European Commission

CEMENT AND LIME

INNOVATION FUND

Deployment of net-zero and innovative technologies

GeZero: First German inland cement plant Geseke becomes net carbon negative by implementing a full CCS chain

The Innovation Fund is 100% funded by the EU Emissions Trading System

| Project Factsheet

GeZero (Geseke Zero Emissions) is a full-chain and a full-scale Carbon Capture and Storage (CCS) project (from source to sink) for Geseke, a Heidelberg Materials' cement plant in North Rhine-Westphalia (Germany). The project plans to build a new second generation Oxyfuel kiln on an industrial scale. This will be combined with several innovations to improve the technical, economical, and environmental performance of the plant, leading to approximately 100% relative GHG emission avoidance compared to the reference scenario.

The first-of-its-kind project will contribute to the development of an entire CCS value chain solution for a location which is not in close proximity to the coast nor to inland carbon dioxide (CO2) storage options. Starting to operate in 2029, the project aims to safely capture and store approximately 700 000 tonnes of CO2 equivalent (tCO2e)

COORDINATOR
HEIDELBERG MATERIALS AG

LOCATION
Germany

CATEGORY
Energy Intensive industries / CO2 capture for storage, full chain Carbon Capture and Storage (EEI / CCS)

SECTOR
Cement lime

AMOUNT OF INNOVATION FUND GRANT
EUR 190,905,744

EXPECTED GHG EMISSIONS AVOIDANCE
7,265,868 tonnes CO2 equivalent

STARTING DATE
01 January, 2024

ENTRY INTO OPERATION DATE
31 December, 2028

FINANCIAL CLOSE DATE
31 December, 2025

Updated on 13 December 2023

annually beneath the North Sea. This is equivalent to about 3.5% of the annual CO2 emissions of the German cement industry, or the yearly average CO2 footprint of 66 700 Germans (calculated according to the Federal Environment Agency, 2023). The project is expected to transform the Geseke plant into one of the first fully decarbonised European plants to produce cement and clinker.

The project includes a new cutting-edge oxyfuel kiln combined with upstream Oxygen (O2) production through an Air Separation Unit (ASU). The purification (concentration) and liquefaction of the CO2 will take place in a Cryogenic Processing Unit (CPU). GeZero's logistical concept includes rail loading and interim storage facilities. The CO2 will be transported via train to Wintershall Dea's hub "CO2nnectNow" in Wilhelmshaven and from there via ship and pipeline to the final permanent storage site. This transport solution by rail will bridge the gap until a CO2 pipeline infrastructure is available. The electrical energy demand will be met exclusively by renewable energy. For example, a new solar farm at the factory premises will help to cover a small portion of this demand. In addition, biomass will be used for thermal energy generation and to capture the associated CO2, which will create so-called negative emissions, thus sustainably contributing to the EU's CO2 reduction targets.

GeZero contributes significantly to reaching the climate goals of the industrial sector and to establishing a future carbon management infrastructure. In addition, due to its demand for green energy, the project underlines the need for energy transition and aims to be part of the solution by installing its own solar power farm. GeZero will serve as a CO2 collection hub for smaller local emitters, giving them access to intermediate storage and rail loading infrastructure. Located near four other cement plants, GeZero plays a crucial role to help making this part of Germany a model region for climate-neutral cement production, ensuring the creation of future-proof jobs.

| Beneficiaries

HEIDELBERG MATERIALS AG — Germany