**LEILAC1&2 Project Information**

**Project Developer Website**

Multiple https://www.project-leilac.eu/

**Project Location**

Belgium and Germany

**Project Type**

CO2 Capture

**Project Description**

Supported by the European Union, the LEILAC (Low Emissions Intensity Lime And Cement) projects are developing a breakthrough technology that aims to enable the cement and lime industries to capture their unavoidable CO2 emissions emitted from the raw limestone. The Calix process engineers the existing process flows of a traditional calciner indirectly heating the limestone via a special steel vessel. This unique system enables pure CO2 to be captured as it is released from the limestone, as the furnace exhaust gases are kept separate, meaning that these process emissions can be captured without significant energy or capital penalty. The main energy requirement is for CO2 compression (for transport and storage).

The technology is being de-risked and rapidly scaled up – with a unit treating 20% of a typical cement plant’s emissions being currently designed for operation in 2023.

**Operational Status**

Pilot-scale plant began operations in 2019

Demonstration-scale plant aims to start operation in 2023

**Technology Description**

Capture: Calix’s LEILAC technology re-engineers the existing process flows of a traditional calciner, indirectly heating the limestone via special steel vessels. This unique system enables pure CO2 to be captured as it is released from the limestone, as the furnace exhaust gases are kept separate. Calcining raw meal by indirect heating (LEILAC) or by contact-heat (conventional calciner) can be done in principle with the same specific energy. The process does not involve any additional processes or chemicals, and simply involves a novel “calciner” (kiln) design.

For the remaining emissions associated with heating the reactor, the technology just involves heating a module of tubes / reactors (avoiding the mixing-up of combustion emissions with process-related emissions), and aims to enable the use any type of fuel. This makes achieving a low-emissions cement kiln relatively easy, using biomass rich fuels, electricity, hydrogen etc. If alternative fuels, biomass, or conventional fuels are used, conventional carbon capture techniques which have been already developed and optimised by the power sector can be applied, potentially leading to negative emissions.

Emissions source: the pilot captures industrial emissions at the HeidelbergCement plant in Lixhe, Belgium. Extensive research, development and engineering was necessary to design and construct the first-of-a-kind pilot on time and on budget in 2019. The larger Demonstration plant, at four times the scale, will capture 100ktpa of CO2 from one of HeidelbergCement’s plants in Germany.

**TRL Progression**

Starting: TRL 5

Target: TRL 7

**CO2 Reduction Potential**

Capture rate: With the commencement of operations, initial trials of the LEILAC pilot are extremely promising and the technology is working as expected. While still to be pushed to its full capacity, the pilot can separate CO2 at a rate of around 18000 tonnes per year, the equivalent to the annual emissions of around 8000 cars.

The Demonstration plant aims to separate around 100 ktpa of CO2 (20% of a typical cement plant’s emissions). It intends to reduce most of the risks associated with applying this technology, enabling a full scale application shortly after validation. At full scale, it is anticipated that 95% of all process emissions of a cement or lime kiln are captured.

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**Project Financing**

The LEILAC1 project, a €21m project, has received €12m of funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 654465. The balance of the funds will be provided by the consortium partners (Heidelberg Cement, Lhoist, Cemex, Tarmac, Calix, TNO, PSE, Carbon Trust, Quantis, Solvay and Imperial College London).

The LEILAC2 project, a €34m project, has received €16m of funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 884170. The balance of the funds will be provided by the consortium partners (HeidelbergCement, Cimpor, Lhoist, IKN, Calix, Certh, Politecnico di Milano, BGR, GSB-RBINS, Engie Laborelec, Portos).



