



INNOVATION FUND

Driving clean innovative technologies towards the market

CalCC – First industrial-scale carbon capture for lime production integrated with transport of CO₂ to coastal hub and shipping to geological storage in the North Sea

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



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Project summary

The CalCC project will showcase a pathway for decarbonisation in the European lime industry. The project is capturing and permanently storing CO₂ emitted during lime production at Lhoist Group's Réty site in France. This innovative project will cover the full CO₂ value chain: capture, pipeline transport, liquefaction, shipping, and offshore geological storage. For the carbon capture aspect of the project, Air Liquide will build the first Cryocap™ FG unit in a lime plant at industrial scale. The Cryocap™ technology uses cryogenic temperatures to separate gases and creates a 99.99% pure CO₂ stream needed for CO₂ transport and geological storage. The project plans to achieve 87% relative greenhouse gas (GHG) emission avoidance compared to the reference scenario.

COORDINATOR

Chaux et Dolomies du Boulonnais (FR)
(affiliate of Lhoist Group)

BENEFICIARY

Air Liquide France Industrie (FR)

LOCATION

Réty, France

SECTOR

Cement and lime

GHG EMISSION AVOIDANCE

5.8 Mt CO₂ eq

AMOUNT OF THE INNOVATION FUND GRANT

EUR 125 198 197

RELEVANT COSTS

EUR 208 663 662

TOTAL PROJECT COSTS

EUR 3 036 929 288

ESTIMATED CAPEX

EUR 198 444 191

STARTING DATE

1 January 2023

PLANNED DATE OF ENTRY INTO OPERATION

31 December 2027

The first low-carbon intensity lime on the market

The lime industry is one of the “hard-to-abate” industries, as lime production generates CO₂ from decomposition of limestone. These so-called “process emissions” cannot be avoided by switching to zero-carbon fuels. Thanks to the CalCC project, Lhoist will be able to reduce the CO₂ emissions of its site in Réty by more than 600 000 tonnes per year¹, starting in 2028. This is equivalent to the annual emissions of about 90 000 people in Europe². This first-of-its-kind project will support local and other European lime users from various industries, such as water treatment, chemicals, paper and steel manufacturing, in their path to carbon neutrality, by providing the first low-carbon lime on the market.

Leveraging its know-how and unique expertise in CO₂ capture technologies, Air Liquide will build and operate a unit of its innovative and proprietary Cryocap™ FG (Flue Gas) technology. This will capture and purify 95% of the CO₂ from Lhoist’s existing lime production unit in the Hauts-de-France region. The cryogenic carbon capture technology is 100% electrical and will be used for the first time in Europe to decarbonise the lime sector.

The deployment of a low-carbon industrial ecosystem

The CalCC project is a further step in creating a low-carbon industrial ecosystem in the broader Dunkirk area. The captured CO₂ is planned to be transported via a CO₂ dense phase pipeline, which will run for roughly 50 km and be shared with other industrial streams in order to increase savings and achieve synergies. The CO₂ terminal in the Port of Dunkirk, including the subcooling / liquefaction unit, will be implemented as shared infrastructure with nearby hard-to-abate cement and steel industries. These synergies position the Hauts-de-France region as a driver in the development of integrated CCS logistic solutions.

The liquified CO₂ will be shipped in specially adapted vessels, to be safely and permanently stored in subsea geological formations, in the North Sea.

A solution to support the EU’s carbon neutrality objective

This innovative project will bring together all the elements of the carbon capture and storage (CCS) chain, solving potential interface issues and demonstrating the full value chain for the first time on a lime plant.

The project will pave the way for other emitters, as it shows a high scalability potential on existing plants both at sector level (cement and lime industry), and on an economy-wide level across sectors and across countries. CalCC will share its experiences to support industries in their efforts to contribute to the EU’s objective of achieving climate neutrality by 2050.

¹ Approximately 87% of the CO₂ generated by the operation of the project will not be emitted to the atmosphere.

² Considering Eurostat’s estimate: the total carbon footprint of EU-27 in 2019 was equal to 6.8 tonnes of CO₂ per person.