TAIHEIYO CEMENT
NEWS LETTER

January 28, 2022

Adoption of "Development of CO_2-Capture Technology for the Cement Production Process" as a NEDO-funded project under the Green Innovation Funding Program towards the world's first cement production process to successfully capture limestone-derived CO_2 in the preheater

A project to Design and Demonstrate Technology for CO_2 Capture during the Cement Production Process (hereinafter, the "current project") being undertaken by Taiheiyo Cement Corporation (Headquarters: Bunkyo-ku, Tokyo; President: Masafumi Fushihara) has been adopted by the New Energy and Industrial Technology Development Organization (NEDO) of Japan as a Green Innovation Funding Project. The Green Innovation Fund was launched in 2021 by METI and provides funding toward the goal of achieving carbon neutrality by 2050. This project falls under the category of "Development of Technology for Producing Concrete and Cement Using CO_2."

Taiheiyo Cement has been developing technology to capture CO_2 in the rotary kiln exhaust gas by chemical absorption using amine-based absorbents. In addition to continuing to develop the chemical absorption technology, the goal of the current project is to develop the world's first calciner to efficiently capture CO_2.

The current project includes development of a methanation system suitable for cement production concurrently with the development of other carbon circulation technologies, including carbonation of demolished concrete for its reuse as a cement raw material.

The demonstration period of the current project is planned to be up to 10 years from fiscal 2021 to 2030, followed by expected deployment at cement plants.

Purposes of the current project

(1) Development of the CO_2-Capture cement production process

About 60% of CO_2 emitted from the cement production process are derived from the primary raw material, limestone, which when heated releases CO_2 through the decarbonation reaction ($CaCO_3 \rightarrow CaO+CO_2$) at about 900°C as it passes through the calciner. Taiheiyo Cement has focused on this reaction to proceed to develop the current project to capture CO_2 at the calciner.

Conventional calciners use atmospheric air to support combustion, but the calciner in the current project instead uses oxygen-enriched gas to ensure that highly concentrated CO_2 can be captured using compact equipment.

Another feature of this technology to use an existing preheater and rotary kiln without major modification will be that the high thermal efficiency of the whole production process and the volume of recycled raw materials that can be utilized will be maintained.

Note: The calciner is the burning equipment installed inside the preheater to improve the burning efficiency in the rotary kiln.

(2) Development of the methanation system

The captured, highly concentrated CO_2 can be converted to methane (CH_4) in contact with hydrogen. In the current project, the development of a methanation system applicable for the cement production process will be subcontracted to IHI Corporation.

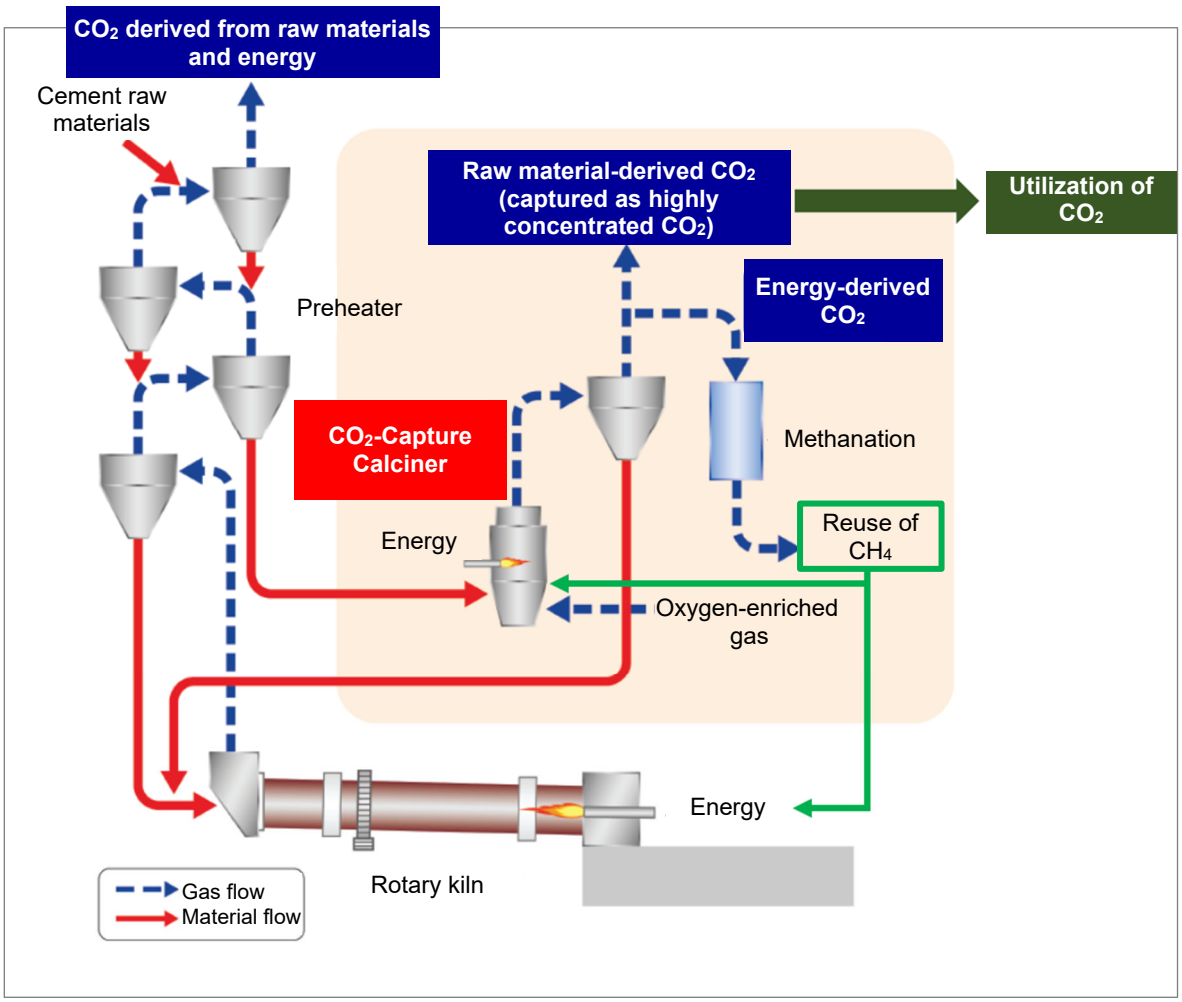
The aim is to use the methane obtained as an alternative thermal energy source for cement production and, consequently, reduce the volume of fossil energy consumption.

We, Taiheiyo Cement, have launched our Carbon Neutral Strategy 2050, which aims to achieve carbon neutrality in the entire supply chain by 2050. In this strategy it is essential to establish innovative technologies in addition to improving the application and further development of existing technologies.

We consider that creating practical CO_2 capture and carbon recycling technologies suitable for the cement production process is the most important challenge for the future of the cement industry and have positioned it at the core of our growth strategy. The current project provides an important impetus towards meeting this challenge and further accelerates our activities toward the realization of carbon neutrality by 2050.

References:

NEDO Green Innovation Funding Program Special Website (in Japanese)
https://green-innovation.nedo.go.jp/
NEDO Press Release dated January 28, 2022: Development of carbon circulation technology for the concrete and cement fields started under the Green Innovation Fund Program (in Japanese)
https://www.nedo.go.jp/news/press/AA5_101510.html



Concept of the cement production process that captures CO_2