European Commission
FP7 Grant Agreement
No: 609837

Main Contributions of STAGE-STE to line-focus Technologies and Thermal Energy Storage Systems

Latest joint efforts between Research and Industry for strengthening European CSP leadership (STAGE-STE Workshop)

European Economic and Social Committee

Brussels, January 23rd, 2018

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EERA European Energy Research Alliance

Comité économique et social européen
European Economic and Social Committee

Main contributions of STAGE-STE to line-focus technologies

STAGE-STE has made two different types of contributions towards line-focus technologies :

- ***Technological improvements***, related not only to technical items, but also to O&M issues,
- ***Non technological contributions***, boosting the development of international standards or creating data basis for line-focus systems

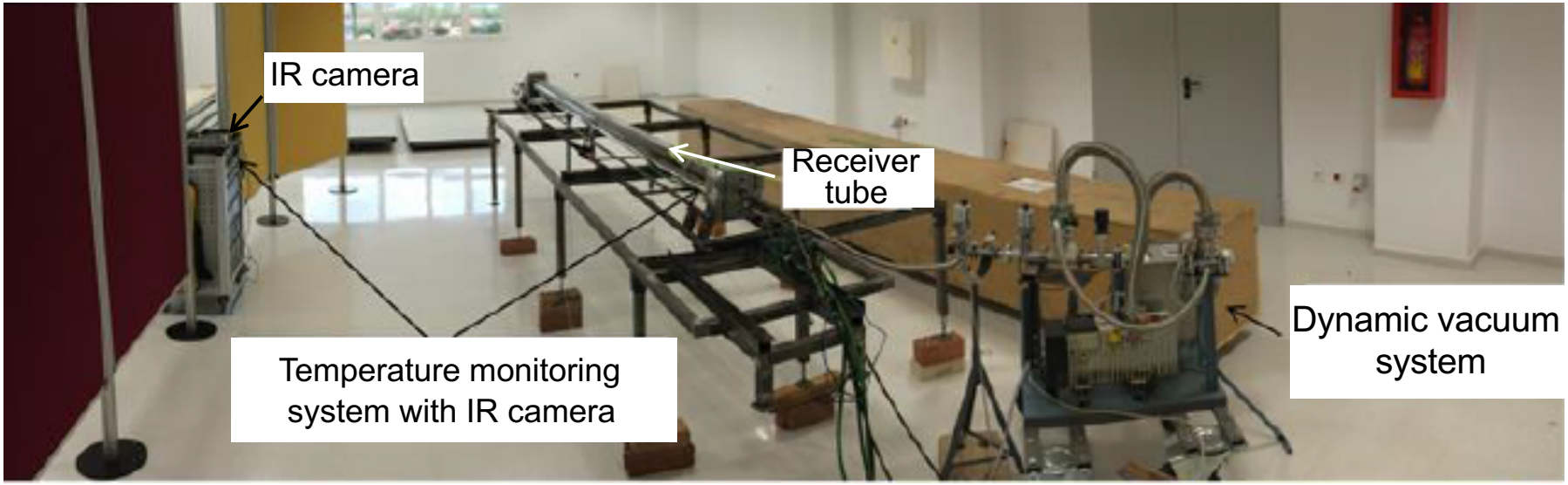
Kindly provided by Tubosol S.L.

Main contributions of STAGE-STE to line-focus technologies

Technological Improvements

- **Procedure to monitor the status of the vacuum in linear receivers**

The vacuum level in linear receivers can be monitored using the procedure developed and tested in STAGE-STE WP11 with IR images



Test bench installed at PSA for indoor measurements

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Scientific and Technological Alliance for Guaranteeing the European Excellence in Concentrating Solar Thermal Energy

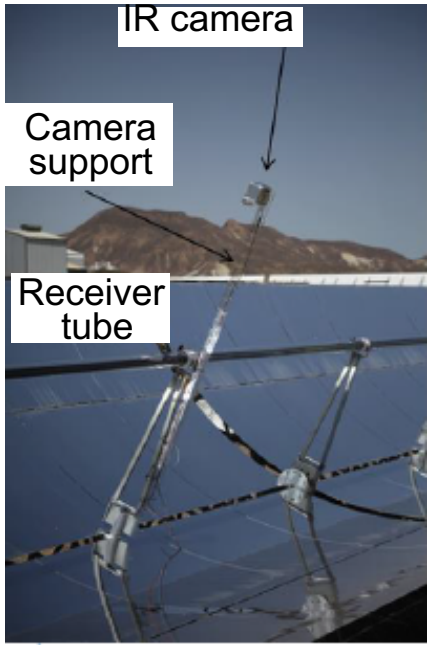
FP7 Grant Agreement number: 609837
Start date of project: 01/02/2014
Duration of project: 48 months

Project Deliverable 11.7:

Guidelines for the analysis of vacuum-status of receiver pipes by non-contact measurements

WP11 – Task 2.2	Deliverable 11.7
Due date:	January 2017
Submitted	January 2017
Partner responsible	CIEMAT
Person responsible	Loreto Valenzuela (CIEMAT)
Author(s):	Eneko Setien Solas(CIEMAT), Rafael López-Martin (CIEMAT)
Document version:	1
Reviewed/supervised by:	
Dissemination Level	Public

Experimental set-up at PSA for on-field measurements



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Technological Improvements

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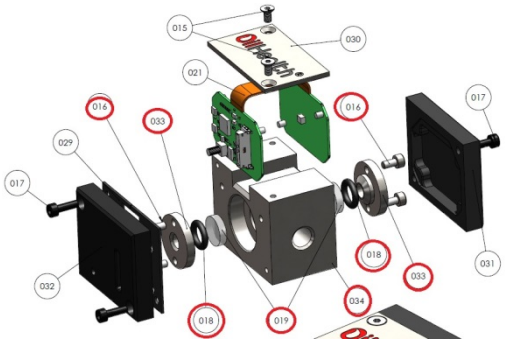
- **Development of a device for off-line monitoring of thermal oil**

The degradation of thermal oils currently used in commercial plants can be monitored off-line using the device developed in STAGE.STE for this purpose



OilHealth® sensor used by the oil monitoring device

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- **Dynamic solar field testing procedures for commercial plants**

A dynamic test procedure has been successfully used in the solar fields of two commercial STE plants to evaluate the collectors performance ($\eta_{opt,\ o^o}$, IAM) using the instrumentation available in commercial solar fields

Main contributions of STAGE-STE to line-focus technologies

Non Technological Improvements

- **Creation of a data base for line focus collectors**

A complete data base with the technical characteristics of available line-focus collectors has been created and implemented at:

http://stage-ste.eu/keydocuments/solar_collectors/index.php/SolarCollectors

Main contributions of STAGE-STE to line-focus technologies

STAGE-STE data base for line focus collectors

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- **Development boosting of new international standards**

STAGE-STE partners have significantly contributed to the working groups implemented within the standardization technical committee IEC TC117 "Solar Thermal Electric Plants", and several IEC standards related to line-focus technologies have been thus developed

Main contributions of STAGE-STE to line-focus technologies

New IEC standards for line-focus technologies with a significant contribution of STAGE-STE partners

- IEC 62862-3-2: “General requirements and test methods for parabolic-trough collectors”. This standard complements the standard ISO 9806 (2017)

- IEC 62862-3-3: “General requirements and test methods for linear solar receivers”

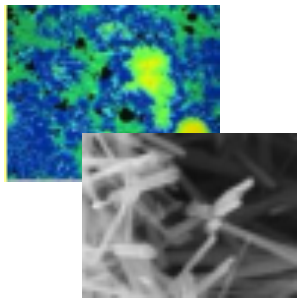
- IEC 62862-3-1 “*Solar thermal electric plants - Guidelines for design of parabolic trough solar thermal electric plants*”

- IEC 62862-1-1 “Solar Thermal Power Plants. Terminology”

Main contributions of STAGE-STE to Thermal Storage Systems

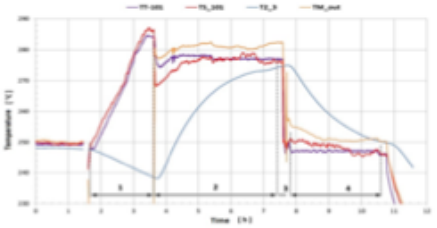
STAGE-STE has significantly increased the knowledge on important aspects related to new approaches for Thermal Energy Storage (TES) systems:

- Identification of barriers that may limit the commercial use of innovative HX designs, and storage media proposed for latent heat storage (limited working pressure, degradation of storage media, practical problems for sintesis of metallic alloys with more that 2 components and technical constraints associated to the use of nanoparticles)



- The compatibility with solar salt of natural, industrial waste and concrete fillers for thermocline tanks has ben deeply investigated

- Improved models of TES systems, both at components and and system level



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Thank you for you attention !!

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