

Partners



Follow us

ceegsproject.eu

[@ceegsproject](https://twitter.com/ceegsproject)

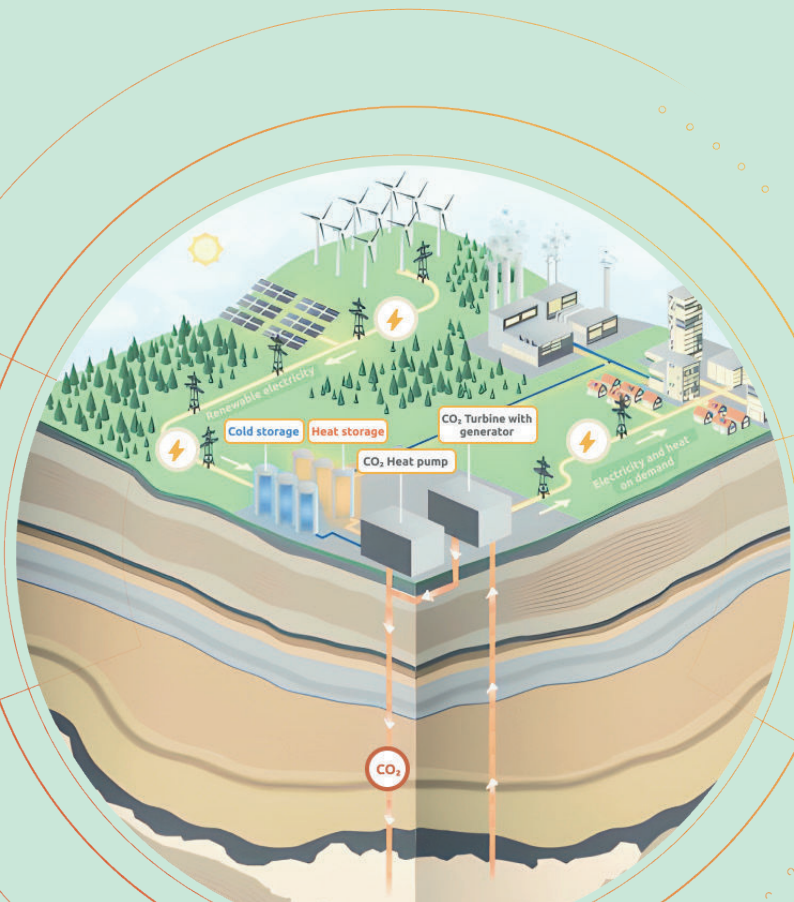
Contact

info@ceegsproject.eu



CEECS

Novel CO₂-based Electrothermal Energy and Geological Storage system



Funded by
the European Union

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.



CEEGS in a nutshell

CEEGS is a 3-year long Horizon Europe-funded project that will develop a cross-sectoral technology for the energy transition, combining a renewable energy storage system based on the transcritical CO₂ cycle, CO₂ storage in geological formations and geothermal heat extraction.

Our main objective

The project's main objective is to provide scientific proof of the techno-economic feasibility of the technology, raising the current Technology Readiness Level (TRL) from 2 to 4 by addressing gaps in the interface between surface transcritical cycle and the subsurface CO₂ storage.

Why?

The phasing out of fossil fuels and the achievement of the 'net zero emissions' target is a top priority in the EU. In the context of an ambitious energy transition, it is important to design a cross-sectoral technology that is both technologically and economically feasible.

The system developed by CEEGS has a negative CO₂ footprint as part of the stored underground CO₂ is diffused into the geological formation, resulting in permanent sequestration.

CEEGS is a scalable system with the potential for high-performance, high-capacity energy storage. It can be used for electricity storage and production, heating and cooling, and also providing partial CO₂ sequestration.

The concept minimises costs and surface impact, increases energy storage capacity, and delivers energy in different forms, providing high versatility due to integration possibilities in multiple applications.

How and when?

1. The first stage will demonstrate the feasibility of the concept, solving the main challenge of the interface between the surface/subsurface parts (currently TRL2). The rest of the components have higher TRLs. The CEEGS project will set the interface and global concept into TRL 4. A 20-kW lab demonstration for the interface (TRL4) shall focus on the CO₂ cycle and its operability. This will take three years.
2. If successful, a second stage would build a demonstrator of 100 kW that integrates subsurface and surface components to reach a TRL6 in a second 3-year project.
3. A third-stage 3-year project would impulse the technology up to a commercial scale (TRL 8-9).

Expected results

- A breakthrough energy storage solution based on transcritical CO₂ cycle that combines geological storages of CO₂ in natural reservoirs and new closed-loop CO₂ cycle technology, with their integration at TRL4.
- Definition of geological availability together with geological system design to guide exploration and feasibility.
- New component designs and engineering solutions to make the CEEGS concept technologically and economically viable. Solve open issues on Total CO₂/underground storage design.
- Validation of technical assumptions and complete risk analysis, including social acceptance that fosters decision-making in a stage-gate process.
- Draft a complete business model and business cases for stakeholders to trigger further public and private investments in the development (TRL 5-7) and demonstration (TRL 7-8) of the CEEGS technology.

