European Commission

CEMENT AND LIME

INNOVATION FUND

Deployment of net-zero and innovative technologies

GO4ZERO: Towards a carbon negative large-scale clinker plant through first-ever demonstration of a groundbreaking flue gas recirculation concentration-based concept paired with a full CCS solution

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

| Project Factsheet

The GO4ZERO project aims to put into operation an innovative pollutant free and carbon negative clinker kiln in the Holcim Obourg plant located in Wallonia, Belgium. The project will couple an oxy-combustion process with a large-scale carbon capture and sequestration system (CCS). The oxyfuel clinker kiln design significantly concentrates CO2 in its flue gases and, CO2 processing technologies, will make the project excel in carbon capture and purification. The processed CO2 will be transported by pipeline to the Antwerp@C CO2 Export Hub, where it will be liquefied and loaded onto CO2 ships for permanent and safe offshore storage beneath the North Sea. The project is expected to have 103% avoidance in relative greenhouse gas (GHG) emissions when compared to the reference scenario without implementing Carbon Capture and Sequestration.

The project will combine several innovative

COORDINATOR
HOLCIM BELGIQUE SA

LOCATION
Belgium

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 230,000,000

EXPECTED GHG EMISSIONS AVOIDANCE
10,045,932 tonnes CO2 equivalent

STARTING DATE
01 January, 2024

ENTRY INTO OPERATION DATE
31 December, 2028

FINANCIAL CLOSE DATE
31 March, 2025

Updated on 19 March 2024

technologies to produce a carbon negative clinker, ultimately supporting the construction sector in improving its sustainability. The CO2 intensity per tonne of clinker will be below the European benchmark value prior to carbon capture through low heat consumption, optimised combustion and gas recirculation conditions, as well as intensive use of alternative high-biomass content fuels and decarbonised raw materials. The cement portfolio will be further developed to reduce the embedded clinker factor (the amount of clinker in cement) and to push the use of new mineral components in substitution to clinker and slag.

The plant will also contribute a very low level of indirect carbon emissions from energy input. This will be achieved through a combination of sourcing energy from a locally developed 30 megawatt (MW) floating photovoltaic farm, secured electricity through Power Purchase Agreements (PPAs), and the installation of a Waste Heat Recovery, yearly producing 50 gigawatt hours (GWh) of energy. Additionally, to reach the inlet gas specifications of the cryogenic purification unit (CPU), the design of the oxyfuel kiln is combined with cleaning technologies for flue gases, the combination of which will be the first of its kind (including a wet scrubber, thermal oxidiser, and selective non-catalytic reduction (SNCR)). A cooling condensing unit will extract water from the kiln gases and send it to a condensate treatment plant to comply with strict wastewater disposal conditions. The project is planning to produce annually more than 2.3 million tonnes (Mt) of carbon neutral cementitious materials - mainly cement, but also clinker - pioneering work on the path to a sustainable construction sector. It will also avoid more than 10 million tonnes CO2 equivalent of absolute GHG emissions over the first ten years of operation. The project will contribute to the European objectives to reach climate neutrality by 2050, and in particular to the Net-Zero Industry Act to reach 50 Mt per year of CO2 storage capacity in 2030.

The dissemination of the project results, developed knowledge and lessons learned, will directly benefit all stakeholders throughout the project lifecycle, accelerating the roll-out of the oxyfuel process combined with an efficient Carbon processing unit. The project is expected to create 18 direct jobs for the oxyfuel kiln, auxiliaries and the CPU and 54 indirect jobs.

| Beneficiaries

HOLCIM BELGIQUE SA	Belgium
AIR LIQUIDE GLOBAL E SOLUTIONS FRANCE	France
AIR LIQUIDE INDUSTRIES BELGIUM	Belgium