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

Context and Opportunities for CCS in Central and Eastern Europe *Preliminary Findings of the CCS4CEE Project*

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Energy Policy Group

- Energy/climate think tank, based in Bucharest
- Focus on CEE region, in European and global context
- Lead on Work Package 3 (WP3) of CCS4CEE project
- Conducted assessment of Romania as part of CCS4CEE project

Energy & Climate Policy

October 5, 2021 / Energy & Climate Policy, Grants

CCS4CEE: Building momentum for the long-term CCS deployment in the CEE region

The project addresses the "Climate Change Mitigation and Adaptation" programme area of the EEA and Norway Grants Fund for Regional Cooperation, by focusing on the challenge of achieving the deep [...]



October 1, 2021 / Energy & Climate Policy, International Energy Politics

Is Maritime Transport the Achille's Heel of the Paris Agreement?

by Aime Boscq* Maritime shipping is the backbone of the international economy, accounting for more than 90% of world trade. [1] This critical economic weight has recently been illustrated by the [...]

Assessment of current state, past experiences and potential for CCS deployment in the CEE region

ROMANIA

Authors: Luciana Miu, Diana Nazare, Mihnea Cătuți, Radu Dudău, Constantin Postoiu, Mihai Bălan



September 10, 2021 / Energy & Climate Policy, EU Energy Policy, Renewable Energy, Technology Futures

Will Hydrogen Take up Natural Gas' Role in the Energy Mix?

by Aime Boscq* Natural gas is at the heart of a heated debate within the European Union (EU) over whether it should be included in the EU's taxonomy classifying green investments[1]. [...]



Project workflow (2021-2023)

WP3

Assessment of current state, past experiences and potential of CCS deployment in CEE region

- Analytical reports, focusing on the current state, past experiences and potential for CCS deployment in the target countries.
- Stakeholder engagement events (workshops and seminars)

WP4

Developing policy roadmaps for national CCS deployment and regional cooperation

 Integrated policy roadmap prepared based on inputs delivered by partners
Stakeholder events focusing on policy roadmaps (workshops and seminars)

WP5

From roadmaps to implementation: supporting the development of flagship CCS initiative in the CEE region

 Networking and capacitybuilding for implementing CCS initiatives in target countries
Setting up a dedicated

platform to ensure that the network will last beyond the project duration.

Partner countries



Funding





Where could CCU/CCS play a role?



- Steady increase in GDP, but still below EU average
- Shift to services, but industry contribution still higher than EU average
- Manufacturing is a key sector, particularly cement, lime and glass production, metals

Source: EPG (for the CCS4CEE WP3 summary report)



CEE economies are carbon-intensive

Carbon intensity: CO₂ per unit GDP (kg/current US\$)

Most partner countries are above EU average in terms of their share of process emissions in total emissions, and **cement production is the largest driver.** Estonia, Poland and Romania are exceptions.

Ukraine's metallurgy process emissions are equivalent to more than half of total metallurgy process emissions in the entire EU-28.

Compared to EU-28 averages, the share of process emissions from the chemical industry in Lithuania is **nine times larger**, and from the cement industry in Latvia **three times larger**.

- CO₂ emissions have decreased, but...
- High reliance on fossil fuels for energy production
- Old thermal power plants (many coal-fired)
- Carbon intensity of economies higher than EU average (0.18 kg/current US\$)
- Striking contributions to national CO₂ emissions of economically significant sectors

Source: Our World in Data; EPG (for the CCS4CEE WP3 summary report)

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Major (>1 Mt CO₂) emitters

- Bełchatów power plant in Poland largest emitter (due to shut by 2036)
- Poland has largest contribution to emissions, followed by Ukraine (limited data)
- 70% of large emitters are TPPs (mostly coal-fired)
- Largest non-energy emitters are US Steel Košice in Slovakia and Liberty Galați in Romania; Poland has a notable share
- Some large industrial emitters are supplied by large coalbased power stations nearby
- Baltic states: Eesti in Estonia, Orlen and Achema in Lithuania, Latvia all < 1 Mt CO₂ in 2020 (Schwenk 0.77 Mt)





Where could this CO₂ be stored in CEE?

- Total storage (indicative): ca. 92 Gt CO₂
- Ukraine's Donbass region: 45.7 458 Gt
- Mostly in saline aquifers (less-studied than HC reservoirs)
- For comparison: CEE (incl. Ukraine) CO₂ emissions in 2019: < 1Gt
- Baltic states: negligible potential in Estonia, relatively low in Lithuania and middling in Latvia
- Mineral carbonation in serpentinite deposits in southern Lithuania (Varena deposit ~ 0.5-1 Gt)
- Transportation: road/rail networks, extensive gas pipeline network, multimodal transport



Is there know-how and experience?

- Relatively little experience compared to NW Europe
- CCS testing and demonstration projects (abandoned): Bełchatów (Poland), Getica (Romania)
- Experience with CO₂-EOR and -EGR (Hungary, Romania, Croatia)
- Experience with CCU (chemical industry)
- New CCS project announcements: Klaipėda liquefied CO₂ logistics and value chain
- History of academic research and experience with international research projects



Project name	Project focus	Timeframe		Countries from the region involved in the project										
			CZ	EE	HR	HU	LT	LV	PL	RO	SI	SK	UA	
Assessing European capacity for geological storage of carbon dioxide (EU GEOCAPACITY)	Storage	2006-2008	+	+	+	+	+	+	+	+	+	+		
Monitoring and verification of CO ₂ storage and ECBM in Poland (MOVECBM)	Storage	2006-2008							+		+			
Towards a transport infrastructure for large-scale CCS in Europe (CO2EUROPIPE)	Transport	2009-2011	+						+					
Pan-European coordination action on CO ₂ Geological Storage (CGS EUROPE)	Storage	2010-2013	+	+	+	+	+	+	+	+	+	+		
Novel algae-based solution for CO_2 capture and biomass production (ALGADISK)	Capture					+					+			
Technology Options for Coupled Underground Coal Gasification and CO ₂ Capture and Storage (TOPS)	Capture and utilization	2013-2017							+		+			
Enabling Onshore CO ₂ Storage in Europe (ENOS)	Storage	2016-2020	+								+	+		
From residual steel gasses to methanol (FReSMe)	Utilization	2016-2021								+	+			
Innovative management of Coal by-Products leading also to CO ₂ emissions reduction (COALBYPRO)	Capture and storage	2017-2020	+						+					
Unconventional MEthane Production from Deep European Coal Seams through combined Coal Bed Methane (CBM) and Underground Coal GAsification (UCG) technologies (MEGAPlus)	Storage	2018-2021	+						+					
Strategic planning of regions and territories in Europe for low-carbon energy and industry through CCUS (STRATEGY CCUS)	Multiple	2019-2022			+				+	+				
Biomass gasification with negative carbon emission through innovative CO_2 capture and utilisation and integration with energy storage (BIOMASS-CCU)	Capture and utilization	2019-2022				+			+					
Building momentum for the long-term CCS deployment in the CEE region (CCS4CEE)	Multiple	2020-2023	+	+	+	+	+	+	+	+	+	+	+	



Policies and regulation for CCU/CCS in CEE



- Regulatory environments vary (particularly on CO₂ storage and transportation)
- Ban on storage in some countries (despite including CCS in long-term strategies)
- Confusing and conflicting regulation in some countries (particularly Baltic states)
- Administrative bottlenecks in some countries (despite the existence of competent authorities)
- Insufficient regulation on CCU and lack of clarity on CO₂-EOR/-EGR
- Long-term national strategies and plans rarely mention CCS, often perceived as a transition solution



Perceptions of CCU and CCS

Stakeholders

- 176 stakeholders in 11 countries
- Stakeholders are cautious about CCS
 - high costs
 - lack of clear government support and financing
 - challenging administrative procedures
 - issues related to CO₂ leakage from geological storage, plus complexity of required storage infrastructure
- Preference for CCU (including CO₂ EOR) over CCS
- Importance of regional and inter-sectoral cooperation
- Baltic states: low-middling engagement, main barriers are ban on storage and financial requirements (incl. transport and storage in Lithuania)

Public

- Lack of knowledge about CCS
- Attitudes towards climate action less favourable than in the rest of EU
- History of opposition to other similar projects (gold mining, fracking) or even CCS projects (Bełchatów)
- Mistrust of government and industrial actors may post challenges in some countries
- Institutional positioning vague at best (conflicting in Lithuania)
- Media narratives non-existent
- All stakeholders highlight importance of social acceptance



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http://ccs4cee.eu