

BUILDING MOMENTUM
FOR THE LONG-TERM CCS DEPLOYMENT
IN THE CEE REGION

Summary of CCS4CEE project

Czechia

Implemented by:



Supported by:



Co-financed by:



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ze środków Programu Rozwoju
Organizacji Obywatelskich
na lata 2018 – 2030

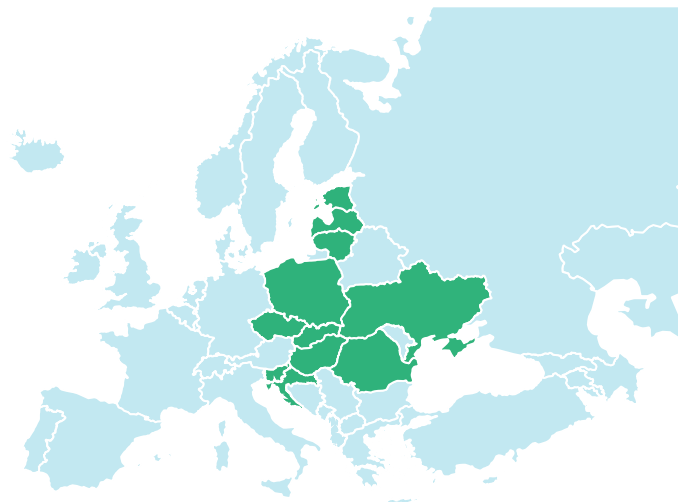


CCS4CEE project

PROJECT CONTEXT | Recent advances in several key areas (e.g., renewable energy sources, energy storage, electric vehicles) enable significant greenhouse gas (GHG) emission cuts but are not sufficient to reach deep decarbonisation consistent with Paris Agreement, as recognised by International Energy Agency in its technology assessments and various modelling studies by both European Union institutions and independent researchers. Carbon capture and storage (hereinafter – CCS)¹ deployment may reduce industrial emissions, provide low-carbon industrial heat and improve energy security by allowing dispatchable power sources to continue operating with low emissions. However, its large-scale implementation requires a long-term policy framework. At the moment, the topic of CCS is not present in the mainstream debate on climate policy in the Central and Eastern European (hereinafter – CEE) countries. This may lead to uneven progress in CCS deployment across Europe, resulting in increased catching-up costs as well as missed opportunities for national development and regional cooperation. This project is designed to counteract this scenario.

PROJECT GOAL | The project aims to renew the discussion on the long-term deployment of CCS in the CEE region, leading to new policies and joint projects. It is expected that building evidence-based consensus among key stakeholders will pave the way to implement concrete policies and ventures. This will be achieved through combining analytical work, in the form of a series of national and regional publications and events, with outreach, communication and capacity-building activities focused on the importance of timely CCS deployment and associated international cooperation.

SCOPE AND PHASES | The project covers Poland, Czech Republic, Slovakia, Hungary, Slovenia, Croatia, Romania, Lithuania, Latvia, Estonia and Ukraine.



¹ CCS refers to “the capture of CO₂ from industrial installations, its transport to a storage site and its injection into a suitable underground geological formation for the purposes of permanent storage”, as defined by the European Commission. On the other hand, in carbon capture and utilisation (hereinafter – CCU), the captured CO₂ is transported to a facility in which it is utilised. CCU exhibits fundamental differences stemming from the fate of the captured and transported CO₂ – in CCU, it is embodied into products, whereas in CCS it is permanently stored in underground geological formations. The main focus of the CCS4CEE project is CCS.

The project is implemented by four stakeholders from the CEE region in cooperation with the expert partner from Norway:



WiseEuropa

WiseEuropa is an independent think-tank institute located in Warsaw. It is the lead partner of the project and coordinator of the work in Poland, Croatia and Slovenia.



Institute for
European
Integration

Institute for European Integration is a non-profit, non-partisan, and independent think tank focusing on European integration and cohesion. It coordinates the work in the Czech Republic and Slovakia.

CIVITTA

CIVITTA is a leading management consultancy from CEE. It coordinates the work in Lithuania, Latvia, Estonia and Ukraine.

EPG
ENERGY POLICY GROUP

Energy Policy Groups is a non-profit, non-partisan independent think-tank located in Bucharest. It coordinates the work in Romania and Hungary.

BELLONA
E U R O P A

The Bellona Foundation (expertise partner) is an independent non-profit organisation that aims to provide expertise regarding the climate change issue by identifying and implementing sustainable environmental solutions.

The three phases are implemented in the project:

1. Determination of the starting point: assessment of the current state and potential of technological options, as well as European policy landscape and national contexts (Work Package 3, 2021);
2. Development of national roadmaps as well as regional cooperation roadmap for CCS deployment in the CEE region (Work Package 4, 2022);
3. Supporting implementation of the roadmaps through networking and capacity-building events (Work Package 5, 2023).

The project targets national and local policymakers, the business sector, research institutions and civil society. This will support the emergence of a socially accepted mix of appropriate policies, R&D and deployment activities. The project will ultimately benefit the CEE societies by supporting the timely implementation of CCS technologies which will ensure a smooth low-carbon transition.

PROJECT FUNDING | The project is funded by EEA and Norway Grants Fund for Regional Cooperation (project contract number 2018-1-1141).

ADDITIONAL INFORMATION ON THE PROJECT | Additional information about the project, including national and regional reports and deliverables, can be accessed on the project website: ccs4cee.eu

Opportunities and barriers for CCS deployment

CCS4CEE PROJECT COUNTRIES

Across project countries, several commonalities relevant to CCS have been identified:

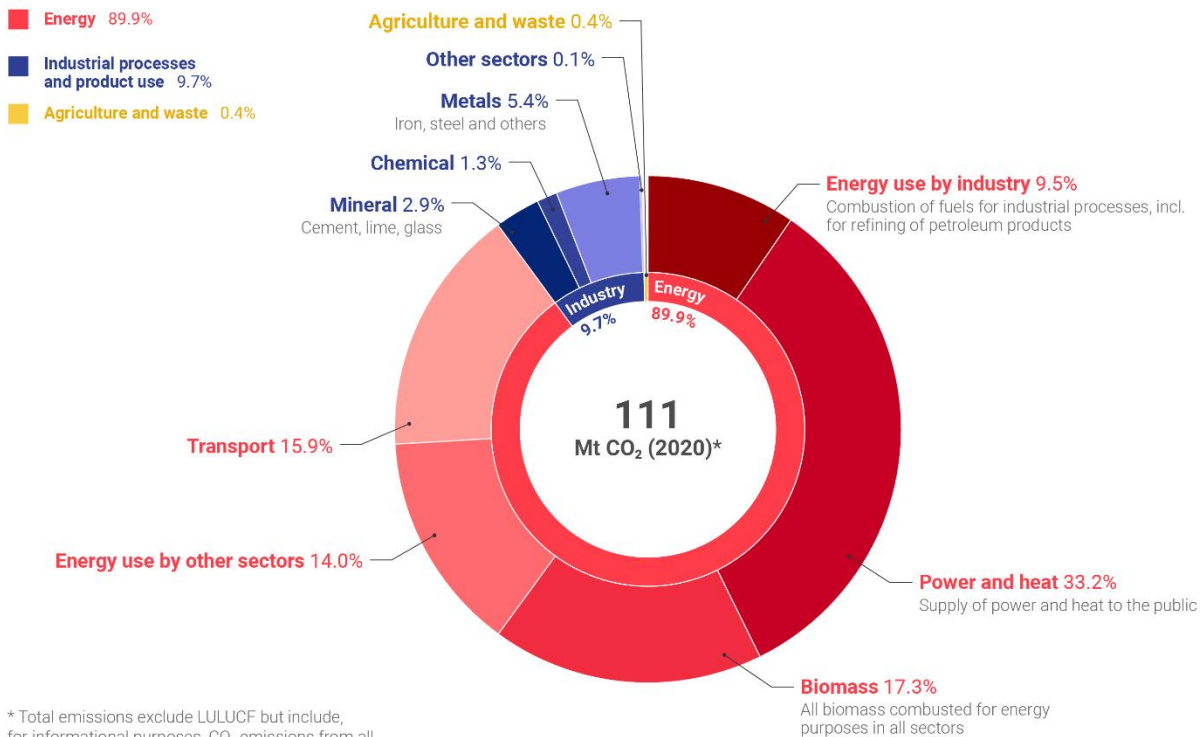
- Many project countries rely on manufacturing sectors, while their energy production depends heavily on fossil fuels. This condition, coupled with sometimes distant or uncertain deadlines for emissions reduction targets, means that CCS for the energy sector cannot be ruled out in the CEE region.
- Various transportation methods may be available to move CO₂ from emitters to storage sites in project countries or within the region. However, CO₂ transportation infrastructure is mostly absent.
- Amongst the project countries, Ukraine has the highest estimated potential for geological storage of CO₂, followed by Romania and Poland. However, more research is needed to refine knowledge on storage potential, which often relies on theoretical estimates.
- Most project countries have a history of research (and occasionally testing) of CCS. Future projects would be supported by existing know-how and experience, including, international cooperation.
- The regulatory environments of project countries are relatively underdeveloped and many fail to provide certainty for CCS, particularly regarding storage and transportation.
- Funding support is available at the EU level, and frameworks such as Projects of Common Interest may lend themselves to large-scale regional CCS projects.
- Many stakeholders in project countries are cautious about deploying CCS, due to its high costs, lack of clear government support and financing, and challenging administrative procedures. Many also tend to favour CCU over CCS, due to perceived lower complexity and risks.
- An overall lack of public and institutional knowledge of CCS is an important feature evident in project countries.

CZECHIA

- What are the overall industrial ecosystem and CO₂ emissions sources?

Fossil fuels dominate the Czech energy mix. Czechia is a highly emission-intensive economy compared to the EU average, and CO₂ emissions equal more than 110 MtCO₂ (2020). As Figure 1 highlights, almost 10% of these emissions are of a process origin – such as high-temperature processes in iron & steel or cement facilities – where CO₂ originates from the production process itself and not only from the combustion of fuels. Emissions from fuel combustion are included in the energy sector.

CO₂ EMISSIONS IN CZECHIA BY SECTORS



Data source: European Environment Agency (2020), infographics by Fakta o Klimatu

Figure 1: CO₂ emissions in Czechia by sectors

The European Commission aims to support CCS development mainly in the manufacturing industry, especially in the hard-to-abate sectors such as cement, iron & steel or chemicals. In the energy sector, a significant potential of CCS is given to waste-to-energy and biomass-to-energy power plants. For this reason, Figure 1 highlights both process and energy emissions in the industry and biomass used for energy production, where BECCS could play a significant role (bioenergy with CCS).

Figure 2 highlights the geographical element of the Czech industry and energy sectors. Emission-intensive facilities under the EU ETS classification with more than 0.25 MtCO₂eq annual emissions are displayed. While our Czech iron & steel facilities lay close to each other in an industrialised region of Silesia (very close to Poland and its industrialised area of Upper Silesia), cement and lime facilities are dispersed across the whole country. The largest petrochemical plant in Czechia is located in the northeast, close to the borders with Germany.

THE BIGGEST EMITTERS IN CZECHIA

EU ETS covered emissions of greenhouse gases in 2021

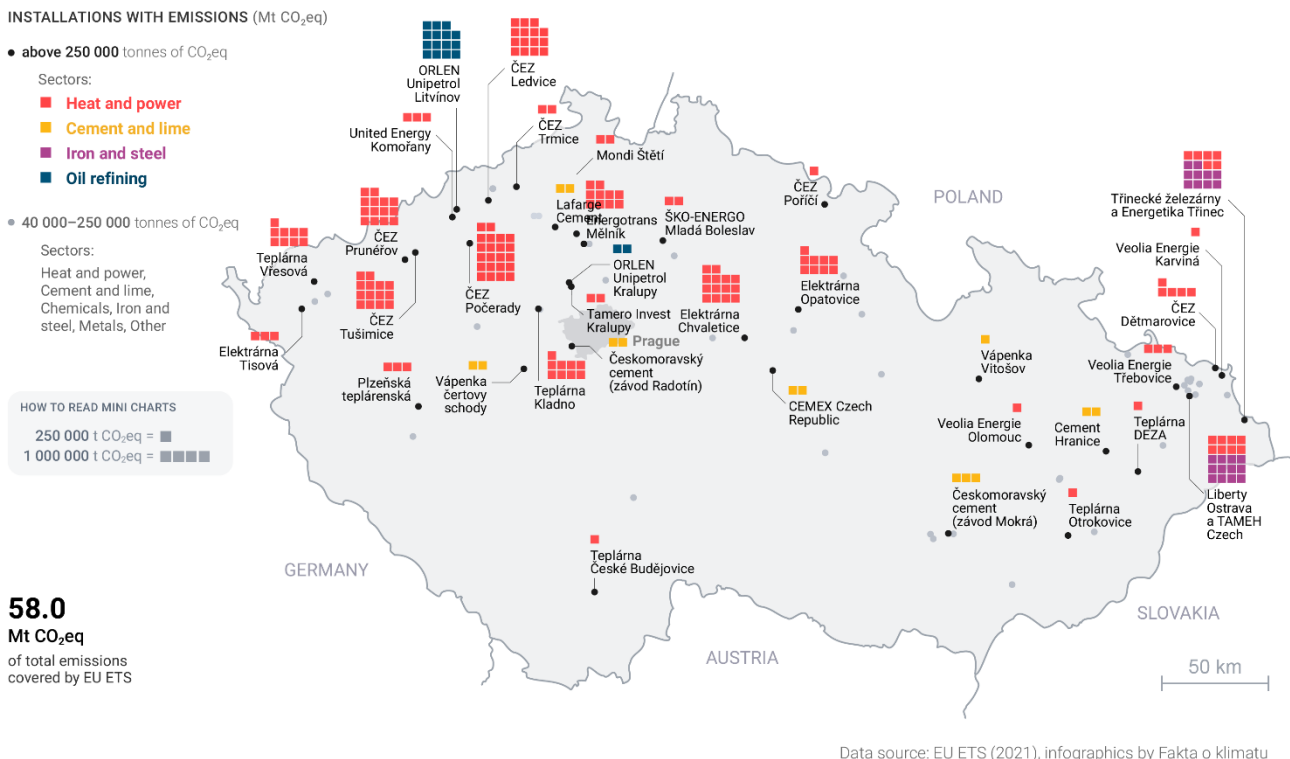


Figure 2: The biggest emitters in Czechia

- Where we stand: Is there any CCS project?

There has yet to be a CO₂ storage pilot project. However, a project coordinated by the Czech Geological Survey, [CO₂-SPICER](#) (CO₂ Storage Pilot in a Carbonate Reservoir), is preparing the first pilot storage field, which could be ready once the project delivers all foreseen tasks by Q2 2024.

Storage capacity estimates have been known for many years, as pan-European projects for CO₂ storage potential have focused on these estimates since 2004. Conservative storage potential is estimated at over 850 Mt CO₂ (equal to annual emissions of hard-to-abate industries times fifty). 90% of this capacity is estimated to be available in saline aquifers, the remaining 10% in depleted hydrocarbon or coal fields.

The capture of CO₂ has been investigated through various R&D capture projects. Currently, projects such as [METAMOPRH](#), [RPB](#) or [BIO-CCS](#) explore options and technologies for CO₂ capture. However, no such technology has been applied in a pilot project.

The transport of CO₂ has been so far investigated only theoretically.

CO₂ utilisation remains a prospective option for many industrial subjects that aim to utilise CO₂ in their daily operations. [The BIO-CCS](#) project also explores the utilisation of CO₂, besides the capturing of CO₂. A newly

launched [CO₂ Czech Solution Group](#) is reportedly preparing a first CCU pilot project in the chemical industry facility.

- [Who can change it: What are the institutions involved in the CCS debate?](#)

We see a divergence between activities on CCS and CCU. Czech Geological Survey has been leading a research strategy on CCS in Czechia for many years. The newly launched [CO₂ Czech Solution Group](#) is establishing a platform focusing on CCU. However, merging activities of these subjects under a single platform would benefit both "streams of thought".

On the governmental level, three ministries remain the most important players – the Ministry of Environment (MoE), the Ministry of Industry and Trade (MIT) and the Ministry of Finance (MF). The first two are primarily responsible for national strategies and the inclusion of CCS in a wider debate on industrial decarbonisation. MF oversees how finance is allocated to various operational programmes and whether CCS pilot projects can be financed through public finance. As we see in the current [modelling study](#) by the Charles University Environment Centre and Cambridge Econometrics, CCS finds its way into these models and should be recognised by the ministries as a technology needed for industrial transformation.

On the private sector level, many proactive companies are involved in broader CCS discussions. Most importantly, [MND](#) oil & gas company is involved in the preparation of the depleted hydrocarbon fields for future pilot storage projects. Other companies are either involved in ongoing R&D projects or actively participate in CCS seminars, create internal strategies for future decarbonisation plans that include CCS, or closely monitor the development of the European or Czech CCS debate.

- [Can we change anything despite the incomplete legal framework? What has to be amended?](#)

The EU CCS Directive has been transposed into Czech law², yet it introduces a limit to commercially storing a maximum of 1 MtCO₂ annually per storage site. An implementing decree on the financial security of CO₂ storage is yet to be drafted and approved. Nevertheless, it is no barrier to continuing with R&D and pilot projects in the upcoming months and years.

In 2023, however, MoE and MIT will update national strategies such as the National Climate and Energy Plan (NECP). The European Commission, in its guidance document for the update of NECP, has, besides other tasks, encouraged the inclusion of a [long-term strategy and update on CO₂ storage](#) potential and the foreseen role of CCS in the decarbonisation strategy of Czechia. While the European Commission is yet to propose its EU-wide [CCS strategy](#) (so-called CCUS Vision document), Czechia can move on and align the national strategy with the tremendous developments in CCS happening in the rest of the EU.

- [Has anything significant happened during the Czech EU Council Presidency \(CZ PRES\)?](#)

CZ PRES delivered an EU-wide conference focused on R&D activities and deployment of low-carbon technologies, [EU SET-Plan Conference](#) in Prague. CCS has been part of the programme, and Czech stakeholders could learn from other European institutions and companies about the latest development in CCS.

Moreover, CZ PRES has been able to finalise the trilogues on EU ETS reform. The legislators agreed on a stricter decarbonisation pathway, and financial instruments such as Innovation Fund and Modernisation Fund

² The EU CCS Directive has been transposed into Czech law by Act No. 85/2012 Coll. on the Storage of Carbon Dioxide into Natural Rock Structures and Amending Certain Acts.

will be strengthened. This money in the bank should give way to more CCS pilot projects around the EU, including Czechia. In the first two large-scale project calls, there has yet to be a successful project application from Czechia. However, one has reportedly been submitted for building a Czech first-of-a-kind CCS project in the cement industry. CCS and permanently stored CO₂ via CCU will be exempt from surrendering EU ETS allowances under agreed conditions.

Poland has moved significantly towards the future application of CCS in the industry. Currently, the Polish government is working on a national CCS strategy. More than two projects are currently ongoing to prepare the CCS industrial ecosystem – for example, the Polish [EU CCS Interconnector](#) in Gdansk, a project of common interest, and [Go4ECOPlanet](#), an Innovation Fund large-scale CCS project in the cement industry. Moreover, [the ACCSESS](#) project aims to pilot a carbon capture technology in a cement plant just a couple of kilometres from Czechia (Góraždze). Therefore, the Czech stakeholders should closely monitor the CCS development in Poland.

- [What to expect in 2023?](#)

We perceive 2023 as a turning year for CCS development in the CEE region. Not only will the national strategies be amended and could reflect on the current scale-up of CCS activities around the EU, but also the EU-wide CCS strategy³ (CCUS Vision) could represent a turning point for CCS in the EU.

A detailed assessment of the current state, past experiences and potential for CCS/CCU deployment in Czechia and other project countries is available on the project website: ccs4cee.eu

³ CCUS Vision could be published in Q4 2023; however, one could expect certain delays and see the strategy published only in Q1 2024.

Policy roadmap for the scaled-up deployment of CCS in Czechia

Based on the assessment of past experiences and CCS potential, a national policy roadmap was prepared to outline how the future development of CCS technologies could proceed and under which enabling conditions. The roadmap provides an overview of various policy actions along the innovation cycle, from research and development to the potential commercialisation of these technologies in order to reach climate targets set by the EU and national strategies. While the roadmap aims to describe an enabling environment to deploy CCS projects, it also focuses on ways to develop transferable knowledge and skills by national stakeholders (governments, research organisations, academia, private sector) in one or more stages along the carbon capture, transport, storage and utilisation chain, and create linkages to gain knowledge and experience from more experienced stakeholders across the globe.

Based on the developed roadmap, the next and immediate steps are highlighted for the further advancement of CCS in Czechia.

- Amendment of the national policies and strategic documents, preparation of NECP update, including the CO₂ storage assessment

Czechia is obliged to submit a draft of the NECP update by the end of June 2023. Based on the guidelines issued by the European Commission, CO₂ storage assessment should be an inherent part of the update. Moreover, MoE and MIT could publicly demonstrate the importance of CCS in the Czech decarbonisation scenarios by its inclusion in the upcoming updates of the State Energy Policy and Climate Long-Term Strategy⁴.

- Launch of a national CCS-dedicated platform and an advisory body to ministries

The CCS-dedicated platform should be launched and become an advisory body to the ministries involved in discussing Czech decarbonisation pathways. Channelling the EU-wide and international expertise to the local business and political environment seems crucial.

- Allocation of appropriate public finance to support CCS pre-feasibility and feasibility studies of pilot projects

Currently, R&D projects receive finance to continue developing different parts of the CCS technology chain. There needs to be public finance to support pre-feasibility and feasibility studies for pilot projects. Moreover, financing saline aquifer exploration is vital to enable local large-scale CO₂ storage in the future.

- Finalising the CO₂ storage financial security implementing decree

⁴ Officially Climate Protection Policy of the Czech Republic, we refer to it as Climate Long-Term Strategy in line with: https://unfccc.int/files/na/application/pdf/cze_climate_protection_policy_summary.pdf.

Without the implementing decree on the financial security of CO₂ storage, companies responsible for CO₂ storage and monitoring cannot estimate the cash flows and possible financial risks connected to the CO₂ storage business. MoE could finalise the draft in the upcoming months.

- **Becoming a proactive member of international platforms and fora**

The Czech government and businesses can monitor the CCS development in other countries and channel the knowledge and expertise from EU blueprints. MoE, MIT, the private sector and other relevant stakeholders could play a more proactive role in the international platforms and fora such as [Zero Emissions Platform](#), [CCUS SET-Plan Working Group](#), or [Carbon Sequestration Leadership Forum](#).

A detailed CCS national roadmap for Czechia and other project countries is available on the project website: ccs4cee.eu

