USC-FlexStore

Underground Sun Conversion – Flexible Storage

> *Interseasonal Storage will prove to be the main challenge in our future energy architecture. We believe to have the Solution.*

This innovative international project is aimed at developing a seasonal, high-volume transformation and storage solution for erratic renewable generation. Energy will be stored safely in gaseous form in underground facilities at depths of over 1,000 metres.

The aim of the project is to take RAG Austria AG's patented "Underground Sun Conversion" (USC) technology (which involves methanation of CO_2 and green H_2) to the next level, and to design services based on it.

Field tests are planned at RAG's research facility in Pilsbach (Upper Austria). In collaboration with Swiss energy supplier Energie 360° and research partners (Wiva, BOKU Vienna, Empa, University of Bern, OST) know-how and specific capabilities are bundled.

Investigations will centre on the technological, commercial, energy-sector and legal requirements for a cross-sector approach that can reduce the current need for substantial imports and use of fossil energy in winter, when demand is stronger.

"USC-FlexStore's" main advantages are its greater flexibility and much higher capacity compared with other storage technologies, enabling a true interseasonal and reliable power shift from high production to high consumption.

Project Duration

01.12.2020 - 31.05.2023

Project Budget

Total Budget: € 3,689,604.-

Funding: € 1,636,025.-

Project Coordinator

RAG Austria AG (Austria)

Project Partners

- Energie 360° AG (Switzerland)
- BOKU (Austria)
- Universität Bern (Switzerland)
- OST (Switzerland)
- Empa (Switzerland)
- WIVA P&G (Austria)

Project Website

www.underground-sun-conversion.at/flexstore

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ERA-Net Smart Energy Systems

ERA-Net Smart Energy Systems Joint Call 2019 (MICall19)

This project has been awarded funding within the ERA-Net SES Joint Call 2019 for transnational research, development and demonstration projects. EUR 16.5 Mio of funding have been granted to 14 projects active in 15 regions and countries.

This project has received funding in the framework of the joint programming initiative ERA-Net Smart Energy Systems. The initiative has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreements no. 646039 and no. 755970.

Joint Programming for Flourishing Innovation – from Local and Regional Trials towards a Transnational Knowledge Community

www.eranet-smartenergysystems.eu

Main Objectives

The project's objective is to embed an inter-seasonal storage technology in a socio-economic and political framework in order to contribute to a renewable, sustainable, reliable and secure energy future. By converting excess power to H_2 and adding sustainably aquired CO_2, feeding them in a porous underground storage formation, a microbiological process is started that produces methane. This resulting energy-carrier can be used in a highly flexible manner to prevent widely anticipated supply gaps.

Expected Key Results

Technology

- The established process of geomethanization in the reservoir will be further developed and the robustness and flexibility of the system regarding off-stoichiometric gas contents will be answered.
- A field test provides accelerated life testing and monitoring of this emerging inter-seasonal storage solution and investigates the effects measured in lab tests in a storage reservoir.

Market

- New operation concepts will be designed to apply the geo-methanation technology in other storage reservoirs. With the investigation of storage potential in Switzerland, FlexStore will provide a blueprint for the scalability of the technology.
- Through modelled energy production and consumption patterns will define the potential for the aimed marketable service. Boundary conditions to be met by an economic environment are identified and defined.

Adoption

- Findings will be actively spread among the scientific community, the affected economic and political stakeholders. The results will be further enhanced by outlining risk and risk-perception assessments to foster the knowledge and acceptance of the geo-methanation technology.
- Identification and discussion of potentially competing concepts for underground usage of identified potential sites.

Funding agencies: