SOLPART

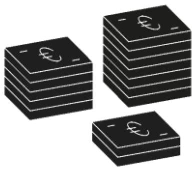
High Temperature Solar-Heated Reactors for Industrial Production of Reactive Particulates

The project presentation

This project has received funding from the EU Horizon 2020 Framework Programme for Research and Innovation under grant agreement no 654663

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 – 4 years
- **Partners:**



- Total funding : € 4 558 687
- EU contribution: € 4 366 562

SOLPART

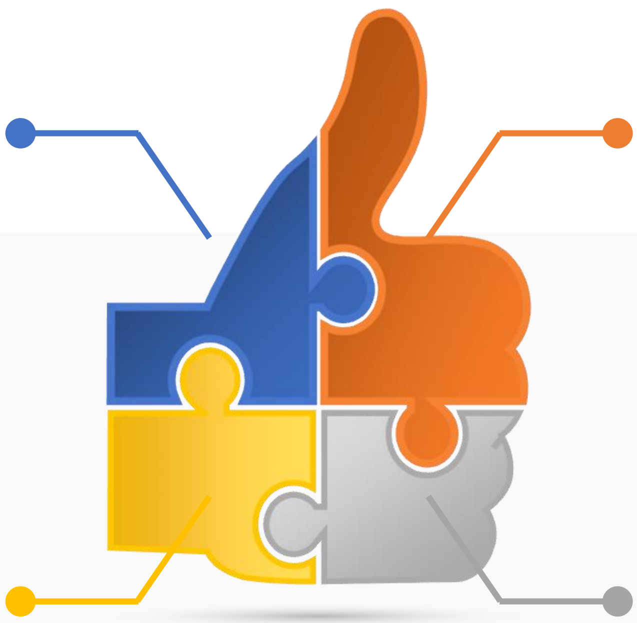
The project case study

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 SOLPART 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)
To inject 60% solar energy in cement processing.



4. How will this happen?

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
To simulate at prototype scale a 24h/day industrial process thereby requiring a high temperature particle transport and storage system.

3. Value to Customers and Projet Impact

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.

The SOLPART workplan

WP1
- Assessment of technologies for solar particle processing and storage at high temperature (HT)

WP2
- Lab scale development and testing of 800-1000°C solar reactors

WP3
- Development of HT storage and handling technologies for reactive particles

WP4
- Design, construction and implementation of the pilot scale solar unit

WP5
- Testing and performance evaluation of the pilot solar unit

WP6
- Environmental life cycle assessment of the solar process and comparison to the standard technology

WP7
- Plant integration, scaling up, economic and risk assessment of the solar process

WP8
- Dissemination and exploitation of the results

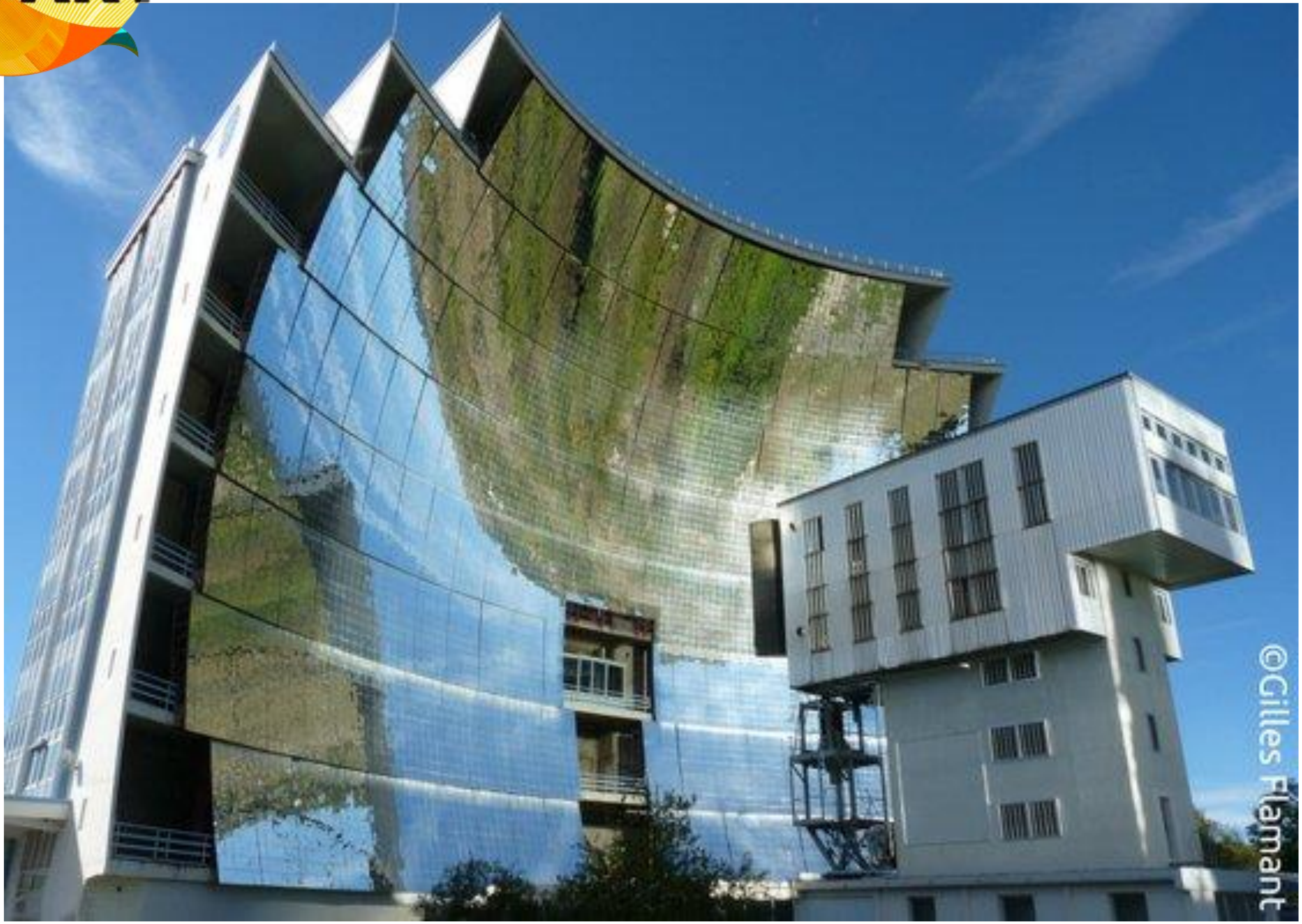
WP9
- Project management

Key expected sustainability impacts

Indicator (Max 3-4 key indicators)	Baseline	Expected Impact
Global Warming Potential (mainly CO_2 emission reduction)*	Currently around 800 and 900 Kg/ton of product	To reduce by 40% CO_2 emissions in the lime and cement industry (which corresponds to the burning of fossil fuels – 40% of the CO_2 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

Harnessing the sun to clean up industrial processes



PROMES-CNRS test site of the SOLPART pilot

Project contact

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