



Vlaanderen
is ondernemen

CLEI

PRE-APPLICATION ICON PROJECT

0 Project information

0.1 General information

Program

ICON program	<i>Spearhead cluster ICON project</i>
strategic research center or spearhead cluster or thematic initiative	<i>SIM-MaRes</i>

Project acronym, title and one-sentence summary

acronym	<i>CLEI</i>
title	<i>Calcination of Local resources for Low Environmental Impact cements</i>
one-sentence summary	<i>Development of calcined clay cements based on Flemish resources.</i>

Project start date and duration:

estimated start date	<i>01/05/2024</i>
duration (months)	<i>48</i>

Resubmission

resubmission	<i>no</i>
project number	<i>/</i>

Contact

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0.2 Confirmed partners

<u>Industry partners</u>
ResourceFull
Enjoy Concrete
InsPyro
2 other partners tentative
<u>Research Partners</u>
VITO
KU Leuven
1 other partner tentative

1 Project overview

The use of calcined clays in cements is one of the major pathways towards lowering the CO₂ footprint of the cement industry in the state-of-the-art. The so-called limestone-calcined-clay-cements (LC³) have been studied extensively by leading researchers and are being commercialized by the main industry players. In Flanders reserves of suitable clays are limited – like most natural resources. Project CLEI targets the use of local Flemish clay-containing secondary streams for the production of cements after a calcination treatment. A substitution of the state-of-the-art natural clays for novel Flemish streams does not go without technical challenges and increased basic scientific knowledge as well as solving some challenges at pilot scale are necessary to make the calcined Flemish resource cement a success. These challenges are related to both the calcination process itself as the use of the calcined materials in cement and concrete.

The CLEI project develops calcined clay cements based on local Flemish streams. Fundamentals of the calcination process are investigated and tailored to the needs of the Flemish secondary resources. The interplay between raw material composition, calcination process parameters (temperature, throughput, particle size distribution), and the properties of the calcined material such as the reactivity as supplementary cementitious material will be elaborately investigated. The process control is envisioned to be enhanced by digital tools that are developed to fit the needs of the Flemish resources. The reactions of the calcined materials in cement blends are investigated in detail in the strategic basic research part of the project. This includes a detailed characterization of the calcined material and a conversion of reactivity to behavior in the different cement blends developed in the project. The cement blends will range from standard EN 197-1/197-5 fitting blends towards ultra-low carbon cements for which tailor made activators and admixtures are foreseen to be developed. The developed concrete formulations will be extensively tested for durability to identify the exposure classes in which they are suitable. The most promising formulations will be demonstrated in a construction project that is to be identified during the course of the project.