



SFERA: Solar Facilities for the European Research Area

Concentrated solar power (CSP) is a very promising renewable source of energy. The solar resource in the Mediterranean countries of the EU and in North Africa is huge. The best known application so far is bulk electricity generation through thermodynamic cycles, but other applications have also been demonstrated, such as production of hydrogen and solar fuels, water treatment and research in advanced materials. The EU-funded research project – SFERA – aims to boost scientific collaboration among the leading European research institutions in solar concentrating systems, offering European research and industry access to the best research and test infrastructures and creating a virtual European laboratory.

● HARNESSING THE POWER OF THE SUN

To achieve a secure and sustainable energy supply, and in view of growing climate change concerns, the EU has taken on the role of Kyoto Protocol promoter and set out ambitious goals to achieve a large share of renewable energy in the European market. In particular, March 2007 saw European leaders sign up to a binding EU-wide target to source 20% of their energy needs from renewable sources such as hydro, wind and solar power by 2020.

Solar energy, as a primary source of renewable energy, will likely contribute a major part of this share. Moreover, its conversion by concentrating technologies for electricity and heat generation has long been proven cost-effective for a wide range of applications. CSP systems focus direct solar radiation through optical devices (mirrors) onto an area where a receiver is located. There, the concentrated radiation is transformed into heat.

Indeed, the first recorded use of such a technique was in 212 BC when Archimedes is said to have used mirrors to burn Roman ships attacking Syracuse. Nowadays the applications provide either heat or electricity. Several commercial CSP projects have recently been put into operation. An additional 800 MW are under construction and several GW are in advanced stages of planning, particularly in Spain, but also in other Southern European countries, like France, Italy and Greece.

There is, however, a need to invest further in research, development and application of concentrating solar systems involving a growing number of European industries and utilities in global business opportunities. Europe is a leader in the research and development of this technology. Most of the large R&D infrastructures are European and our industry is leading the way in its commercial deployment. The purpose of SFERA is thus to integrate, coordinate and further focus scientific collaboration among the leading European research institutions in solar concentrating systems and offer European researchers and industry access to the best-qualified research and test infrastructures.



Through coordinated integration of their complementary strengths, efforts and resources, the project is working to increase the scientific and technological knowledge base in the field of concentrating solar systems in both depth and breadth, provide and improve the research tools best-suited for the scientific and technologic community in this field, and increase the general awareness – especially of the scientific community – of the possible applications of concentrated solar energy.

The overall goal of these efforts is to create a unified virtual European Laboratory for Concentrating Solar Systems, easily accessible to interested researchers, and thus serving as the structural nucleus for growing demand in this field. Such a European Solar Laboratory would also contribute to a sustainable, secure European energy supply and to a firm basis for global competitiveness of European technology suppliers in this field.

Five of the project partners – CIEMAT-PSA, DLR, PROMES-CNRS, ETH and PSI – previously collaborated in the SolLAB virtual laboratory consortium, which has initiated several networking activities since its creation in 2004. ENEA and WEIZMANN now join the consortium, thus looking to consolidate a partnership as the reference European Solar Laboratory.

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The project incorporates transnational access, networking and joint research activities. Researchers will have access to five state-of-the-art high-flux solar research facilities, unique in Europe and in the world. Access to these facilities will help strengthen the European Research Area by opening installations to European and partner countries' scientists, thereby enhancing cooperation. It will also improve scientific critical mass in domains where knowledge is now widely dispersed, and generate strong Europe-wide R&D project consortia, increasing the competitiveness of each member.

The joint research activities aim to improve the quality and service of the existing infrastructure, extend their services and jointly achieve a common level of high scientific quality. Currently all facilities use their own procedures to perform tests and experiments under concentrated sunlight and have developed their own devices to measure flux and temperature as the most relevant and complex signals in these installations. In addition, new facilities that use artificial light sources to simulate the concentrated sunlight have become recently become available and need to be qualified to assess their best application fields

To improve the quality of the installation testing services, the partners will, for example, cooperate to establish common guidelines on how to perform testing and develop and exchange best-practice approaches. They have included the competences

of the DIN, the German standardisation institution, in order to come up with a systematic and professional approach in this field.

In addition, a set of five networking activities will be undertaken. These include the organisation of training courses and schools' to create a common training framework, providing regularised, unified training of young researchers in the capabilities and operation of concentrating solar facilities. Communication activities will seek to both strengthen relationships within the consortium, creating a culture of cooperation, and to communicate to society in general, academia and especially industry what SFERA is and what services are offered. This will give many potential users the opportunity to become aware of the possibilities existing for making use of the SFERA infrastructures.



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Partners:

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Deutsches Zentrum für Luft- und Raumfahrt e.V. (DE)

Centre National de la Recherche Scientifique (FR)

Paul Scherrer Institut (CH)

Eidgenössische Technische Hochschule Zürich (CH)

Weizmann Institute of Science (IS)

National Agency for New Technologies, Energy and the Environment (IT)

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Project webpage: <http://sfera.sollab.eu>