



Eastern
Lights



Co-funded by
the European Union

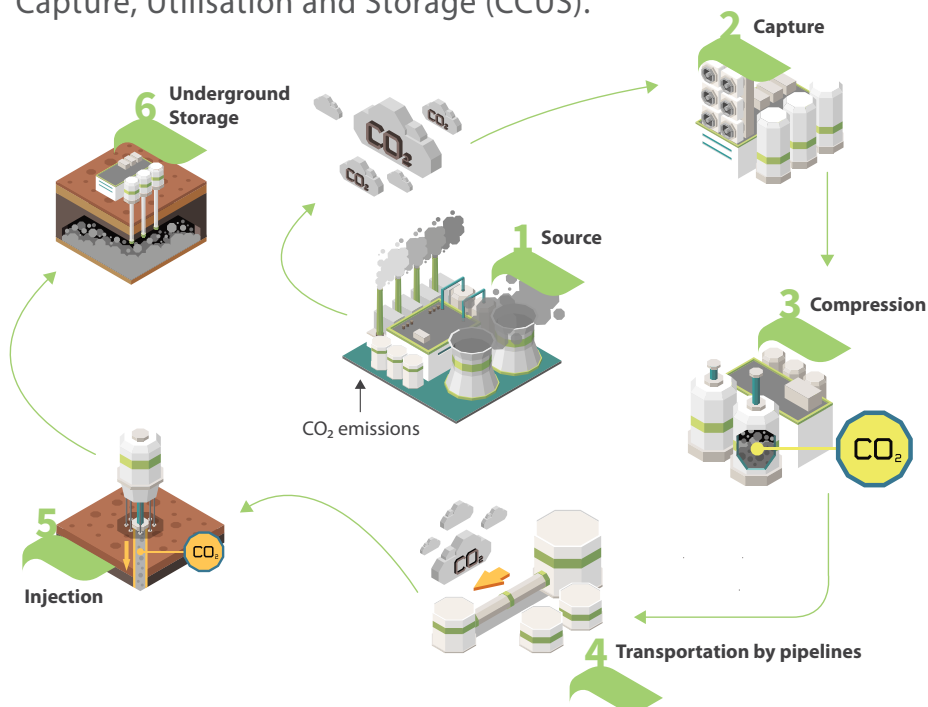
Pioneering CCUS in Eastern Europe

Demonstrating the Secure
Underground Return of
Industrial Carbon



A Mission for our future: Can we **return carbon back** to where it came from?

We all want thriving communities, with a healthy environment and a strong economy. The challenge is figuring out how to have both. What if we could turn one of industry's biggest problems into part of the solution? Imagine if we could capture the carbon dioxide (CO_2) released by our vital industries before it enters the atmosphere and contributes to climate change. That's the core idea behind a technology known as Carbon Capture, Utilisation and Storage (CCUS).





This is the goal of the Eastern Lights project, a pioneering research and demonstration initiative located in North-West Bulgaria.

The location was selected based on compelling local evidence and decades of scientific confidence. For more than 40 years, the nearby Chiren underground gas storage facility has operated safely and successfully in the very same type of geological formations.



CCUS allows us to capture CO₂ directly at the source (energy and industrial processes burning fossil fuels) and return it deep underground, locking it safely and permanently in the same types of geological structures which fossil fuels originally came from.

- Before this technology
- can be adopted on a large
- scale, its viability must be
- demonstrated in a real-
- world setting.

The proven principles used for storing natural gas are essentially the same as those required for storing CO₂, giving us a strong foundation for this project.



Our Project

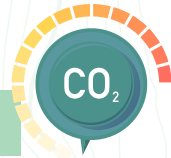
We are building a small-scale, demonstrational facility to conduct rigorous scientific tests.

Eastern Lights is not mainly about storage—it's about exploration. Like geologists, we aim to study and create a three-dimensional model of the hidden subsurface topography and the rocks that compose it.

Our primary purpose is to see if this region has the right conditions to become a safe and secure home for stored carbon in the future.

Laying the foundation for CO₂ reduction across Eastern Europe

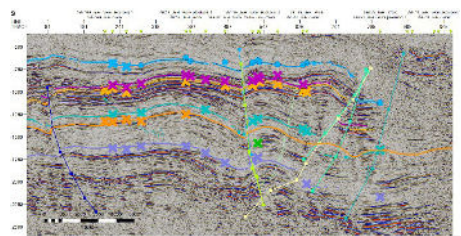
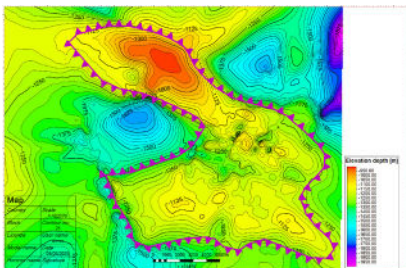
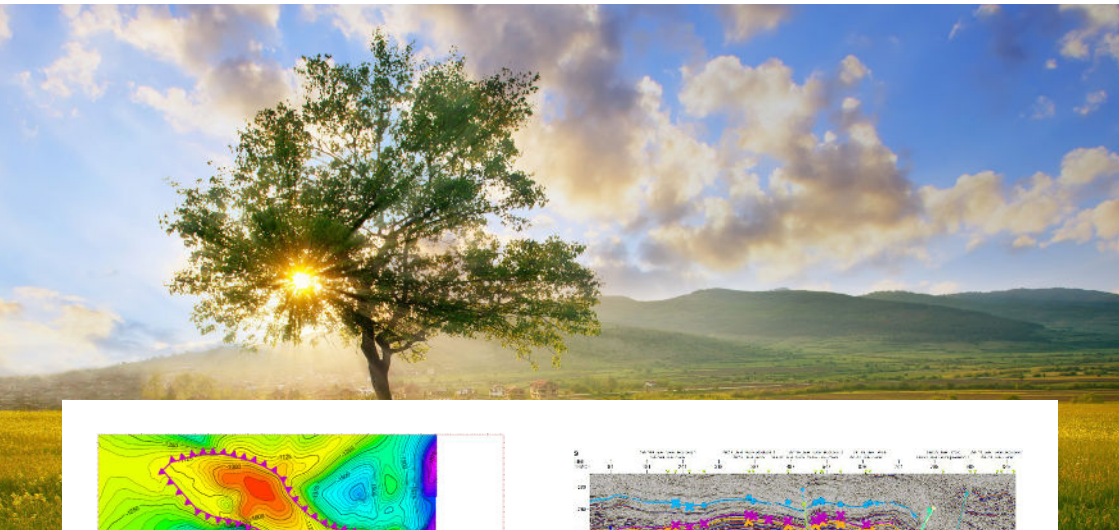
RESEARCH



Before we can consider storing a single molecule of CO₂, we have a critical checklist to complete. It includes conducting detailed studies, running advanced computer simulations to track the CO₂, and carrying out rigorous testing to guarantee its permanent storage.

COMMUNITY ENGAGEMENT

Most importantly, it means starting a conversation and sharing our findings with local communities every step of the way. We are launching an information campaign to share our plans, answer your questions, and work together to build a safe and prosperous future for the region.



- The pictures show a thorough analysis of geological data to identify the ideal
- location for exploratory drilling within the potential storage area.

Key Facts

PROJECT PARTNERS

The Eastern Lights alliance is built on trust and shared goals. Coordinated by Holcim Bulgaria, the project brings together the expertise of 19 different partners across 8 countries, including respected scientific institutions, industry leaders, and community-focused NGOs.





● 19 Project Partners



- Full budget: € 24,215,648
- EU funding: € 19,122,237

FACTS & FIGURES



● 4 years duration



● 8 Countries

OUR VISION FOR CCUS

IN EASTERN EUROPE

With the support of funding from Horizon Europe, our shared goal is to build a solid, practical blueprint for clean technology in North-West Bulgaria.

We are carefully studying how CO₂ can be safely transported and stored, creating a workable and secure solution that will help our local cement producers and other industries thrive in a low-carbon future.

However, our vision extends far beyond this initial phase.

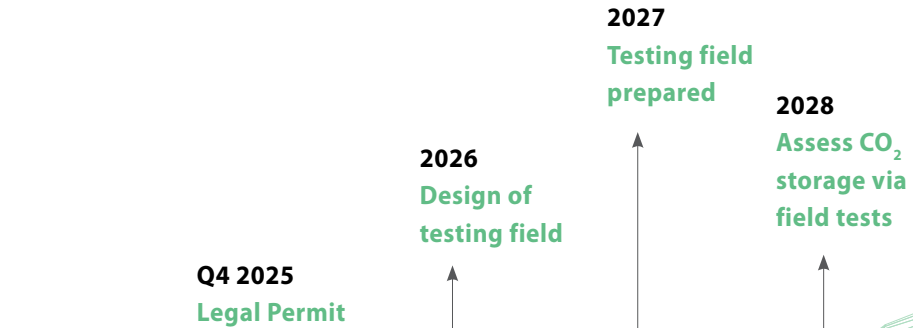
This initiative is not only a local study, it is engineered to be the cornerstone for a large-scale, cross-border CCUS cluster throughout Eastern Europe, ensuring our entire region has a foundation for sustainable growth.

We are paving the way for a cross-border CCUS cluster in Eastern Europe.

Timeline

PROJECT MILESTONES

We expect to complete the crucial phase of research and assessment by 2028, after all the necessary studies and safety tests confirm that we have a solid and secure plan.



Your questions answered

Here you can find answers to common questions about our project.

WHAT IS CO₂?

Carbon dioxide (CO₂) is a colorless, odorless gas that is a natural and vital part of the Earth's atmosphere. However, it's also a major greenhouse gas. Pure CO₂ is widely used in our daily lives for applications like carbonating beverages, shielding welds, processing food, filling fire extinguishers, and creating dry ice for cooling.

While some CO₂ comes from natural sources, large quantities are released from human activities, particularly the burning of fossil fuels in industry, power generation, and transportation. Controlling these emissions is crucial for managing global warming. To address this challenge, one leading solution is Carbon Capture, Utilisation and Storage (CCUS).

CCUS offers a flexible solution where the captured and purified CO₂ can be utilized for the production of synthetic

fuels, plastics, construction materials, etc. or as an alternative, be stored in deep underground formations. Even this stored carbon dioxide can be subsequently retrieved and processed if needed.

This process involves:

- Capturing CO₂ from large emission sources.
- Compressing the gas into a dense, liquid-like state. This high-pressure fluid is similar to the liquid CO₂ found in a fire extinguisher.
- Injecting it deep underground into stable geological formations for permanent storage.

Commercially, pure CO₂ is used to carbonate beverages, fill fire extinguishers, and create dry ice for refrigeration.



HOW WILL THIS PROJECT HELP OUR ENVIRONMENT?

Our goal is to provide Bulgarian industries with a safe and permanent solution for managing carbon dioxide (CO₂) emissions. This initiative will enable vital industries to continue operating, securing thousands of jobs.

This project is the essential first step. We are currently performing a thorough assessment by studying the deep underground geology to identify the optimal

location and to rigorously verify that this technology is safe for our region. By completing this foundational work, we are paving the way for a cleaner, more sustainable industrial future for Bulgaria.

WILL THIS DISRUPT OUR DAILY LIVES?

We will make every effort to keep any inconvenience to an absolute minimum.

Drilling

We will need to drill one exploration well. This will only last for about three months, during normal weekday working hours. The work area will be small (about the size of a large yard), and we will wait until after the agricultural season is over. After the work is finished, the site will be completely rehabilitated.

Modelling

Creating a 3D model of the geological structure beneath the surface requires specialized equipment—trucks—to pass through the area for approximately 20 days. The equipment is not planned to pass through any residential areas. During this brief period, temporary noise emissions are possible, the intensity of which will be well below the maximum permissible limit of 80 dB.

Our Commitment

We will always work directly with landowners, pay for the use of any land, and provide fair compensation for any disruption.

IS THIS PROJECT SAFE FOR OUR HEALTH, WATER, AND LAND?

Yes. Your safety and the health of our shared environment are our number one priorities.

Proven Technology

This technology is very safe. Think of the Chiren underground gas storage facility, which has operated safely right here in North-West Bulgaria for over 40 years without any issues. We are using the same proven principles.

Safe for Water

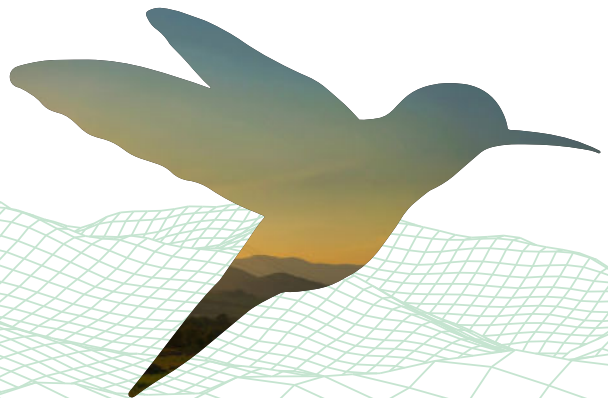
The CO₂ will be stored in rock formations over a kilometer deep underground, far away from and completely sealed off from any freshwater sources.

Protecting Nature

We will conduct a full environmental impact assessment study and will not begin without official permits. We will completely avoid protected nature areas and wildlife habitats.

24/7 Monitoring

A dedicated team of experts will monitor the site around the clock to ensure everything is always secure.





WILL THE PROJECT CREATE JOBS?

The Eastern Lights project is committed to creating valuable opportunities for skilled employment and building local prosperity.

From the very beginning, several hundred workers will be needed to help us lay this groundwork. The initial phase of technical surveys will create more than 200 temporary jobs, with additional roles opening up as the project develops. As it matures, this initiative will provide stable, long-term careers for skilled specialists in operations, monitoring, and maintenance, strengthening the region's economic future.

WHERE WILL THE CO₂ COME FROM?

For this first testing phase, no CO₂ is being captured in Bulgaria.

Our project focuses on proving that the onshore storage site is practical and safe. To run the test, we will bring in a small, controlled amount of purified CO₂ from a trusted industrial partner abroad.

In the future, the goal is for this storage site to be used by Bulgarian industries, like our own cement plants, to permanently store the carbon they capture.

WHY DID YOU CHOOSE NORTH-WEST BULGARIA?

The selection of North-West Bulgaria is based on two primary factors: its specific geology and the proven success of existing, similar infrastructure in the area.

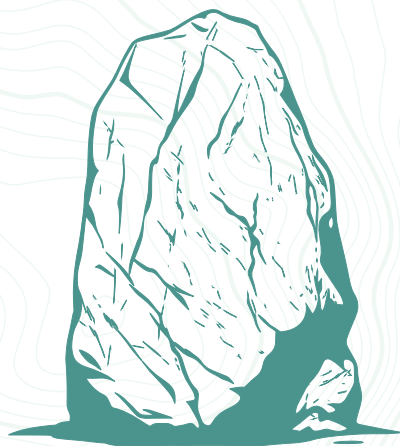
The rock formations deep beneath this region possess the necessary characteristics for secure, long-term CO₂ storage.

These include a porous rock layer with the capacity to hold CO₂, which is covered by a thick, impermeable 'cap rock' layer that acts as a natural, permanent seal. The reliability of such a system has been proven in practice by the decades-long, trouble-free operation of the Chiren underground gas storage facility and the other oil and gas fields in the region (Devetaki, Butan, Gorni and Dolni Lukovit, Dolni Dabnik).

The long-term operational success of the Chiren underground gas storage facility provides a direct, real-world

demonstration of this geological system's ability to contain gases securely over many decades.

Our current work involves detailed modelling and site-specific tests to identify the most optimal location within this promising area.





Join the Eastern Lights Community

Learn more about how we are planning to
accelerate CCUS on our website:

www.eastern-lights.eu

Newsletter

Subscribe to our newsletter on our website and be
the first to receive news on Eastern Lights

We want to hear from you!

If you have any questions, queries
or comments on Eastern Lights, please contact us
at **contact@eastern-lights.eu**



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