

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

Summary of CCS4CEE project

Lithuania

Implemented by:



Co-financed by:



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Wolności - Centrum Rozwoju
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ze środków Programu Rozwoju
Organizacji Obywatelskich
na lata 2018 – 2030

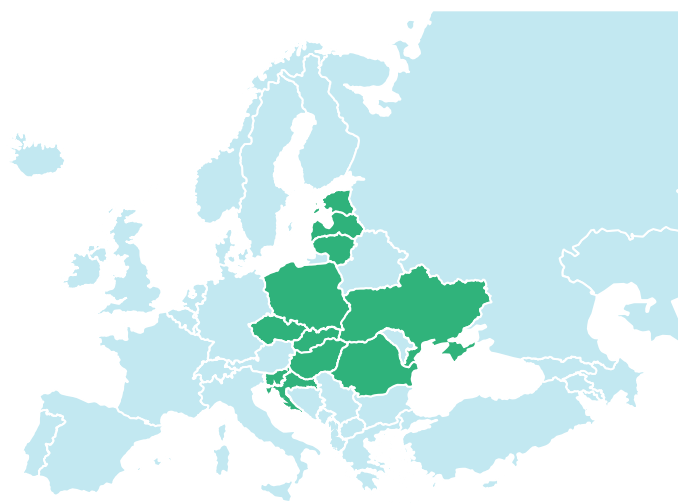


CCS4CEE project

PROJECT CONTEXT | Recent advances in several key areas (e.g., renewable energy sources, energy storage, electric vehicles) enable significant greenhouse gas emission (GHG) 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 the security of the electricity supply by complementing short-term energy storage. 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 utilization (hereinafter – CCU), the captured CO₂ is transported to a facility in which it is utilized. 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 organization 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:

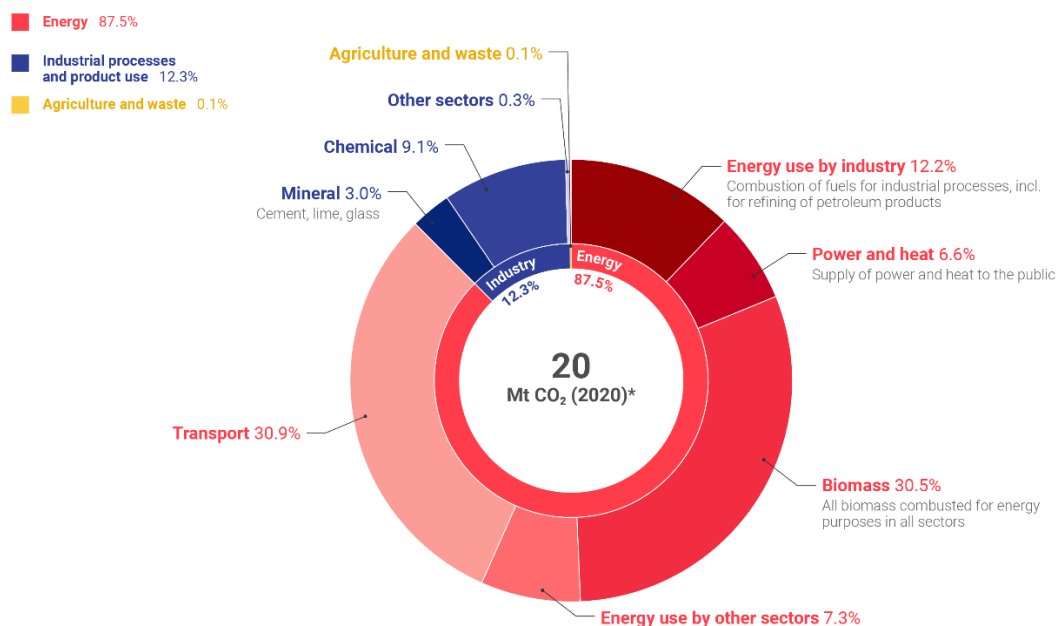
- Many project countries rely on manufacturing sectors, while their energy production depends heavily on fossil fuels. This condition, coupled with sometimes distant or uncertain deadlines for emissions reduction targets, means that CCS for the energy sector cannot be ruled out in the CEE region.
- Various 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 (PCI) 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.

LITHUANIA

Lithuania is focused on reducing its carbon footprint and achieving net zero emissions until 2050. **National Energy and Climate Plan** for 2021-2030 was drawn out to lay out steps to achieve EU climate goals until 2030. However, CCS is mentioned only as an alternative solution without any related national strategy, and the need for a feasibility study to identify those technological application opportunities in Lithuania was recognized.

Currently, the majority of CO₂ emissions in the country are attributed to 2 main sources: **transport and biomass combusted for energy purposes**. Combined, they amount to more than 60% of the total 20 Mt CO₂ emitted. The overall energy sector is responsible for around 88%, while the industry is responsible for the remaining 12%. EU ETS covers 6 Mt CO₂eq of those emissions (**FIGURE 1**).

CO₂ EMISSIONS IN LITHUANIA BY SECTORS



* Total emissions exclude LULUCF but include, for informational purposes, CO₂ emissions from all biomass combusted for energy production, which could partly be abated with CCS (Bioenergy with carbon capture and storage – BECCS)

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

FIGURE 1. CO₂ EMISSIONS IN LITHUANIA BY SECTORS

To assess the potential for CCS, it is useful to highlight **the main point sources of CO₂**, as such emitters are the most suitable and studied for capturing emitted CO₂. The industry sector can be distinguished here – this sector emits around 12.3% of total country's CO₂ emissions, with fertilizer producer "Achema" emitting the most – more than 2 Mt CO₂eq in 2021. The next biggest emitters in the industry are the oil refinery "Orlen Lietuva" and the cement factory "Akmenės cementas". Combined, they emitted around the same amount as "Achema" during the same year (**FIGURE 2**). The largest heat and power producers using fossil energy sources can usually also consider CCS in their decarbonization. However, in Lithuania, their emissions are not as prominent as in the neighbouring countries. All those companies and other interested stakeholders actively seek solutions to lower their emissions. However, the **high cost of CCS** technologies and the **lack of transportation infrastructure for CO₂** are one of the main obstacles that hinder the further application of this technology.

THE BIGGEST EMITTERS IN LITHUANIA

EU ETS covered emissions of greenhouse gases in 2021

INSTALLATIONS WITH EMISSIONS (Mt CO₂e_q)

• above 250 000 tonnes of CO₂e_q

Sectors:

■ Heat and power

■ Cement and lime

■ Chemicals

■ Oil refining

• 40 000–250 000 tonnes of CO₂e_q

Sectors:

Heat and power, Others

HOW TO READ MINI CHARTS

250 000 t CO₂e_q = ■

1 000 000 t CO₂e_q = ■■■■

6.0

Mt CO₂e_q

of total emissions
covered by EU ETS



Data source: EU ETS (2021), infographics by Fakta o klimatu

FIGURE 2. THE BIGGEST EMITTERS IN LITHUANIA

Changes in the law in 2019 **prohibited any underground storage in Lithuania**. Therefore, it limits the development of CCS technologies through industrial and investigative levels. Nevertheless, previously conducted research found **prospective underground storage sites** in the northern part of Lithuania that could be used for CO₂ storage. Additionally, depleted oil fields are potential sites for CO₂ storage, but funding from the government to inspect them would be necessary.

Due to the significant opposition from politicians and various environmental organizations before the legislation changes on underground storage and the lack of knowledge on CCS, **public opinion toward CCS can be considered mainly negative or indifferent**. However, regarding the public image of CCS as the solution to reduce carbon emissions in the country, no clear opinion could be formed due to the lack of country-wide public discussions regarding the benefits and risks of these technologies.

Considering the main political and economic uncertainties described previously, there are no large-scale projects implemented yet by the stakeholders regarding CCS technologies. Additionally, stakeholders stressed that no significant investments would be made before clear and stable EU carbon footprint calculations and penalties are in order. Nevertheless, companies are conducting small-scale experiments alone or collaborating internationally to minimize costs. Furthermore, Lithuania seems to be more focused on **hydrogen as a tool for decarbonization** since there is a developed strategy for its implementation in various sectors.

Since the publication of the Lithuanian national report, stakeholders in Lithuania and Latvia, in cooperation with international shipping companies, prepared the CCS Baltic Consortium project and applied for the Project of Common Interest status in December 2022. This project aims to create the first CCS infrastructure in the

Baltic region, providing an open-access opportunity for the emitters to transport their captured CO₂ to storage sites abroad (primarily the North Sea).

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

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

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 potential commercialization 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 organizations, academia, private sector) in one or more stages along the carbon capture, transport, storage and utilization 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 Lithuania.

1. **Launch a knowledge platform** consisting of interested stakeholders:
 - a. Define clear objectives that the platform would work on;
 - b. Appoint a person or entity to coordinate the group's work;
 - c. Create or apply current tools that could help disseminate gathered insights to increase public support (e.g., website).
2. **Conduct a feasibility study** to validate the need for a cooperation cluster nationally and internationally regarding CO₂ capture, transportation and storage opportunities abroad.
3. **Suggest the government to alter the legislation** on underground storage, which prohibits any research.
 - a. Define a safety benchmark for significant scale research projects;
 - b. If proven safe, propose amending underground storage prohibition law to allow industrial CO₂ deposits.
4. Encourage Lithuania's Geology Survey to **assess depleted oil fields** potential as a carbon storage option (after changes in legislation allow it):
 - a. Arrange funding from the government to conduct these experiments.
5. **Explore funding opportunities** on a national and international level:
 - a. Conduct research on available funding for CCS technologies implementation.

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

