

## How did this project arise?

The STAGE-STE project (acronym of: *Scientific and Technological Alliance for Guaranteeing the European Excellence in Concentrating Solar Thermal Energy*) is consequence of the European Commission IRP (Integrated Research Programmes) call of July 2012 addressed to a number of EERA (European Energy Research Alliance) Joint Programmes, being CSP one of them (there are about 15). EERA ([www.eera-set.eu](http://www.eera-set.eu)) is an organization involving more than 150 European energy research organizations to reinforce the collaboration in the development of energy technologies (through joint R&D) and support the competitiveness of European industry at international level.

## Which are the goals of this initiative?

The objectives are very broad and ambitious, based on three main pillars. Firstly, to convert the STAGE-STE consortium into the natural reference institution for CSP research in Europe providing to both the Commission and the Industry a natural gatekeeper for R&D investment and technology transfer in the field. This is intended to be achieved with the alignment of the different CSP EU national research programs, avoiding overlaps and duplications, so that activities funded by national and Commission Programmes can be synchronized. Secondly, to address a comprehensive number of coordinated and integrating activities to lay the foundations for long-lasting research cooperation in Europe, such as:

- Joint activities to foster the use of existing research facilities to create an European dimension and to support scientific communities and industry in their access.
- Training activities and exchange of researchers to facilitate the co-operation between research organisations.
- Transfer of knowledge activities to reinforce the partnership with industry.
- International cooperation activities (very important component as explained later on).

In this entire context, strong cooperation and coordination will be implemented here with EU-SOLARIS and SFERA II Projects.

Third and final pillar is formed by research activities, which covers the whole technological spectrum around CSP:

- Line-focusing technologies
- Pint-focusing technologies
- Thermal storage for CSP plants
- Materials for solar receivers and CSP components
- Solar Fuels
- CSP plus Desalination

## Which is the state of the project and what phases are considered in the Project?

The Project has just finished the negotiation phase with the European Commission and it is now on the contract signature process. Formal start is expected on February 1<sup>st</sup>, 2014. The project is scheduled to last 4 years (until January 2018) and activities are divided into 12 different Work Packages, 6 related with coordination and supporting activities and another 6 with RTD activities, being all of them closely integrated.

## What is the scope of this Project?

Project scope and relevance will be measured by a defined number of Key Performance Indicators (KPIs), jointly defined between the European Commission and project Management Board. These defined KPIs (46 in total) structured to objectively measure the impacts of the project execution on: a) research programmes integration; b) quality of

research results; c) the use of available facilities; d) building trust and exchanging knowhow; e) innovation. These KPIs, at the same time, are defined to measure the impact on technological progress. To this end, specific objectives were identified in all technological research topics, defining their present value and the expected one after the 4-years of project execution.

### **Which are the technological challenges for the solar industry?**

Main technological challenge is the development of reliable and efficient technology suitable to financially be implemented at the different world regions of higher DNI potential. This is why the international cooperation (beyond EU borders) is defined as a top priority of the project. It is clear that, besides the current European industrial leadership on CSP, the “natural” application and development of these technologies is going to take place outside Europe. This is the reason to also involve into the project the key research organizations from nearly all world areas of significant relevance to CSP (North Africa, Middle East, China, Australia, Mexico, Brazil, Chile and South Africa). As these organizations are also providing key additional research facilities, the overall consortium achieved within STAGE-STE (40 partners to date) has a unique powerfulness, never previously achieved in the CSP field.

### **How can this project contribute to the improvement in the learning curve of solar thermal and cost reduction?**

Learning curve and cost reduction are also at the core of most of the STAGE-STE activities. This is why a strong endorsement and support was also achieved from the CSP European industry, clearly leading most of commercial initiatives all around the world. This good and also long term relationship, between European research organizations and companies is behind most of technological and commercial successes, fact especially remarkable in the case of some Spanish organizations and companies (and reason of the relatively high number of Spanish organizations and companies involved into the project).

### **Financing and details of the participating organisations**

Project consortium involves the majority of European and World level top organizations with large recognized knowledge and expertise on CPS:

- 1) Centro de Investigaciones Energeticas, Medioambientales y Tecnologicas (CIEMAT), Spain, Project Coordinator.
- 2) Deutsches Zentrum fuer Luft - und Raumfahrt EV (DLR), Germany.
- 3) Paul Scherrer Institut (PSI), Switzerland.
- 4) Centre National de la Recherche Scientifique (CNRS), France.
- 5) Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung E.V. (FRAUNHOFER), Germany.
- 6) Agenzia Nazionale per le Nuove Tecnologie, L'energia e lo Sviluppo Economico Sostenibile (ENEA), Italy.
- 7) Eidgenoessische Technische Hochschule Zurich (ETHZ), Switzerland.
- 8) Commissariat a L'Energie Atomique et aux Energies Alternatives (CEA), France.
- 9) The Cyprus Institute Limited (CYI), Cyprus.
- 10) Laboratorio Nacional de Energia e Geologia I.P (LNEG), Portugal.
- 11) Fundacion Centro Tecnologico Avanzado de Energias Renovables de Andalucia (CTAER), Spain.
- 12) Consiglio Nazionale delle Ricerche (CNR), Italy.

- 13) Fundacion CENER-CIEMAT (CENER), Spain.
- 14) Fundacion Tecnalia Research & Innovation (TECNALIA), Spain.
- 15) Universidade de Evora, Portugal.
- 16) Fundacion IMDEA Energia (IMDEA), Spain.
- 17) Cranfield University, United Kingdom.
- 18) Fundacion TEKNIKER (TEKNIKER), Spain.
- 19) Universita degli Studi di Palermo (UNIPA), Italy.
- 20) Centro di Ricerca, Sviluppo e Studi Superiori in Sardegna (CRS4), Italy.
- 21) Instituto de Engenharia de Sistemas e Computadores, Investigacao e Desenvolvimento em Lisboa (INESC ID), Portugal.
- 22) Associacao do Instituto Superior Tecnico para a Investigacao e Desenvolvimento (IST-ID), Portugal.
- 23) Sener Ingenieria y Systemas S.A. (SENER), Spain.
- 24) AREVA Renouvelables SAS (AREVA), France.
- 25) HSE Hitit Solar Enerji AS (HITITE), Turkey.
- 26) Acciona Energia S.A. (ACCIONA), Spain.
- 27) Schott Solar CSP GMBH (SCHOTT), Germany.
- 28) Archimede Solar Energy SRL (ASE), Italy.
- 29) European Solar Thermal Electricity Association (ESTELA), Belgium.
- 30) Abengoa Solar New Technologies SA (ASNT), Spain.
- 31) King Saud University (KSU), Saudi Arabia.
- 32) Universidad Nacional Autonoma de Mexico (UNAM), Mexico.
- 33) Stellenbosch University, South Africa,
- 34) Centre for Solar Energy Research and Studies (CSERS), Libya.
- 35) Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia.
- 36) Fundacao de Apoio a Universidade de Sao Paulo (FUSP), Brazil.
- 37) Institute of Electrical Engineering of the Chinese Academy of Sciences (IEECAS), China (People's Republic of).
- 38) Universidad de Chile (UDC), Chile.
- 39) Universite Cadi Ayyad (UCAM), Morocco.
- 40) Fondazione Bruno Kessler (FBK), Italy

Total Project Budget: **19.697.459 Euros**

Total European Commission contribution: **9.997.207 Euros**

### **Any comments of interest**

STAGE-STE project is defined as an open club, so any organization interested to join is welcomed with two only requirements: it has to provide some additional value to the existing consortium and should cover their own expenditures (as all Commission contribution has already been distributed).

STAGE-STE proposal achieved the maximum possible score (15 points over 15) in the European Commission evaluation process. The achievement of this success is also a very good indicator of the long and excellent collaboration background existing among all main CSP research organizations in Europe.