

NET ZERO GREEN HOUSE GASES STRATEGY IN THE ROTARY KILN OF THE PORTLAND CEMENT INDUSTRY

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ABSTRACT

The International Energy Agency estimates that by 2020 the world will produce 4.3 Gt of Portland cement. Portland cement has around 0.87 tons of CO₂/ton Portland Cement, contributing about 8% of total global CO₂ emissions. In addition to CO₂ emissions, Portland cement production uses a tremendous amount of energy, which is 10-11 EJ per year or about 2-3% of global energy use. These two problems mainly occur in the rotary kiln unit, where the clinker formation reaction occurs before it becomes the Portland cement. The study aims to investigate the strategy and optimization of the rotary kiln in CO₂ emissions as a form of support in realizing the SDGs related to climate change management. The research method design is conducting a literature review, simulation, and optimization to produce CO₂ emissions produced in a rotary kiln using simulator. Simulation of the variation of feed material entering the rotary kiln and variations of the rotary kiln configuration, whereas the optimization from the amount of CO₂, energy, and clinker composition. The targeted result of this study is to obtain the optimum feed composition and rotary kiln configuration that produces the lowest CO₂ emissions and requires the lowest energy but with the best clinker composition.

Keywords: carbon dioxide; clinker; Portland cement; rotary kiln; simulator