

EC Grant Agreement n°609788

CHEETAH

Cost-reduction through material optimisation and Higher EnERgy output of solAr pHOtovoltaic modules - joining Europe's Research and Development efforts in support of its PV industry

Deliverable

D2.5 – Information tool with all the available test infrastructures and protocols for their use

WP2 – Fostering the use of existing facilities and expertise



Section 1 – Document Status

Document information

Deliverable name	D2.5 – Information tool with all the available test infrastructures and protocols for their use
Lead beneficiary	UPVLC
Due delivery date from Annex I	M12
Actual / forecast delivery date	M14
Dissemination level	Public Restricted Confidential

Document validation

Name	Organisation	Date	Visa
Guillermo Sanchez	UPVLC	18/02/2015	ok
Jan Kroon - Coordinator	ECN	23/02/2015	ok

Document history

Version	Date	Modifications	Name
V1	30/01/2015	Creation	Guillermo Sanchez
V2	18/02/2015	Suggestions and questions	Jan Kroon
V3	18/02/2015	Addition of concluding remarks	Guillermo Sanchez
Vf	23/02/2015	Format and typo corrections	Tania Langon

Section 2 – Table of content

Section 1 – Document Status	2
Section 2 – Table of content.....	3
Section 3 – Publishable summary.....	4
Section 4 – Executive summary.....	5
Section 5 – Deliverable report.....	6

Section 3 – Publishable summary

Deliverable 2.5 is related to the tasks described task 2.2 from WP2: “Benchmarking the quantity and quality of access to the common infrastructure, by utilizing best practices methodology to improve the impact of the initiative”. To plan the work ahead for this task, we began by reviewing the activities related to the use of common infrastructures under the project SOPHIA (Project reference: 262533, INFRA-2010-1.1.22 - Research Infrastructures for Solar Energy: Photovoltaic Power). Right after that we decided to focus in the definition of a suitable metric to measure the quality and quantity of the access to common infrastructures. After several rounds of interactions among the partners we have generated a questionnaire to be able to gather the data needed to quantify it. After a first round of data collection, a specific metric was proposed and a final questionnaire was generated to be used during the project, and be able to measure the evolution and the impact of the promotion activities.

Section 4 – Executive summary

Description of the deliverable content and purpose

Deliverable 2.5 is related to the tasks described task 2.2 from WP2: “Benchmarking the quantity and quality of access to the common infrastructure, by utilizing best practices methodology to improve the impact of the initiative”. The main purpose of the first deliverable of this task is to set-up a metric capable of adequately monitoring the progress of the quality/quantity of the use of common infrastructures during the project. The main outcome of this deliverable is a specific metric, and the associated questionnaire to gather the data needed. Also, a first round of data collection was done as a first trial and collected data are presented. Also the intermediate questionnaire documents are provided.

Brief description of the state of the art and the innovation brought

The deliverable brings the innovation in setting up a metric that is very useful to quantify the number and the quality/intensity related to the use/exchange of the infrastructures. If it isn't the best possible one, it is at least a way to monitor the evolution year-by-year of the infrastructure access to check if the promotion activities really render the expected results or not,.

Section 5 – Deliverable report

1. Background

This deliverable is included in Task 2.2: “Benchmarking the quantity and quality of access to the common infrastructure, by utilizing best practices methodology to improve the impact of the initiative” and is related to the need of setting up a metric capable of monitoring it during the duration of the project.

The difficulties of setting up such metric are related to the fact that quantifying is not an easy task when it concerns heterogeneous parameters with respect to each other and not only related to the access numbers. Just as example the number of samples and testing procedure exchange and any other activity related to infrastructure exchange. Nevertheless, the metric was chosen under the assumption that almost any quantity related to the use of the infrastructures will be appropriate, if not as the best possible one to measure it, as a way to monitor the evolution, in the sense that it allows comparing for instance year-by-year the effect of action plan to foster knowledge exchange and access to existing infrastructures. This relative comparison will then allow to check if the promotion activities really render the expected results or not, at the end of the Examination period.

There is a mismatch between the original deliverable D2.5 title and the description of the work to be done under task 2.2. In fact this deliverable will report the results of the work done to follow what was outlined in the description of work, i.e. “Benchmarking the quantity and quality of access to the common infrastructure, by utilizing best practices methodology to improve the impact of the initiative”. The “formal” discrepancy in the title will be amended with a new arrangement of the deliverable list that will shortly be released for approval.

2. Methodology

The **methodology** we have chosen was first to analyze what was done within FP7-SOPHIA Photovoltaic Research Infrastructure project (<http://www.sophia-ri.eu/>, Project reference: 262533, INFRA-2010-1.1.22 - Research Infrastructures for Solar Energy: Photovoltaic Power) and to receive the feedback during that project related to the use of common infrastructure, in order to find the right approach. Based on that, we set-up a first teleconference to organize a brain-storm among the members involved in WP2 to identify the possible measures to understand the current situation, and to promote the quality/quantity of the use of common infrastructures.

In a second teleconference, the issues related to the absence of allocated budget for the use of common infrastructures were reviewed, problems identified and possible solutions outlined.

In a third teleconference, the previous topic was reviewed again, and we moved forward to a more specific solution focused on identifying ways of obtaining measurable units of the use of common facilities.

As a result of this, a first draft document with a proposed questionnaire was outlined and distributed among the partners in draft version end of December 2014 and with more defined content in January 2015 to gather WP2 partners opinions. After this step, a targeted questionnaire was generated and sent to the partners to make a first round of collecting the data in order to set-up a first metric proposal.

From the feedback from the partners we realized that some of the data we were collecting were somehow overlapping with the data collected from WP3 concerning the exchange of scientists. We then decided that some exchange of information between WP2 and WP3 would be needed to avoid such overlap, and that a good opportunity of doing so would be the annual meeting.

Indeed, after this information exchange with WP3, a new questionnaire was generated, following the same format as it was done for WP3, facilitating its use for the partners and avoiding the requesting of any duplicity of efforts.

Such questionnaire was distributed among the partners to be filled in during the annual meeting.

After reviewing the data, the results were collected and analyzed and a final questionnaire was generated.

3. Intermediate steps for the completion of D2.5

Feedback was received from the partners during the different stages of Task 2.2, initially as part of the decision process of setting up the most suitable quantitative method of measuring the quality/quantity of use of common infrastructures. After that it was received in the form of supplied data in completion of the questionnaires.

3.1. Initial ideas

As a result of the analysis of the exchange activities performed in the past under project SOPHIA, the discussion among the partners and the brainstorming activities it was concluded that setting up a metric was paramount, and the best possible way of defining the course of this task, and therefore we focus part of our resources in doing it that first.

Several activities have been initiated such as:

- Collect information among SOPHIA users who:
 - Requested information from other partners
 - Submitted a proposal for free access to Research infrastructure

- Use of service /information offered by CHEETAH Knowledge Exchange Area portal (KEAP)
- Collect information related to quality of the service and future expectations/needs

Also, we came out with the following ideas on how to promote the use of common infrastructures in the future:

- Understanding of the issues related to non successful calls and corrective actions
- Explain that there is a limited number of access calls to avoid the feeling that is going to be there whenever I may need it and promote the idea of a valuable service that needs to take profit from as soon as possible, so people will move to action.
- Make a clear calendar since the beginning with fixed deadlines
- Give examples of the use of the infrastructures with specific values of delivery time
- Outline specific offer of services. For instance something like offering specific cell technology with target efficiency.

3.2.1st draft questionnaire

A first draft questionnaire was generated and distributed among the partners in November 2014, to review their feedback and eventually change it to a new version. The original idea was to review the different work packages within CHEETAH to determine to what extend we use some other partners infrastructure.

In order to do so, the idea was to choose the most straight forward metric to quantify the amount of samples generated and tested as part of the current R&D activity within CHEETAH, as a way to generate the first statistics of the percentage of infrastructures exchange. For the study we suggested of doing the following steps:

- Make an inventory of activities
 - by requesting information to the R&D work package participants
- To know the amount of
 - people exchange
 - samples exchange
 - other activities related to infrastructure exchange
- And also quantify the amount of resources utilized in order to measure the cost. This information will be used to establish in the future an exchange balance policy, providing that there is no direct funding allocated for the exchange of activities within the project.

Such questionnaire is brought here:

[QUESTIONNAIRE](#)

1. Please fill in the box with the total number of samples generated or tested during the first year of the CHEETAH at your facilities (at home), including the work done for your own research activities and the one done for other partners. Specify the number of samples you have requested to manufacture or test to another partner, and how many samples you have generated or tested for other partners.

D2.5 - Information tool with all the available test infrastructures and protocols for their use

number of samples					
manufactured			tested		
at home	requested to other locations	manufactured for other partners and delivered ⁽¹⁾	at home	delivered to other location for test	received from other location to be tested ⁽¹⁾

(1) For each please describe the type of sample/service provided and an estimated cost in terms of PM's, materials and hours of infrastructure usage.

- Please consign here any visit or stay that any member of your organization have done to any other partner's facility which implies the use of manufacture or test facilities.

people stays in external locations		
Name of the researcher	stay duration	host organization

people hosted from external locations		
Name of the researcher	stay duration	organization

- Please refer here to any other activities related to the promotion of the tools and facilities located at your place.

Other activities related to the promotion of tools/facilities exchange	
Type of activity	estimated PMs

3.3. Feedback comments from the partners

Here we have the comments received from the partners concerning the first draft questionnaire:

- The document is adequate, in my opinion.
- Can you please clarify what is the purpose of collecting information about sample preparation costs and sharing with partners?
- Can you please also clarify what is meant by "requested to other locations" (second column)?
- In general it is a nice idea to quantify the exchange of infrastructure. But we have some trouble with the form of the document. The quantification of costs, effort, person months will

cause trouble. In practice, you cannot make all bookings in the project in that way that you can correlate everything together. From our point of view it is not necessary for the quantification of this exchange.

- For example, if we deposit samples at our lab and send them to a partner for some measurements and get them back, it is good to document that samples were prepared by partner A and the experiment E was done by partner B. Also the amount of samples is of minor interest. If you send more samples just for backup or some samples were getting damaged and you only look to the number, it doesn't make sense.
- Another issue is the exchange of researchers. Isn't there an overlap with WP3? Remember that it was demanded by the PO to avoid such overlap between deliverables.
- Then, what is the meaning of "activities related to the promotion of the tools"? It make sense to document the interaction/exchange of existing infrastructure. As I understood, promotion of this is not the focus of CHEETAH.
- We would like to provide the work to quantify the exchange of infrastructure but from our side, the document is not useful for this.
- There is just a point I like to discuss. In the present form we quantify the number of manufactured/tested samples, however there is no quantification of the time (hours) spent for manufacture and for tests. I mean, it will be difficult to compare manufacture/test of heterogeneous devices and activities as those present in CHEETAH. So probably the quantification of the time will help. In fact, for the other two points (visit and other activities) there is a quantification of duration or PM.
- I think the questionnaire is very good to gather the information what samples have been processed and how the exchange of sample has been working. However can you include a table for the available infrastructure?

4. Summary of the results

The draft questionnaire was distributed among the partners to collect a first set of data which we can use to make an early evaluation of the current situation during the first year of the project. Besides the draft questionnaire, a second questionnaire was generated and distributed during the annual meeting in Chambéry. This second questionnaire was generated as a result of the reviewing of the activities of the first year, and after realizing that part of the requested information in the draft questionnaire was requested in another questionnaire from WP3 as well. Such second questionnaire was generated by using the same table generated in

WP3, and modifying in it some of the fields. The results collected with that second questionnaire during the meeting are brought also here in the next bullet.

4.1. Summary of the data collected among the partners

Sending Institution	Contact person	number of samples					
		Manufactured			Tested		
		at home	requested to other locations	manufactured for other partners and delivered ⁽¹⁾	at home	delivered to other location for test	received from other location to be tested ⁽¹⁾
ECN	Sjoerd Veenstra	45 (800 (estimate, incl. hours, materials, & equipment))					24 (400)
UNIMIB	Simona Binetti	100			100		
ISE	Birger Zimmermann	90			90	40	

In order to take the opportunity of receiving additional feedback from the partners during the 1st annual meeting in Chambéry, the following table was prepared and the subsequent data filled in by the partners. In order to facilitate its use to the partners, it was elaborated by taking the original table prepared by Iver Lauermann for WP3, and adapted to the content needed for WP2 activities and D2.5.

Sending Institution		Contact person at sending institution		Receiving institution	Contact person	Type of service requested	quantity	Date	have the sample been processed already?
No	Short name	First Name	Last Name	No - Short name	First Name	sample process or sample test	Number of samples	Give approximate dates and duration, if known	yes or not
3	ISE	Frixos	Stavrou						
		Marion	Drießen						
		Stefan	Reber						
		Harry	Wirth						
		Michael	Koehl						
		Ulrich	Eitner						
		Birger	Zimmermann	NPL, ECN, ENEA	F. Castro/S. Vernisha	Aging + Charact.	90	Dec-2014	No
4	DTU	Suren	Gevorgyan	NPL, ECN, ENEA, ISE		Cells for charact.	40	Dec-2014	yes
		Frederik	Krebs						
		Michil	Beliatis						
6	JÜLICH	Aileen Cris	de Guia						
		Jürgen	Hüpkes	EPFL, Julich		modules	oct-15		yes
		Karsten	Bittkau						
17	LNEG	António	Joyce						
		Maria João	Brites			OPV Kesterite		Mid-2015	yes
		José Brito	Correia						
26	IMPERIAL	Jenny	Nelson						

(ICL)	James	Durrant						
	Antonio	Urbina						
	Zhe	Li	DTU	ISE	Polymer samples	4		

4.2. Final questionnaire

Taking into account the comments received from the partners, we should remove from the questionnaire everything else related to people exchange, since it is covered within WP3. However, we propose to consider the efforts related to the exchange of samples by realizing an inventory related to the specific Work package to which the activities refer.

The new suggested questionnaire is :

			number of samples					
			Manufactured			Tested		
Sending Institution	Contact person	WP number	at home	requested to other locations	manufactured for other partners and delivered	at home	delivered to other location for test	received from other location to be tested

4.3. Final metric

After reviewing the activities during the first year of the project, there is already a quite active exchange of infrastructures within FP7_CHEETAH, and this is related to a good scientific atmosphere and confidence among the partners. Within this environment, the exchange of samples is one of the best ways to know each other's infrastructure capabilities, and to promote such good relationship and confidence. One of the best ways to confirm that in fact the exchange of infrastructures is taking place is by **measuring the amount/intensity of collaborative work compared with the work carried out at your own lab. A simple metric to quantify is the ratio between samples that travels and samples made and tested at home.**

In the following example, 90 samples have been manufactured and tested at home, were 40 of them were delivered for test to another location. The ratio will then be 40/90, i.e. a 44% of test exchange, while no sample were sent to another location to complete manufacturing, i.e. a 0% of sample manufacturing exchange. Such percentage of exchange is the most suitable way to establish our metric.

number of samples

Manufactured			Tested		
at home	requested to other locations	manufactured for other partners and delivered ⁽¹⁾	at home	delivered to other location for test	received from other location to be tested ⁽¹⁾
90	0	0	90	40	0

4.4. Conclusions and remarks

The need of a measurable way of evaluating the quantity/quality of the use of common infrastructures was highlighted since the beginning of this task. Background information was obtained from project SOPHIA in a straightforward way, since many of the partners involved in CHEETAH were also involved in SOPHIA. After several attempts, a final metric was established, and the corresponding questionnaire generated. It was also sent to the partners to fill it in, and data collected and analyzed in order to complete the protocol at least once. Now that the protocol have been established and tested, it will be used in the coming periods of the project for at least once a year. It is also the intention of this protocol to be fully automated and implemented in the “information tool” and reported in D2.6, in such a way that it will finally eliminates the need of sending questionnaires.