PRESS RELEASE
27 April 2022, Copenhagen, Denmark

New cement partnership to eliminate fossil fuels by electrifying clay calcination

To further decarbonise the cement industry, FLSmidth and a series of leading industry experts have formed a new partnership called ECoClay™. To reduce CO_2 emissions from cement production by up to 50%, the ECoClay partners will develop and commercialise the technology needed to replace fossil fuels in the calcination of clay by fully electrifying the process.

The use of calcined clay to replace traditional, limestone-based clinker in final cement products is essential in drastically reducing the massive environmental footprint from conventional cement production, which today accounts for approximately 7-8% of the world's CO_2 emission.

Current clay calcination processes have gained momentum in recent years – especially with FLSmidth's flash calciner system, producing a highly reactive clay, which allows cement producers to replace up to 30% of the limestone-based clinker, resulting in up to 40% lower CO_2 emissions per tonne of cement produced. By electrifying the clay calcination process preferably from renewable sources and thereby eliminating the use of fossil fuels to drive the activation reaction, the ECoClay partnership expects to further reduce emissions by 10% at more uniform conditions that allow processing of a broader range of raw clays.

Led by FLSmidth, the global ECoClay partners include the Danish Technological Institute, US-based industrial heating expert Rondo Energy, cement producers VICAT from France and Colombian Cementos Argos, and the Technical University of Denmark. The project is partly funded by the Energy Technology Development and Demonstration Program (EUDP) under the Danish Energy Agency.

Based on the shared research and tests on high-temperature electric heat generation, storage solutions and renewable grid integration, the ECoClay partnership will build a pilot plant at FLSmidth's R&D Center in Denmark. The consortium will seek to demonstrate how the ECoClay process is superior to the conventional combustion processes, has a smaller physical footprint on site and significantly lower emissions of air pollutants.

According to the project plan, the ECoClay partners expect to be able to commence construction of the first full-scale electric clay calcination installation by the end of 2025.

The ECoClay partners comments:

Carsten Riisberg Lund, Cement Industry President, FLSmidth
"The significance of this partnership cannot be overestimated; ECoClay is accelerating the green transition of cement production – aiming to set a new future standard for the industry," says Carsten Riisberg Lund, Cement Industry President, FLSmidth. "We are proud to be in the good company of fellow industry pioneers showing the right determination and ingenuity to make this

happen. ECoClay is another essential step towards realising our MissionZero pledge to enable cement producers to operate plants at zero emissions by 2030," Carsten Riisberg Lund adds.

John O'Donnell, CEO, Rondo Energy
"Rondo's technology captures intermittent renewable electricity and stores it for delivery as continuous high-temperature industrial scale heat, unlocking enormous economic, environmental and societal value by displacing fossil fuels cost-effectively. Rondo is proud to be a partner in this project for its great potential to reduce the CO_2 emissions of cement production, which currently accounts for 7 percent of global CO_2. Calcined clay has no intrinsic (mineral process) emissions; by replacing the fuel combustion powering the calcination process with renewable electricity, the EcoClay partnership will deliver prompt, practical, low-cost emissions reductions at scale – and can build the foundation for true-zero cement."

Julien Poillot, Innovative Projects Manager, VICAT
"Already a leader in the development of low-carbon cements with activated clays, Vicat is enthusiastic about the success of ECoClay in electrifying its production with renewable energy."

Tomás Restrepo, People and Transformation Vice-President, Cementos Argos
"Calcined clays production is an excellent call to materialize the opportunities that electrification can bring to our industry. We are very excited about this opportunity, collaborative work between companies with different backgrounds and from around the world is key to fostering innovation. We will bring our expertise gained in the industrial production of clays in our Rioclaro Plant in Colombia. At Argos, we are constantly seeking to improve our portfolio and production processes to respond to the challenges presented by climate change and contribute to building a more sustainable world."

Mikkel Agebæk, Executive Vice President Materials, Danish Technological Institute
"Electrification of high temperature industrial processes and Power-To-X are important for the transition to renewable energy, we have previously contributed to electrifying steam methane reforming and have now moved to the cement industry", says Mikkel Agebæk, Executive Vice President Materials, Danish Technological Institute. "We are proud to be part of this international group of companies striving to make cement industry zero emissions. Adds Mikkel Agerbæk.

Peter Arendt Jensen, Senior Researcher, DTU Chemical Engineering
"We are looking forward to this collaboration, which includes several companies and three DTU departments. The partnership will play a significant role in converting the energy-intensive industry from fossil fuels to the use of electricity from carbon-neutral technologies," says Senior Researcher Peter Arendt Jensen at DTU Chemical Engineering.

PRESS RELEASE
27 April 2022, Copenhagen, Denmark

Contacts:

Research and Partnerships
Thomas Petithuguenin, +45 30 93 20 47, Thomas.Petithuguenin@FLSmidth.com
Longzhen Hu, +45 29 46 21 81 Longzhen.Hu@FLSmidth.com

Media Relations
Rasmus Windfeld, +45 40 44 60 60, rwin@flsmidth.com

About FLSmidth
FLSmidth provides sustainable productivity to the global mining and cement industries. We deliver market-leading engineering, equipment and service solutions that enable our customers to improve performance, drive down costs and reduce environmental impact. Our operations span the globe and we are close to ~10,100 employees, present in more than 60 countries. In 2021, FLSmidth generated revenue of DKK 17.6 billion. MissionZero is our sustainability ambition towards zero emissions in mining and cement by 2030. FLSmidth works within fully validated Science-Based Targets, our commitment to keep global warming below 1.5°C and to becoming carbon neutral in our own operations by 2030. www.flsmidth.com