The SOLPART project

- Reference of the call : LCE-02-2015 - Developing the next generation technologies of renewable electricity and heating/cooling - Solar heating for industrial processes
- Start/end date: 01/2016 – 12/2019
- Partners:

SOLPART

SPIRE PROJECT

Project Case Study

1. The EU/ SPIRE needs

The reduction of the CO2 emissions of energy intensive industries (i.e. the cement sector) who need the major part of their energy input as thermal heat (for high-temperature chemical reactions) and are (behind the power industry) the biggest energy consumers and CO2 emitters.

2. The Project Solution

The development of a solar reactor for high-temperature industrial processes to produce the thermal heat needed by these energy intensive industries (instead of using fossil fuels).

4. How will this happen?

- Creation of a strong added-value for new applications/fields for solar heat

- Creation of a market transformation with a huge potential of the technology to adapt to other industry sectors

3. Value to Customers

The integration of solar energy into industrial high-temperature processes, to reduce by 40% CO2 emissions in the lime and cement industry and by 100% if the CO2 capture and sequestration are applied.
The reduction of O&M costs by reducing the use of fossil fuels.

What are the **key expected sustainability impacts** of the SOLPART project in the cement industry ?

Project logo

Indicator (Max 3-4 key indicators)	Baseline	Expected Impact
Global Warming Potential (mainly CO2 emission reduction)*	Currently around 800 and 900 Kg/ton of product	To reduce by 40% CO2 emissions in the lime and cement industry (which corresponds to the burning of fossil fuels – 40% of the CO2 emissions in a cement plant)
Fossil energy intensity*	Cumulative energy demand currently 3.469 MJ per tonne of product	The use of solar reactors would replace completely the process of burning fossil fuels, such as coal, to heat the reactors that produce the heat required for this decarbonation process. This corresponds to 1700 to 1800 MJ/t of economy.
Economic added value e.g. Annual Operating Cost of [manufacturing plant]	Energy costs – 30-40% of the total costs of a cement plant are dedicated to the consumption of electricity and fuels (20% for the use of fossil fuels)	Reduction of 20% of the total costs for the operation of a cement plant by replacing the use of fossil fuels by solar energy

*Core SPIRE indicator

What **outputs or learning** from the SOLPART project could have value for other SPIRE projects here?

- The project has only reached its 18 months so the main results regarding the solar process and the demonstration of the solar reactor are still under development. The major deliverables expected are described below :
- The quantification of performances of one selected solar reactor concept at pilot scale (>30 kWth) for calcination of calcium carbonate-based materials at about 900°C.
- Development of a 900°C/160 kg particulate storage system combined with the solar reactor and able to deliver 10 kg/h CaO.
- Assessment of the complete loop - solar reactor + storage – 24h/day during several days.
- Complete environmental, risk and economic assessment of the solarized process with respect to the traditional route
- An open-source life cycle assessment model of the solar system and standard technology
- The project opens new application domains for solar heat. The project is of general interest for many mineral industries e.g. lime and cement and even the metallurgy industry (e.g. hematite to magnetite, roasting of sulfides to oxides and others).

The SOLPART project: Harnessing the sun to clean up industrial processes

Contact: Gilles Flamant
gilles.flamant@promes.cnrs.fr
Exploitation manager email:
m.prouteau@euronovia-conseil.eu
Project website: www.solpart-project.eu