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<u>Accelerated deployment of integrated CCUS chains based on</u> solvent capture technology

Exploring CCUS chains in Belgium and Greece based on open-access CESAR1 solvent capture technology

CO₂GeoNet Open Forum – October 4th 2023

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The AURORA project

- Horizon Europe Innovation Action project (*HE-CL5-2022-D3-01-15: Decarbonising industry with CCUS*)
- Project period:
 - January 2023 June 2026 (3 1/2 years)
- Project overall budget:
 - 16 258 397 EURO
 - Funding from EC: 12 196 763 EURO
- 12 partners from 6 European countries



Figure 3-3: Map of AURORA partners.





Project consortium



		Partner id and acronym
Research/ Academia	Image: Seven	1. SINTEF 2. NTNU 3. TCM 12. UCAM 4. UNIROMA1
Industry/ Technology provider	Victor EnergiesVictor CARPONVictor Contrantes Contron Contrantes 	5. TOTAL 6. ACC 7.MOH 8.HERACLES 9.UMICORE
SME	QeuroqualityCYBERNETICANorwayFrance	10. CYB 11. EQY



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Project concept











Source and sink mapping



• Sources in two regions

- Emitter mapping
 - Belgium
 - Greece

• Sinks

- Storage sites mapping
 - North Sea region (most likely into existing or planned infrastructure)
 - Mediterranean
- CO2 utilisation mapping
 - E.g., methanol production







Sources

• Focus regions

- Belgium
- Greece

• Local, regional, and national emitters

- Identify industrial clusters
- Mid- and long-term vision
- Assess single versus cluster approach for different elements in the CCUS chain

CO₂ capture

CO₂ conditioning

Transient

storage

Hub

(Transient storage/

reconditioning

Transport

CO2 storage

Transport

• The potential will depend on cluster definition and the

Emitters

- Inside an industrial park (local) collaboration from capture to storage is possible
- Industrial region collaboration on part of the transport chain and storage
- National collaboration on part of the transport chain and storage



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Emitters



Storage – Mediterranean



Areas of interest

- The Adriatic Sea geological province
 - One of the most important regions of natural gas and oil production in the entire Mediterranean area
 - Now attracting much attention as a potential geological storage site for CO2
- Onshore Southern Balkan area
 - Potential areas onshore in northern Greece, Croatia, and Romania
- Ionian Sea and Eastern Greece
 - Deep saline aquifers in the Greek Mesohellenic basin
 - Existing depleted hydrocarbon fields in the Tertiary sedimentary basin of Prinos



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Reference: Geocapacity and CO2stop projects

Full-chain development



- The chain design will depend on
 - Location of the CO2 source(s) more than one? Single or cluster approach?
 - The CO2 stream purity and T/P from CO2 capture plants
 - The type and location of the CO2 sink
 - Storage reservoir characteristics, impurity limitations, T/P, onshore/offshore
 - Utilisation CO2 specification
 - Regulatory limitations
 - E.g., onshore pipeline transport pressure restrictions
 - The type of transport ship and pipeline (trucks, barge, rail)
 - Transport T/P and CO2 purity limitations
 - The number of transport stages
 - Need for hubs and reconditioning of the CO2









Methodology



- Methodology for full-chain CCUS
 - 1. Regulation and policies
 - a) Regional, national, European
 - 2. Flowsheet design
 - a) Process design/optimisation
 - 3. Cost estimation
 - 4. Life cycle assessment
 - 5. Assess social and political readiness
 - 6. KPIs



Replicable and transferable full-chain methodology





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QUESTIONS? Thank you!

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