

## Project main objectives

To develop, at pilot scale, a high temperature (800-1000°C) 24h/day solar process suitable for continuous particle treatment in energy intensive non-metallic minerals' industries.

To examine the integration of such a technology in existing industrial plants.

1 MW CNRS solar furnace for testing the solar pilot plant

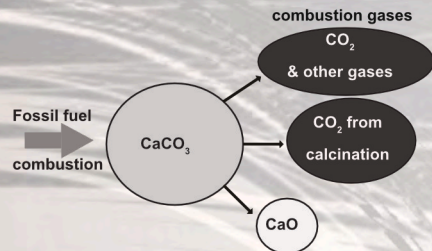


## Why integrating concentrated solar thermal energy in the process industry?

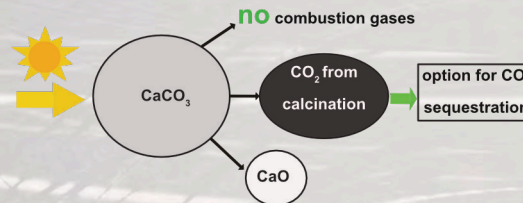
Energy intensive industries such as e.g. cement industry (based on  $\text{CaCO}_3$  calcination) need the major part of their energy input as thermal heat and are (behind the power industry) the biggest energy consumers and  $\text{CO}_2$  emitters. Therefore, we develop a renewable way to supply this thermal heat: concentrating solar technology.

## PROJECT CONCEPT

### CLASSICAL PROCESS



### SOLAR PROCESS



### Project aim

To supply totally or partially by solar heat the thermal energy requirement for  $\text{CaCO}_3$  calcination, which is 60% of the total required energy in a cement plant and 100% of it in a lime plant.



DLR lab-scale rotary solar reactor

### Project expected results

To demonstrate a pilot scale solar reactor (about 30 kWth) operating at about 900°C suitable for calcium carbonate decomposition and cement raw meal calcination (calcination reaction:  $\text{CaCO}_3 = \text{CaO} + \text{CO}_2$ ).

To simulate at prototype scale a 24h/day industrial process (TRL 4-5) thereby requiring a high temperature particle transport and storage system.



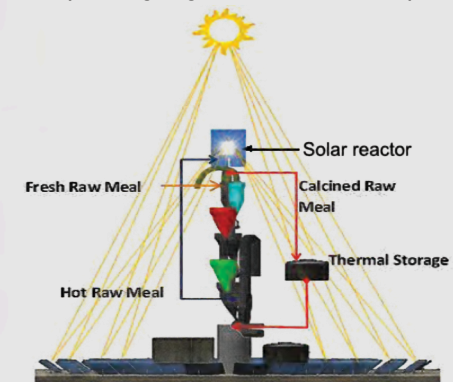
CNRS lab-scale fluidized bed solar reactor

## Project main impact

To reduce by 40%  $\text{CO}_2$  emissions in the lime and cement industry and by 100% if the  $\text{CO}_2$  capture and sequestration are applied. To inject 60% solar energy in cement processing.

To develop a solar technology able to treat particles at about 900°C and apply it to various minerals (lime, dolomite, phosphate).

Concept for integrating a solar reactor in a cement plant



## Project organisation

