



# SFERA-III

Boosting the innovation potential  
and development of concentrated  
solar power research infrastructures





## Introduction

SFERA-III (Solar Facilities for the European Research Area - Third Phase) is a Horizon 2020 project funded under the Research Infrastructures programme.

### Main Objectives

- To foster the **innovation potential and sustainability** of Concentrating Solar Thermal (CST) RIs
- To **reduce fragmentation** of the CST research and innovation ecosystem through the support to the consolidation of a CST network
- To boost and better coordinate the use of CST RIs by **international researchers**
- To join European R&D forces to **improve services and equipment** of SFERA-III RIs

### Main activities

- **Networking activities** to further develop the cooperation between the SFERA-III RIs, the scientific community, industries and other external stakeholders
- **Transnational access activities** to provide access to European and non-European researchers from both academia and industry to world-class scientific and technological concentrated solar RIs
- **Joint research activities** to improve the integrated services provided by the RIs

### SFERA III Vision

- Become a unique distributed RI for CST technologies
- Optimise RI development and R&D coordination in Europe
- Provide high quality scientific infrastructure services at international level
- Boost researchers' access to highly specialised RI through a single access point
- Ensure the alignment of the RIs activities with the industry's needs
- Maintain Europe at the forefront of CST technologies development

## Facts & figures



### Duration

- 48 months starting January 2019
- Coordinated by CIEMAT-PSA, SPAIN



### Consortium

- 15 partners from 9 EU member countries
- Among which 13 research infrastructures



### Involved Key Actors

- European advanced Concentrating Solar Power research infrastructures
- The European Solar Thermal Electricity Industry Association (ESTELA)
- Key professionals, Scientific communities, Policy makers, General public, Students



### Budget

- 9,103 M€



### Funded under

- H2020-EU.1.4.1.2. - Integrating and opening existing national and regional research infrastructures of European interest

## What is a “European Research Infrastructure”?

Research Infrastructures are facilities that provide resources and services for research communities to conduct research and foster innovation.

They can be used beyond research e.g. for education or public services and they may be single-sited, distributed, or virtual.

The European Commission defines, evaluates and implements strategies and tools to provide Europe with world-class sustainable Research Infrastructures.

The Commission does this while cooperating closely with EU member states and Horizon 2020 associated countries. It also ensures that these research infrastructures are open and accessible to all researchers in Europe and beyond.



## Concentrating Solar Thermal Technologies

CST technologies use mirrors or lenses to concentrate sunlight onto a small area receiver where sunlight is transformed into thermal energy.

According to how sunlight is concentrated, CST technologies are classified into **line-focusing** and **point-focusing technologies**. The main line-focusing CST technologies are parabolic trough and linear Fresnel, whereas the main point-focusing technologies are parabolic dish and central receiver.

### The four main CSP technologies



Parabolic Trough



Linear Fresnel



Parabolic Dish



Central Receiver

## CST application

The main applications of the CST technologies are power generation, process heat, cooling, desalination and solar chemistry. Commercially, the most widely used application is power generation, known as Solar Thermal Electricity (STE).

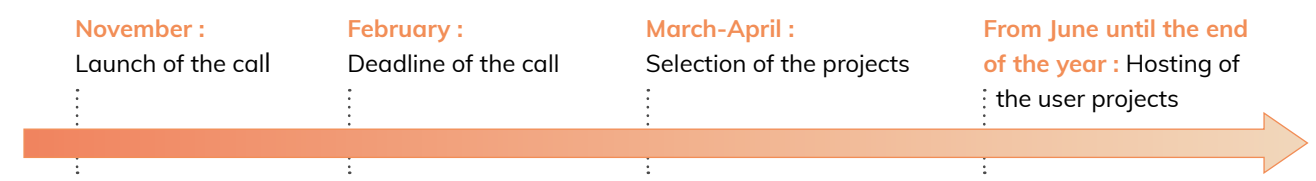
## How to get access to these CSP technologies ? How does it work ?

- Do you want to run experiments in the best European laboratories?
- Are you interested in making analyses using the best research equipment?
- Do you care about accurate measurements?
- Would you like to run experiments on sophisticated, world-class equipment?

**Get FREE access to our SFERA-III CSP research infrastructures!**

SFERA-III Transnational Access ensures free of charge access to the best European research infrastructures in the CST technology field. Apart from the cost of research itself, travel, accommodation and subsistence costs are reimbursed by the projects budget.

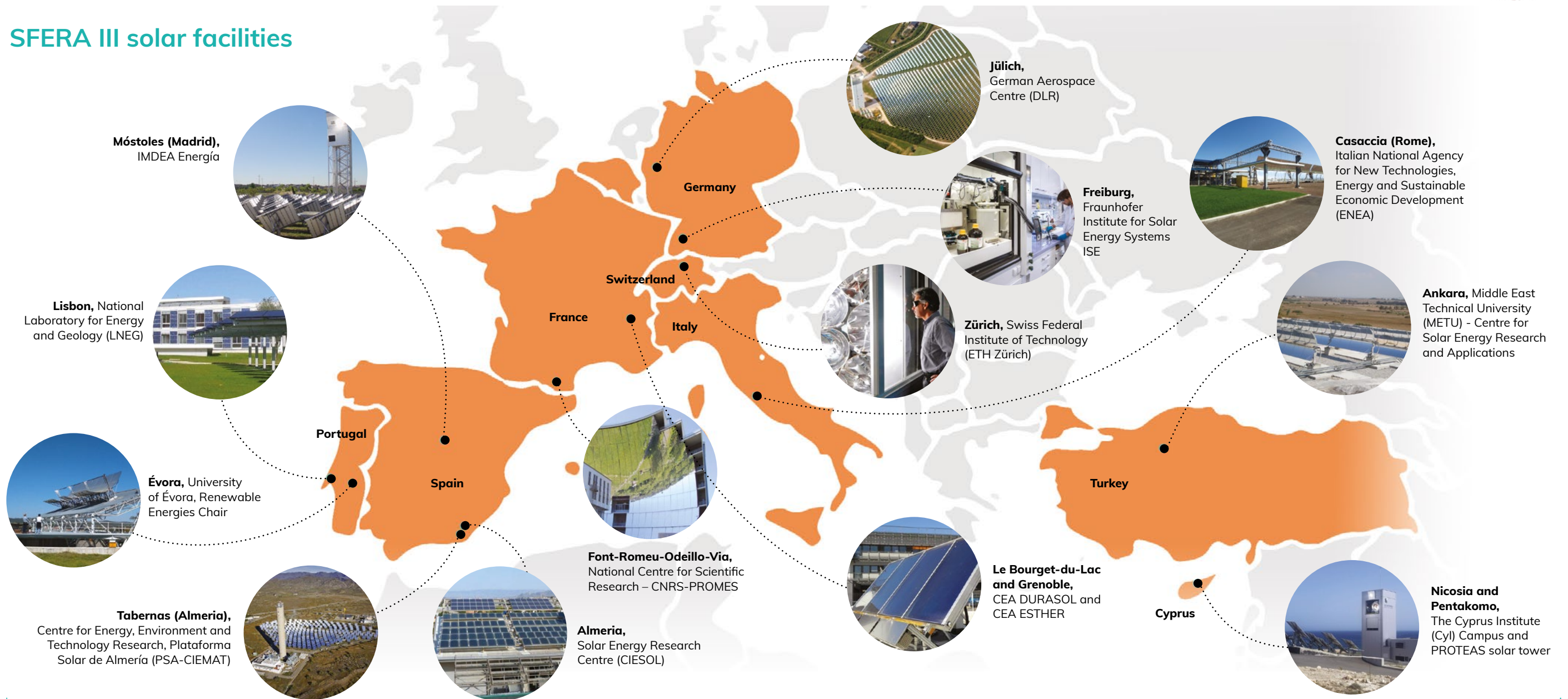
This opportunity is open to European and non-European researchers via a call for projects running every year.



To submit a project, a User Research Proposal Form has to be submitted.  
**Get more information on our website: [www.sfera3.sollab.eu](http://www.sfera3.sollab.eu)**



# SFERA III solar facilities





## Access possibilities in SFERA-III

Thanks to 13 world-class CST research infrastructures, the SFERA-III project offers access to a wide spectrum of experiments:

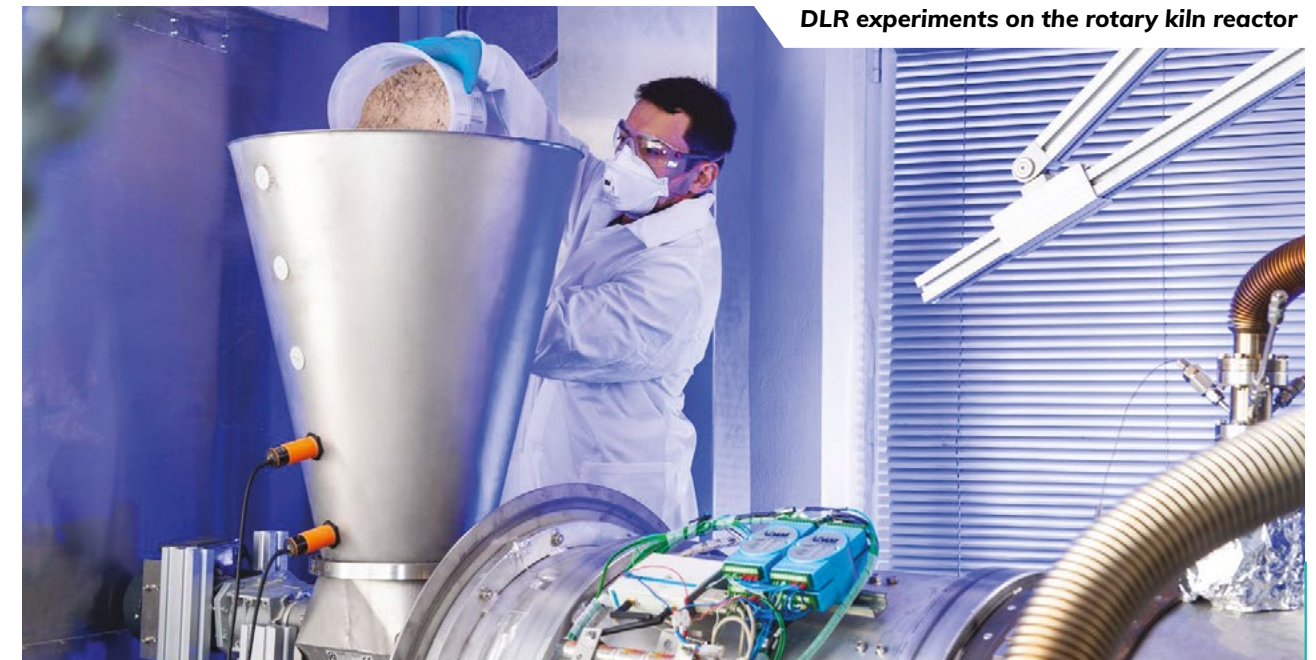
- **Solar thermal electricity generation** (tests from research on components and methods to full prototypes systems): thermodynamic cycles such as Brayton and Stirling, receivers and their coatings, thermal storage, concentrating optics and mirrors, control algorithms and solar resource evaluation, heliostats and linear collectors, high concentration PV cells, etc.
- **Solar fuels production:** H<sub>2</sub>, Syngas, liquid and gas hydrocarbons, etc.
- **Cycles for chemical storage** of solar energy for short and long duration: ZnO, CeO, Iron, etc.
- **Solar water treatment:** desalination, disinfection and decontamination
- **Solar heating and cooling of buildings** to improve energy efficiency
- **Modelling and controlling** of concentrating solar technologies for power plants and for industrial processes
- **High value material synthesis and/or coatings deposits** (experimental or test of processes): nanomaterials like C or ZnO nanotubes, new ceramics or metals, foams, catalytic layers, etc.
- High-flux **photochemistry** and **photo-physics**
- Characterisation of **materials behaviour and properties** under extreme conditions such as for solar, space or nuclear fields: thermal shields, high temperature materials and parts, etc.
- **Solar pumping of LASER** for industrial and space applications.

## Joint Research Activities

The Joint Research Activities (JRAs) aim at increasing the research capacities of the infrastructures and improving the services offered to the users.

Six research areas & activities are proposed and led by the R&D centres of the consortium:

- Development of test procedures for materials and components of thermal storage systems,
- Dynamic control and diagnostics of integrated systems for the production of solar fuels,
- Sensor calibrations and techniques for accurate determination of performance parameters of prototypes installed in RIs,
- Development and testing of new technological concepts for solar desalination and water treatment facilities,
- Monitoring physical properties of receiver materials at focal point of concentrated solar facilities,
- Towards a European e-Infrastructure on CST technologies to provide virtual access to RIs and support the creation of new services.



**DLR experiments on the rotary kiln reactor**



## Networking Activities

### The Networking Activities (NAs) aim at:

- Enhancing and strengthening the co-operation between the participants to nurture the birth of innovative actions
- Guaranteeing a broad information exchange platform between the scientific community, the industry and other stakeholders (i.e. standardization bodies but also with policy-makers)
- Ensuring the long-term viability sustainability of the single European Solar Research Infrastructure
- Creating a pool of high-qualified professionals via adequate training activities targeted at the industry, early-stage researchers and the general CST community

### SFERA III networking actions:

- Annual Winter/Summer Schools
- Dedicated on-site training for industries
- Annual Doctoral Colloquia for the SFERA III PhD students
- Standardization activities
- Webinars on CSP technologies
- Organisation of actions to strengthen EU CSP policies



To get the latest information on our annual events, **stay in touch and register to our Newsletter!**

## A word from the coordinator

“The importance of the SFERA-III project lies in organising and implementing the networking activities (NA), the transactional access activity (TA) and the joint research activities (JRA) of all the R&D centres participating in the project as if it were a **single European Solar Research Infrastructure**.

This project is **unique in Europe** and will bring significant innovation not only arising from the development of **novel concepts** and from the improvement of the existing services through the **joint research activities**; but also from a much stronger and more consistent integration of these services through the **networking activities**.

Furthermore, SFERA-III aims to design an **e-infrastructure** linked to the European R&D centres devoted to CST technologies. An e-infrastructure linking all the centres and offering remote access to the facilities, data and specific softwares, and e-services for CST systems.

This whole integrated concept aims finally at improving the RI services for the **benefits of the users**, internal or external, European or non-European, public or private. Indeed, SFERA III, thanks to the EU funding, has developed an attractive programme for **transnational access** to its research infrastructures. We will be proud again for another 4 years to welcome in our RIs high quality access projects that could not carry out their research without this great opportunity offered with the project.

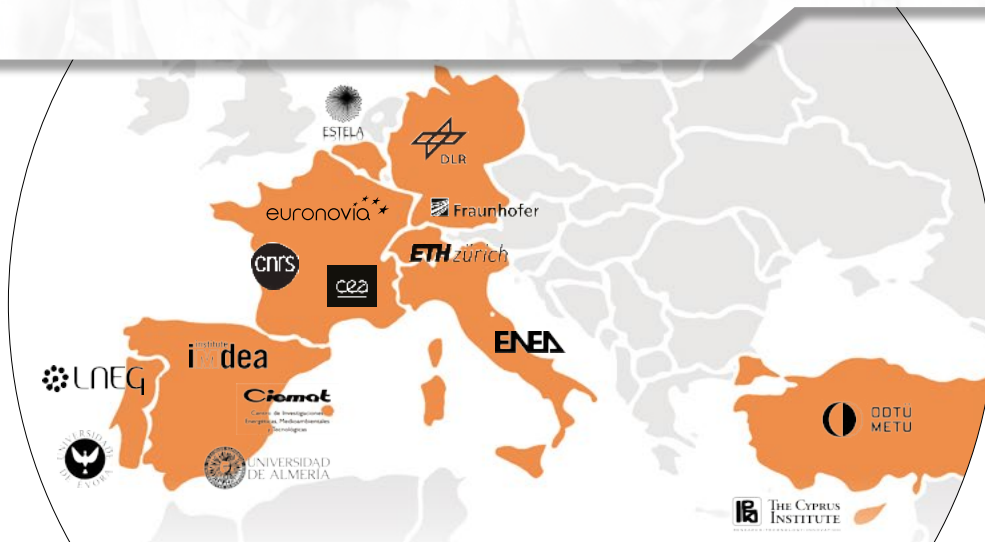
This combination of these 3 activities (NA, TA, JRA) will result in an **extended capability of the RIs** as a whole, providing a significant added value for the **industry** and **researchers** working in this field.”



Ricardo Sanchez, CIEMAT-PSA



# the SFERA-III consortium



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