024.pdf (p. 6)

NATIONAL GOVERNMENT FUNDING

Finland currently lacks specific public funding earmarked for CCS. However, there is dedicated funding, amounting to 127 million EUR, allocated to "low carbon hydrogen production and CCU" initiatives, through the Energy Investment Aid scheme which awards funding from the EU Recovery and Resilience Facility (RRF). The NECP refers specifically to state-supported projects aimed at producing synthetic methanol and ammonia. The scheme also provides funding of 47.5 million EUR to direct electrification and industrial decarbonisation efforts, but there is no mention of CCS within the scheme.

Some innovation funding was made available for CCUS through Finland's participation in the global initiative Mission Innovation, according to the NECP. Meanwhile, voluntary sectoral low-carbon roadmaps for key industrial energy sectors, developed in cooperation with companies and organisations in each sector, call for investments in research and new technologies including the implementation of CCUS.¹¹

RECOMMENDATIONS

Only minor updates have been made on CCS deployment in the final NECP, compared to the draft update. Based on information available through other relevant sources, Bellona finds that the final NECP does not reflect the full picture of CCUS developments in Finland. Bellona encourages the Finnish government to:

1

DEVELOP AN IMPLEMENTATION PLAN FOR CCS DEPLOYMENT

In collaboration with industry, academia, and civil society, build upon existing research and data to establish a comprehensive implementation plan or strategy for CCS in Finland, including for bio-CCS and for industrial process emissions with few to no other abatement options. A medium to long-term, comprehensive plan will send a strong signal to stakeholders driving private investments and encouraging and facilitating the engagement of civil society and academia in the debate around CCS development and deployment.

2

DEVELOP CO₂ TRANSPORT INFRASTRUCTURE

In discussion with industry and other stakeholders, and building on existing research, assess transport infrastructure needs and establish a plan for open-access and multimodal CO₂ transport infrastructure deployment, connecting capture sites with storage facilities, including through transport hubs and Nordic cooperation.

3

MAKE PUBLIC FUNDING AVAILABLE FOR HIGH-CLIMATE VALUE APPLICATIONS

With no or fewer scalable decarbonisation alternatives and where CCS would come with a higher mitigation potential and therefor the highest climate value.⁶⁸

4

ENSURE ROBUST ASSESSMENT OF CCU

Ensure that CCU products are assessed based on their full lifecycle emissions to ensure clear climate benefits.

5

CONSIDERING THE POTENTIAL FOR BIO-CCS IN FINLAND, IT IS ESSENTIAL THAT THE GOVERNMENT ENSURES THE ENVIRONMENTAL INTEGRITY AND CLIMATE BENEFITS OF ANY BECCS/BIO-CCS DEVELOPMENTS

Adhere to robust accounting rules, certification standards, liability frameworks, and sustainability requirements for BECCS/Bio-CCS to guarantee its environmental integrity and net climate benefits. This includes comprehensive Monitoring, Reporting, and Verification (MRV) systems that account for all greenhouse gas emissions—both direct and indirect—across the entire value chain, domestically and internationally where applicable. These systems should employ conservative estimation methods and ensure that biomass sourcing prioritises sustainability, minimises lifecycle emissions, and achieves a net-negative balance. Bellona [recommends](#) the separation of CDR targets into emissions reductions, land-based sequestration and permanent carbon removals, to enhance clarity on climate goals. This would ensure anthropogenic biogenic based removals are not deterring emission reductions.

FRANCE



Criteria	Performance	Score
Implementation plan	The government has published a roadmap for CCUS deployment in France titled State of play and prospects for the deployment of CCUS in France, detailing key milestones and support measures for its implementation.	
CO2 capture	Envisions deploying CCS in the industrial sector (not specifying whether this only pertains to process emissions) by 2027, with estimated CO ₂ capture volumes: 4-8.5 Mtpa CO ₂ by 2030 and 20-25 Mtpa CO ₂ by 2050.	
CO2 storage	Studies to assess CO ₂ storage potential were launched in 2024.	
CO2 transport	Currently in the process of consulting to determine the most effective CO ₂ transport methods.	
National government funding	The development of CCS technologies is supported through the strategy for decarbonising industry under the «France 2030» investment plan with an overall budget of EUR 4.5 billion.	

Other relevant initiatives

Does not mention any other measures to support the deployment of CCS.

CCS IMPLEMENTATION PLAN

In its NECP, France outlines plans to deploy Carbon Capture and Storage (CCS) technologies to tackle industry's process emissions, specifically targeting sectors such as cement, lime, chemicals, and metals. CCS is positioned as a complementary technology in France's industrial decarbonisation strategy to priority measures like electrification, energy efficiency improvements, and fuel switching.

The Plan also foresees the use of captured CO₂ for the purpose of producing synthetic fuels – approximately 10% of captured CO₂ is expected to be utilised.

*In July 2024, France published its roadmap to CCUS deployment, titled *State of play and prospects for the deployment of CCUS in France*¹ (*État des lieux et perspectives de déploiement du CCUS en France*), previously subject to public consultation with industrial stakeholders. In this roadmap France declares that to meet its industrial emission reduction targets (45% emission reductions by 2030 and carbon neutrality by 2050), the first CCUS projects must be in place by 2030, focusing initially on high-emitting industrial hubs before expanding nationwide by 2040-2050. The government provides support to large-scale CCS projects starting 2024, though channelling funding for decarbonisation to large industrial emitters and enabling the development of CO₂ transport and storage infrastructure in so called "CCS valleys" across the country.*

CO₂ CAPTURE

France provides information on the potential for carbon capture but does not specify whether it pertains specifically to process emissions. Nevertheless, as the primary focus is on efficiency improvements, electrification, and fuel switching when it comes to industrial decarbonisation it's possible that the captured potential refers to process emissions only. However, this is not explicitly stated. France envisions deploying CCS in the industrial sector as of 2027, with estimated CO₂ capture volumes ranging from 4 to 8.5 MtCO₂ per year by 2030 and 30 to 50 MtCO₂ per year by 2050. By 2050, the plan foresees applying CCS technologies for the purpose of carbon removals to reach net-zero.

The provisional scenario of the third iteration of France's National Low-Carbon Strategy (Stratégie Nationale Bas-Carbone - SNBC 3) foresees the capture of the following volumes of CO₂ broken down by industry:

Industry	Biogenic CO ₂ (Mt)	Fossil CO ₂ (Mt)	Total CO ₂ Captured (Mt)
Primary Metals	0.5	2.8	3.3
Chemical	0.5	1.7	2.2
Non-Metallic Minerals	0.2	1.0	1.2
Total by 2030	1.2	5.4	6.6

Table 1: Projected CO₂ capture by industry in France's SNBC 3 (by 2030)

Source: [France - Final updated NECP 2021-2030 \(p.64\)](#)

CO₂ TRANSPORT

France is currently consulting the sector to determine the most effective transportation methods, considering primarily pipelines, but also other modes of transport such as trains, barges or lorries. The Plan declares that the French government will encourage the planning and development of CO₂ transport networks. The Energy Regulatory Commission is tasked with developing CO₂ transport framework models to enable the orderly development of the CO₂ transport network.

According to France's CCUS roadmap, a **regulation for CO₂ transport infrastructure** is being considered to address the need for **non-discriminatory access to the network, transparency, and tariff regulation**.²

CO₂ STORAGE

While France has not developed any CO₂ storage to date, its final Plan outlines an intention to establish domestic CO₂ storage capacity. Studies to assess France's CO₂ storage capacities were launched in early 2024. Additionally, France has concluded a bilateral agreement with Denmark for CO₂ export for storage purposes and is considering a similar agreement with Norway.

According to the French CCUS roadmap³, besides the North Sea, the Mediterranean also serves as a short-term storage option for French industrial emissions. However, by 2030, France aims to develop its own national storage capacity, which would be more cost-effective and more easily accessible. This will involve assessing France's geological storage potential and financing initiatives to improve subsurface knowledge.

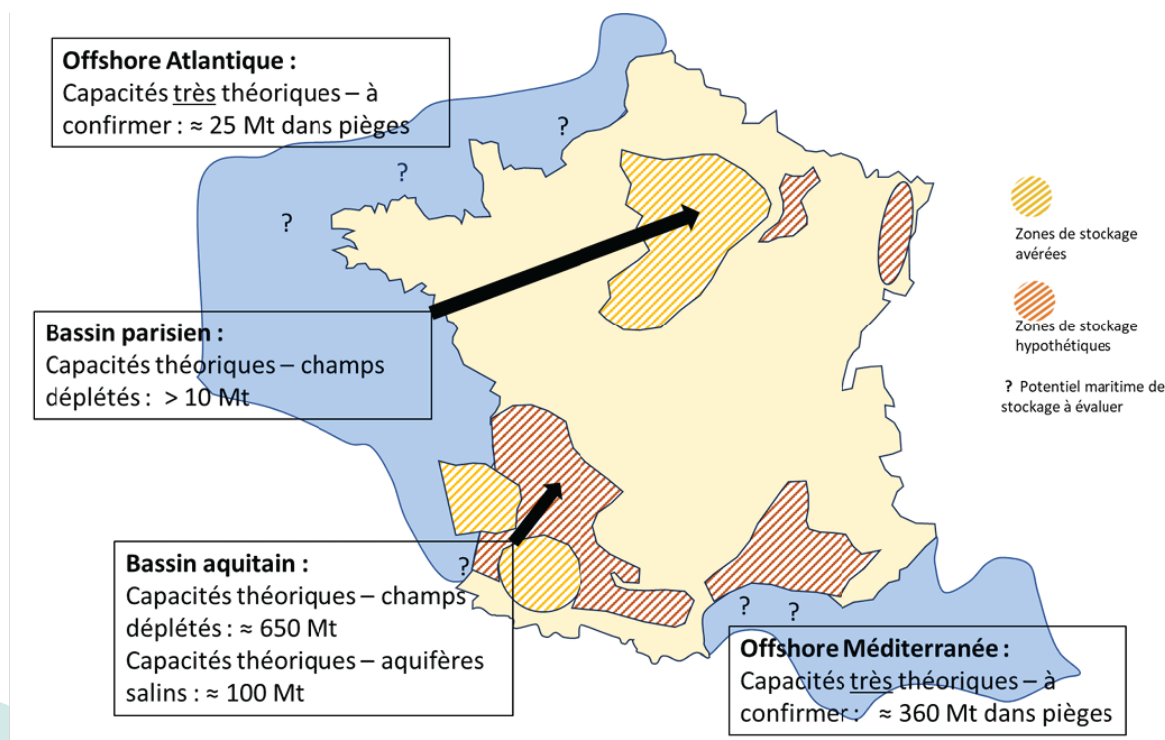


Figure 1: Map of CO₂ geological storage potential in France based on theoretical studies and data from oil and gas production.

Source: [État des lieux et perspectives de déploiement du CCUS en France \(p.28\)](#)

NATIONAL GOVERNMENT FUNDING

The development of CCS technologies is supported through the strategy for decarbonising industry under the 'France 2030' investment plan with an overall budget of EUR 4.5 billion, reduced from EUR 5.6 billion declared in the draft NECP. Funding includes EUR 610 million for the emergence and commercialisation of industrial decarbonisation solutions. As part of this plan, there is a potential allocation of EUR 25-30 million to support studies or initiatives focused on enhancing understanding of the French subsoil's capacity for storing CO₂. These efforts involve seismic campaigns or injectivity tests and have started in 2024. Under the innovation strand, the initiative allows for the eligibility of new CO₂ capture technologies in programs such as ADEMIBaC and IBAC PME calls.

Additionally, a new support scheme for large industrial decarbonisation projects was launched at the end of 2024. The scheme will support amongst other, the installation of CO₂ capture units on industrial plants with no alternatives to fully decarbonise for the purpose of permanent geological storage.

RECOMMENDATIONS

France has largely stayed on course in fulfilling its commitments made in its draft NECP not least to develop a CCUS roadmap, outlining the role of the technologies in achieving France's broader decarbonisation objectives. However, as the roadmap was published around the same time as the final NECP submission, several key details from the roadmap were not fully reflected in the Plan.

France demonstrates a strong commitment to deploying CCS as a crucial solution for decarbonising its hard-to-abate industries. This commitment is reinforced by substantial (though reduced compared to the draft NECP) government funding, ongoing assessments of the country's subsurface CO₂ storage potential, and efforts to map out CO₂ infrastructure while establishing the necessary regulatory framework for a functioning market to transport CO₂. Taken together, these efforts position France as a frontrunner in CCS deployment within the EU. In this context, Bellona Europe recommends the following measures:

1

PRIORITISE PUBLIC FUNDING FOR HIGH-CLIMATE-VALUE CCS APPLICATIONS

With no or fewer scalable alternatives and where CCS would come with a higher mitigation potential and therefor the highest climate value.⁴

2

DEVELOP A CO₂ TRANSPORT INFRASTRUCTURE DEPLOYMENT PLAN

Establish a comprehensive plan for an open-access and multimodal CO₂ transport infrastructure deployment connecting capture sites and storage facilities. Providing clarity on associated timelines, funding, and support mechanisms.

⁴ Bellona Europa & E3G, 2023, Carbon Capture and Storage Ladder: Assessing the climate value of CCS applications in Europe, https://network.bellona.org/content/uploads/sites/3/2023/07/CCSL_briefing.pdf



3 ENSURE ROBUST ASSESSMENT OF CCU

Ensure that CCU products are assessed based on their full lifecycle emissions to ensure clear climate benefit.

4 ENSURE THE ENVIRONMENTAL INTEGRITY AND CLIMATE BENEFITS OF BECCS/BIO-CCS

Develop and adhere to robust accounting rules, certification standards, liability frameworks, and sustainability requirements for BECCS/Bio-CCS to guarantee its environmental integrity and net climate benefits. This includes comprehensive Monitoring, Reporting, and Verification (MRV) systems that account for all greenhouse gas emissions—both direct and indirect—across the entire value chain, domestically and internationally where applicable. These systems should employ conservative estimation methods and ensure that biomass sourcing prioritises sustainability, minimises lifecycle emissions, and achieves a net-negative balance. Bellona [recommends](#) the separation of CDR targets into emissions reductions, land-based sequestration and permanent carbon removals, to enhance clarity on climate goals. This would ensure anthropogenic biogenic based removals are not deterring emission

GERMANY



Criteria	Performance	Score
Implementation plan	Refers to the initiation of a process to develop a comprehensive Carbon Management Strategy (CMS) and legislation to regulate the transport and storage of CO ₂ . Preliminary results are known ("cornerstone paper") and cited in the NECP, but publication is still pending.	●
CO₂ capture	Does not report on process emissions to be abated with CCS. Refers to the Carbon Management Strategy process indicating hard-to-abate industry emissions (lime, cement, waste with some focus on chemical industry) as the primary focus of CO ₂ capture.	●
CO₂ storage	Does not report on geological CO ₂ storage capacity, but cites plans to start exploration for storage in the German EEZ and lifting the ban on CO ₂ storage in Germany.	●
CO₂ transport	Does not report on planned CO ₂ transport infrastructure. However, CO ₂ pipelines are vaguely mentioned as part of a transport network under the CMS / Carbon Transport and Storage Law.	●
National government funding	Several programmes exist to fund research and development projects, including the BIK programme for medium-sized enterprises; however planned funding opportunities in the second round of the important 'Carbon Contracts for Difference' programme remain unspecified, as eligibility of CCS will depend on details yet to be clarified in the forthcoming Carbon Management Strategy.	●

Other relevant initiatives

- Various innovation programmes featuring CCUS technologies such as the 7th iteration of the German Energy Research Programme.

DISCLAIMER | the german national energy and climate plan (necp) was written and submitted before the collapse of the german government on november 6th. important legislative proposals announced in the necp, such as the lifting of the ban on co2 storage in germany through the german carbon transport and storage act, have yet to be approved by parliament and are therefore still in dispute. it remains uncertain whether the incoming government will take forward and implement the initiatives and strategies outlined in this plan.

CCS IMPLEMENTATION PLAN

In its National Energy and Climate Plan (NECP), Germany identifies Carbon Capture, Utilisation, and Storage (CCUS) technologies as necessary complementary tools for industrial decarbonisation, alongside priority measures such as energy demand reduction and efficiency improvements, within the country's climate change mitigation strategy. **It acknowledges the essential role of CCS and the associated CO₂ infrastructure in reaching Germany's net-zero target by 2045, particularly in addressing process emissions in sectors like cement, lime, parts of the basic chemicals industry and waste incineration, while also serving as a prerequisite for achieving negative emissions.**

As part of its upcoming Carbon Management Strategy, Germany has increased its focus on CCS, with initial key elements already reflected in its final NECP. This includes recognising the urgency of making CCS technologies available for industry by 2030.

With the German Carbon Management Strategy still under development, the NECP lacks detailed plans for supporting CCS deployment. However, it references several ongoing and planned public consultation processes and work programs aiming at addressing questions related to:

- deploying and scaling CO₂ capture technologies on industrial installations,
- supporting the development of regional, supra-regional, and, where appropriate, European CO₂ networks, as well as
- requirements for CO₂ stream specifications during transport.

CO₂ CAPTURE

The Plan includes reference to IPCC reports, highlighting the climate change mitigation potential of CCS, while reinforcing that the scale-up of CCS must explicitly serve climate action. **The Plan emphasises that government support for CCS will be strictly limited to addressing hard-to-abate or unavoidable emissions, such as process emissions from cement, lime, parts of the chemical industry and waste-to-energy plants, though it does not specify targeted volumes.** Additionally, CCS is briefly mentioned as a prerequisite for the production of low-carbon hydrogen.

CO₂ TRANSPORT

The NECP highlights the ongoing development of the Carbon Management Strategy and the Carbon Transport and Storage Law (KSpTG) for CO₂ transport. Once implemented, this regulation has significant potential to incentivise CO₂ transport infrastructure by removing much of the prevailing uncertainties and mitigating risks associated with CO₂ infrastructure deployment.

CO₂ STORAGE

The Plan does not provide concrete figures on Germany's CO₂ storage potential, but the Federal Institute for Geosciences and Natural Resources (BGR) estimates the theoretical potential for CO₂ storage to be at 2,88 Gt in depleted oil and gas fields and 6,3 to 12,8 Gt in saline aquifers.¹ **The NECP refers to the German federal government plans to introduce legal provisions to enable the exploration of offshore CO₂ storage sites within the country's Exclusive Economic Zone (EEZ),** ensuring compliance with strict environmental protection regulations. To enhance domestic storage capabilities, the KSpTG will establish a legal framework that allows individual federal states to opt in for onshore CO₂ storage under specific conditions. This approach seeks to align CCS deployment with Germany's long-term negative emissions strategy, establishing essential climate infrastructure as a critical component for achieving the country's net-zero targets.

NATIONAL GOVERNMENT FUNDING

Several identified instruments could support CCS deployment, though they do not explicitly state this as an objective. The NECP refers to **two such programmes**. The German approach enables CCS within a technology-neutral framework across various applications, but limits public funding for specific hard-to-abate sectors, excluding fossil fuel power plants. This demonstrates a commendable effort to prevent CCS from contributing to fossil fuel lock-in.

1. **The 'Federal Funding for Industry and Climate Action' (BIK)** is aimed at medium-sized companies and supports projects related to development, demonstration, and market deployment aimed at addressing process emissions in hard-to-abate, emission-intensive industries. Implemented by the Climate Action Competence Centre in Energy-Intensive Industries (KEI), the programme focuses on optimisation and efficiency improvements, fuel switching, hydrogen, CCS and CCU. Through the BIK programme, the federal government also aims to reduce process emissions in key sectors like steel, chemicals, and cement through innovative technologies. While CCS is now included in the BIK funding programme, it remains limited in scope.
2. **The 'Climate Change Contracts' also known as 'Carbon Contracts for Difference' (CCfDs),** are designed for bigger companies and help industries to invest in and operate climate-friendly production facilities, particularly in sectors such as steel, cement, glass, and paper. These contracts could incentivise the deployment of necessary technologies and infrastructure, including CCS. However, their implementation is dependent on further details outlined in the yet-to-be-finalised Carbon Management Strategy.

OTHER RELEVANT INITIATIVES

Germany is involved in *ERA-Net Cofund ACT (Accelerating CCS Technologies)*, a program promoting large-scale projects encompassing the entire value chain of CCUS processes. This includes initiatives related to capture, transport, storage, or utilisation of CO₂. Germany also pursues cross-border collaboration within NSBTF concerning scientific, technical, legal, economic and political questions related to North Sea CO₂ storage. The NECP also mentions other programmes to support innovation to decarbonise industry that have CCS components, such as the Carbon Direct Avoidance (CDA) programme.

1 Bundesanstalt für Geowissenschaften und Rohstoffe: Häufig gestellte Fragen

RECOMMENDATIONS

Germany's NECP refers to the ongoing process of developing a comprehensive Carbon Management Strategy and a single CO₂ transport and storage regulation. At the time of publication of this assessment, this process has come to a halt as the traffic lights coalition collapsed on November 6th, 2024. It remains to be seen how much of this important process can be taken forward and what the future government will undertake in this area. However, the issue of carbon management is likely here to stay. For the future development of CCS in Germany, the following are the Bellona Deutschland's recommendations:

1

EXPEDITE THE DEVELOPMENT OF THE CARBON MANAGEMENT STRATEGY

To provide detailed frameworks for CCS deployment, including clear timelines, available funding and support mechanisms, as well as specific targets for CO₂ capture, transport, and storage. Align the strategy (as well as the corresponding Long Term Strategy Negative Emissions and Circular Economy Strategy) with existing climate goals while addressing the identified gaps, such as the provision of concrete steps to scale up CCS technologies by 2030.

2

CONDUCT DETAILED ASSESSMENTS OF GERMANY'S CO₂ STORAGE CAPACITY

In particular with regard to the environmentally complex and sensitive situation in proposed offshore locations within the already heavily exploited EEZ. Integrate these findings into the Carbon Management Strategy to balance legitimate local marine protection interests with national climate protection goals. Set measurable short-term and long-term targets for the development of CO₂ storage sites to ensure

3

STRENGTHEN COORDINATION AND INVESTMENT IN CO₂ TRANSPORT AND STORAGE NETWORKS

Ensure sufficient coordination between emitters and transport network operators to optimise CO₂ infrastructure, also recognising Germany's role as a CO₂ transit hub. Allocate adequate financial and coordination resources to develop CO₂ transport networks and storage sites, ensuring they are operational by 2030.

4

ALLOCATE TARGETED FUNDING TO SUPPORT CCS DEPLOYMENT IN HARD-TO-ABATE SECTORS

Ensure that funding through existing programs, such as BIK and 'Carbon Contracts for Difference' (CCfDs), is securely allocated to provide explicit and reliable support for CCS projects in hard-to-abate sectors like cement, lime, waste to energy and basic chemicals. Ensure that public funding is prioritised for projects with the highest climate value (in line with the criteria laid out in the Bellona/E3G CCS ladder). Ensure that alternative technologies to CCS are sufficiently funded, where

GREECE



Implementation plan

Plans for the implementation of CCS with the necessary regulatory and licensing framework currently under development and several CCS projects under implementation on the ground.



CO2 capture

Makes precise projections to capture CO₂ from industrial processes at 3.3 Mtpa by 2030 and 3.9 Mtpa by 2050. Several capture projects are currently under development.



CO2 storage

Makes projections on geological storage availability for commercial use and plans to continue exploration of the subsurface. The Prinos CO₂ storage project is currently under development.



CO2 transport

A pipeline transportation network plan is currently being developed by Hellenic Hydrocarbons and Energy Resources Management Company (HEREMA) and the Hellenic Gas Transmission System Operator (DESFA).



National government funding

- Through the Recovery and Resilience Fund, Greece is co-financing its first CO₂ storage development project in Prino.
- Announces the introduction of support mechanisms similar to CCfDs and foresees the allocation of funding of 2 bln EUR by 2030.



Other relevant initiatives

- Has plans for on-board CCS for maritime transport as well as CCU.
- Made agreements for cross-border CO₂ transport with third countries.

CCS IMPLEMENTATION PLAN

Greece's NECP confirms **that the development of a comprehensive regulatory and licensing framework for the CCS value chain is currently underway**, as part of the REPowerEU chapter of Greece's National Recovery and Resilience Plan.

The Greek government views CCS as a bridging solution until alternative technologies become available. **The focus for the application of CCS is on sectors where no alternative abatement options are available, naming cement production and refineries, specifically grey hydrogen production.** Although green hydrogen is seen as a possible alternative, its high cost slows adoption. The strategy does not foresee CCS for waste management. Moreover, despite noting industrial activities in other hard-to-abate industries such as fertiliser and plastics production, Greece has not yet laid out specific plans for CCS deployment in these sectors.

Greece rejects CCS as a means to continue the use of fossil fuels as a result of the understanding that CO₂ storage capacities are inherently finite. **Greece is advancing the exploration of its geological storage capacities, overseen by the Hellenic Hydrocarbons and Energy Resources Management Company (HEREMA)**, which has been the competent authority for CO₂ storage since 2022.

The adoption of CCS in maritime transport through onboard carbon capture (OCC) is also planned as a transitional measure pending the availability of synthetic fuels, which aligns with the assessment of the International Maritime Organization. Greece commits to promoting research and the retrofitting of ships.

Looking ahead, **Greece plans to implement Direct Air Capture (DAC) technologies starting from 2045**, aimed at offsetting emissions predominantly from the transport sector.

In a legislative initiative from February 2025, the Greek Ministry of Energy and Environment proposed a novel approach for CO₂ storage management. It suggests allocating 50% of the storage capacity to the open market while reserving the remaining 50% for distribution based on state-defined criteria as recommended by HEREMA. This approach is explained by the government's view of CO₂ storage as a scarce resource.¹

CO₂ CAPTURE

Greece quotes industrial emissions at 9.2 Mtpa in 2022, planned to be reduced to 4.3 Mtpa by 2050. The volume of CO₂ captured is expected to increase from 3.3 Mtpa by 2030 to 8.4 Mtpa by 2050. **Captured industrial emissions are projected to stabilise around 4 Mtpa while DAC is expected to contribute 4.5 Mtpa by 2050.** CO₂ used for Carbon Capture and Utilisation (CCU) is anticipated to reach up to 2.7 Mtpa by 2050, while storage volumes are expected to increase to 5.7 Mtpa. The associated energy penalty is estimated at 9.3 TWh in 2050 (8.8TWh for DAC and 0.5TWh for CO₂ storage), which would represent 7% of the country's total energy consumption.

¹ Naftemporiki. 2025. Council of Ministers: 2 billion euros in investments in carbon and hydrogen storage. <https://www.naftemporiki.gr/politics/1924731/ypoyrgiko-symvoylio-ependyseis-2-dis-eyro-stin-apothikeysi-anthra-ka-kai-ydrogonoy/>

Origin and fate of captured CO ₂ emissions	Volume 2030 (Mtpa)	Volume 2040 (Mtpa)	Volume 2050 (Mtpa)
Industry	3.3	4.2	3.9
DAC	0	0	4.5
Overall	3.3	4.2	8.4
- to be utilised	0.2	0.8	2.7
- to be stored	3.1	3.5	5.7

Source: National Energy and Climate Plan Greece, p. 4

According to an analysis in the context of the Horizon Europe project CCUS ZEN, Greece's annual industrial emissions including power production amount to 32 Mt. Six cement production sites contribute 5 Mt, and six refineries 7.5 Mt to the national total.² The NECP states that four of those sites have already developed CCS strategies, with three having secured grants from the Innovation Fund

- The IRIS Project, which has received 127 mln € from the Innovation Fund, aims to capture 0.5 Mtpa at a hydrogen production unit via natural gas reforming at a Motor Oil refinery in Corinth. 10ktpa shall be used for synthetic methanol production for maritime transport. Operations will start in 2028 and shall be expanded to two more refineries in the future.³
- The IFESTOS Project will capture 1.9 Mtpa at a Titan cement production plant in Kamari, by using oxyfuel and post-combustion cryogenic capture technologies, combining exhausts from two different kilns in one capture unit. They have been granted 234 mln € from the Innovation Fund. Operations shall start in 2030.⁴
- The OLYMPUS Project will use OxyCalciner technology to capture 1 Mtpa at a Holcim cement production plant in Milaki, starting in 2029. To this goal, Holcim will collaborate with French indus-

CO₂ TRANSPORT

The Greek NECP states that discussions over a CO₂ network are actively ongoing between key stakeholders, including industry leaders and government bodies, **to develop hybrid transport solutions that integrate both pipeline and shipping. A pipeline transportation network plan is currently being developed by HEREMA and the Hellenic Gas Transmission System Operator (DESFA)**, designed to connect industrial sites with Greece's main storage Prinos. Italy has already expressed interest in using Greece's storage for storing its own emissions.⁶

2 CCUS Zen. 2023. High-level regional mapping of CO₂ emission sources, utilization industry and infrastructure in the Baltic Sea and Mediterranean Sea regions. <https://zenodo.org/records/14392847>

3 European Commission. IRIS: Innovative low caRbon hydrogen and methanol production by large Scale carbon capture. https://ec.europa.eu/assets/cinea/project_fiches/innovation_fund/101133015.pdf

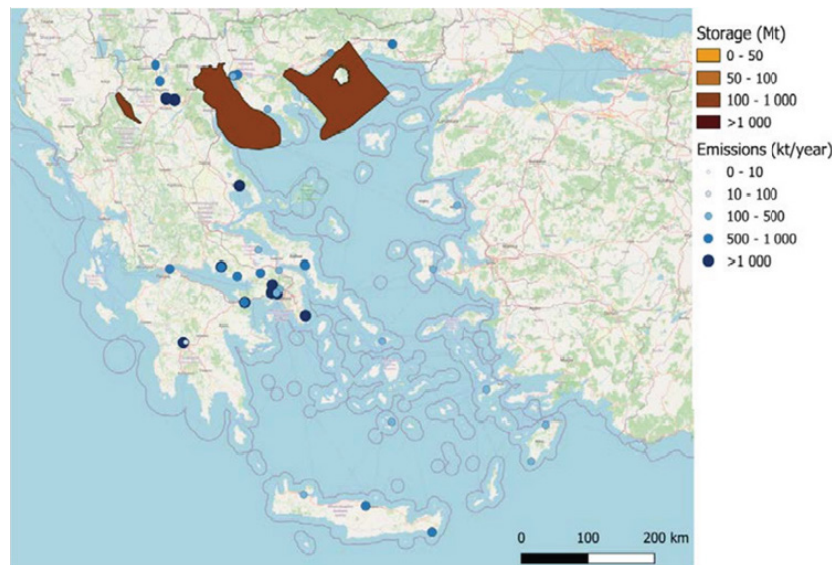
4 European Commission. IFESTOS – one of the largest carbon capture projects in Europe to enable the production of zero carbon cement concrete and create decarbonization synergies with regional industries. https://ec.europa.eu/assets/cinea/project_fiches/innovation_fund/101133204.pdf

5 European Commission. OLYMPUS: Ascending to the top of CO₂ avoidance in the EU cement sector through the innovative OxyCalciner technology. https://ec.europa.eu/assets/cinea/project_fiches/innovation_fund/101086023.pdf

6 Ministry of the Environment and Energy Security. 2024. National Energy and Climate Plan Italy. https://commission.europa.eu/document/download/75b8162c-3d62-4627-8706-c62997b324da_en?filename=ITALY%20-%20DRAFT%20UPDATED%20NECP%202021%202030%20%281%29.pdf

CO₂ STORAGE

The NECP emphasises the need for developing new suitable geological formations for commercial use in order to meet industry's decarbonisation needs. Research in that regard is being done by HEREMA and the Hellenic Geological and Mining Authority (HGMA). **In the context of the CCUS Zen project, seven potential storage sites with a combined total capacity of up to 3.2 Gt were identified**, albeit with low storage readiness levels at this stage. They are highlighted in the map below, together with major industrial emission point sources.



Title: Greece - CO₂ emission sources and potential CO₂ storage sites;

Source: High-level regional mapping of CO₂ emission sources, utilization industry and infrastructure in the Baltic Sea and Mediterranean Sea regions (p. 120) <https://zenodo.org/records/14392847>

Greece's first pioneer project is the **Prinos CO₂ storage site**, developed by EnEarth, a branch of the oil & gas company Energean. The project **is set to begin storing 1 Mtpa of CO₂ in 2026, with expectations to increase CO₂ storage rates to 3-4 Mtpa by 2029**. As part of a larger infrastructure project including a CO₂ pipeline network and a liquefaction site in Revithousa, Prinos was classified as a Project of Common Interest under the EU Connecting Europe Facility. It is set to receive 150 mln € from the Recovery and Resilience Fund⁷ and an additional 120 mln € from the Connecting Europe Facility⁸. Furthermore, Prinos is involved in Horizon Europe research initiatives. These include HERCCULES⁹, which tests new CCUS solutions in Southern Europe, and COREu, the EU's largest research project on CCS to date (<https://coreu.eu/>).¹⁰

7 European Commission. 2024. Commission approves €150 million Greek State aid measure funded under Recovery and Resilience Facility to support construction of carbon storage facility in Prinos. https://ec.europa.eu/commission/presscorner/detail/en/ip_24_4905

8 European Commission. 2025. Prinos Offshore storage at Prinos field for emissions from EL, by pipeline, and from BG, HR, CY, EL, IT and SI by ship. https://ec.europa.eu/assets/cinea/PCI/files/PCIFiche_13.11_1st_PCI_PMI_list.pdf

9 HERCCULES – full chain CCS demonstration. <https://www.herccules.eu/>

10 COREu. <https://coreu.eu/>

NATIONAL GOVERNMENT FUNDING

The government estimates that investment requirements for CCUS amount to 1 bln € for the 2025-2030 period and an additional €14.4 billion for the period of 2031 to 2050. CO₂ storage infrastructure is expected to demand the mobilisation of 1.2 bln € of investments in the 2025-2030 period and another 1.6 bln € in the following twenty years.

Greece is looking primarily to EU funds for public support, particularly the Recovery and Resilience Fund, REPowerEU, and the Innovation Fund. In addition to these sources, **the Greek government is considering the establishment of a support scheme similar to Carbon Contracts for Difference (CCfDs) with a “clawback” mechanism**, linked to the EU Emissions Trading System. This would provide predictability through price stability for stakeholders in the CCS value chain. **In a more recent legislative proposal, an immediate investment of €390 million in CCS and hydrogen projects by June 2026 was outlined, with ambitions to elevate total CCS investment to €2 billion by 2030.** However, the specific origins of the funds and the extent to which Greece will commit its own national resources to this undertaking remain unclear.

OTHER RELEVANT INITIATIVES

Greece will advocate for the restructuring of the regulatory framework at the European level to allow for cross-border transport of CO₂ to third countries. HEREMA has signed a Memorandum of Understanding (MoU) with the Cyprus Hydrocarbon Company, agreeing to collaborate on CO₂ transport, utilisation, and storage. HEREMA has also established a partnership with the Norwegian research institute SINTEF to draw on Norway's experience in the development of offshore CO₂ transport and storage technologies.¹¹ Greece further signed an MoU with Egypt in 2025, promoting cooperation in CO₂ management and considering the option of CO₂ cross-border transfer from Greece to Egypt.^{12 13}

Greece also considered CCU in its NECP with several Greek companies involved Horizon Europe projects on CCU, among them HiRECORD, demonstrating CO₂ capture technology for quicklime production¹⁴, and ConsenCUS, using captured CO₂ emissions to produce formic acid.¹⁵

11 European Commission. 2023. *Member State report on Implementation of Directive 2009/31/EC on the geological storage of carbon dioxide (“CCS Directive”)*. https://ec.europa.eu/assets/clima/ccs/2023/policy_ccs_country_report_2023_greece_en.pdf

12 Ministry of Energy and Environment. 2025. *Th. Skylakakis from Cairo: When the dust settles from the tensions, what remains are the agreements you sign and the plans you implement –* <https://ypen.gov.gr/th-skylakakis-apo-kairo-otan-katakatsei-i-skoni-apo-tis-entaseis-afto-pou-menei-einai-oi-symfonies-pou-ypografeis-kai-ta-schedia-pou-ylopoieis-ypografi-elli-no-aigyptiakou-mnimoniou-gia-to-ccs-k/>

13 Ministry of Energy and Environment. 2024. *Steps forward for the Greece-Egypt cable and cooperation on CCS (CO₂ capture and storage) issues during the visit of the Minister of Environment and Energy, Th. Skylakakis, to Egypt.* <https://ypen.gov.gr/vimata-brosta-gia-to-kalodio-elladas-aigyptou-kai-ti-synergasia-se-themata-ccs-diakratisis-kai-apothikefsis-CO2-stin-episkepsi-tou-ypourgou-perivallontos-kai-energeias-th-skylakaki-stin-aigipto/>

14 HiRECORD. <https://hirecord.eu/>

15 ConsenCUS. <https://consencus.eu/>

RECOMMENDATIONS

Greece is making great strides towards the implementation of CCS, with a regulatory and permitting framework and several projects across the CCS value chain under development. The Greek CO₂ storage project, Prinos, is set to establish the first commercial offshore CO₂ storage site in the Eastern Mediterranean with the potential to serve as an international CO₂ storage hub. Crucially, the Greek government foresees the establishment of a support mechanism similar to CCfDs to provide price stability and encourage investment into decarbonisation solutions as well as significant funding for CCS deployment, although the clear commitment of these funds has not yet been established. Against this backdrop, Bellona Europa encourages the Greek government to:

1

COMMIT AND PRIORITISE PUBLIC FUNDING FOR HIGH-CLIMATE-VALUE CCS APPLICATIONS

With no or fewer scalable alternatives and where CCS would come with a higher mitigation potential and therefore the highest climate value.

2

EXPAND IMPLEMENTATION TO COVER HARD-TO-ABATE INDUSTRIES

Currently, the focus is primarily on Greece's most-polluting industrial sectors, cement and refining. We recommend exploring CCS strategies for hard-to-abate sectors such as the fertiliser industry and waste incineration, which are currently lacking concrete plans.

3

BROADEN STAKEHOLDER ENGAGEMENT

We urge the Greek government to involve civil society organisation in stakeholder consultations on CO₂ storage & transport network development to ensure environmental integrity and enhance public trust. Inclusive dialogue with diverse stakeholders can help address concerns of the public and local communities, improve transparency, and foster broader societal support for the deployment of CO₂ infrastructure.

4

ENSURE THE ENVIRONMENTAL INTEGRITY AND CLIMATE BENEFITS OF BECCS/ BIO-CCS

Develop and adhere to robust accounting rules, certification standards, liability frameworks, and sustainability requirements for BECCS/ Bio-CCS to guarantee its environmental integrity and net climate benefits. This includes comprehensive Monitoring, Reporting, and Verification (MRV) systems that account for all greenhouse gas emissions— both direct and indirect—across the entire value chain, domestically and internationally where applicable. These systems should employ conservative estimation methods and ensure that biomass sourcing prioritises sustainability, minimises lifecycle emissions, and achieves a net-negative balance.

HUNGARY



Criteria	Performance	Score
Implementation plan	Does not plan concrete implementation of CCS.	●
CO2 capture	Does not report on process emissions to be abated with CCS.	●
CO2 storage	Mentions that Hungary has geological formations that may be suitable for CO ₂ storage, including depleted oil and gas fields with limited short-term capacity, and deep saline aquifers with greater long-term potential due to their higher storage capacities.	●
CO2 transport	Does not report on planned CO2 transport infrastructure.	●
National government funding	Does not foresee the allocation of national funding for CO2 capture, transport or storage.	●
Other relevant initiatives	Does not mention any other measures to support the deployment of CCS.	

In its NECP, Hungary acknowledges that climate neutrality is not achievable without Carbon Capture and Storage (CCS). The plan notes that carbon capture technologies *may be* necessary to decarbonise specific sectors, where electrification and other solutions are not viable. The Plan mentions the following sectors as likely to rely on CCS to fully decarbonise: energy production, metals, petroleum, and mineral industries. CCS would come into the picture after all more cost- and energy-efficient emission reduction and removal options have been exhausted. Hungary also refers to the increased importance of carbon capture technologies in light of the Net Zero Industry Act (NZIA).

The government notes that decarbonising hard-to-abate industries may require close cooperation between industry stakeholders and public authorities. However, it stops short of committing to enabling such cooperation. While the NECP states that further surveys and analyses are needed to assess domestic opportunities and constraints, it does not include any concrete commitments to undertake them.

Hungary has geological formations that may be suitable for CO₂ storage, including depleted oil and gas fields with limited short-term capacity, as well as deep saline aquifers, which offer greater longterm potential due to their higher storage capacities.

The draft NECP outlined plans to begin applying CCS technologies in the industrial sector by 2040 and in the power sector by 2045. However, the final NECP only includes modelling for CCS in the power sector, with deployment starting from 2035.

Despite the lack of public support for the deployment of CCS, Hungary is home to the Danube CCS project. This is Hungary's first commercial-scale, onshore bio-CCS project led by Danube CCS Ventures.¹ The project aims to capture around 500 kt of biogenic CO₂ annually from the fermentation processes at Pannonia Bio and permanently store it in a deep saline aquifer via a 10–15 km pipeline and multiple injection wells leading to negative emissions.² The project is supported by the EU Innovation Fund.

RECOMMENDATIONS

Hungary's final NECP further weakens its already limited ambition on CCS deployment. While the earlier draft used clearer language to highlight the role of CCS in decarbonising hard-to-abate industries, many of these references have now been removed or diluted. Despite the significance of Hungary's industrial base for the national and regional economies, the government appears to engage with the topic of industrial decarbonisation only to the extent required by the Net Zero Industry Act. Therefore, Bellona recommends the Hungarian government to:

1 Danube Removals | DANUBE Energy
2 First Large-Scale Bio-CCS in Hungary to Store 500,000 Tons of CO₂ Annually | Impactful Ninja

1 DEVELOP AN IMPLEMENTATION PLAN FOR CCS DEPLOYMENT

In collaboration with industry, academia, and civil, building upon existing research³ and data to establish a comprehensive implementation plan or strategy for CCS deployment in Hungary, primarily for industries with few to no other abatement options. A medium to long-term, comprehensive plan will send a strong signal to stakeholders, driving private investments and encouraging and facilitating the engagement of civil society and academia in the debate around CCS development and deployment in Hungary.

2 PROVIDE PUBLIC SUPPORT AND PRIORITISE PUBLIC FUNDING FOR HIGH-CLIMATE-VALUE CCS APPLICATIONS

With no or fewer scalable alternatives and where CCS would come with a higher mitigation potential and therefore the highest climate value.⁴

3 STRENGTHEN REGIONAL COOPERATION

Enhance cooperation with neighbouring countries, particularly Austria and Croatia, that are making significant strides in CCS deployment in order to build expertise and accelerate decarbonisation efforts.

³ e.g., Szén-dioxid-tárolási és -hasznosítási (CCS/CCU) lehetőségek Magyarországon : Fehér könyv - SZTE Repository of Publications

⁴ Bellona Europa & E3G, 2023, Carbon Capture and Storage Ladder: Assessing the climate value of CCS applications in Europe, https://network.bellona.org/content/uploads/sites/3/2023/07/CCSL_briefing.pdf

IRELAND



Criteria	Performance	Score
Implementation plan	Announced plans for developing a CCS policy framework. The implementation of a comprehensive regulatory framework for CCUS is anticipated between 2031-2035.	●
CO2 capture	Does not report on process emissions to be abated with CCS.	●
CO2 storage	Does not report on geological CO ₂ storage capacity.	●
CO2 transport	Does not report on planned CO ₂ transport infrastructure.	●
		●

Other relevant initiatives

Ireland aims to promote research on blue carbon and relevant policy to this regard.

CCS IMPLEMENTATION PLAN

Ireland's National Energy and Climate Plan (NECP) has no concrete plans for Carbon Capture and Storage (CCS) implementation to date. The NECP mentions the intentions to explore the feasibility of CCS in Ireland and to develop policies accordingly. However, the current legal framework in Ireland prohibits the storage of CO₂, and the country has not yet ratified the 2009 amendment to the London Protocol, which would be necessary to permit cross-border CO₂ transport from the isle to storage sites abroad.

The NECP refers to Ireland's most recent Climate Action Plan¹, which hints at the potential role of CCS in decarbonising energy and industry, with a particular interest in cement production. It announces the establishment of a Working Group to explore various avenues for achieving the necessary emission reductions to stay within Ireland's carbon budget for the time period after 2026, with CCS as one potential solution to consider. The Plan indicates that the development of a policy and regulatory framework for CCS may begin in early 2025 under the joint leadership of the Department of the Environment, Climate and Communications and the Department of Enterprise, Trade and Employment. The implementation of a comprehensive CCUS regulatory framework is anticipated between

Ireland's Long-Term Strategy on Greenhouse Gas Emissions, as referenced in the NECP, predicts a scenario with a "medium" level of industrial CCS deployment from 2031 to 2050, although no further details are provided. Additionally, the NECP refers to a White Paper on Ireland's Transition to a Low Carbon Energy Future, which commits to reviewing the legal status of CCS every five years. The next assessment would be due in 2027.

A study on CCS by the Sustainable Energy Authority of Ireland (SEAI) advocates for a swift and concrete implementation plan for the CCS value chain. However, as the study was only mentioned and not endorsed in the NECP, it remains to be seen to which extent it will influence future CCS policymaking in Ireland.

CO₂ CAPTURE

Ireland's NECP does not commit or provide information on the volumes of CO₂ that will need to be captured.

Nonetheless, the SEAI has explored different scenarios for CO₂ capture in its study. These scenarios vary in the extent of deployment as well as the sectors involved. The SEAI's study outlines a range of projected capture rates by 2050 from a low estimate of 2.7 MtCO₂ per annum under a scenario with high electrification and capture from four industrial sites to a high estimate of 16.9 Mtpa of CO₂, when including biomass and natural gas power production with CSS, across 25 industrial site and heat & power plants. The study further identified 16 industrial sites as economically viable for CCS, with cost estimates below €180 per tonne of CO₂.

¹ Department of the Environment, Climate and Communications (2024): Climate Action Plan 2024. <https://www.gov.ie/en/publication/79659-climate-action-plan-2024/>

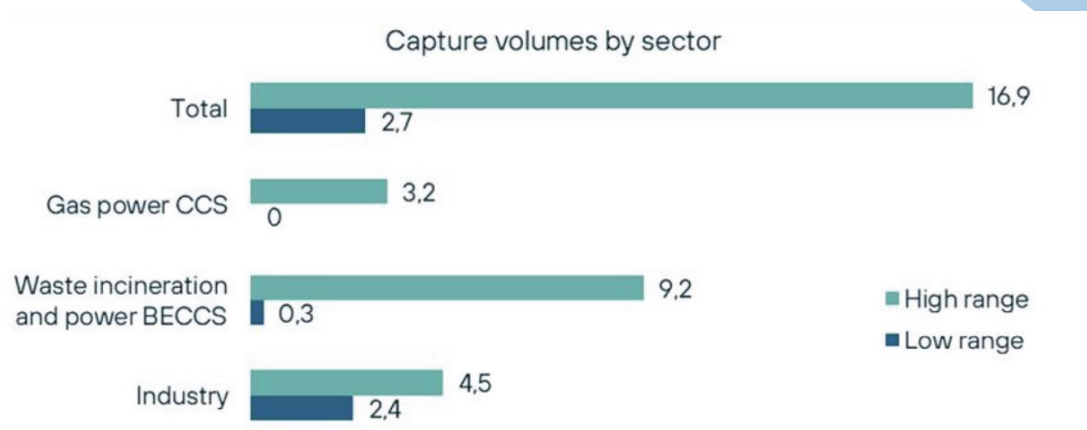


Figure 1: Projected capture volumes by sector in Ireland.

Source: own illustration, based on: Sustainable Energy Authority of Ireland (2022): Carbon Capture Utilisation and Storage (CCUS): Suitability, Costs and Deployment Options in Ireland, (page 8)

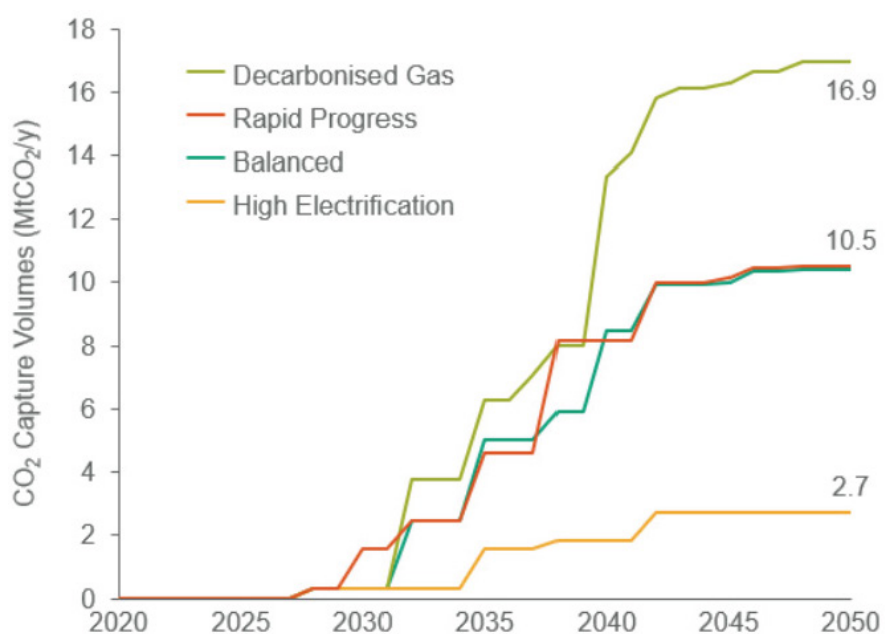


Figure 2: Projected capture volumes per scenario in Ireland. Source: Sustainable Energy

Authority of Ireland (2022): Carbon Capture Utilisation and Storage (CCUS): Suitability, Costs and Deployment Options in Ireland, (page 28)

CO₂ TRANSPORT

In the NECP, CO₂ transport remains unaddressed.

However, the SEAI study identified five key shoreline terminals as potential candidates for receiving CO₂ and enabling offshore transport. In the context of the Cork CCS project, gas transmission operator Ervia is exploring the possibility of repurposing existing gas infrastructure to connect the Inch Terminal to the decommissioned Kinsale gas field, which is being evaluated for its suitability for CO₂ storage.²

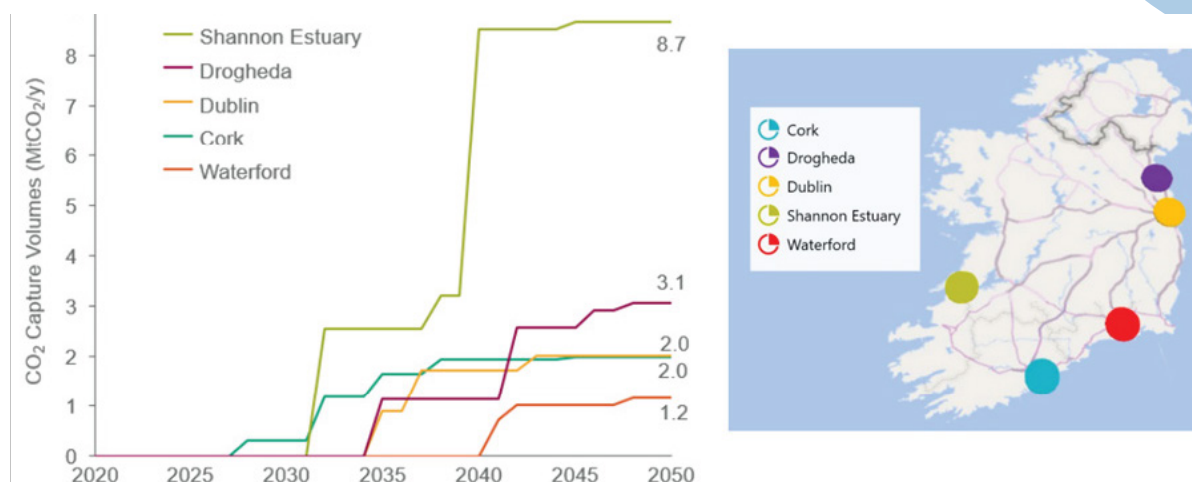


Figure 3: CO₂ travel volume in each Irish shoreline terminal (maximum CCS deployment scenario).

Source: Sustainable Energy Authority of Ireland (2022): Carbon Capture Utilisation and Storage (CCUS): Suitability, Costs and Deployment Options in Ireland, (page 29)

CO₂ STORAGE

The Plan lacks information on CO₂ storage capacities.

Research by O'Sullivan et al. (2024) suggests that Ireland's sedimentary basins off the coast could theoretically provide storage for hundreds of Mt CO₂.³ Moreover, recent investigations have identified potential storage capacities of up to 7 Gt in an onshore basalt layer in the south-western part of Ireland and over 80 Gt in an offshore basalt layer to the west of the isle.⁴ However, these formations present substantial geological challenges to their commercial development. The most practical option currently identified is the depleted Kinsale gas field in the Celtic Sea Basin to the South of Ireland close to Cork, which could potentially store up to 330 Mt of CO₂.⁵

³ Conor M. O'Sullivan et al. (2024): Subsurface storage capacity in structural traps in underexplored sedimentary basins: hydrogen (H₂) and carbon dioxide (CO₂) storage on the Irish Atlantic margin. Manuscript draft.

⁴ O'Sullivan, Conor (2024): From carbon to climate action: harnessing basalt for geological carbon dioxide (CO₂) storage onshore and offshore. 2024. Manuscript draft under review, publication expected in 2025.

⁵ Lewis, Deirdre et al (2009): Assessment of the potential for geological storage of carbon dioxide in Ireland and Northern Ireland. Energy Procedia (1), 2655-2662

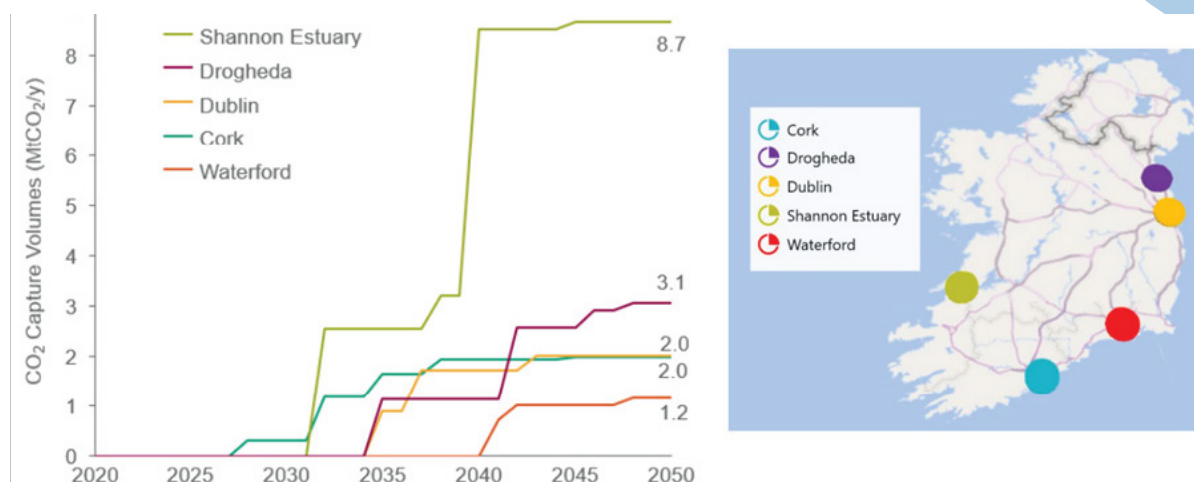


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1 Conor M. O'Sullivan et al. (2024): Subsurface storage capacity in structural traps in underexplored sedimentary basins: hydrogen (H₂) and carbon dioxide (CO₂) storage on the Irish Atlantic margin. Manuscript draft.

2 O'Sullivan, Conor (2024): From carbon to climate action: harnessing basalt for geological carbon dioxide (CO₂) storage onshore and offshore. 2024. Manuscript draft under review, publication expected in 2025.

3 Lewis, Deirdre et al (2009): Assessment of the potential for geological storage of carbon dioxide in Ireland and Northern Ireland. Energy Procedia (1), 2655-2662

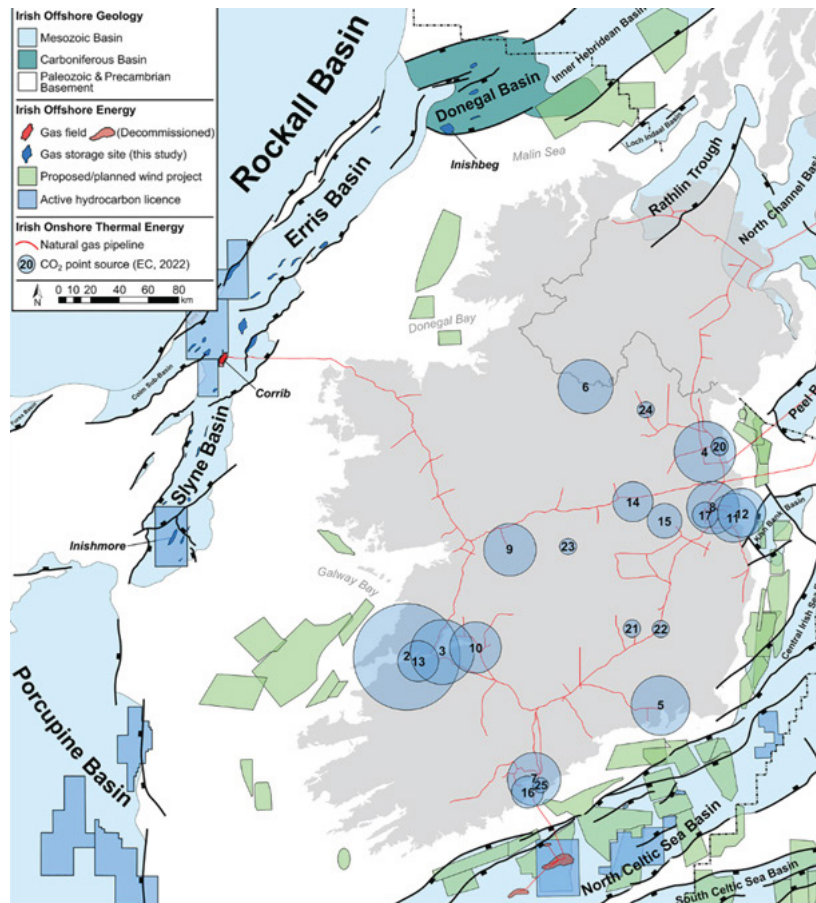


Figure 4: Overview map of energy infrastructure on- and offshore Ireland and size of CO₂ point-source emitters.
Source: O'Sullivan et al. (2024): Subsurface storage capacity in structural traps in underexplored sedimentary basins: hydrogen (H₂) and carbon dioxide (CO₂) storage on the Irish Atlantic margin. (page 25)

NATIONAL GOVERNMENT FUNDING

Ireland does not allocate specific funding for CCS projects as it currently stands. However, Ireland has established the Climate Action Fund (CAF), which is committed to disbursing at least €500 million by 2027 to support projects aimed at reducing greenhouse gas emissions and achieving national climate and energy targets. Although not explicitly mentioned, CCS initiatives may qualify for funding under the CAF if their potential to contribute to the reduction of greenhouse gas emissions is recognised.⁶

OTHER RELEVANT INITIATIVES

Ireland aims to lead the JPI Oceans European Joint Action to establish a knowledge hub on blue carbon⁷ policy-related research.

⁶ Department of the Environment, Climate and Communications (2022): Climate Action Fund Guidelines Applying to the Payment of Financial Support from the Climate Action Fund. <https://www.gov.ie/pdf/?file=https://assets.gov.ie/256419/57c82d93-7382-44fd-ad6e-d49885db2eec.pdf>

⁷ Blue carbon refers to carbon which is stored, or sequestered, in the ocean, its sediments, and vegetated habitats. Irish blue carbon systems include coastal systems, such as saltmarshes, seagrass and macroalgae, coastal and offshore sediments, and potentially cold-water corals. Source: Climate Action Plan 2024

According to Ireland's Climate Action Plan, the Marine Institute and the Environmental Protection Agency already co-funded two blue carbon research projects: BlueC, which adopts a comprehensive approach to exploring Ireland's blue carbon potential, and Quest, which focuses on quantifying and characterising carbon storage in marine sediments.

Additionally, Ireland is home to two notable private ventures active on Direct Air Capture (DAC). NEG8 Carbon announced plans to operate 25,000 DAC units by 2035, potentially capturing 10 Mt of CO₂ annually.⁸ Another company, Carbon Collect, is pioneering a passive DAC technology that leverages natural airflow to reduce costs, targeting a price of 200€ per ton of CO₂ by 2030.⁹

RECOMMENDATIONS

Ireland's final NECP has seen no notable improvements on CCS policy compared to its draft version. A comprehensive strategy is lacking and significant legal barriers remain. Bellona encourages the Irish government to:

1 ADJUST LEGAL FRAMEWORK TO PERMIT CO₂ STORAGE

Ireland must revise its existing legal restrictions on CO₂ storage. Removing this ban is necessary to establish the legal basis for deploying CCS.

deployment to build expertise and accelerate decarbonisation efforts. Ireland should further ratify the London Protocol amendment or enter other forms of international agreements to enable cross-border CO₂ transport.

2 DEVELOP AN IMPLEMENTATION PLAN FOR CCS DEPLOYMENT

In collaboration with industry, academia, and civil society as part of the work of the planned Working Group, build upon the wealth of existing research and data to establish a comprehensive implementation plan or strategy for CCS in Ireland with few to no other abatement options. A medium to long-term, comprehensive plan will send a strong signal to stakeholders driving private investments and encouraging and facilitating the engagement of civil society and academia in the debate around CCS development and deployment.

4 PRIORITISE PUBLIC FUNDING FOR HIGH-CLIMATE-VALUE CCS APPLICATIONS

with no or fewer scalable alternatives and where CCS would come with a higher mitigation potential and therefore the highest climate value.¹⁰ Targeted policy instruments need to be developed to incentivise CCS deployment, specifically addressing cross-chain risks inherent to CO₂ transport and storage and offer sufficient derisking potential to drive private investment.

3 STRENGTHEN REGIONAL COOPERATION

Enhance cooperation with neighbouring countries, particularly the UK and Norway, that are making significant strides in CCS

5 PRIORITISE CCS DEPLOYMENT IN HARD-TO-ABATE INDUSTRIES

Ireland should shift the emphasis in its CCS discussion away from fossil gas power generation and instead prioritise sectors with limited decarbonisation alternatives, particularly cement and lime production. Targeting these industries could deliver significant emission reductions where

⁸ NEG8 Carbon. <https://neg8carbon.com/>

⁹ Carbon Collect. <https://carboncollect.com/>

¹⁰ Bellona Europa & E3G, 2023, Carbon Capture and Storage Ladder: Assessing the climate value of CCS applications in Europe, https://network.bellona.org/content/uploads/sites/3/2023/07/CCSL_briefing.pdf

other technological options like direct electrification are limited or currently unavailable.

6 ENSURE THE ENVIRONMENTAL INTEGRITY AND CLIMATE BENEFITS OF BECCS/ BIO-CCS

As the SEAI study foresees a potentially high share of BECCS deployment, Ireland should develop and adhere to robust accounting rules, certification standards, liability frameworks, and sustainability requirements for BECCS/ Bio-CCS to guarantee its environmental integrity and net climate benefits. This includes comprehensive Monitoring, Reporting, and Verification (MRV) systems that account for all greenhouse gas emissions— both direct and indirect— across the entire value chain, domestically and internationally where applicable. These systems should employ conservative estimation methods and ensure that biomass sourcing prioritises sustainability, minimises lifecycle emissions, and achieves a net-negative balance.

ITALY



Criteria	Performance	Score
Implementation plan	Does not yet have a concrete implementation plan for CCS, however a series of enabling regulatory measures have been put in place and are continuously developed. The Ravenna CCS project is set to unlock CO ₂ storage in the Mediterranean region.	●
CO₂ capture	13,1Mt of CO ₂ per annum from process emissions in sectors designated by the Italian government as hard-to-abate will need to be captured and reduced with CCS.	●
CO₂ storage	Italy has an estimated min. CO ₂ storage potential of ~5 Bn tonnes in saline aquifers, as well as ~750Mt in depleted oil and gas fields. 4Mt of CO ₂ injection capacity is projected to be developed by 2030, with increased projections by 2035 and 2040-2050.	●
CO₂ transport	Identifies shipping and onshore pipelines to be the two main modes of transport to connect captured CO ₂ with offshore storage in the Mediterranean. By 2030, the planned infrastructure is expected to transport approx. 4 Mt of captured CO ₂ per year from hard-to-abate industries located in the Po Valley, as well as major industrial hubs located near ports.	●
National government funding	CCUS is also eligible for up to EUR 5 million in funding under Project Scope 2 of the ARERA pilot project scheme, which supports "innovative uses of existing gas infrastructure". Italy is also currently designing a range of support mechanisms to enable the commercial deployment of CCS, including contracts for difference (CfDs).	●
Other relevant initiatives	Is updating the regulatory framework to speed up permitting processes and define technical rules for CO ₂ transport and storage.	

CCS IMPLEMENTATION PLAN

As outlined in its NECP, Italy has identified Carbon Capture and Storage (CCS) as a key tool to reducing emissions, particularly in harder-to-abate sectors like chemicals, cement, and steel, and also to produce blue hydrogen, not ruling out the use of the technology in the power sector either. It also mentions its significance for negative emissions on the long-term.

To support this, specific targets for CO₂ capture and storage are defined based on the geological characteristics of storage sites expected to become operational by 2030. Additionally, a comprehensive dedicated regulatory framework is under development to create favourable conditions for the deployment of CO₂ capture, transport, and storage projects.

Starting with a comprehensive regulatory framework for CO₂ storage, Italy transposed the EU CO₂ Storage Directive into national law, enabling safe geological storage of CO₂. This was further reinforced in 2020, introducing simplification measures, and in 2021, by recognising Carbon Capture Utilisation and Storage (CCUS) as a strategic activity of public interest, aligning it with national climate and recovery goals.

Most recently, a Law was passed in 2024 to expand and clarify the permitting process for experimental and non-experimental storage projects, particularly in offshore depleted oil and gas fields deemed suitable by law. It exempted certain projects from competitive bidding, defined criteria for evaluating permit applications, established rules on financial collateral based on operator capacity, and reduced administrative burdens. Additionally, it classified CO₂ storage and transport infrastructure as works of public utility, streamlining procedures and reinforcing the strategic role of CCS in Italy's decarbonisation pathway.

Italy is currently developing its CCS policy framework to support the deployment of CCS and CCU. The Ministry of the Environment and Energy Security (MASE) has launched a preparatory study that will provide strategic guidance for completing the regulatory and business model framework. This includes reviewing existing legislation, establishing technical and economic regulation schemes for CO₂ transport and storage, and defining rules for network design, construction, and operation. The study will also inform future Ministerial Decrees, one of which will regulate third-party access to transport and storage networks, ensuring transparency, non-discrimination, and appropriate tariff regulation based on efficiency and unbundling principles. CCS infrastructure will be treated as regulated utilities, with investment decisions based on cost-benefit analyses and national climate goals. To facilitate early-stage deployment, Italy also plans to introduce "last resort" guarantee instruments to mitigate demand-supply mismatch risks. A dedicated working group is simultaneously developing a detailed Technical Regulation to govern CO₂ transport networks, addressing safety, design, materials, maintenance, and possible repurposing of existing gas infrastructure.

CO₂ CAPTURE

Italy's decarbonisation strategy (Italian Lungo Strategy for the Reduction of Greenhouse Gas Emissions) estimates that 20-40 MtCO₂ could be tackled by 2050 with the application of CCS eliminating both process and combustion emissions. The Italian government provides the following breakdown of the need for carbon capture in what they consider hard-to-abate industrial sectors (incl. steel, cement, chemicals, ceramics, refineries, glass, etc.).

Sector	Combustion	Process	Total
Cement & non-metallic minerals	11,4	10,2	21,6
Refining & petrochemical	19	0,8	19,9
Steel and other metals	13,9	1,6	15,5
Chemicals & fertilisers	10,1	0,5	10,6
Total	54,4	13,1	67,5

Table 1: CO₂ emissions from Italian hard-to-abate sectors in 2022

Source: Italian NECP, https://commission.europa.eu/publications/italy-final-updated-necp-2021-2030-submitted-2024_enommission (p. 84)

According to these estimates, 13,1Mt of CO₂ per annum from process emissions in sectors designated by the Italian government as hard-to-abate will need to be addressed through CCS.

This list does not include waste incineration and waste-to-energy plants, which could arguably be also classified as hard-to-abate sources. The waste treatment sector in Italy as a whole emits an additional 7,5 Mt of CO₂ annually, including emissions of biogenic origin which through BECCS could result in negative emissions. CCS is also being considered as a tool to reduce emissions from this sector.

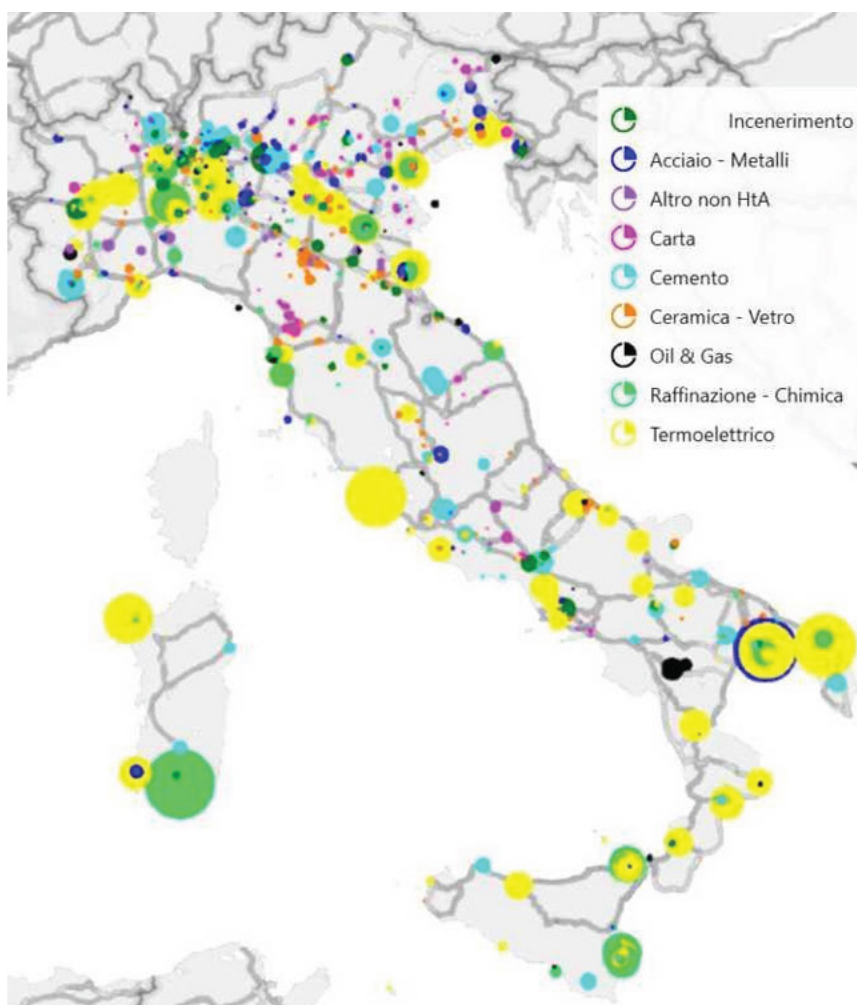


Figure 1: CO₂ emissions map

Source: Italian NECP, https://commission.europa.eu/publications/italy-final-updated-necp-2021-2030-submitted-2024_enommission (p. 85)



Eni and Snam, two major Italian energy companies, through a so-called “market readiness survey” collecting non-binding expressions of interest from emitters, identified that there is interest among Italian emitters to capture approximately 30 Mt of CO₂ per annum by around 2030 for permanent storage. This sends a strong market signal indicating a strong demand for future CO₂ storage services to support the decarbonisation of key industrial sectors.

CO₂ TRANSPORT

Shipping is identified as one of the most important modes of CO₂ transport in Italy, particularly for transporting captured CO₂ from coastal regions and islands. Shipping offers flexible access to offshore CO₂ storage sites. Three coastal industrial hubs have been identified as having close proximity to port infrastructure, which would allow captured CO₂ to be shipped directly to offshore storage facilities.

Meanwhile, emitters in the Po Valley of Northern Italy, an inland industrial region, will rely on an onshore CO₂ pipeline network to transport CO₂ to Ravenna. A modular development of this network is planned, starting with a connection between Ravenna and Ferrara. Future expansions are expected to follow two main corridors: one extending northeast from Ravenna, and another stretching westward from the Po Valley.

By 2030, based on current projections of injection capacity at the Ravenna storage site, the planned infrastructure is expected to transport approximately 4 Mt of captured CO₂ per annum. This volume would come from emitters in hard-to-abate industrial sectors, waste incineration, and gas-fired power generation located in the Po Valley, as well as major industrial hubs located near ports. According to the NECP, the development of these routes, including their timeline, configuration, and capacities, will be adjusted in response to regulatory developments and market demand.

In collaboration with France and Greece, Italy has developed a regional plan to support CCS infrastructure development in the Mediterranean Sea basin within the scope of the TEN-E Regulation, collaborating on the optimisation of liquefaction, transport, and storage processes. This so called “Mediterranean CCS Plan” provides a framework for discussions and cooperation among the three countries, but does not impose any legal, regulatory or political constraints, nor does it replace national CCS policies and strategies.

CO₂ STORAGE

Italy indicates the availability of large storage capacities for CO₂ on its territory, allowing for substantial volumes of captured CO₂ to be permanently stored. Studies conducted into the storage potential of Saline aquifers in Italian territory thus far suggest a minimum storage capacity of approximately 5 Bn tonnes. However, these assessments have not yet been verified by operators. To ensure accuracy and reliability, further dedicated studies, accompanied by an exploratory phase, are planned. This additional research aims to comprehensively assess the aquifer’s extent and characterise the storage site, enhancing the understanding and feasibility of large-scale CO₂ storage in Italy.

An analysis of storage potential has been initiated in Italy, focusing on depleted oil and gas fields specifically in Eni’s portfolio of mining rights. This analysis identified a storage potential of approximately 750 Mt across offshore and onshore depleted oil and gas sites, distributed as follows:

Storage type	Hub/ Location	Estimated total capacity (Mt)	
Offshore	Ravenna Hub	515	Considered the main known hub for geological CO ₂ storage in the Mediterranean region. Comprised of several depleted gas fields intended for CO ₂ storage.
Offshore	Jonio Hub	130	Geological CO ₂ storage site with potential availability from 2040 onward. More complex geology and tied to future market developments.
Onshore	Ravenna Area	69	Onshore sites currently under analysis. Identified as the most relevant and feasible locations for early implementation of geological CO ₂ storage.
Onshore	Sicily	35	

Table 2: Estimated total CO₂ storage capacities of Italian depleted oil and gas fields.

Italy's first CO₂ storage project, Ravenna CCS, located off the coast of Northern Italy is currently developing CO₂ storage. In terms of the timeline of injection capacity development, the project is expected to produce the following capacities:

Year	Phase	Injection capacity
2030	Target capacity for Phase 2	4 MtCO ₂ pa
~2035	Planned expansion phase	12 MtCO ₂ pa
2040–2050	Full development	~16 MtCO ₂ pa

Table 3: Timeline of injection capacity development of the Ravenna CCS project.

According to the NECP, these projections may be revised upward in 2030.

However, recent developments, occurring nearly a year after the publication of the Italian NECP, could prompt an earlier revision of the planned injection capacity trajectory. As of 23 May, under the Net Zero Industry Act (NZIA), oil and gas producers registered in Italy are required to develop CO₂ injection capacity amounting to 6,95 MtCO₂ per annum. This capacity can be established anywhere within EU territory; Italian obligated entities are not confined to domestic projects. However, Italy's significant geological storage potential and the active engagement and support of the Italian government may give reason for an earlier revision of the 4Mt projection upwards to meet this obligation by 2030.

Neighbouring countries expressed interest towards storing their captured CO₂ on Italian territory as well. These expressions of interest forecast a potential collaboration with foreign emitters, mainly France, amounting to more than 1Mtpa of CO₂. Italy also intends to ship domestically captured CO₂ volumes to Greece. Italy is part of three cross-border CCS projects: Callisto Mediterranean CO₂ Network, Augusta C2, and Prinos CO₂ storage project.

NATIONAL GOVERNMENT FUNDING

Italy is designing a range of support mechanisms to enable the commercial deployment of CCS. These include dedicated schemes to assist emitters with the costs of CO₂ capture, taking into account both CAPEX and OPEX, as well as associated transport and storage costs. Specifically, Italy is considering providing support in the form of contracts for difference (CfDs). Access to these mechanisms will be governed by clear eligibility criteria, considering the availability of alternative decarbonisation options and the economic viability of specific CCS configurations.

CCS and CCU are also eligible for funding under Project Scope 2 of the ARERA (Regulatory Authority for Energy Networks and Environment) pilot project scheme, which supports innovative uses of existing gas infrastructure, including sector coupling and the integration of renewable gases. Under this scope, CCS-related projects can receive a maximum eligible contribution of EUR 5 million, provided they align with the objectives of energy transition and decarbonisation.

Public funding, such as the Fund for Sustainable Growth (FCS), is available for industrial research and development. While this fund holds potential for supporting CCS development and deployment, it does not explicitly state such intentions. Italy is mostly planning to rely on EU funds to support CCS, namely Horizon Europe, the Innovation Fund, and the Connecting Europe Facility.

RECOMMENDATIONS

Italy has made notable strides in its NECP in outlining the role that CCS will play in achieving its climate targets. The country is actively developing a comprehensive regulatory framework that spans the entire CCS value chain, from capture to storage. It has identified capture and transport needs and projected CO₂ injection capacity, while also advancing efforts to explore and verify the potential of its extensive saline aquifer formations for permanent storage. On the support side, Italy has allocated dedicated funding for CCS, specifically for the repurposing of existing gas infrastructure for CO₂ transport, and is considering CfDs to help drive market deployment. These coordinated efforts position Italy as one of the leading EU Member States in enabling the deployment of CCS at scale. However, in the lack of a comprehensive national-level CCS implementation plan, Bellona Europa encourages Italy to:

1

DEVELOP AN IMPLEMENTATION PLAN FOR CCS DEPLOYMENT

In collaboration with industry, academia, and civil, building upon existing research and data to establish a comprehensive implementation plan or strategy for CCS deployment in Italy, primarily for industries with few to no other abatement options. A medium to long-term, comprehensive plan will send a strong signal to stakeholders, driving private investments and encouraging and facilitating the engagement of civil society and academia in the debate around CCS development and deployment in Italy.

2

PRIORITISE PUBLIC FUNDING FOR HIGH-CLIMATE-VALUE CCS APPLICATIONS

With no or fewer scalable alternatives and where CCS would come with a higher mitigation potential and therefore the highest climate value.¹

¹ Bellona Europa & E3G, 2023, Carbon Capture and Storage Ladder: Assessing the climate value of CCS applications in Europe, https://network.bellona.org/content/uploads/sites/3/2023/07/CCSL_briefing.pdf



3

ENSURE ROBUST ASSESSMENT OF CCU

Ensure that CCU products are assessed based on their full lifecycle emissions to ensure clear climate benefit.

4

ENSURE THE ENVIRONMENTAL INTEGRITY AND CLIMATE BENEFITS OF BECCS/ BIOCCS

Develop and adhere to robust accounting rules, certification standards, liability frameworks, and sustainability requirements for BECCS/Bio-CCS to guarantee its environmental integrity and net climate benefits. This includes comprehensive Monitoring, Reporting, and Verification (MRV) systems that account for all greenhouse gas emissions—both direct and indirect—across the entire value chain, domestically and internationally where applicable. These systems should employ conservative estimation methods and ensure that biomass sourcing prioritises sustainability, minimises lifecycle emissions, and achieves a net-negative balance. Bellona [recommends](#) the separation of CDR targets into emissions reductions, land-based sequestration and permanent carbon removals, to enhance clarity on climate goals. This would ensure anthropogenic biogenic based removals are not deterring emission reductions.

LATVIA



Criteria	Performance	Score
Implementation plan	Does not have a concrete implementation plan for CCS, however CCS is recognised as a necessary solution to tackle process emissions for the largest heat and electricity generation installations as well as for largest industrial production operators.	●
CO2 capture	Refers to CO ₂ capture necessity for the largest heat and electricity generation installations as well as for largest industrial production operators.	●
CO2 storage	Does not report on geological CO ₂ storage capacity.	●
CO2 transport	Does not report on planned CO ₂ transport infrastructure.	●
National government funding	Does not foresee national funding specifically earmarked for CO ₂ capture, transport or storage. It mainly refers to the Innovation Fund as a funding source for CO ₂ capture projects.	●

Other relevant initiatives

Private players are progressing with the first CO₂ capture project (Schwenk Latvia) and CO₂ transportation project (CCS Baltic Consortium).

CCS IMPLEMENTATION PLAN

Latvia's NECP sees a role for CCS in contributing to reducing greenhouse gas emissions (GHG) emissions in large industrial production as well as within its energy and heat generation sector. A decarbonisation obligation applies to heat and electricity generation installations with a total capacity of more than 100 MW (currently no more than 5 installations in Latvia) and largest industrial production operators which, due to the nature of their production, cannot reduce industrial process or energy emissions (currently 1-2 installations in Latvia). The Latvian NECP mentions carbon capture installations as one option for GHG emission reduction within those sectors and notes that technological feasibility and cost-efficiency must be considered, when aiming to reduce emissions from installations by up to 90 % compared to 2021 levels.

CO₂ CAPTURE

The Plan also states that any new natural gas combustion installations for district heating or industrial plants should only be permitted if combined with carbon capture technology or other low-carbon solutions.

CO₂ TRANSPORT & STORAGE

The Latvian NECP does not report on geological CO₂ storage capacity.

Nevertheless, in November 2024, cement producer Schwenk Latvia announced a 500-million-euro investment to decarbonise their operations through the deployment of CO₂ capture by 2030. This marks the first instance of an industrial company in Latvia applying CCS technology. During the announcement, the Minister for Climate and Energy Kaspars Melnis revealed that the ministry is preparing to initiate exploration of CO₂ storage potential in Latvia is considering regulatory changed to lift the current prohibition on CO₂ storage in the territory of Latvia. Schwenk Latvia is also a partner in the [Baltic CCS Consortium project](#), an EU Project of Common Interest. This project aims to transport captured CO₂ from Lithuania and Latvia to permanent storage sites, potentially in the North Sea.

NATIONAL GOVERNMENT FUNDING

No national government funding is allocated to CCS deployment in Latvia.

The Innovation Fund is mentioned as a potential funding source, along with other public or private funding, though no further details are provided.

RECOMMENDATIONS

Latvia's final NECP demonstrates a slight improvement towards addressing the need for CCS deployment, compared to its initial draft. As major gaps remain in regulation, planning and implementation, Bellona encourages the Latvian government to:

1

SET UP A NATIONAL AND REGIONAL WORKING GROUP TO DEVELOP AN IMPLEMENTATION PLAN FOR CCS DEPLOYMENT

This working group should facilitate development of industrial transformation plans, aligning infrastructure development actions, processes and a funding strategy to reach climate targets in close consultation with municipalities, private sector and civil society stakeholders. The working group should survey CCS needs for the largest emitters taking into account existing and planned short, medium, and long-term investments in production assets. Different modes of transport (pipelines, ships, trains, trucks) should be considered and the planning of infrastructure should allow for potential expansion to connect to other industrial clusters further inland and in neighbouring countries. Government should ensure transparent regulation of the infrastructure to ensure open access, prevent monopolies, and enable its potential future use for purposes such as CDR solutions to achieve negative emissions.

2

DEVELOP A LEGAL FRAMEWORK

Develop national plan with conditions under which responsible ministry would propose amendments to current regulations, lifting ban for industrial geological CO₂ storage in respective territories. Ratify the London Protocol and consider international and/or bilateral agreements for the transport of CO₂ across borders. Advocate for relevant amendments in the Helsinki Convention to enable safe and permanent CO₂ storage in the geological sub-seabed structures of the Baltic Sea. Develop transparent and effective liability regulations for leakage risks for CO₂ transport and long-term storage facilities.

3

PROVIDE THE NECESSARY FUNDING FRAMEWORK

Provide support for further appraisal of geological CO₂ storage opportunities in Lithuania and the Baltic Sea. Provide CCS support programs for hard-to-abate industries to reduce CO₂ emission to the atmosphere. Prioritise public funding for high-climate-value CCS applications with no or fewer scalable alternatives and where CCS would come with higher mitigation potential and therefore the highest climate value. Ensure funding mechanism at the local, national, and regional level to address development of national and cross-border CCS hubs and clusters in the BSR, CO₂ infrastructure needs, with public and private funding and/or co-financing. Define industrial sectors eligible for funding and ensure that CCS solutions are used where other forms of emission reductions (such as electrification) is not technically possible or realistic, and CCS does not hinder the phaseout of fossil fuels.



4

ENSURE ROBUST ASSESSMENT OF CCU

Ensure that CCU products are assessed based on their full lifecycle emissions to ensure clear climate benefits.

5

ENGAGE WITH EXISTING CCS PROJECTS

Build on the momentum of ongoing CCS projects and incorporate insights from current research institutions and stakeholders into a national implementation plan for CCS. One example would be newly launched [GreenHorizon CEE Project: Industrial Carbon Management for a Sustainable Future in CEE](#) with particular emphasis on Latvia.

6

ENSURE THE ENVIRONMENTAL INTEGRITY AND CLIMATE BENEFITS OF BECCS/ BIOCCS

Develop and adhere to robust accounting rules, certification standards, liability frameworks, and sustainability requirements for BECCS/Bio-CCS to guarantee its environmental integrity and net climate benefits. This includes comprehensive Monitoring, Reporting, and Verification systems that account for all greenhouse gas emissions—both direct and indirect—across the entire value chain, domestically and internationally where applicable. These systems should employ conservative estimation methods and ensure that biomass sourcing prioritises sustainability, minimises lifecycle emissions, and achieves a net-negative balance. Bellona recommends the separation of CDR targets into emissions reductions, land-based sequestration and permanent carbon removals, to enhance clarity on climate goals. This would ensure anthropogenic biogenic based removals are not deterring emission reductions.

LITHUANIA



Criteria	Performance	Score
Implementation plan	Reports on plans to deploy CCS technologies, however a concrete implementation plan with activities to support that is still lacking.	●
CO2 capture	Prioritises carbon capture for biogenic emissions and process emissions from hard-to-abate industries, reports on volumes of fossil and biogenic CO ₂ that needs to be tackled through technological abatement, but does not report on process emissions to be abated.	●
CO2 storage	Does not report on geological CO ₂ storage capacity.	●
CO2 transport	Reports on plan to establish open-access CO ₂ transport infrastructure, focusing on hard-to-decarbonise industries but does not provide further specification or details.	●
National government funding	Reports on plan to establishing support mechanisms for carbon capture, transport and utilisation but does not provide further specification or details.	●
Other relevant initiatives	Private players are progressing with the first CO ₂ capture project (Akmenes Cementas) and CO ₂ transportation project led by KN Energies via CCS Baltic Consortium project that has received status of EU Project of Common Interest.	

CCS IMPLEMENTATION PLAN & CO₂ CAPTURE

Lithuania's NECP highlights the potential to develop CO₂ capture facilities at plants where specific production process makes it impossible to meet climate neutrality objectives through other means. This includes the largest biofuel and waste incineration facilities, as well as regions with concentrated biogenic CO₂ sources, provided it is financially viable. The Plan emphasises a preference for prioritising biogenic carbon capture when deploying carbon capture technologies in Lithuania. However, it lacks concrete actions or assigned budgets for developing CO₂ capture facilities and transport infrastructure. Carbon Capture and Storage (CCS) is presented as a long-term consideration rather than one of the priorities for decarbonising hard-to-abate industries.

Table 1: Potential for carbon capture in Lithuania, million tonnes / year

	2030	2040	2050 *
<i>Fossil CO₂ capture forecast Source CO₂: companies with the highest share of emissions in the Lithuanian ETS</i>	0	2,4	1,0
<i>Biogenic CO₂ capture forecast Source CO₂: biomethane production, waste incineration, biofuel production and / or use</i>	0,2	3,5	2,4-3,5

**In 2050, biogenic capture potential may decrease if heat networks are electrified and /or heat producers decide to electrify.*

CO₂ TRANSPORT

One of the planned policy measures is to establish an open-access CO₂ transport infrastructure to enable the decarbonisation of hard-to-abate industries. It is envisioned that the CO₂ transport infrastructure will be dedicated to both the export of fossil CO₂ for the purpose of permanent geological storage and the import of biogenic CO₂ that will be used by local actors as feedstock (e.g. for the production of synthetic fuels).

While Lithuania has not explicitly detailed plans on CO₂ transport infrastructure at the national level, the country is actively collaborating with Poland in the framework of the ECO₂CEE project, an EU Project of Common Interest. This project aims to establish a cross-border CO₂ transport infrastructure with operations targeted to begin in 2027.

In parallel, private sector efforts are progressing through the CCS Baltic Consortium, another Project of Common Interest. Akmenes Cementas is focusing on CO₂ capture, while KN Energies leads the CO₂ transportation component, collectively working to implement Lithuania's first integrated CCS project.

CO₂ STORAGE

The Plan does not report on geological CO₂ storage capacity or exploration of storage potential.

NATIONAL GOVERNMENT FUNDING

The Plan states that support mechanisms are planned for carbon capture, transport and carbon utilisation (CCU) in the production of synthetic green fuels, without providing further specification or details for carbon capture and transportation.

The Innovation Fund and Clean Energy Transition Partnership (CETP) are mentioned as potential funding sources, along with other public or private funding, though no further details are provided.

OTHER RELEVANT INITIATIVES

Other ongoing efforts include a feasibility study to assess the potential for implementing CO₂ capture and storage in Lithuania. The study examines the existing national legislative framework to identify necessary reforms and assess infrastructure upgrades required to support CCS deployment.

RECOMMENDATIONS

Lithuania's final NECP demonstrates increased commitment on CCS, compared to its initial draft. As certain gaps remain in regulation, planning and implementation, Bellona encourages the Lithuanian government to:

1

SET UP A NATIONAL AND REGIONAL WORKING GROUP TO DEVELOP AN IMPLEMENTATION PLAN FOR CCS DEPLOYMENT

This working group should facilitate development of industrial transformation plans, aligning infrastructure development actions, processes and a funding strategy to reach climate targets in close consultation with municipalities, private sector and civil society stakeholders. The working group should survey CCS needs for the largest emitters taking into account existing and planned short, medium, and long-term investments in production assets. Different modes of transport (pipelines, ships, trains, trucks) should be considered and the planning of infrastructure should allow for potential expansion to connect to other industrial clusters further inland and in neighbouring countries. Government should ensure transparent regulation of the infrastructure to ensure open access, prevent monopolies, and enable its potential future use for purposes such as CDR solutions to achieve negative emissions.

2

DEVELOP A LEGAL FRAMEWORK

Develop national plan with conditions under which responsible ministry would propose amendments to current regulations, lifting ban for industrial geological CO₂ storage in respective territories. Ratify the London Protocol and consider international and/or bilateral agreements for the transport of CO₂ across borders. Advocate for relevant amendments in the Helsinki Convention to enable safe and permanent CO₂ storage in the geological sub-seabed structures of the Baltic Sea. Develop transparent and effective liability regulations for leakage risks for CO₂ transport and long-term storage facilities.

**3**

PROVIDE THE NECESSARY FUNDING FRAMEWORK

Provide support for further appraisal of geological CO₂ storage opportunities in Lithuania and the Baltic Sea. Provide CCS support programs for hard-to-abate industries to reduce CO₂ emission to the atmosphere. Prioritise public funding for high-climate-value CCS applications with no or fewer scalable alternatives and where CCS would come with higher mitigation potential and therefore the highest climate value. Ensure funding mechanism at the local, national, and regional level to address development of national and cross-border CCS hubs and clusters in the BSR, CO₂ infrastructure needs, with public and private funding and/or co-financing. Define industrial sectors eligible for funding and ensure that CCS solutions are used where other forms of emission reductions (such as electrification) is not technically possible or realistic, and CCS does not hinder the phaseout of fossil fuels.

4

ENSURE ROBUST ASSESSMENT OF CCU

Ensure that CCU products are assessed based on their full lifecycle emissions to ensure clear climate benefits.

5

ENGAGE WITH EXISTING CCS PROJECTS

Build on the momentum of ongoing CCS projects and incorporate insights from current research institutions and stakeholders into a national implementation plan for CCS.

6

ENSURE THE ENVIRONMENTAL INTEGRITY AND CLIMATE BENEFITS OF BECCS/BIO-CCS:

Develop and adhere to robust accounting rules, certification standards, liability frameworks, and sustainability requirements for BECCS/Bio-CCS to guarantee its environmental integrity and net climate benefits. This includes comprehensive Monitoring, Reporting, and Verification systems that account for all greenhouse gas emissions—both direct and indirect—across the entire value chain, domestically and internationally where applicable. These systems should employ conservative estimation methods and ensure that biomass sourcing prioritises sustainability, minimises lifecycle emissions, and achieves a net-negative balance. Bellona recommends the separation of CDR targets into emissions reductions, land-based sequestration and permanent carbon removals, to enhance clarity on climate goals. This would ensure anthropogenic biogenic based removals are not deterring emission reductions.

LUXEMBOURG



Criteria	Performance	Score
Implementation plan	Policy measure 523 "Framework for Action for the Deployment of Carbon Capture, Utilisation and Storage Technologies" plans to support CCUS deployment but lacks figures or a timeline.	●
CO2 capture	Does not report on the volume of process emissions to be captured.	●
CO2 storage	Does not report on geological CO ₂ storage capacity.	●
CO2 transport	Does not report on planned CO ₂ transport infrastructure, but does claim to plan its development "if necessary" and in collaboration with regional and European stakeholders.	●
National government funding	Plans to introduce two dedicated state aid schemes for industrial decarbonisation, including for CCUS.	●

Does not mention any other measures to support the deployment of CCS.

CCS IMPLEMENTATION PLAN

In its NECP, Luxembourg recognises the importance of CO₂ capture for the decarbonisation of hard-to-abate industries, in particular where electrification or the use of hydrogen is technically or economically unfeasible. CCUS is specifically considered as a solution to tackle industrial process emissions.

Luxembourg therefore plans to support CCUS projects through dedicated policy measures. The most important one of these is PAM 523 “Framework for Action for the Deployment of Carbon Capture, Utilisation and Storage Technologies”. Through this measure Luxembourg plans to assess the potential of CCUS technologies and support their deployment in industries like cement production. CO₂ transport infrastructure would be developed “if necessary” and in collaboration with regional and European stakeholders.

This measure unfortunately lacks any figures or timeline for implementation, making it difficult to assess how the government plans to essentially support CCS projects. Moreover, none of the planned policies make a distinction between CCU and CCS. This could be problematic as in most use cases of CCU the CO₂ is ultimately released into the atmosphere, contributing to further global warming. According to the EU Emissions Trading System (ETS) Directive, only a small number of CO₂ utilisation cases can be considered as leading to emission reductions. As a result, industries relying on CCU will still be required to surrender allowances under the EU ETS. Planning for CCU without ensuring it results in the permanent storage of CO₂, therefore, will not enable these industries to decarbonise and avoid carbon costs.

CO₂ CAPTURE

The NECP does not report on the volume of process emissions to be captured. While the draft NECP included a policy measure to quantify ‘unavoidable emissions from certain sectors’ providing an estimate of the volumes of CO₂ that would require technological abatement, this measure was removed from the final document.

In addition, PAM 523 estimates that the amount of CO₂ emissions captured by 2030 will not be significant and will be limited to small-scale pilot projects, but that a more significant amount may be captured after 2030.

NATIONAL GOVERNMENT FUNDING

Luxembourg has two dedicated measures for funding decarbonisation projects that include carbon capture. The first, PAM 516 “Aid scheme for undertakings – environmental and climate protection”, plans to revise the country’s state aid regulation to allow funding of decarbonisation projects, including CCUS. The aid could take the form of a capital grant, a repayable advance or an interest subsidy.

In the draft NECP, this policy measure also listed Carbon Contracts for Difference (CCfDs), which are used to guarantee investors a fixed price that rewards CO₂ emission reductions above the current

price levels in the EU ETS. The final document has removed mention of this tool.

The second measure, PAM 519 “Enterprise aid scheme – research, development and innovation”, is a funding scheme that supports the R&D side of decarbonisation projects like CCUS.

RECOMMENDATIONS

Luxembourg has improved upon its draft NECP by expanding the number of policy measures dedicated to carbon capture and by addressing CO₂ storage on top of utilisation. Importantly, the final NECP also plans to introduce national government funding for CCUS. However, the final document reverses some of the commitments outlined in the draft, namely the measure to quantify process emissions in given industries and the introduction of Carbon Contracts for Difference as a funding and de-risking tool for CCS projects. The NECP also lacks the distinction between storage and utilisation of CO₂, which is necessary to deliver net emission reductions. Bellona therefore recommends the following measures:

1 **DEVELOP A CCS IMPLEMENTATION PLAN**

In collaboration with industry, academia, and civil society, build upon existing research and data to establish a comprehensive strategy for deploying CCS to enable the full decarbonisation of its hard-to-abate industries. It must take a holistic approach to the entire CCS value chain clearly identifying CO₂ capture needs—primarily to address process emissions; mapping CO₂ transport infrastructure; assessing national CO₂ storage potential; and specifying how much of that storage can be made commercially available and by when. A medium to long-term, comprehensive plan will send a strong signal to stakeholders driving private investments and encouraging and facilitating the engagement of civil society and academia in the debate around CCS development and deployment.

2 **PRIORITISE PUBLIC FUNDING FOR HIGH-CLIMATE-VALUE CCS APPLICATIONS**

With no or fewer scalable alternatives and where CCS would come with a higher mitigation potential and therefore the highest climate value.¹

3 **ENSURE ROBUST ASSESSMENT OF CCU**

Ensure that CCU products are assessed based on their full lifecycle emissions to ensure clear climate benefit.

4 **STRENGTHEN REGIONAL COOPERATION**

Enhance cooperation with neighbouring countries, particularly the Netherlands, Belgium and France, that are making significant strides in CCS deployment to build expertise and accelerate decarbonisation efforts. This is particularly important given the lack of CO₂ storage options

¹ Bellona Europa & E3G, 2023, Carbon Capture and Storage Ladder: Assessing the climate value of CCS applications in Europe, https://network.bellona.org/content/uploads/sites/3/2023/07/CCSL_briefing.pdf

² CATF_European-CO2-Storage-Report_July-23.pdf



MALTA



Criteria	Performance	Score
Implementation plan	Does not have a concrete implementation plan for CCS.	
CO ₂ capture	Does not report on the volume of process emissions to be captured.	
CO ₂ storage	Does not report on geological CO ₂ storage capacity.	
CO ₂ transport	Does not report on planned CO ₂ transport infrastructure.	
National government funding	Does not foresee national funding specifically earmarked for CO ₂ capture, transport or storage.	
Other relevant initiatives	Does not mention any other measures to support the deployment of CCS.	



Malta's final NECP only makes minimal reference to CCS. The country acknowledges the importance of CCS for Europe's path to net-zero by 2050, but it does not foresee the widespread adoption of these technologies on its territory.

Malta's main concern is the geographical constraints for CO₂ storage on its territory. A high-level study to evaluate the feasibility of offshore geological storage was carried out in 2021, which concluded that storage sites exist but would be uncertain and risky to operate, in part due to a lack of knowledge and experience with underground reservoirs. In addition, Malta considers the costs of de-risking CCS investments too high for its government to take on, preferring private or EU-level funding opportunities instead.

As a result, the NECP does not foresee any policies to support the deployment of CCS on Maltese territory and advocates for a flexible EU policy framework that does not obligate it develop CO₂ storage.

RECOMMENDATIONS

While the draft Maltese NECP made no reference to CCS, the final plan introduces the topic, albeit only in a very limited way. Malta does not consider CCS a key mitigation tool, which is understandable given its geographic constraints and small industrial base. As a result, CCS is unlikely to play a central role in the country's decarbonisation pathways. However, further exploration of CO₂ storage potential remains important. Therefore, Bellona recommends the Maltese government to:

1 STRENGTHEN REGIONAL COOPERATION

Enhance cooperation with neighbouring Mediterranean countries, particularly Italy and Greece, that are making strides in CCS deployment to build expertise and foster joint progress on CO₂ storage development.

THE NETHERLANDS



Criteria	Performance	Score
Implementation plan	Does not have a concrete implementation plan for CCS.	●
CO2 capture	Estimates that approximately 9,87 Mt per year of industrial CO ₂ emissions will be tackled with CCS.	●
CO2 storage	Reports estimate the theoretical geological CO ₂ storage capacity in the Netherlands to be around 1.6 Gt, though the portion that can be made operationally available for CO ₂ storage is yet to be determined. Based on publicly announced industry initiatives for CO ₂ storage in the North Sea, it is projected that by 2030, approx. 10–15 Mtpa of CO ₂ injection capacity could become available.	●
CO2 transport	Does not report on planned CO ₂ transport infrastructure, however several CO ₂ infrastructure projects are planned or are currently under development (e.g., PORTHOS, ARAMIS).	●
National government funding	Supports CCS deployment primarily through the SDE++ subsidy scheme, which provides grants to large-scale CO ₂ emission reduction projects. Additional incentive and support measures include the CO ₂ levy, tailored support for major emitters, and HER+.	●

Other relevant initiatives

- Introduced the National Industry Sustainability Programme to address bottlenecks, streamline permitting processes, and guide the implementation of related projects with the aim to accelerate industrial decarbonisation.

CCS IMPLEMENTATION PLAN

In its National Energy and Climate Plan (NECP), **the Netherlands designates a significant role for Carbon Capture and Storage (CCS) in reducing emissions, particularly in the chemistry, refining, ammonia production, and waste incineration sectors.** However, it does not have a concrete implementation plan or strategy for CCS deployment.

CCS is expected to contribute significantly to the identified industrial emission reduction need of 29,1 Mtpa of CO₂, tackling about a third of the needed reductions. While CCS will have its largest impact in decarbonising the industrial sector, its application for decarbonising the power sector (e.g., in relation to oil refining and blue hydrogen production) is also considered, although the NECP does not set specific targets for these uses.

The Netherlands has placed a strong emphasis on carbon removals as well, with recently announced policy targets aiming for up to 3,5 Mt of CO₂ removals in 2030. The government has committed, as part of the climate package presented in the spring of 2023, to achieving 1,5 Mt of negative emissions by 2030 through the capture and storage of biogenic CO₂ from waste incineration, bioenergy, and biofuel plants. **The development of a Negative Emissions Roadmap is also underway,** reflecting a long-term commitment to scaling up removals. However, they are expected to play a limited role until 2030 and must not undermine efforts to reduce emissions. Meanwhile, Carbon Capture and Utilisation (CCU) is also under consideration, with financing available for CCU pilot projects.

CO₂ CAPTURE

According to the NECP, CCS is expected to address approximately 9,87 Mt per year of industrial CO₂ emissions.

CO₂ TRANSPORT & STORAGE

The Dutch government takes a market-based approach to CCS deployment, incentivising market forces to adopt the most cost-effective decarbonisation pathways. **This approach allows market dynamics to determine the volumes of CO₂ that will be captured and stored.** Instead of setting specific targets for CO₂ storage or transport infrastructure development, the Netherlands establishes reduction targets for each sector in its Coalition Agreement, renewed at the beginning of each political term. For example, the manufacturing sector has a CO₂ reduction target of 20 Mt by 2030, which CCS is expected to help achieve under prevailing techno-economic conditions.

While **due to its laissez-faire approach the government does not have specific targets for CO₂ infrastructure or geological storage capacity development,** the NECP highlights two important ongoing CO₂ infrastructure projects: Porthos and Aramis. **The Porthos project is developing a CO₂ storage capacity of 2,5 Mtpa,** and it reached its final investment decision in October 2023, now being in the construction phase¹. **The Aramis project, with a planned final capacity of 22 Mtpa,** has advanced to the front-end engineering design (FEED) phase and is expected to take Final Investment Decision in 2025/26.²

1 [Project - Porthos](#)
2 [Project - Aramis](#)

Recently, in a joint statement to the European Commission, the Netherlands together with Denmark, Finland, Germany, France, and Sweden have called for a clear regulatory framework for cross-border CO₂ transport.³

The Netherlands has identified a theoretical CO₂ storage capacity of approximately 1,6 Gt on its continental shelf, though further assessments are required to determine commercially viable capacity. Based on current industry initiatives, **it is estimated that by 2030, 10–15 Mtpa of CO₂ injection capacity could become available**, depending on market interest and the pace of permitting procedures.

NATIONAL GOVERNMENT FUNDING

The Dutch government supports and incentivises CCS deployment in various ways, directly and indirectly, to drive industrial decarbonisation and meet its 2030 climate targets.

- **CO₂ levy and minimum price**

The Netherlands incentivises industrial decarbonisation, and by extent CCS deployment, through the national CO₂ levy, which complements the EU ETS. This tax ensures that industrial emitters contribute to emission reduction targets. With rising rates and decreasing tradable allowances, it incentivises investments in cleaner technologies while offering flexibility to prevent financial strain and avoid carbon leakage (the relocation of emissions abroad). Additionally, a CO₂ minimum price introduced in 2023 ensures a base cost for emissions, reinforcing the financial case for decarbonisation investments.

- **Risk-sharing through state-owned entities**

To provide more certainty for industry, the government supports CCS projects through state-owned stakeholders such as Energie Beheer Nederland (EBN) (50% owned by the Ministry of Economic Affairs and Climate) and Gasunie (fully state-owned). This approach leverages public ownership to reduce investment risks through risk-sharing, foster trust in the development of infrastructure, and ensure alignment with national climate objectives while encouraging private sector participation.

- **SDE++ subsidy scheme**

The Netherlands encourages CCS deployment primarily through the Stimulating Sustainable Energy Production and Climate Transition (SDE++) subsidy scheme, which supports large-scale renewable energy as well as CO₂ emission reduction projects. The SDE++ covers the financial gap between EU ETS prices and marginal emission reduction costs for CO₂ capture, transport, and storage projects.

Successful applicants may receive grants to cover the unprofitable portion of their projects, addressing the overall costs associated with CCS implementation. Recognising the significant CO₂ reduction potential of CCS for industry, the cap on CCS funding under the SDE++ scheme was removed in 2023. For 2024, an €11,5 billion budget has been allocated to deploy climate technologies, including CCS.

- **Tailored support for major emitters**

The Dutch NECP outlines a tailor-made approach to accelerate industrial decarbonisation by targeting the 15 largest emitters, responsible for two-thirds of industrial emissions. These companies must commit to ambitious CO₂ reductions beyond the CO₂ levy requirements, contributing to an additional 3,5 Mt of CO₂ reduction by 2030, alongside nitrogen reduction and environmental improvements. In return, the government provides tailored support, addressing financial and non-financial barriers, such as energy infrastructure and permitting processes. This initiative aims to accelerate decarbonisation efforts, retain jobs, and secure continued investment in the Netherlands.

- **HER+ subsidy scheme**

The HER+ scheme supports projects with the potential to deliver emissions reductions by 2030. While primarily aimed at renewable energy projects, it also funds innovative CCS projects that align with the country's climate goals.

OTHER RELEVANT INITIATIVES

The Netherlands introduced the National Industry Sustainability Programme (NPVI) in March 2023 to provide a platform for collaboration among departments, local and regional authorities, network operators, clusters, and industry representatives. The initiative aims to address bottlenecks, streamline permitting processes, and guide the implementation of related projects with the aim to accelerate industrial decarbonisation.

The Netherlands closely coordinated with several countries and outside of the EU on cross-border matters related to CCS. Dutch stakeholders are involved in several PCI and PMI projects⁴, such as EU2Northsea, Delta Rhine Corridor, and Northern Lights, all focusing on CO₂ cross-border infrastructure deployment.

RECOMMENDATIONS

While lacking a comprehensive strategy, the Netherlands is emerging as an EU frontrunner in CCS deployment, adopting a market-based approach that has enabled the development of important first-mover CCS projects in the EU. This positions the country as a key player in the development of CO₂ transport and storage infrastructure, not only to meet its own decarbonisation goals but also to support the emission reduction efforts of neighbouring countries, including industry-heavy Germany. The Netherlands is laying the groundwork for a broader European CO₂ market, reinforcing its role in regional climate action. Against this backdrop, Bellona encourages the Dutch government to:

1

DEVELOP AN IMPLEMENTATION PLAN FOR CCS DEPLOYMENT

In collaboration with industry, academia, and civil society, build upon existing and planned policy measures, research and data to establish a comprehensive implementation plan or strategy for CCS in the Netherlands. A medium to long-term, comprehensive plan will send a strong signal to stakeholders incentivising private investments and encouraging and facilitating the engagement of civil society and academia in the debate around CCS development and deployment.

3

ENSURE ROBUST ASSESSMENT OF CCU

Ensure sufficient coordination between emitters and transport network operators to optimise CO₂ infrastructure, also recognising Germany's role as a CO₂ transit hub. Allocate adequate financial and coordination resources to develop CO₂ transport networks and storage sites, ensuring they are operational by 2030.

2

PRIORITISE PUBLIC FUNDING FOR HIGH-CLIMATE-VALUE CCS APPLICATIONS

With no or fewer scalable alternatives and where CCS would come with a higher mitigation potential and therefor the highest climate value alignment with net-zero objectives as well as nature protection goals.

4

ENSURE THE ENVIRONMENTAL INTEGRITY AND CLIMATE BENEFITS OF BECCS/BIO-CCS

Develop and adhere to robust accounting rules, certification standards, liability frameworks, and sustainability requirements for BECCS/Bio-CCS to guarantee its environmental integrity and net climate benefits. This includes comprehensive Monitoring, Reporting, and Verification (MRV) systems that account for all greenhouse gas emissions—both direct and indirect—across the entire value chain, domestically and internationally where applicable. These systems should employ conservative estimation methods and ensure that biomass sourcing prioritises sustainability, minimises lifecycle emissions, and achieves a net-negative balance. Bellona [recommends](#) the separation of CDR targets into emissions reductions, land-based sequestration and permanent carbon removals, to enhance clarity on climate goals. This would ensure anthropogenic biogenic based removals are not deterring emission reductions.



POLAND



Criteria	Performance	Score
Implementation plan	Poland recognises the role of CCS in industrial decarbonisation, particularly for hard-to-abate sectors, but does not provide a comprehensive CCS implementation plan.	
CO₂ capture	Does not report on process emissions to be captured and stored, however it reports separately on process and non-process emissions.	
CO₂ storage	Does not report on CO ₂ storage capacity to be made available annually but sets out regulatory and policy measures to facilitate the development of new storage capacity, including a network of onshore storage sites.	
CO₂ transport	Does not report on planned annual CO ₂ transport infrastructure development but sets out specific measures aimed at supporting its future development.	
National government funding	Plans to create a "financial support instrument" for CCUS deployment as part of Action 59.	
Other relevant initiatives	Does not mention any additional measures to support the deployment of CCS.	

CCS IMPLEMENTATION PLAN

Poland's NECP recognises the role that CCUS can play in decarbonising a broad range of activities alongside measures like fostering renewable energy uptake and efficiency improvements. The Plan outlines specific policies to support CCUS applications in industry, particularly in hard-to-abate sectors like cement, which will be prioritised. Although they are not explored as extensively in the NECP, consideration is also given to policies supporting the development of CCUS in steel and chemicals production as well as fossil power generation, biomass, waste and hydrogen production.

While Poland does not yet have a CCS implementation plan, the NECP cites measures to be adopted in the near future. The core of these measures is the creation of a national CCUS strategy alongside a comprehensive legal framework and investment support mechanisms to enable the development of CCUS technologies in Poland. The government also plans to identify R&D needs, develop national competences for these technologies, define a model for CO₂ transport and revise its CO₂ storage regulatory framework. The NECP, however, does not provide a timeline for the adoption of any of these measures, and they are unfortunately not quantified in any way.

The final NECP echoes the concerns presented in the draft NECP surrounding the cost of CCS, the availability of storage on Polish territory and social acceptance of projects. It also recognises that investments into CCS value chains will depend on the price of ETS allowances, energy prices and the availability of decarbonisation alternatives. Nevertheless, Poland now shows more willingness to support the deployment of CCS, moving beyond exploratory measures and encouraging project development in the country, in particular by developing a stable regulatory framework and fostering private investment.

CO₂ CAPTURE

The Polish NECP does not report on process emissions to be captured for storage. It does, however, still present process and non-process emissions in industry separately. Process emissions are projected to account for around half of total industrial emissions in 2030, respectively at 23,7 MtCO₂e under the WEM scenario and 20,3 MtCO₂e under the WAM scenario. The planned reduction in industrial emissions is attributed to a variety of measures, such as electrification, increased use of renewable electricity and CCUS, but without quantifying each measure's individual contribution to overall industrial emissions reduction.

Poland is home to GO4ECOPLANET, a CO₂ capture project aiming to fully decarbonise cement production at Holcim's Kujawy plant. The project, which was awarded a €228 million grant from the EU Innovation Fund in 2022 is looking to begin operating in 2030 and capture around 1.2 MtCO₂ per year.¹

CO₂ TRANSPORT

The NECP provides limited detail on planned CO₂ transport infrastructure, while recognising its importance for the deployment of CCUS technologies. Action 59 sets out plans to establish a financial support instrument and regulatory measures to facilitate CCUS deployment in Poland. These measures are expected to support, among other areas, the development of industrial clusters and the construction of CO₂ pipelines. Poland also

1 [Go4ECOPlanet – Project website](#)

aims to strengthen the regulatory framework for CO₂ transport by designating an oversight entity for CO₂ transport networks.

Poland also hosts ECO2CEE, an open access liquid CO₂ import-export terminal located in Gdańsk. The project, led by a consortium of companies (ORLEN, Air Liquide and Holcim), was awarded the status of an EU Project of Common Interest (PCI) in 2023.² It aims to connect CO₂ capture installations like GO4ECOPLANET to offshore storage in the North Sea.³

CO₂ STORAGE

The Polish NECP does not report on annual CO₂ storage capacity to be made operational. The surrounding legislative framework, dating from 2014, only allowed CO₂ storage offshore under the Baltic Sea. As part of its efforts to promote CCS development, Poland committed to its reform in the NECP, which was done in June 2026 and significantly expanded the areas where onshore geological storage can take place. This is expected to facilitate the identification and development of suitable storage sites closer to industrial emitters at lower cost.⁴

In addition, Action 59 aims to support CO₂ storage infrastructure alongside transport networks, specifically to create a “network of onshore storage sites”. To achieve this, Poland plans to adopt legislative measures enabling geological surveys to identify suitable underground formations. The country will also launch a nationwide public awareness campaign on the safety of onshore CO₂ storage.

HuCCSar is the first onshore storage project in Poland. As a pilot, it has received a €26 million grant from the EU Innovation Fund. Its goal is to demonstrate technical capacity for onshore subsurface storage in the country, aiming to store 52 kt CO₂ between May 2026 and March 2028.⁵

NATIONAL GOVERNMENT FUNDING

Poland plans to create a “financial support instrument” for CCUS deployment as part of Action 59 meant to fund R&D, subsurface exploration, transport and storage infrastructure as well as pilot projects. Unfortunately, this support scheme is to be developed in the future and lacks any quantification and earmarking in the NECP itself.

2 [ORLEN – Project ECO2CEE presentation](#)

3 [GO4ECOPLANET value chain presentation, Baltic Carbon Forum 2024](#)

4 Poland opens new chapter for Carbon Capture and Storage by expanding areas eligible for onshore CO₂ storage – Bellona EU

5 [HuCCSar: HUB for Carbon Capture and Storage to decarbonize the hard-to Abate Regions in Poland – Innovation Fund](#)

RECOMMENDATIONS

The final Polish NECP demonstrates good progress towards developing a more concrete national CCS strategy and associated policy measures. Compared with the draft Plan, which expressed considerable reservations about the role of carbon capture technologies, the final NECP more clearly recognises CCS as an important solution for achieving Poland's climate and industrial decarbonisation objectives. Nevertheless, important gaps remain, including the absence of comprehensive assessments of CO₂ capture, transport and storage needs, quantified policy measures, and a dedicated timeline for achieving industrial decarbonisation objectives. Bellona therefore encourages the Polish government to:

- 1 PUBLISH AND IMPLEMENT A COMPREHENSIVE CARBON MANAGEMENT STRATEGY:** Poland should put forward a Carbon Management Strategy and swiftly move from planning to implementation. The strategy must take a holistic approach to the entire CCS value chain, with particular attention to clearly identifying CO₂ capture needs, primarily to address process emissions; mapping CO₂ transport infrastructure; assessing national CO₂ storage potential; and specifying how much of that storage can be made commercially available and by when. The drafting process should actively involve stakeholders across the board, including industry, academia, and civil society, and should build upon existing research, data, and technical expertise.
- 2 STRENGTHEN REGIONAL COOPERATION:** Enhance cooperation with neighbouring countries, like Germany, Denmark, and Sweden that are making strides in CCS deployment, to accelerate decarbonisation efforts.
- 3 ENSURE ROBUST ASSESSMENT OF CCU:** Ensure that CCU products are assessed based on their full lifecycle emissions to ensure clear climate benefits.⁶
- 4 ENGAGE WITH EXISTING CCS PROJECTS:** Build on the momentum of ongoing CCS projects and incorporate insights from current research institutions and stakeholders into a national implementation plan for CCS.

FURTHER RESOURCES

- Nooraiepour, M., Dąbrowski, K. M., Masoudi, M., et al. (2025). "Geological CO₂ storage assessment in emerging CCS regions: Review of sequestration potential, policy development, and socio-economic factors in Poland." *International Journal of Greenhouse Gas Control*, 148, 104524. DOI: 10.1016/j.ijggc.2025.104524
- "Scenarios of Carbon Capture and Storage Importance in the Process of Energy System Transformation in Poland" (2025). *Energies*, 18(9), 2278.
- "Carbon Capture Utilisation and Storage Technology Development in a Region with High CO₂ Emissions and Low Storage Potential—A Case Study of Upper Silesia in Poland" (2022). *Energies*, 15(12), 4495.

6 [There and back again: Navigating the climate impacts of CO₂ use - Bellona EU](#)

PORTUGAL



Criteria	Performance	Score
Implementation plan	Portugal recognises the necessity of deploying carbon capture technologies but does not plan concrete steps to achieve said deployment, and conflates CCS, CCU and carbon removals.	●
CO2 capture	Does not provide a breakdown of emissions by source, and therefore does not specifically assess the amount of process emissions to be captured; however, it sets overall emission capture targets for 2030 and 2040.	●
CO2 storage	Does not report on geological CO ₂ storage capacity but aims to assess its potential for geological storage by 2030.	●
CO2 transport	Does not report on planned CO ₂ transport infrastructure.	●
National government funding	Does not foresee the allocation of national funding for CO ₂ capture, transport or storage.	●
Other relevant initiatives	Does not mention any additional measures to support the deployment of CCS.	

CCS IMPLEMENTATION PLAN

In its National Energy and Climate Plan (NECP), Portugal recognises the necessity of deploying carbon capture technologies to achieve the EU's emissions reduction targets. It specifies that CCS would be used to reduce emissions from hard-to-abate industries where other decarbonisation options are not available.

Portugal wants to capture process emissions from the materials industry, such as cement, as well as sectors like glass, chemicals, pulp and paper. However, their goal would be to utilise the captured CO₂ (CCU) rather than permanently store it (CCS) – in particular to create synthetic jet fuels. This undermines effective climate action, as the captured CO₂ is ultimately released into the atmosphere, contributing to further global warming. According to the EU Emissions Trading System (ETS) Directive, only a small number of CO₂ utilisation cases can be considered as leading to emission reductions. In most cases, including the production of synthetic fuels, CO₂ is reemitted, ultimately not delivering net emission reductions. As a result, industries relying on CCU will still be required to surrender allowances under the EU ETS. Planning for CCU without ensuring it results in the permanent storage of CO₂, therefore, will not enable these industries to decarbonise and avoid carbon costs.

There is a clear conflation of terms related to industrial carbon management technologies in the Portuguese NECP. These technologies include carbon capture and storage (CCS), carbon capture and utilisation (CCU) and carbon dioxide removal (CDR), each with distinct climate impacts. However, the NECP does not differentiate between CCS and CCU and treats both as contributing towards negative emissions. This conflation creates ambiguity around the actual climate benefits, as not all pathways result in permanent emissions reductions or removals. To ensure effective climate action the contribution of each pathway should be clarified based on the source of the CO₂ and its fate¹.

While the NECP lacks a concrete implementation plan for CCS, policy measure 7.1.4 does mention the planned development of a national CCUS strategy in the years leading up to 2030. Portugal also wants to support research and development of EU-funded CCS projects but provides no further details.

CO₂ CAPTURE

The Portuguese NECP does not report on the volume of process emissions to be captured, but it does define targets for overall emissions to be captured by 2030 and 2040. Under existing policies, Portugal projects no CO₂ capture by 2030 and only 0.2 MtCO₂ per year by 2040. With additional policies, these figures rise to 0.1 MtCO₂ by 2030 and 3.9 MtCO₂ per year by 2040. These volumes are planned to be utilised rather than permanently stored.

CO₂ STORAGE

The NECP does not report on geological CO₂ storage capacity in Portugal. Through its policy measure 7.1.4, the country aims to assess its potential for geological storage by 2030 but no such assessments have been conducted by the Portuguese government yet.

STRATEGY CCUS, an EU-funded project supporting the development of low-carbon energy and industry in Southern and Eastern Europe, found suitable storage capacities of 40–335 MtCO₂ onshore and potential capacities of 739–3470 MtCO₂ offshore.² The project is partnered with Portugal's Directorate-General of Energy and Geology (DGEG), a public administration body responsible for designing, implementing and evaluating policies on energy and geological resources.

1 Bellona Europa – Clearing Conflations on Carbon Capture Terminologies
2 STRATEGY CCUS Lusitanian Basin | Portugal

NATIONAL GOVERNMENT FUNDING

Portugal does not allocate public funding for CCS deployment. The NECP only mentions existing EU support schemes like Horizon Europe and the InnovFin Energy Demo Projects funding by the European Investment Bank (EIB).

RECOMMENDATIONS

The final Portuguese NECP shows some progress compared to the draft mentioning plans to develop a national CCS strategy and to assess CO₂ storage capacities. While this is a welcome development, they remain high-level and should be strengthened by setting clear timelines and concrete steps for implementation. To enable Portuguese hard-to-abate industries to fully decarbonise, Bellona recommends the following measures:

1 DEVELOP A CCS IMPLEMENTATION PLAN

In collaboration with industry, academia, and civil society, build upon existing research and data to establish a comprehensive strategy for deploying CCS to enable the full decarbonisation of its hard-to-abate industries. It must take a holistic approach to the entire CCS value chain clearly identifying CO₂ capture needs—primarily to address process emissions; mapping CO₂ transport infrastructure; assessing national CO₂ storage potential; and specifying how much of that storage can be made commercially available and by when. A medium to long-term, comprehensive plan will send a strong signal to stakeholders driving private investments and encouraging and facilitating the engagement of civil society and academia in the debate around CCS development and deployment.

2 ENSURE CONSISTENT AND SCIENCE-BASED TERMINOLOGY IN LINE WITH EU FRAMEWORKS

To avoid conflation and ensure alignment with EU-level legislations and communications, particularly the Industrial Carbon Management Strategy (ICMS), it is important that the Portuguese government adopts accurate and consistent terminology when referring to ICM technologies. These terms must be used according to their different climate impacts. Accurate, science-based terminology is essential not only for transparency and accountability, but also to ensure that climate strategies are built on realistic assessments of each technology's contribution to emissions reduction or removal. Policies supporting different industrial decarbonisation pathways must be based on a clear understanding of their contribution to emission reductions, and by extension, to industrial decarbonisation. CCU projects in particular should be assessed based on their full lifecycle emissions to ensure clear climate benefit.

3 PRIORITISE PUBLIC FUNDING FOR HIGH-CLIMATE-VALUE CCS APPLICATIONS

With no or fewer scalable alternatives and where CCS would come with a higher mitigation potential and therefor the highest climate value.³

4 BUILD UPON EXISTING RESEARCH PROJECTS

Provide government support for projects like STRATEGY CCUS that create robust and applicable scenarios for the deployment and scaling of CCS in Portugal. Using this academic expertise could fast-track the implementation of CCS technologies across the country.

ROMANIA



Criteria	Performance	Score
Implementation plan	- Has established the necessary institutional framework to enable CCS deployment on its territory. - PAM 6 policy measure "Employing CCUS policy technologies" aims to promote CCUS for vast emission reduction in the mineral industry (incl. cement production) targeting 50% emission reductions in the industry by 2050. - Romania's National Carbon Management Strategy is set to be adopted in 2025.	
CO2 capture	Overall carbon capture need is assessed at 62 MtCO ₂ per annum, of which 26 MtCO ₂ per annum would come from the steel and cement industries.	
CO2 storage	Romania's upcoming National Carbon Management Strategy will assess CO ₂ storage capacity on Romanian territory as well as make projections for injection volumes. Today, Romania estimates its geological CO ₂ storage capacities to be at least 9 MtCO ₂ per annum.	
CO2 transport	The Ministry of Energy has estimated that up to 16 MtCO ₂ per annum could be transported via pipelines. Romania's upcoming National Carbon Management Strategy will assess the needed CO ₂ transport infrastructure.	
National government funding	Plans the channelling of €750M in public funding through mainly EU funding instruments (Innovation Fund, Modernisation Fund, Recovery and Resilience Facility) by 2027.	
Other relevant initiatives	Does not mention any additional measures to support the deployment of CCS	

CCS IMPLEMENTATION PLAN

In its NECP, Romania outlines a dedicated policy measure for Carbon Capture and Storage (CCS), PAM 6: “Employing CCUS Policy Technologies.” This measure targets the mineral industry particularly cement production—with the objective of capturing 50% of its emissions by 2050, amounting to an estimated reduction of 2.5 MtCO₂¹. The country has established the institutional framework necessary for CCS deployment, including the transposition of the CO₂ Storage Directive into national law and the creation of an inter-institutional working group on CCS. The implementation involves national agencies, ministries, regulators, major CO₂ emitters, and companies capable of providing transport and storage services.

Following the adoption of the Net-Zero Industry Act (NZIA), Romania’s NECP introduces an implementation plan for mandatory CO₂ storage development by the oil and gas sector, outlined in PAM 9: “Setting a National Obligation for CO₂ Injection and Storage for the Oil & Gas Industry.” To fulfil the NZIA requirements, Romania plans to develop a National Carbon Management Strategy, expected to be adopted in 2025. This strategy will assess CO₂ storage capacity, projected injection volumes, transport infrastructure, and financing mechanisms. It will also aim to strengthen institutional capacity and promote public participation in CCUS development. As part of this plan, Romania intends to support and co-finance at least three CCUS projects by 2027, estimating implementation time for a full CCS value chain project to be at 6 to 7 years.

CO₂ CAPTURE

In response to the Commission’s feedback on the draft NECP, the Romanian Ministry of Energy conducted an analysis indicating that 62 MtCO₂ per year would need to be captured, with 26 MtCO₂ per year attributed to the steel and cement sectors. However, the NECP provides no further context or detail for these figures, nor does it outline a strategy to meet the projected CO₂ capture needs.

While the NECP mentions the use of carbon capture to reduce emissions from the mineral industry, particularly cement, it sets a target of 2.5 MtCO₂ by 2050. It remains unclear whether this target refers to process emissions, and no concrete strategy is provided to guide its implementation.

CO₂ TRANSPORT

The Ministry of Energy has estimated that up to 16 MtCO₂/year could be transported via pipelines in Romania. ANRE, the Romanian Energy Regulatory Authority has mandated to issue CO₂ transport licences, ensuring transparent and non-discriminatory access to the CO₂ transport networks. Local authorities are tasked with issuing building permits for CO₂ transport pipelines, while a series of other Ministries and Agencies have supervisory, monitoring and administrative roles.

According to Romanian law (GEO 64/2011) the development of CO₂ transport and storage are of national interest, which can help speed up related permitting procedures. To fully capitalise on this, the Plan suggests enhancing institutional capacity as well as involving key local authorities and agencies from the early stages of the process to engage the public in the decision-making process.

1 The NECP does not specify whether this is per annum or the total expected amount by 2050.

CO₂ STORAGE

Romania estimates its geological CO₂ storage capacities to be at least 9 MtCO₂/year. However, no exploration permit for CO₂ storage has been issued to date, despite the secondary legislation for granting exploration permits and storage permits having been established. In addition, there are currently no regulations for the reuse of oil wells for CO₂ storage.

The National Agency for Mineral Resources (ANRM) is the main implementing authority for capture and geological storage of CO₂, overseeing the permitting process for exploration and storage licences, verifying compliance with legal requirements during operation, as well as coordinating the assessment of geological storage sites and storage potential. However, the agency currently operates with low capacity that needs to be expended to speed up permitting procedures and agreements related to CCUS technologies. The National Guard on Environment (NGE) is responsible for undertaking routine inspections of CO₂ storage sites under the requirements of the CO₂ Storage Directive.

NATIONAL GOVERNMENT FUNDING

Romania plans to allocate €750M in public funding to entities implementing CCUS technologies, including CO₂ transport infrastructure, until 2027. These resources are envisioned to come from the EU's Modernisation and Innovation Funds. The Innovation Fund, in particular, allocates funding through a competitive selection process, meaning that no specific amount is guaranteed for Romanian projects. As a result, the government can neither rely on nor effectively plan for this funding to support CCUS deployment. Romania also aims to get support from public-private partnerships like the European Energy Efficiency Fund. Notably absent from this plan is any national government funding.

Finally, while the NECP notes that 44.1% of investments under the Recovery and Resilience Facility (RRF) will go to the green transition, including industrial decarbonisation, no share of that funding is specifically earmarked for CCS.

RECOMMENDATIONS

The final Romanian NECP marks an improvement over the draft by offering more detailed information on implementation plans and preliminary assessments of capture needs, transport plans, and storage capacities. The government's plan to develop a Carbon Management Strategy is a welcome and much needed development, especially in light of Romanian oil and gas companies' obligation under the NZIA to contribute to developing 50Mt of CO₂ injection capacity by 2030 in Europe. However, the Plan still lacks clarity regarding key figures and provides limited insight into how targets will be achieved. Bellona therefore encourages the Romanian government to:

1 PUBLISH AND IMPLEMENT A COMPREHENSIVE CARBON MANAGEMENT STRATEGY

Romania should urgently publish its Carbon Management Strategy and swiftly move from planning to implementation. The strategy must take a holistic approach to the entire CCS value chain, with particular attention to: clearly identifying CO₂ capture needs—primarily to address process emissions; mapping CO₂ transport infrastructure; assessing national CO₂ storage potential; and specifying how much of that storage can be made commercially available and by when. The drafting process should actively involve stakeholders across the board, including industry, academia, and civil society, and should build upon existing research, data, and technical expertise.



2 STRENGTHEN REGIONAL COOPERATION

Enhance cooperation with neighbouring countries, like Bulgaria and Hungary that are making strides in CCS deployment, to accelerate decarbonisation efforts.

3 PRIORITISE PUBLIC FUNDING FOR HIGH-CLIMATE VALUE CCS APPLICATIONS

With no or fewer scalable alternatives and where CCS would come with a higher mitigation potential and therefore the highest climate value². Targeted policy instruments need to be developed to incentivise CCS deployment, specifically addressing cross-chain risks inherent to CO₂ transport and storage and offer sufficient derisking potential to drive private investment.

² Bellona Europa & E3G, 2023, Carbon Capture and Storage Ladder: Assessing the climate value of CCS applications in Europe, https://network.bellona.org/content/uploads/sites/3/2023/07/CCSL_briefing.pdf



SLOVAKIA



Criteria	Performance	Score
Implementation plan	Does not have a concrete implementation plan for CCS.	
CO₂ capture	Estimates the full abatement potential of CCS to be 6 MtCO ₂ in 2030.	
CO₂ storage	Does not report on geological CO ₂ storage capacity, however a report commissioned by the Ministry of Finance notes that there are no large carbon storage options exist in Slovakia.	
CO₂ transport	Does not report on planned CO ₂ transport infrastructure.	
National government funding	Does not foresee national funding specifically earmarked for CO ₂ capture, transport or storage.	
Other relevant initiatives	Does not mention any other measures to support the deployment of CCS.	



In its NECP, Slovakia acknowledges the decarbonisation potential of CCS, in particular for the abatement of industrial emissions. It estimates the full abatement potential of CCS to be 6 MtCO₂ in 2030 for an average cost of 100 to 150€ per tonne of CO₂. However, no implementation plan or funding is provided to fulfil this potential.

The final Slovak NECP does not include any detailed assessment of CO₂ transport or storage potential and lacks any policy measure to support CCS deployment on its territory. The Slovak government however has commissioned a study titled *Decarbonisation of the Slovak economy by 2030*¹ to outline potential national decarbonisation pathways and their costs, in reference to which the Slovak NECP outlines three potential emission reduction pathways.

One of these pathways involves the application of CCS to achieve an emission reduction of 20 MtCO₂ by 2030, a 76% reduction compared to 1990 levels. The cost of deploying CCS in this scenario has been determined at 13.5 billion EUR. The exact contribution of CCS to achieving the 76% reduction target is however unclear. The supporting report emphasises the importance of CCS for maximising decarbonisation potential within Slovakia, especially in the building materials (e.g., cement, lime), petroleum (e.g., refining) and chemicals (e.g., ammonia) industry where CCS has been identified as indispensable to a full decarbonisation.

It reports on Slovakia having no large CO₂ storage potential on its territory, suggesting the need to transport captured CO₂ to locations such as Poland for permanent storage.

However, the NECP itself does not explicitly highlight these findings, it rather refers to the report for more detailed information, and as a result this cannot be considered the official position of the Slovak government.

The report also emphasises the necessity of EU-wide funding support for CCS, particularly for infrastructure deployment projects like CO₂ pipeline constructions, due to high capital costs. However, the Plan does not specify any funding measures related to CCS, indicating financial support gaps in Slovakia's decarbonisation efforts.

RECOMMENDATIONS

The final Slovak NECP makes no progress compared to the draft version in addressing the role of carbon capture, transport and storage in the country's decarbonisation strategy. While Slovakia acknowledges the role that CCS can play in reducing industrial CO₂ emissions, it provides no supporting policies or funding for its deployment. Bellona therefore recommends that the Slovak government:

1

DEVELOP AN IMPLEMENTATION PLAN FOR CCS DEPLOYMENT

In collaboration with industry, academia, and civil, building upon existing research² and data to establish a comprehensive implementation plan or strategy for CCS deployment in Slovakia, primarily for industries with few to no other abatement options. A medium to long-term, comprehensive plan will send a strong signal to stakeholders, driving private investments and encouraging and facilitating the engagement of civil society and academia in the debate around CCS development and deployment.

¹ [decarbonization of the slovak economy by 2030 study_062022.pdf](#)

² e.g., [Szén-dioxid-tárolási és -hasznosítási \(CCS/CCU\) lehetőségek Magyarországon : Fehér könyv - SZTE Repository of Publications](#)



2 STRENGTHEN REGIONAL COOPERATION

Enhance cooperation with neighbouring countries, like Austria that is making strides in CCS deployment, to accelerate decarbonisation efforts, as well as Hungary and Poland where CCS projects are under development.

3 DEVELOP A CO₂ TRANSPORT INFRASTRUCTURE

In discussion with industry and other stakeholders, assess transport infrastructure needs and establishing a plan for an open-access and multimodal CO₂ transport infrastructure deployment, connecting capture sites with storage facilities to be built or under construction in neighbouring countries.

SLOVENIA



Criteria	Performance	Score
Implementation plan	Does not have a concrete implementation plan for CCS.	●
CO2 capture	Does not specify the volume of process emissions to be abated with CCS but identifies hard-to-abate sectors as the primary focus for addressing these emissions.	●
CO2 storage	Injection and storage of CO ₂ is prohibited in Slovenia.	●
CO2 transport	Options for CO ₂ transport by rail and existing gas infrastructure are being explored.	●
National government funding	Providing financial incentives for CCS deployment is a key objective within the decarbonisation pillar of Slovenias Plan. They also plan for a future support scheme for CCS in the form of Carbon Contracts for Difference. However, currently there is no national funding allocated to CCS.	●
Other relevant initiatives	- Aims to support feasibility studies for larger projects with the goal to facilitate the development of a pilot project in the cement industry. - Carbon capture is identified as a key area for future research.	

CCS IMPLEMENTATION PLAN

While the Slovenian NECP recognises the need for Carbon Capture and Storage (CCS) technologies to reduce CO₂ emissions in hard-to-abate sectors, it does not present a concrete implementation plan for CCS deployment. Providing financial incentives, however, for CCS deployment is a key objective within the decarbonisation pillar of Slovenia's Plan in accordance with the Net Zero Industry Act which aims to strengthen Europe's net-zero manufacturing ecosystem., Slovenia also foresees scope for Carbon Capture and Utilisation (CCU) at existing energy sites and energy-intensive industries, planned to be used to produce synthetic methane.

CO₂ CAPTURE & TRANSPORT

Options for carbon capture and transport by rail and existing gas infrastructure are being explored. There's currently one carbon capture project underway in Slovenia.

Cement producer, Salonit Anhovo, has been in the process of planning Slovenia's first carbon capture pilot project, to become operational by 2028, with potential for large-scale deployment by 2035.¹ The project plans to store the captured carbon outside of Slovenia's territory and is exploring possibilities for cross-border transport and storage infrastructure.²

CO₂ STORAGE

CO₂ storage is not foreseen. Injection and geological storage of CO₂ is prohibited in Slovenia.

NATIONAL GOVERNMENT FUNDING

The Plan highlights the need to incentivise hard-to-abate sectors to apply for both domestic and EU funds such as the Climate Change Fund, Innovation Fund, and Modernisation Fund, among others, to support CCS deployment. This may include financial support for companies to prepare applications.

Slovenia is also currently planning a future support scheme for CCS and industrial emissions reduction, looking into Carbon Contracts for Difference as an option.

1 https://ccs4cee.eu/wp-content/uploads/2022/06/CCS-Roadmap_Slovenia.pdf

2 <https://ccs4cee.eu/wp-content/uploads/2022/07/Sara-Lupo-Deloitte.pdf>

OTHER RELEVANT INITIATIVES

Before 2030, Slovenia does not plan to implement large-scale CO₂ capture but aims to support planning efforts, such as feasibility studies for larger projects with the goal to facilitate the development of a pilot project in the cement industry, expected to be Slovenia's first major CO₂ capture initiative.

Carbon capture is also identified as a key area for future research in energy management under the Research, Innovation, and Competitiveness pillar of the Plan.

RECOMMENDATIONS

While Slovenia made some progress in its final NECP compared to the 2023 draft, it still falls short on aligning with the European Commission's recommendations. Therefore, Bellona encourages the Slovenian government to:

1

DEVELOP AN IMPLEMENTATION PLAN FOR CCS DEPLOYMENT

In collaboration with industry, academia, and civil society, build upon existing research and data to establish a clear implementation plan for CCS in Slovenia.

2

STRENGTHEN REGIONAL COOPERATION

Enhance cooperation with neighbouring countries, particularly Austria and Italy, that are making significant strides in CCS deployment.

3

ENSURE ROBUST ASSESSMENT OF CCU

Ensure that CCU products are assessed based on their full lifecycle emissions to ensure clear climate benefit.

4

TAKE CONCRETE STEPS TO IMPLEMENT CARBON CONTRACTS FOR DIFFERENCE (CCFDS)

For hard-to-abate industries, as is already planned, helping to establish a viable business case for CCS deployment in sectors that cannot otherwise fully decarbonise.

SPAIN



Criteria	Performance	Score
Implementation plan	Does not have a concrete implementation plan for CCS, however within policy measure 1.10, CCS is considered a necessary solution to tackle process emissions.	●
CO2 capture	Process emissions from the industry sector amount to approximately 17MtCO ₂ e per annum.	●
CO2 storage	Does not report on geological CO ₂ storage capacity.	●
CO2 transport	Does not report on planned CO ₂ transport infrastructure.	●
National government funding	Does not foresee national funding specifically earmarked for CO ₂ capture, transport or storage.	●
Other relevant initiatives	- Plans to establish the Carbon Contracts Support Fund under the PERTE Fund which may boost investment in CCS technologies. - Proposes launching CCUS stakeholder dialogues. - Is developing a feasibility study to explore decarbonisation strategies through technological advancements, including CO₂ capture and storage.	

CCS IMPLEMENTATION SPAIN

In the Spanish National Energy and Climate Plan (NECP), 'Measure 1.10' targets the decarbonisation of the industrial sector, **acknowledging the role of Carbon Capture and Storage (CCS) technologies in decarbonising hard-to-abate industries** where process emissions cannot be otherwise tackled. The plan emphasises that **Carbon Capture, Utilisation and Storage (CCUS) technologies should not hinder the transition away from fossil fuels, and priorities for industrial decarbonisation remain focused on electrification and renewable energy integration, efficiency improvements, and the use of hydrogen where feasible, with CCUS as a "last resort" solution.**

CO₂ CAPTURE

In terms of CO₂ capture potential, the Plan notes that **process emissions from industry stand at approximately 17 MtCO₂e per annum.** However, this figure is not presented within a CCS-specific abatement context and is not expected to decrease by 2030, indicating that CCS technologies may not be operational on a meaningful scale before this date.

CO₂ TRANSPORT AND STORAGE

While the Spanish NECP makes no mention of the country's CO₂ storage potential, the Spanish Geological and Mining Institute estimates CO₂ storage capacity to be between 12 and 44 Gt in Spain, which could accommodate between 121 to 445 years' worth of its annual point-source emissions.¹ According to another assessment employing a hubs and clusters approach, 21% of Spanish emissions amounting to up to 68.7 MtCO₂ per year could be decarbonised with CCS.² Regarding CO₂ transport infrastructure, the Strategy CCUS EU-funded research project has assessed Spain's potential, focusing on industrial hubs that could facilitate risk-sharing for infrastructure development. The project identified that pipeline and ship transport in the Ebro Basin could effectively transport captured CO₂ from two potential clusters to offshore storage sites, reducing the Basin's total emissions by 50%.³

NATIONAL GOVERNMENT FUNDING

Spain's industrial decarbonisation efforts are supported by the Industrial Decarbonisation PERTE (Strategic Project for Economic Recovery and Transformation) **Fund**, a dedicated national

1 Instituto Geológico y Minero de España (2010). Plan De Selección y Caracterización De Áreas y Estructuras Favorables Para El Almacenamiento Geológico De CO₂ En España.

2 Hubs and clusters approach to unlock the development of carbon capture and storage – Case study in Spain - ScienceDirect

3 https://strategyccus.brgm.fr/sites/default/files/D1_4_Public%20Final%20Report_310822.pdf (pp.56)

fund **with a budget of €2.37 billion**, comprised of both grants and loans. Part of this funding is allocated to establishing a Carbon Contracts Support Fund, which will include a pilot project supported by €100 million in loans. **Although the funding does not specifically allocate resources for CCS deployment, financial support mechanisms like Carbon Contracts for Difference can increase investment confidence in decarbonisation solutions like CCS through mitigating financial risks associated with potentially volatile carbon prices.** Additionally, PERTE funding is available for Important Projects of Common European Interest (IPCEIs); while CCUS projects are not currently classified as IPCEIs, if this is to change in the future, it could enable further support for CCUS technologies through state aid in Spain.

OTHER RELEVANT INITIATIVES

Despite the lack of a comprehensive government-level commitment and implementation plan, several initiatives are already focusing on CCS deployment. Under the Ministry for the Ecological Transition and the Demographic Challenge, the City of Energy Foundation runs programmes focused on energy and environmental research and innovation through the Institute for Just Transition. These programmes support just transition efforts by promoting research and decarbonisation projects. **As part of this work, the Spanish government is conducting a feasibility study to explore decarbonisation strategies, including CO₂ capture and storage**, along with other technologies.

Spain also hosts a public-private alliance known as ALINNE, which serves as a forum for strategic analysis in research and innovation across key technology areas essential to the energy transition. Its mission is to support the development and oversight of the national strategy on investment and innovation. ALINNE is supported by and collaborates with the Spanish Energy Technology Platforms (ETPs), which offer a comprehensive mapping of national capacities with regards to, amongst others, CO₂ capture and storage.

These alliances and partnerships are important because they foster collaboration between public and private sectors, align national efforts in research and innovation, and build the foundation for developing and scaling CCS technologies essential for achieving Spain's long-term decarbonisation

Although neither **the Industrial Carbon Management Strategy (ICMS)** nor **the Net Zero Industry Act (NZIA)** inspired specific CCS commitments in Spain, they seem to have **sparked significant discussion about CCUS' role and application in the country** since the publication of the draft NECP in 2023. This discussion largely focuses on the targeted deployment of CCS, the implications of the NZIA for Spain, and the potential use of captured CO₂ as a feedstock in the Spanish chemical industry. **The Plan proposes launching stakeholder dialogues aimed at defining and quantifying the sector's technological development needs.**

Since the publication of the Spanish NECP, the Spanish offshore CO₂ storage project, Tarraco₂-Storage, has been awarded funding by the Innovation Fund (IF)⁴—marking Spain's first large-scale CCS project to receive IF funding.

RECOMMENDATIONS

While Spain made progress in its final NECP compared to the 2023 draft, giving greater attention to the role of CCS in achieving its climate goals, it still falls short of aligning with the European Commission's recommendations. Therefore, Bellona encourages the Spanish government to:

1

DEVELOP AN IMPLEMENTATION PLAN FOR CCS DEPLOYMENT

In collaboration with industry, academia, and civil society, build upon the wealth of existing research and data to establish a clear implementation plan for CCS in Spain. This plan should account for current data on CO₂ storage potential and already mapped out potential transport routes, drawing on studies from the Spanish Geological and Mining Institute and other research bodies.

2

STRENGTHEN REGIONAL COOPERATION

Enhance cooperation with neighbouring countries, particularly France and Italy, which are making significant strides in CCS deployment. Spain's considerable CO₂ storage capacity positions it to support regional decarbonisation efforts, fostering economic opportunities for Spain and reaping climate benefits across Europe.

3

ENGAGE WITH EXISTING CCS PROJECTS

Build on the momentum of ongoing CCS projects and incorporate insights from current research institutions and stakeholders into a national implementation plan for CCS.

4

FOSTER STAKEHOLDER PARTICIPATION

Ensure broad participation by actively engaging a wide range of stakeholders from industry, academia and civil society organisations in planned stakeholder dialogues. Such involvement can help accelerate Spain's industrial decarbonisation efforts by incorporating diverse expertise and perspectives.

5

ENSURE ROBUST ASSESSMENT OF CCU

Ensure that CCU products are assessed based on their full lifecycle emissions to ensure clear climate benefit.⁵

SWEDEN



Criteria	Performance	Score
Implementation plan	Introduced policies and incentives to support CCS development and deployment. However, a comprehensive implementation plan is still lacking.	●
CO2 capture	Reports on estimated capture potential by 2030 and capture potential for biogenic CO ₂ by 2045. However, does not report specifically on process emissions.	●
CO2 storage	Is exploring possibilities for CO ₂ storage within its territory but does not expect to have any domestic storage sites ready by 2030.	●
CO2 transport	Does not report on planned CO ₂ transport infrastructure. However, it refers to CO ₂ transport by ship to storage sites in Norway.	●
National government funding	- Funding for the full value chain of bio-CCS is available through a reversed auction scheme, amounting to a total of approx. EUR 3.6 billion. - Funding for research and innovation projects, demonstration and full-scale facilities for bio- and fossil-based CCS, including process emissions, is available through Industriklivet, a public support scheme for industrial transition.	●

Other relevant initiatives

- Established a National Center for CCS at the Swedish Energy Agency.
- The State initiative Fossil Free Sweden has presented a strategy for bio-CCS in Sweden by 2030 to the Government.
- Collaborates regionally on matters related to CCUS through the Nordic Council of Ministers.

Sweden has significantly increased its ambition and reporting on Carbon Capture and Storage (CCS) in the final NECP compared to the draft Plan. In 2024, following the EU Commission's Communication on Industrial Carbon Management, Sweden declared that CCS tackling CO₂ emissions from fossil, biogenic or atmospheric origin, and Carbon Capture and Utilisation (CCU) are important technologies for meeting climate targets.

The Plan specifies that CCS on fossil fuel abatement should be applied "where relevant", while cautioning that measures to "promote CCS should avoid lock-in in the continued use of fossil fuels and raw materials." Furthermore, the deployment of Carbon Capture, Utilisation and Storage (CCUS) should consider factors such as circular economy, resource efficiency, socio-economic efficiency and life-cycle climate impacts.¹

CCS IMPLEMENTATION PLAN

Sweden has put in place support schemes for CCS development and deployment, further explained below. A National Center for CCS has been established within the Swedish Energy Agency, which has also proposed additional policy instruments for CCUS to the Government.² However, a comprehensive, government-endorsed plan is notably absent.

CO₂ CAPTURE

The Swedish NECP outlines scenarios where **CCS could help to tackle over 1.5 Mt of CO₂ equivalents annually by 2030**. The report also highlights the potential for negative emissions through bio-CCS, estimating that **between 1.2 and 2.2 Mt of biogenic CO₂ could be captured each year starting in 2030**. The main biogenic CO₂ sources in Sweden include chemical pulp mills where incineration takes place as part of chemical recycling. Sweden also has several combined heat and power plants (CHP) and heat plants that use by-products from the forestry and sawmill industry or household waste as fuel. The total theoretical capture potential for biogenic CO₂ from these sources is up to 20-30 Mt of CO₂ per year, with a realistic minimum of 10 Mt deemed to be achievable by 2045.³

CO₂ TRANSPORT

The NECP mentions CO₂ transport by ship to storage sites in Norway but does not provide further detail.

Recently, in a joint statement to the European Commission, Sweden together with Denmark, Finland, Germany, the Netherlands and France have called for a clear regulatory framework for cross-border CO₂ transport.⁴

CO₂ STORAGE

The Swedish Geological Survey (SGU) is currently investigating suitable sites for perma-

- 1 Sweden - Final updated NECP 2021-2030 (submitted in 2024) - European Commission
- 2 | Energimyndigheten
- 3 Sweden - Final updated NECP 2021-2030 (submitted in 2024) - European Commission
- 4 JOINT STATEMENT.pdf

nent CO₂ storage in Sweden. However, Sweden does not expect to have domestic storage capacity developed before 2030. The NECP refers to storage possibilities in Norway, where commercial CO₂ storage is already available. Additionally, information on Sweden's state support scheme for bio-CCS (see below), indicates that Sweden will need to rely on storage sites in other countries, with Denmark, Norway, and the Netherlands cited as potential partners, before domestic storage is potentially developed.⁵

NATIONAL GOVERNMENT FUNDING

Funding for research and innovation projects as well as demonstration and full-scale facilities for bio- and fossil-based CCS, including process emissions, is available through **Industriklivet, a public support scheme for industrial transition.**

In 2024, Sweden launched a **support scheme for bio-CCS through a reversed auction**, following EU approval. Since then, the reversed auction closed for bids in November 2024. Applicants who fulfil the criteria and present the lowest bid for capturing, transporting and storage of biogenic CO₂ will receive funding once storage has commenced. **A total of approximately EUR 3.6 billion (SEK 36 billion) is available over the period 2026-2046.**⁶

Some Swedish CCUS projects have also received funding from the EU Innovation Fund, including for CCS on Waste-to-Energy plants and production of bio-fuels and e-fuels through CCU.⁷ Funding is also available for research projects on CCUS through the Clean Energy Transition (CET Partnership) under Horizon Europe, to which the Swedish Energy Agency is an active partner.

OTHER RELEVANT INITIATIVES

A **National Center for CCS** has been established within the Swedish Energy Agency mandated by the Government to monitor CCUS developments nationally and internationally. Its responsibilities include:

- identifying and reporting on barriers for CCS development in Sweden,
- evaluating issues related to carbon accounting and reporting, and
- assessing how to optimise the full CCS value chain from a climate and energy perspective.⁸

The **State initiative FossilFree Sweden**, which brings together over 500 stakeholders from business, municipalities, other public actors and civil society, published a *Strategy for bio-CCUS* in Sweden in 2024. The Strategy has been presented to the Government, but the NECP does not provide further detail on if and how it will be implemented.

Sweden collaborates with neighbouring countries within the *Nordic Energy Policy Cooperation Programme* under the **Nordic Council of Ministers**, across various themes, including CCUS. *Nordic Energy Research* – an institution for joint energy research and analysis under the Nordic Council of Ministers – has issued a report titled “*Tracking Nordic Clean Energy Progress 2020*” which assesses the progress toward carbon neutrality in the Nordic region. Among its findings is the recognition that large-scale demonstrations of CCS are imperative for certain sectors.

5 Frågor och svar om CCS och stöd för bio-CCS

6 Stöd för bio-CCS genom omvänd auktion

7 Innovation Fund projects - European Commission

8 Nationellt centrum's uppdrag och utredningar

RECOMMENDATIONS

Sweden's final NECP demonstrates increased commitment on CCS, compared to its initial draft. As certain gaps remain, Bellona encourages the Swedish government to:

1

DEVELOP AN IMPLEMENTATION PLAN FOR CCS DEPLOYMENT

In collaboration with industry, academia, and civil society, build upon existing and planned policy measures, research and data to establish a comprehensive implementation plan or strategy for CCS in Sweden. A medium to long-term, comprehensive plan will send a strong signal to stakeholders incentivising private investments and encouraging and facilitating the engagement of civil society and academia in the debate around CCS development and deployment.

2

DEVELOP A CO₂ TRANSPORT INFRASTRUCTURE

In discussion with industry and other stakeholders, assess transport infrastructure needs and establishing a plan for an open-access and multimodal CO₂ transport infrastructure deployment, connecting capture sites with storage facilities, including through transport hubs.

3

PRIORITISE PUBLIC FUNDING FOR HIGHCLIMATE

With no or fewer scalable alternatives and where CCS would come with a higher mitigation potential and therefor the highest climate value.

4

ENSURE ROBUST ASSESSMENT OF CCU

Ensure that CCU products are assessed based on their full lifecycle emissions to ensure clear climate benefits.

5

INCREASE TRANSPARENCY IN REPORTING AROUND CCS AND CCU

Ensure clear and comprehensive reporting on CCS plans and related data. Provide detailed and regularly updated information on a dedicated online platform to promote transparency and accessibility for stakeholders and other interested parties.

6

ENSURE THE ENVIRONMENTAL INTEGRITY AND CLIMATE BENEFITS OF BECCS/BIO-CCS

Develop and adhere to robust accounting rules, certification standards, liability frameworks, and sustainability requirements for BECCS/Bio-CCS to guarantee its environmental integrity and net climate benefits. This includes comprehensive Monitoring, Reporting, and Verification (MRV) systems that account for all greenhouse gas emissions—both direct and indirect—across the entire value chain, domestically and internationally where applicable. These systems should employ conservative estimation methods and ensure that biomass sourcing prioritises sustainability, minimises lifecycle emissions, and achieves a net-negative balance. Bellona recommends the separation of CDR targets into emissions reductions, land-based sequestration and permanent carbon removals, to enhance clarity on climate goals. This would ensure anthropogenic biogenic based removals are not deterring emission reductions.

Conclusion

Many of the final updated NECPs show clear improvements from their draft versions. Almost all Member States now acknowledge CCS and its role in decarbonising hard-to-abate industries, which is a welcome first step necessary for developing policies to support its deployment. Unfortunately, this acknowledgment in many cases does not translate into practical support for the deployment of CCS and foster growth in the technology's use. It is also insufficient at this point, as the rapid deployment of CCS will be crucial to tackle hard-to-abate emissions and meet Europe's climate targets.

Beyond acknowledgement, Member States need commitment, but also an implementation plan in line with the EU's Industrial Carbon Management Strategy (ICMS) and the Net-Zero Industry Act (NZIA). The ICMS identifies a set of actions to be taken, at EU and national level, to establish a single market for CO₂ in Europe and to create a more attractive environment for investments in technologies like CCS. The NZIA establishes an obligation for oil and gas companies to develop 50 Mt of CO₂ injection capacity by 2030, with the goal of spurring a CO₂ market and providing assurance to first movers in the field of CCS.

We can see a clear difference between the frontrunners and the rest when it comes to CCS implementation plans. The best performing Member States have developed roadmaps and strategies that include milestones and supporting measures. Most others, however, have limited proposals for CCS implementation and often fall short of the Commission's recommendations.

A thorough CCS strategy requires Member States to assess their national CO₂ capture, transport and storage capacities. There is a marked improvement between the draft and updated NECPs in this regard: a number of Member States have, in response to the Commission's feedback, reported on some or all of these metrics. Unfortunately, these countries make up a small share of the total. Most of the submitted NECPs have partial or no such assessments. Inadequate figures in turn make it more difficult to create sound policy, which is especially problematic given the planned phase-out of free Emissions Trading System (ETS) allowances starting 2026.

Measures to support CCS deployment also require public support, in particular for first-mover projects, which some NECPs highlight. These funding and de-risking schemes are crucial to kickstart projects with a high-risk profile due to their high upfront capital investment needs and uncertain returns. However, few countries provide any type of derisking measures at the national level, often citing EU level funding instruments such as the Innovation Fund and the Connecting Europe Facility to provide co-financing for important CCS projects on their territories.

Many Member States are developing funding instruments for industrial decarbonisation more broadly, but without earmarking towards CCS specifically. This can be an issue if CCS is in competition with other technologies on a cost basis given its high upfront costs.

Another area of improvement between the draft and final documents is a better understanding of the difference between the Storage (CCS) and Utilisation (CCU) of captured CO₂. Despite some progress, many NECPs still conflate the two under the acronym CCUS or outright prioritise CCU over CCS in their planned policies. CCU is often treated as an emission reduction tool, not detailing safeguards and robust carbon accounting measures that are needed to guarantee the climate benefit of CCU products. According to the EU Emissions Trading System (ETS) Directive, only a small number of CO₂ utilisation cases can be considered as leading to emission reductions. As a result, industries relying on CCU will still be required to surrender allowances under the EU ETS. Planning for CCU without ensuring it results in the permanent storage of CO₂, therefore, will not enable these industries to decarbonise and avoid carbon costs.

Regional cooperation is another area in which improvements could be made. With the exception of North-West Europe, few countries are actively seeking cross-border collaboration. Developing CCS across an entire region has many benefits. Infrastructure can be shared, and so can be the risks as they are spread across more stakeholders. Additionally, this would work to balance an emerging concentration of CO₂ storage in the North Sea, where the most advanced and numerous projects are. A more even geographical distribution of CCS technologies would also benefit the Member States that have fewer or no CCS deployment by levelling the playing field and allowing all hard-to-abated industries across Europe to decarbonise.

In spite of these shortcomings, changes between the draft and final NECPs are largely positive. Many countries have improved on one or more of the areas mentioned above and thus gotten closer to a full-scale CCS deployment strategy. There is also much more momentum for CCS technologies as a whole as many projects are being launched across Europe and more to come.

Following the adoption of the ICMS and NZIA we can expect much faster deployment of these technologies across the continent. The obligation to operationalise 50 Mt of CO₂ injection capacity by 2030 is key for the future of CCS in the EU and could be the first step to creating a European market for CO₂. Member States with oil and gas obligated entities will be the ones to enforce this obligation. Bellona will follow developments in this area closely to understand how the requirement will influence policies in these Member States.



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Bellona Europa is an international, independent and non-profit organisation that meets environmental and climate challenges head on. We are solutions-oriented and have a comprehensive and cross-sectoral approach to assess the economics, climate impacts and technical feasibility of necessary climate actions. To do this, we work with civil society, academia, governments, institutions, and industries.