



## Low Carbon Cement Project (LCC)

### CONTEXT

India is the second-largest producer of cement in the world after China, accounting for eight percent of the total global production. With an increased focus on infrastructure development in India and an unprecedented growth in the housing sector due to rising population, the demand for cement is expected to rise even further. It is estimated that India's cement consumption will continue to grow at six to ten percent annually.

While an increase in demand for cement augurs well for the overall economic growth of the country, its production has a detrimental impact on the environment. Estimates suggest about five to eight percent of carbon dioxide in the atmosphere due to human activity originates from cement production.

Against this background, the Swiss Agency for Development and Cooperation (SDC) is supporting the development of a new type of low carbon cement, a blend of crushed limestone, calcined clay and clinker.

The new cement mix called Limestone Calcined Clay Cement (LC3) has the potential to reduce carbon dioxide emissions by up to 30 percent compared to standard cement while saving production costs at the same time.

### OBJECTIVES

The phase 3 of the LCC project aims to reduce global CO<sub>2</sub> emissions by fast and sustainable uptake of LC3 by the construction sector, supported by a conducive regulatory environment. It has the following components:

- R&D has closed critical remaining knowledge gaps to support LC3 deployment.
- LC3 is included in Indian cement standards.
- Information on LC3 is broadly disseminated, realized construction projects and an enabling policy framework to de-risk investment and accelerate commercial deployment.



Clean Energy & Energy Efficiency

### PROJECT AT A GLANCE

**Area:** Mitigation

**Duration:** 2020 - 2022

**Budget:** CHF 1'850'000

#### Implementation Partners:

- Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland (Project lead)
- Indian Institute of Technology (IIT): Delhi and Madras, India
- Centro de Investigación y Desarrollo de Estructuras y Materiales (CIDem), Cuba
- Technology and Action for Rural Advancement (TARA), India

#### Geographic Focus:



## KEY ACHIEVEMENTS

- Studies have confirmed that the production of LC3 with a clinker content of 50 percent results in about 30 percent less CO<sub>2</sub> emissions than standard cement and about 10 percent less than other blended cements.
- Draft standards in India to make LC3 a cement standard have been circulated for the public consultation. LC3 is approved as a cement standard in Cuba.
- Extensive tests in the lab and in the field have shown that LC3 has similar characteristics than standard cements.
- Resource mapping has shown that suitable clays are widely available in India, partly even as waste materials from current mining activities.
- While the actual cost of producing LC3 depends on the specific circumstances of each cement plant, case studies indicate that on average the production costs are similar or slightly lower.
- Trial production and applications of LC3 (e.g., pavements, small roads, LC3 based concrete platform) conducted in India and Cuba.
- Two Technology Resource Centers (TRCs) in India and Cuba are supporting the cement companies in Asia, Africa and the Latin American regions.
- Performance tests of LC3 have laid a foundation for its commercial production.



## PLANNED RESULTS

- All relevant technical characteristics of LC3 are scientifically investigated and published.
- Remaining knowledge gaps related to cement and concrete are scientifically investigated and results published.
- Answers to anticipated technical questions during the standardization process generated and made available.
- Continued support is secured through active engagement in the standard approval committees, with cement companies and joint work with key stakeholders/experts.
- Dissemination of project results for up-scaling of the production and consumption of LC3 in the cement, concrete and construction industry.
- First-of-a-kind LC3 plants and construction project with LC3 cements help de-risk investment decisions and support commercial deployment.
- Policy makers are fully aware of the positive environmental and social impacts of the deployment of LC3 cements.



## IN NUMBERS



5–8% of carbon dioxide in the atmosphere due to human activity originates from cement production.



India is the second-largest producer of cement in the world after China.



India accounts for 8% of the total global production of cement.



India's cement consumption is expected to grow between 6-10% annually.



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## ABOUT SDC IN INDIA

The Swiss Agency for Development and Cooperation (SDC) has been a partner of India for more than 60 years. Since 2011, SDC's engagement focuses specifically on climate change adaptation and mitigation, and other environmental challenges. The office in India is part of SDC's Global Programme Climate Change and Environment (GPCCE). Other SDC Global Programmes like Food Security, Water and Health also have ongoing activities in India, as part of their regional/global initiatives.

Website: [www.eda.admin.ch/countries/india/en/home.html](http://www.eda.admin.ch/countries/india/en/home.html)

Email: [newdelhi.ccd@eda.admin.ch](mailto:newdelhi.ccd@eda.admin.ch)

