inship

Integrating National Research Agendas on Solar Heat for Industrial Processes

Project Deliverable 6.5: Mid–Term Report On The Infrastructure Access Scheme

D 6:5 – MID–TERM REPORT ON THE INFRASTRUCTURE ACCESS SCHEME		
WP	6	
Due date:	31.12.2019	
Submitted	23.07.2020	
Partner responsible	CIEMAT	
Person responsible	Ricardo Sanchez	
Reviewed/supervised by:	Peter Nitz	
GA Number	731287	
Start of the project	01.01.2017	
Duration of the project	4 years	
DISSEMINATION LEVEL		
PU	*Public*	X
NATURE OF THE DELIVERABLE		
R	X	
HISTORY		
Author	Date	Comments
Ricardo Sanchez	28.02.2020	INITIAL CONSOLIDATED VERSION
Ricardo Sanchez	07.07.2020	MINOR CHANGES TO SECTIONS 2 AND 4 AND ADDITION OF NEW SECTION 7

Contents

1. Content of deliverable

This report includes a description of the publicity done on the new opportunities for access the INSHIP's research infrastructures offered in this Project, and a description of the selection procedure of the proposals received in the different calls scheduled during the lifetime of the INSHIP Project. On the other hands, this report gathers information about the proposals received, approved and rejected in each call, about the projects already implemented as well as the main achievements obtained through the corresponding mobility mission.

Finally, a list with the scientific output of the users at the installations, a list of researchers who have accessed to INSHIP's research infrastructures through Union support and a list of research infrastructures made accessible to all researchers in Europe and beyond through EU support (INSHIP support) and summary of access per installation per reporting period (RP) are included in this report.

2. Description of the publicity concerning the new opportunities for access

The Infrastructure Access Scheme (IAScheme) is a funding option to perform joint R&D activities at an existing and registered Research Infrastructure (RI) working on SHIP related topics. It has been designed with the objectives of: i) providing a significant added research activities to the ECRIA, ii) collecting an important amount of further national contributions (from a larger number of organizations), and iii) enlarging the scope and critical mass of the common European research community on SHIP topic (up to the full EERA JP-CSP) to guarantee the best possible ECRIA results.

In the first and second calls, the advertising campaign for access to our research infrastructures was carried out internally, that is, within the consortium. The main idea was to promote INSHIP Infrastructure Access Scheme among the INSHIP consortium partners. The approach was done by e-mail, and also on the private are of the INSHIP project website.

In the third call, in addition to the e-mail sent to each partner of the INSHIP consortium, an official launch of the call was carried out in social networks, i.e. LinkedIn and Twitter, making use of several accounts which aim are to promote the activities of EU-funded CSP projects like INSHIP, namely through the LinkedIn 'H2020 CSP projects' group and the twitter account with the same name. Furthermore, the communication manager of EERA (European Energy Research Alliance) was asked to make this call announced on the EERA website, as she did on 22nd November 2019, and the communication manager of ESTELA (European Solar Thermal Electricity Association) was also asked to submit the call to all its members through the means of communication she usually use.

22 NOV 2019

EU PROJECT INSHIP: CALL FOR PROPOSALS FOR ACCESS TO INFRASTRUCTURES

The EU-funded project INSHIP (Integrating National Research Agendas on Solar Heat for Industrial Processes) has opened a 2nd call for proposals under the recently established Infrastructure Access Scheme. The scheme is part of the INSHIP project and financed by the EU. It allows researchers, but especially industry players to use different facilities and exchange staff. [...]

https://www.eera-set.eu/new-call-for-proposals-to-access-the-ship-infrastructure-iascheme/

Within the framework of the advertising campaign carried out in this third call, an information flayer was prepared and distributed among the partners, and was also upload on the INSHIP website (https://www.inship.eu/research_infrastructures.php) to make it available to the industry, as they are a primary target of this call. The industry is expected to lead the proposals for this call, and that is why ESTELA was contacted to spread the word about the call among its members.

3. Description of the selection procedure

The following details the proposed selection procedure finally used for the selection of proposals under the IAScheme, after the update proposed by the coordinator of the activity, discussed during the 3rd Coordination Meeting in Trento in October 2019, and finally approved by the General Assembly on 30 October 2019. The changes to this procedure are related to the eligible costs of the core partners and networking partners, to the in-kind contribution required to partners, and to the budget limit than can be requested in each proposal.

The date of launch of the calls for proposals, the duration of the calls, and the periods established for the mobility missions were also adapted to the needs that were emerging for the successful implementation of the IAScheme, and this is described in section 4 of this document.

3.1. Definition of the procedures for the selection

Initially two calls for mobility actions were planned within the INSHIP project. The first one from 4th September 2017 until 31st December 2017, and the second one from 22nd November 2019 until 31st December 2019. The two periods stablished for mobility missions were April 2018 to September 2019 for the first call and February 2020 to October 2020 for the second call.

Joint mobility proposals should be submitted according to an application form which will be available at INSHIP website.

At the end of the call, each applicant form is reviewed by the Mobility Coordinator (MC) so that an eligible check is made according to the following criteria:

- Proposals must be led by the research infrastructure owner. Consortia must have a minimum of two INSHIP partners and the inclusion of industrial partners will be positively evaluated.
- Non-disclosure agreements should be signed by the consortia of the proposal when an industrial partner is included.
- Proposals aim the development of short term (1-4 weeks) concrete activities related to specific tasks from WPs 2 to 5.
- Proposals must include a budget detailed description and budget allocation for the different INSHIP partners.
- For INSHIP partners, the budget description must include requested EC contribution and foreseen "in-kind" contribution. This in-kind contribution must be ensured over the whole INSHIP project. Eligible costs include travel and accommodation costs.
- For Networking partners, eligible costs might include Infrastructure consumables or, when a clear and EC approved method for Infrastructure use cost calculation is available, corresponding Infrastructure use costs.
- For Networking partners hosting activities at their Research Infrastructure (RI), or visiting a RI, the personnel costs are eligible.
- Accommodation and travel costs for invited Industrial partners are eligible within INSHIP partners' budget. It should be already mentioned in the proposal which partner is responsible for which invited Industrial partner.

- EC contribution per proposal is limited by [15.000€ x number of INSHIP partners involved - distribution within proposal open], and the overall budget per proposal in total is limited by max. 50.000€ EC contribution.

Once done, the MC sends the proposals to the Independent Panel of Experts (IPE), which will review them according to previously defined criteria. The Independent Panel of Experts (IPE) is composed by three experts designated from the Stakeholder group to evaluate Applications submitted in each call. IPE have one months to review the Applications remotely according to the evaluation criteria described in this document in section 3.2. Then they meet to discuss their score for the projects and rank them. The MC gathers all assessment reports.

Table 1. **Members of the Independent Panel of Experts**

Name	Organisation	Country
Miguel Frasquet	Solatom CSP s.l.	Spain
Ilknur Yilmaz	The Scientific and Technological Research Council of Turkey	Turkey
Costas Travasaros	Prime Laser Technology SA	Greece

Finally, the MC then ranks the projects and validates all scores of the proposals and makes a classification according to three categories. In the second call, priority is given to such mobility projects submitted by partners who have not been granted in the first call. The three categories to classify the proposals are:

- Accepted projects granted mobility;
- Accepted projects on the reserve list;
- Rejected proposals.

The MC is the one in charge of sending the letters of acceptance or rejection. For the projects rejected, a special letter will be drafted to inform on the reasons for rejection. The applicants will have the possibility to respond on the rejection of the proposal by contacting the MC. The MC will transfer the request to the IPE and together they could reopen the evaluation, should they consider that the request of the applicant is justifiable.

Once the Applicants with accepted projects are informed of their acceptance, the Facility Manager (FM) of the hosting installation will be in charge of planning the dates for the venue and supporting the visiting personnel in the logistic formalities, including office desk, internet access and all necessary technical support during the period of the mission.

Upon approval, INSHIP Project Coordinator will automatically transfer the corresponding budget to the INSHIP partners included in the Consortium. Upon budget transfer, each partner is responsible for justification of the corresponding costs according to the IAScheme proposal, to be reported in the overall Financial Cost Statement of the respective partner.

3.2. Definition of the criteria and scores

The IPE shall base its selection on the following criteria:

- Alignment with the INSHIP ECRIA objectives. Scientific excellence (originality and innovation).
- The overall quality of the proposal.
- The relevance of the proposal on the related research task within the corresponding WP.
- The in-kind contribution ratio proposed.
- Industrial partner inclusion.
- Exploitation plan for future coordinated actions.

The final ranking is decided by all panel members in a consensus basis during the meeting, by considering all relevant data. The best ranked proposals will be short-listed for mobility missions and the rest will be considered as part of a reserve list.

Proposals ranked in the reserve list could be finally granted with the mobility access if accepted proposals do not communicate with the MC for informing about the estimated mobility dates within the first month after notification.

4. Description of the Infrastructure Access Scheme Proposals/Mobilities

The first call for proposal was finally launched in September 2017 and extended until July 2018, due to the low participation of the INSHIP partners in the activity, with the idea that mobility missions would be carried out from January 2019. Note that due to the low number of proposals received for this first call, the second call was launched in January 2019, just after the evaluation process of the first proposals by the IPE was completed, with the idea that mobility missions would be carried out from June 2019 to December 2020. In addition, and due to the still low number of proposals received and the small budget requested by these proposals compared to the total budget available for the action, a third call for proposals was required and launched in November 2019. This call remains open on a continuous basis with the only requirement that last proposals shall be approved in such a time frame that results are achieved within the INSHIP project lifetime.

Five proposals were received in the first call, see Table 2. The evaluation process by the IPE was completed in mid-September 2018. Of these five proposals, three were approved by the Independent Panel of Expert (IPE), and two were rejected, i.e. ARISHIP and FOC. Of the three approved proposals only two were implemented within the established period for the first mobility missions, i.e. October 2018 to September 2019. The third one, SOLSAHP, was implemented in November 2019, during the established period for the second mobility missions.

Table 2. **Proposals received in the first call.**

Acronym (Project title)	Host Institution short name	Applicant short name
SOLSHAP ("Solar reflectors shape measurement using autocollimators")	CIEMAT	IK4-TEKNIKER
Pre-Modulus (´"Preparing the project 'Modulus – Modular Balance of Plant ")	DLR	FISE
SOLGAS ("Solar Gasification of waste materials")	CNRS	CEA
AIRSHIP (Aerothermal characterization of 10kW solar absorber for SHIP involving volumetric receivers)	IMDEA	FBK
FOC (Fiber Optic Characterization)	CNR INO	IST-ID

Similarly, in the second call, five proposals were received, see Table 3. The evaluation process by the IPE was completed in mid-April 2019. Of these five proposals, three were approved by IPE, and two were rejected, i.e. FOC and ETC-SC. Of these three approved proposals only one has been implemented coinciding with the period established for the first mobility missions, i.e. October 2018 to September 2019.

Table 3. **Proposals received in the second call.**

Acronym (Project title)	**Host Institution short name**	**Applicant short name**
LFSteam ("Control law of the discharge valve in heat exchangers for the production of steam under constant conditions using thermal oil from Fresnel collector")	CIEMAT	USE
M3DSHIP ("Metallic 3D-printed solar absorbers for high-temperature industrial processes")	IMDEA	FBK
ETC-SC ("Experimental Testing of Evacuated Tube Collector with Semicircular Mirror")	LNEG	CRES
FOC (Fiber Optic Characterization)	CNR INO	IST-ID
ECSH ("Synergistic integration of electrochemical technologies with solar heating")	CIEMAT-PSA	UNIPA

Therefore, as of today, four of the six projects evaluated and accepted by the IPE have been implemented (SOLSHAP, Pre-Modulus, SOLGAS, LFSteam). An **overview summary** of all proposals and their status is provided in section 7 of this report.

Below is an overview of the objectives of each project and the main achievements after the implementation.

Title of the Project: **Solar reflectors shape measurement using autocollimators**	
Acronym:	SOLSHAP
Name of the installation:	PTTL test facility
Short name of the applicant institution:	IK4-TEKNIKER
Short name of the host institution:	CIEMAT
Members of the Consortia:	IK4-TEKNIKER; CIEMAT
Related INSHIP research WP and Task:	WP3 Task 3.4
Onsite working period:	18/11/2019 to 22/11/2019
Onsite working time (in Person week(s)):	2 person weeks
Remote working time (in Person week(s)):	13 person weeks

Objectives

The knowledge of the geometrical quality of the optical surfaces in solar collectors is crucial to determine its performance. Different techniques are available to measure the geometry of solar reflectors; close-range photogrammetry or deflectometry are techniques that have been applied in solar test facilities but also in production lines up to now.

The solution proposed in this project, which has been developed by IK4-TEKNIKER is the application of an inline control of solar reflectors based on the autocollimation principle. The proposed

technique outperforms previous approaches in several aspects. On the one hand, the inspection cell is only slightly larger than the reflector panel under test, as a result, the inspection cell is compact and improves the use of the layout of the plant. On the other hand, the measurements are carried out with considerably smaller uncertainties than other approaches. The compact arrangement of reflectors and autocollimators provides a solution that is very stable from the mechanical point of view. The measuring time is really short because the measurement consists of taking a simultaneous measurement with the set of autocollimators (ACs), similar to taking one photograph.
The starting TRL of the system was 4 and with the project a TRL 6 was achieved.
Linked to INSHIP project, WP3 Task 3.4, CIEMAT is developing a compact and innovative linear Fresnel collector that uses curved mirror panels, which are measured with the system.

Main achievements

The principal achievements that have been carry out in the application of an inline control of solar reflectors based on the autocollimation principle are summarized as follow:
1. The Control Box assembly for the control of the ACs, which composed by the next element (see Figure 1):
- Embedded PCs (One for each autocollimator): Carries out the necessary image processing of the autocollimator and offers the results and the identification of the device through an Ethernet port.
- Power supply
- Ethernet switch: To ensure the simultaneous measurement with the autocollimators
2. The autocollimators platform adaptation to ensure a correct ACs distribution that guarantee a reliable measurement of the linear Fresnel reflectors.

Figure 1. The autocollimation system adaptation

3. The first set-up to ensure the correct measurements of each AC. For this purpose, a MATLAB script has been developed in order to connect with the Embedded PCs to taking simultaneous measurements.
4. The development of the post-processing functions in MATLAB code, to obtain the solar reflector curvature using the AC's measured angels.
5. The experiments with a linear Fresnel reflector in the Tekniker installation proportionated by the PSA, the purpose of these experiments is the validation of the equip before the delivery to PSA installation.
6. The delivery of the equipment to the PSA installation. A special transport box has been manufactured.to avoid any equipment damage.
7. The set-up of the device at the PSA installation and measurement of a linear Fresnel reflector for the final validation of the equipment (see Figure 2):

Figure 2. Set-up at the PSA installations

Title of the Project: **Pre-Modulus**	
Acronym:	Pre-Modulus
Name of the installation:	Sopran
Short name of the applicant institution:	Fraunhofer
Short name of the host institution:	DLR
Members of the Consortia:	DLR; Fraunhofer; Protarget AG; Industrial Solar GmbH; Solarlite GmbH; ROBA Piping Projects GmbH
Related INSHIP research WP and Task:	WP3, Task 3.1 and Task 3.2
Onsite working period:	03/07/2019 to 04/07/2019
Onsite working time (in Person week(s)):	2 days plus travels, 6 Persons
Remote working time (in Person week(s)):	7 weeks

Objectives

Currently BoP's of industrial solar heat plants are planned individually for each installation. Not many installations are being built and their size, temperature and heat transfer media differ so that each solar collector supplier has to plan and construct the BoP's individually for his plants. Especially for field sizes of several 100 m² of aperture area the relative costs for a BoP are high, increasing the solar heat generation costs significantly.
The investigations in Pre-Modulus aim at preparing a proposal to standardise and thus reduce costs for BoP's. This relates to the aims of INSHIP especially in WP3, Task 3.2 – Balance of plant concept for better cost competiveness for market introduction.
The TRL ranges from 4 (Technology tested in lab) to 6 (technology demonstrated in relevant environment).

Main achievements

Currently BoP's of industrial solar heat plants are planned individually for each installation. Not many installations are being built and their size, temperature and heat transfer media differ so that each solar collector supplier has to plan and construct the BoP's individually for his plants. Especially for field sizes of several 100 m² of aperture area thus the relative costs for a BoP are high, increasing the solar heat generation costs significantly. Therefore, a consortium of industrial

partners in cooperation with DLR and ISE has prepared the proposal "Modulus" for standardising BoP's to reduce costs. The investigations in the Pre-Modulus project helped to prepare technical concepts for the proposal.
The tasks related are Task 3.1 Solar driven steam generation and Task 3.2 Balance of Plants concepts in WP 3 "Technology and applications to medium temperature SHIP (150°C to 400°C)"
As a coordination objective the "acceleration of knowledge transfer to the European industry, at both end-user sector and technology supplier levels, in order to ensure the industrial European leadership on SHIP" has been addressed by the integration of 4 companies (all technology suppliers) in the Pre-Modulus project.
Pre-Modulus also intended to prepare the German "Modulus" project which has been submitted by now with good chances for acceptance until May 2020. This helps to reach the goals of the INSHIP "action through the promotion of specific research activities aligned with the scientific topics of the ECRIA and setting the base for the preparation of project proposals aligned with national and EC funding objectives and engaging the participation of industrial partners".
The research objective "To ensure a swifter and efficient integration of existing Solar Thermal technologies into low and medium temperature processes." and the action "Through the implementation of specific activities aiming standardized integration of SHIP into existing facilities, …" is addressed as the Modulus project will contain standardisation of BoP's as a central topic to reduce cost.
The tests in Pre-Modulus helped to realise the KPI_8. "Number of joint tests carried out by two or more ECRIA participants" by the joint testing of ISE and DLR.
While the Pre-Modulus project could not directly help to achieve the "KPI_28 Reduction of Solar Steam Integration BoP costs" the Modulus project aims at significantly reducing these costs.
The main difficulty has been the weather condition. During the testing period only about 50% of the time sunshine was good enough to run the tests.

Title of the Project: **Solar gasification of waste materials**	
Acronym:	SOLGAS
Name of the installation:	PROMES solar furnace
Short name of the applicant institution:	CEA
Short name of the host institution:	CNRS-PROMES
Members of the Consortia:	CEA, SIBUET, CNRS-PROMES
Related INSHIP research WP and Task:	WP4
Onsite working period:	01/07/2019 to 19/07/2019
Onsite working time (in Person week(s)):	3
Remote working time (in Person week(s)):	0

Objectives

Over the last few years, solar-only and solar-hybrid gasification have demonstrated their effectiveness to convert a wide variety of feedstock such as wood, coal and petcoke, activated charcoal and corn waste. Although promising, because offering an attractive way for improving the economical balance of solar gasification, the use of Municipal Solid Waste (MSW) and industrial waste (IW) as a primary feedstock for solar gasification was barely discussed. Due to the complex nature of waste and its high percentage of ash, its efficient solar conversion needs to be carefully examined.

Often, the recovery of material and energy from MSW and IW is carried out through the production of Refuse Derived Fuel (RDF). Prepared from plastic wastes, food packaging wastes including plastic, paper, aluminum, glass, etc. RDF presents several advantages over unprocessed waste as they are easier to handle with fairly constant physico-chemical properties and a low chlorine content (generally below 1.5%). Within this framework, and with the purpose of recycling waste with natural sunlight, solar gasification of waste particles in the form of RDF or beech wood sawdust was carried out in a directly irradiated conical cavity-type solar reactor. The goal of the study was to assess the ability of the reactor to convert the millimetric waste particles and identify the potential technical issues to be tackled for improving the reliability of the solar process (TRL 4-5).

Main achievements

First solar-only and solar hybrid experiments on RDF particles were performed for various experimental conditions:

	Run# 1	Run# 2	
$T_{operating}$	1300°C	1300°C	
$m_{feedstock}$	20g	20g	
V_{motor}	12V	12V	12V
Operating mode	Allothermal	Allothermal	Hybrid
F_{RDF}	0.57 g/min	0.58 g/min	0.58 g/min
F_{steam}	0.25 g/min	0.25 g/min	0.25 g/min
F_{oxygen}	0 NL/min	0 NL/min	0.25 Nl/min
S/B	0.58	0.58	0.58
$(S/B)/(S/B)_{st}$ based on Eq.1	1.06	1.06	1.06

The results were promising and showed both high syngas quality and a good performance. Nonetheless, the continuous process suffered significantly from the instability of the injection that particularly affected the hybrid process. Another encountered issue concerned ash agglomeration at the bottom of the conical cavity (**Figure 3**). The melting ashes agglomerated around the packed Al2O3 bed just above the gas injection tube, this should be correctly managed to avoid obstructing or blocking the gas passage. Further experiments were therefore performed using beech wood sawdust particles at 1200°C and at 1300°C under direct and indirect heating configurations. Thanks to their low ash content, and their more uniform size distribution, they were cleaner and easier to handle.

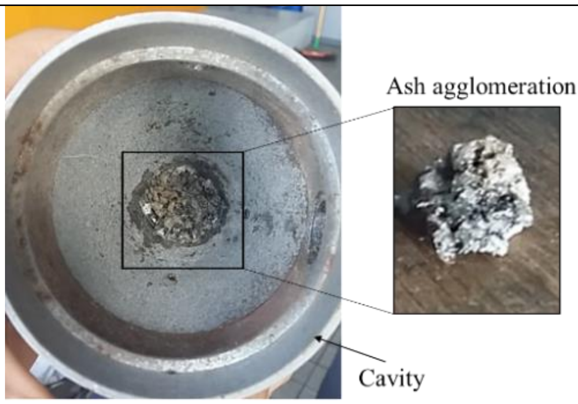

Figure 3. Top view photography of the solar cavity after experiment

Title of the Project: **Control law of the discharge valve in heat exchangers for the production of steam under constant conditions using thermal oil from Fresnel collector**	
Acronym:	LFSteam
Name of the installation:	HTF Test loop (CIEMAT – PSA)
Short name of the applicant institution:	CIEMAT
Short name of the host institution:	CIEMAT
Members of the Consortia:	CIEMAT, USE
Related INSHIP research WP and Task:	WP3 – Task 3.1
Onsite working period:	01/07/2019 to 19/07/2019
Onsite working time (in Person week(s)):	8
Remote working time (in Person week(s)):	8

Objectives

To achieve a greater integration of solar energy in thermal processes, it is necessary to deepen into solar systems for the production of steam with stable conditions concerning pressure and temperature. In the bibliography several articles and projects have been identified in which analysis of the control system is carried out in order to achieve stable vapor conditions. The conclusions of the investigations indicate that the control is simpler and more stable when the pressure of steam produced is higher than 30 bar, due to a lower variability of the properties of the steam, however, for industrial processes the steam consumed is produced up to 16 bar. Hence, it is necessary to deepen the control logic of the system when the system produces steam at low pressure.

Also, most of the existing systems focus on direct steam production in the collector itself, however, no indirect steam production systems have been identified from the use of thermal oil inside the collector. This supposes a further modification in the control system, since it has to include in the control scheme the process of heat transfer inside the heat exchanger / vaporizer.

The objective of the project is to achieve a deeper knowledge in the control systems of steam production in solar driven generators when Fresnel collectors with HTF are used.

Main achievements
During the access period the Fresnel collector was installed in the test bench, and its test plan defined, but it cannot be executed due to a rupture of the HTF circulation pump. The optical and thermal model of the Fresnel collector previously developed by the University of Seville was adjusted using commercial parameters. During January and February 2020 the SOLATOM Fresnel sensor is being tested at PSA. Regarding the development of the thermal model of a steam generator, the literature review was carried out and the model was implemented in the MATLAB SIMULINK tool. From a geometric point of view, the data from the steam generator of the DISS test bench were used. Several simulations were performed with different operating conditions of pressure inside the generator and heat provided, obtaining the variation of the steam flow and the water level in generator over time (dynamic simulation). The activities related to the modelling of the steam discharge valve from the generator and its control law were carried out. A PID control with feed-forward using the generator's linear has been selected model for the control law. Work is being done on simulations and comparison with test results to adjust the model parameters.

5. Scientific output of the users at the installations

No.	Type	Title	Authors	Title of the Journal/Proc./Book	Number, date or freq. of the Journal/Proc./Book	Is Peer-reviewed?	Is Open Access?	DOI
1								
2								
3								
4								
5								

6. Infrastructures List of users

Researchers who have accessed to INSHIP's research infrastructures through Union support

Researcher		**Employing organisation/Home institution**			**Project acronym**	**Installations used by the researcher**	
Name	**Activity Domain (Discipline)**	**Name**	**Legal Status**	**Country**		**Infrastructure Short Name**	**Installation Short Name**
Ahmed Brahim		IK4-TEKNIKER	RES	Spain	SOLSHAP	PSA	PTTL test facility
Aitor Olarra		IK4-TEKNIKER	RES	Spain	SOLSHAP	PSA	PTTL test facility
Theda Zoschke		Fraunhofer ISE	RES	Germany	Pre-Modulus	DLR	Sopran
Houssame BOUJJAT	Engineering technology	CEA	RES	France	SOLGAS	PROMES	PROMES small scale solar furnace
F. Javier Pino		Universidad de Sevilla	UNI		LFSteam	PSA	HTF Test loop

Research infrastructures made accessible to all researchers in Europe and beyond through Union support and summary of access per installation per reporting period (RP).

Participant number	Organisation short name	Short name of infrastructure	Installation Short name	Access provided in RP1 (days)	Access provided in RP2 (days)	Access provided in RP3 (days)	Total access provided (days*)
1	DLR	DLR	Sopran			2	2
2	CIEMAT	PSA	PTTL test facility			5	5
2	CIEMAT	PSA	HTF Test loop			15	15
12	CNRS	PROMES	PROMES small scale solar furnace			15	15

* Onsite working time

7. Summary table of proposals received, approved and implemented

Call number	Acronym (Project title)	Host Institution short name	Applicant short name	Approved (yes/no)	Implemented (yes/no)
1	SOLSHAP ("Solar reflectors shape measurement using autocollimators")	CIEMAT	IK4-TEKNIKER	Yes	Yes
1	Pre-Modulus ("Preparing the project 'Modulus – Modular Balance of Plant")	DLR	FISE	Yes	Yes
1	SOLGAS ("Solar Gasification of waste materials")	CNRS	CEA	Yes	Yes
1	AIRSHIP (Aerothermal characterization of 10kW solar absorber for SHIP involving volumetric receivers)	IMDEA	FBK	No	N/A.
1	FOC (Fiber Optic Characterization)	CNR INO	IST-ID	No	N/A
2	LFSteam ("Control law of the discharge valve in heat exchangers for the production of steam under constant conditions using thermal oil from Fresnel collector")	CIEMAT	USE	Yes	Yes
2	M3DSHIP ("Metallic 3D-printed solar absorbers for high-temperature industrial processes")	IMDEA	FBK	Yes	No
2	ETC-SC ("Experimental Testing of Evacuated Tube Collector with Semicircular Mirror")	LNEG	CRES	Yes	No
2	FOC (Fiber Optic Characterization)	CNR INO	IST-ID	No	No
2	ECSH ("Synergistic integration of electrochemical technologies with solar heating")	CIEMAT-PSA	UNIPA	No	No

Co-funded by the Horizon 2020 Framework Programme of the European Union