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ConsenCUS: Carbon Capture, Usage and Storage

Dear ConsenCUS community,

A new newsletter, a new test location! After a successful campaign at the site of cement factory Aalborg Portland in Denmark, the ConsenCUS demonstration plant is shipped to the oil refinery of OMV Petrom, in Romania. An exiting step to continue with our tests in a whole new industrial setting. In this newsletter we update you on this process.

The shipment to the new site coincided with our 3-year mark. So that is why we organized our 7th consortium meeting (and 4th live meeting) in Romania. The site visit to the OMV Petrom refinery in Petrobrazi was impressive and we engaged with each other for good discussion and presentations to prepare for our last year of the project execution.

This newsletter covers some more results, such as an overview of the events where ConsenCUS will be present and two articles by Wetsus. Please enjoy reading these updates from ConsenCUS!

On behalf of the ConsenCUS team
Dirk Koppert, Project Manager

News



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Results test site Aalborg, Denmark

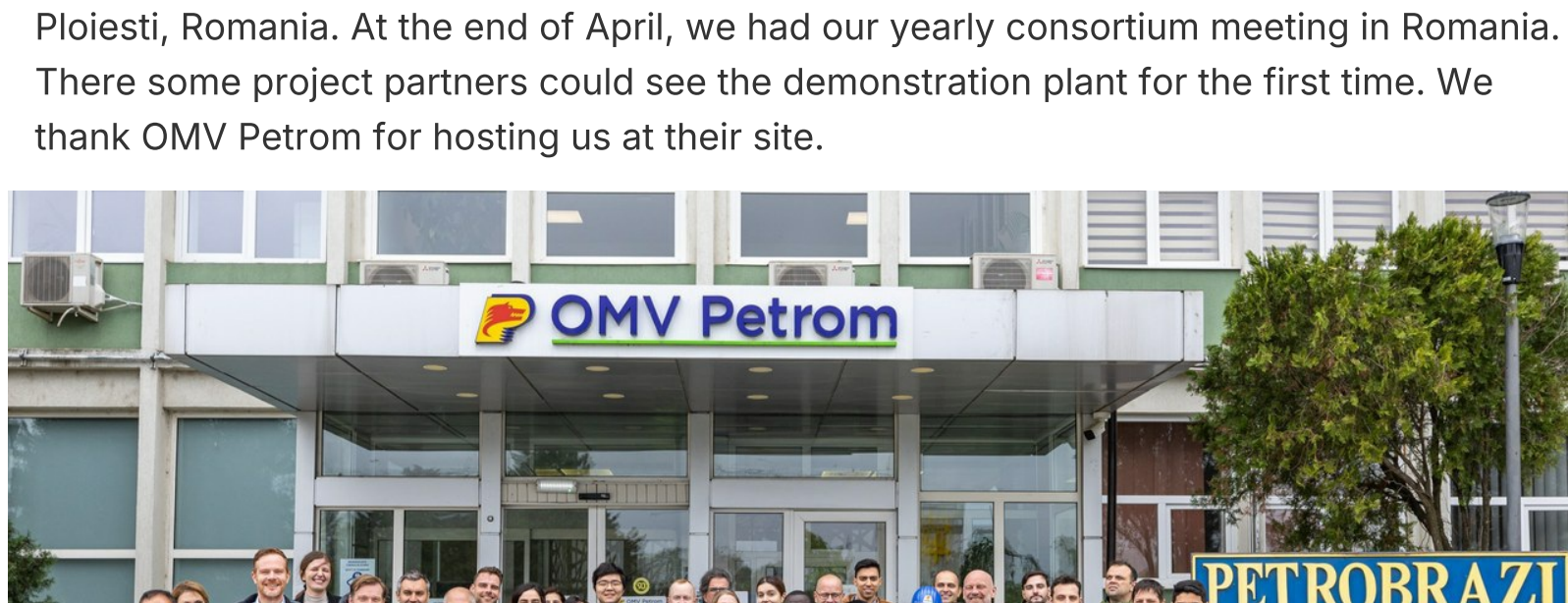
The campaign at Aalborg Portland constituted the first operation of the demonstration plant. After final installations and troubleshooting, the plant became operational by February 2024. Following this, a parametric study of the plant capabilities was conducted, leading to the first ever electrochemical CO₂ capture at a cement plant by the 8th of March 2024. This was a great milestone for the project, as the technology has never been demonstrated on this scale before.



Transport demonstration plant and build up in Romania

On the 8th of April 2024, the ConsenCUS demonstration plant containers were lifted onto trucks at the cement plant Aalborg Portland in Denmark. After a 5-day 2000 km journey, they reached the Petrobrazi refinery near Ploiesti in Romania. Here they were lifted onto the prepared concrete. Plant pipes and wires were soon connected again. The demonstration plant is placed at a prominent position, behind the main gate of the large refinery site.

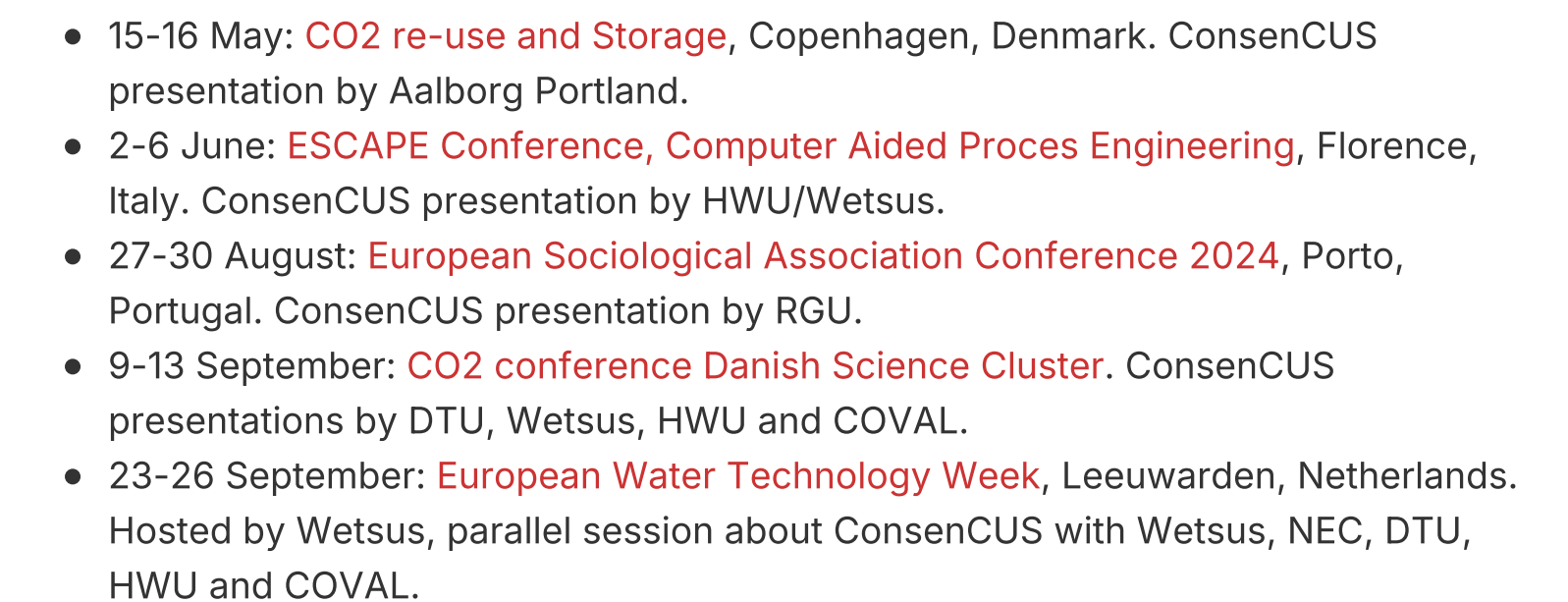
By the 19th of April, the last containers had arrived at OMVPET. The Danish team of blacksmiths and supervisors who took down the plant were ready and pipe installations between modules began immediately and were concluded the day after (Saturday the 20th). Now follows the installation of the flue gas piping, test, and repair of transport damage to sensors and piping and finally CO₂ capture with solvent.



Highlights General Assembly Bucharest Romania 24 and 25 April 2024

ConsenCUS is deliberately shipping its demonstration plant across Europe. Although this gives some planning and extra commissioning risks, the benefits of testing the demonstration plant in three different industrial settings gains valuable experience (both in CCUS as well for the host-sites on how to host a CCUS-plant) for the development of CCUS across European industries and policies.

From May until September, the plant is running at the oil refinery of OMV Petrom near Ploiesti, Romania. At the end of April, we had our yearly consortium meeting in Romania. There some project partners could see the demonstration plant for the first time. We thank OMV Petrom for hosting us at their site.



During this consortium meeting, we could engage with Romanian policy advisors to the Romanian government. The consortium presented the ConsenCUS project to:

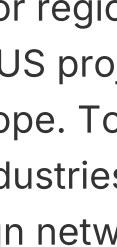
- Alina Jalea – Romanian Government – State Counsellor
- Cosmina Mișu – Permanent representative of European Commission in Romania – Minister Counsellor
- Armand Niculescu – Advisor to the Prime Minister Office

A side-event was organized by EPG, together with partners GEUS/BGS. The event was an evening seminar on CO₂ storage at the Petroleum-Gas University of Ploiesti, situated in a municipality near the Petrobrazi refinery demonstration site for the ConsenCUS technology. Luciana Mișu of EPG, Nikolai Andrianov of GEUS, and Maxine Akhurst and Audrey Ougier-Simonin of British Geological Survey presented the work of the ConsenCUS project and wider research on CO₂ storage, a hot topic on the industrial decarbonisation agenda. More information on this event can be found [here](#).

ConsenCUS was/will be present at...

- 13-15 May: [MagForum Industrial Mineral Forum & Research](#), Halkidiki, Greece. General presentation Grecian Magnesite 14th of May: Lowering the environmental footprint of magnesia products: alternative materials & CO₂ capture with ConsenCUS as example.
- 13-16 May: [InterPore 2024](#), Qingdao, China. Poster presentation ConsenCUS by GEUS.
- 15-16 May: [CO₂ re-use and Storage](#), Copenhagen, Denmark. ConsenCUS presentation by Aalborg Portland.
- 2-6 June: [ESCAPE Conference, Computer Aided Process Engineering](#), Florence, Italy. ConsenCUS presentation by HWU/Wetsus.
- 27-30 August: [European Sociological Association Conference 2024](#), Porto, Portugal. ConsenCUS presentation by RGU.
- 9-13 September: [CO₂ conference Danish Science Cluster](#). ConsenCUS presentations by DTU, Wetsus, HWU and COVAL.
- 23-26 September: [European Water Technology Week](#), Leeuwarden, Netherlands. Hosted by Wetsus, parallel session about ConsenCUS with Wetsus, NEC, DTU, HWU and COVAL.
- 29 September – 2 October: [7th Chemical Looping Conference](#), Banff, Alberta, Canada. Hosted by Nader Mahinpey, University of Calgary.
- 1-2 October: [CO₂ Storage Conference 2024](#), Aberdeen, Scotland. ConsenCUS presentation by NZTC.
- 15-16 October: [CCUS Capturing a Net Zero Future](#), London, England. Presentation ConsenCUS.
- 20-24 October: [GHGT-17 CCS Conference](#), Calgary, Canada. Presentation ConsenCUS: GEUS (poster), HWU (poster and presentation), Wetsus, RGU (e-poster) and Aalborg Portland (presentation).
- 4-7 November: [5th EAGE Global Energy Transition](#), Rotterdam, Netherlands. ConsenCUS presentation by BGS.
- 26-27 February 2025: Please save-the-date for the End Conference ConsenCUS in Brussels, Belgium. Venue will follow.

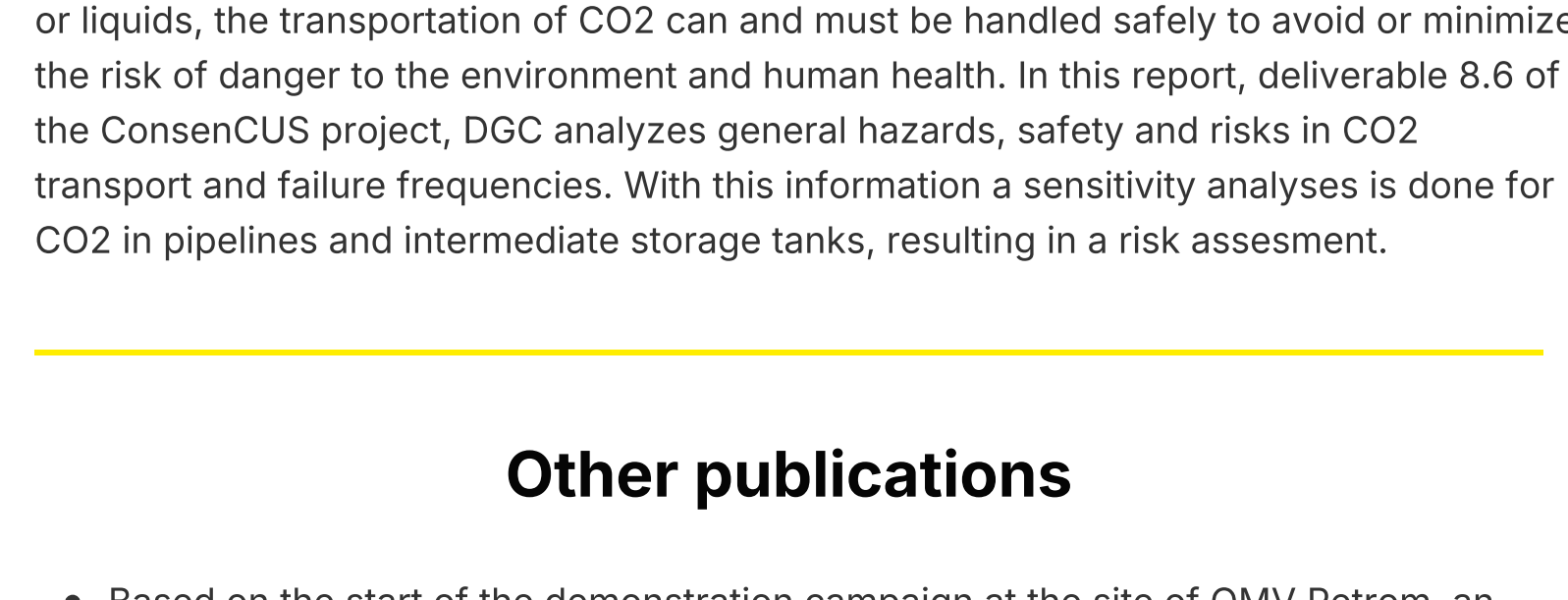
Introducing the partners



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In each newsletter, we will introduce a partner who is associated with this research project. This newsletter we introduce OMV Petrom.

OMV Petrom



OMV Petrom is the largest integrated energy producer in Southeastern Europe, with an annual Group hydrocarbon production of approximately 41 million boe in 2023. The Group has a refining capacity of 4.5 million tons annually and operates an 860 MW high-efficiency gas-fired power plant. The Group is present on the oil products retail market in Romania and neighbouring countries (Bulgaria, Serbia and Moldova) through approximately 780 filling stations under two brands – OMV and Petrom.

OMV Petrom is a company in which, as of end-2023, Romanian shareholders hold over 43% of the shares (of which the Romanian state, through the Ministry of Energy, holds 20.7%, and 22.5% is owned by pension funds in Romania, to which almost 500,000 individual investors and other Romanian entities are added). OMV Aktiengesellschaft, one of the largest listed industrial companies in Austria, holds a 51.2% stake in OMV Petrom, and the remaining 5.6% are held by other foreign investors. Of the total shares of OMV Petrom, 28.1% represents the free float on the Bucharest Stock Exchange.

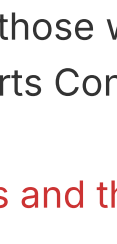
OMV Petrom is one of the largest contributors to the state budget, with approximately 42 billion euro in taxes and dividends paid between 2005 and 2023. During the same period, the company invested approximately 18 billion euro.

Since 2007, OMV Petrom has included corporate responsibility principles into its business strategy. Between 2007 and 2023, the company has allocated around 160 million euro to develop communities in Romania, focusing on environmental protection, education, health, and local development.

On July 29th, 2020, OMV Petrom announced its support for the recommendations issued by the Task Force on Climate-related Financial Disclosures (TCFD) regarding risks and opportunities on climate change. OMV Petrom annually reports on the progress made in implementing these recommendations.

[Read more](#)

Deliverables



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Although not all deliverables are public, those who are will be uploaded to our [webpage](#). Feel free to click through the latest reports ConsenCUS delivered.

D8.3: Report on value chain components and their techno-economic performance based on literature data

Investment decisions on, and policy design for CCUS technologies, need to be based on scientific evidence and must be underpinned by estimated costs, among other considerations. This is no mean feat and increases in complexity when considering complete industrial production clusters or regions, instead of individual production plants. Work package 8 of the ConsenCUS project aims to develop cost optimal CCUS clusters in northwest and southeast Europe. To that end, network optimization models are developed that link CO₂ sources (industries, electricity production, among others) and sinks (storage, utilization) and design networks that reach full decarbonisation at minimum cost. This deliverable presents component models for common emitter types (cement, iron & steel, power production) and relevant interventions (decarbonization options) that can be used in the network models developed in this work package later on. It also presents component models for CO₂ transport and storage.

D8.6: Safety report of CO₂ logistics

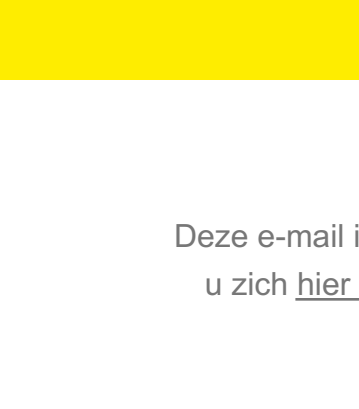
An important but often underestimated step to succeed in CCUS is the need for transporting CO₂ from one or more sources to a CO₂ storage facility or utilization site. ConsenCUS partner Danish Gas Technology Centre (DGC) examined the safety issues for CO₂ transportation related to the CCUS value chain. CO₂ is potentially toxic. It can displace oxygen in breathing air at high concentrations. This can lead to shortness of breathing, mild narcosis, confusion, headache, etc. Like all other means of moving gases or liquids, the transportation of CO₂ can and must be handled safely to avoid or minimize the risk of danger to the environment and human health. In this report, deliverable 8.6 of the ConsenCUS project, DGC analyzes general hazards, safety and risks in CO₂ transport and failure frequencies. With this information a sensitivity analysis is done for CO₂ in pipelines and intermediate storage tanks, resulting in a risk assessment.

Other publications

- Based on the start of the demonstration campaign at the site of OMV Petrom, an article was published in *Economica* (major business publication) and *E-nergia* (top tier energy publication). The articles are in Romanian (translation tip: [Deeple](#)).
 - [Carbon technology, which, among other things, could ensure the future of the thermal engine, is being tested in Romania- Economica.net](#)
 - [The technology that, among other things, could ensure the future of the thermal engine, is being tested in Romania – e-nergia](#)
- Based on the research of partner Wetsus, together with DTU, a manuscript was accepted in the *Chemical Engineering Journal** 488 (2024). This work demonstrates and characterizes the use of a bipolar membrane electrodialysis for pH-driven CO₂ capture and solvent regeneration using potassium hydroxide solutions: [Optimizing alkaline solvent regeneration through bipolar membrane electrodialysis for carbon capture - ScienceDirect](#).

* The *Chemical Engineering Journal* is an influential international research journal on the research and development of technology in the field of chemical engineering. The overall focus is on original and rigorous research results with generic significance.
- Wetsus delivered an article in *ACS Sustainable Chemistry & Engineering***[: Energy Efficient Carbon Capture through Electrochemical pH Swing Regeneration of Amine Solution](#).

** *ACS Sustainable Chemistry & Engineering* is a non-profit scientific organization with more than 140 years of experience, a champion for chemistry, its practitioners, and their global community of members.
- Innovation News Network published a [general ConsenCUS news item](#) in the digital magazine The Innovation Platform. This was also promoted via their [social media channels](#). The full edition of The Innovation Platform - Issue 18 will be published on the 3rd of June 2024.



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