



Project SOPHIA

PhotoVoltaic European Research Infrastructure

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NA2: Expert groups on a PV infrastructure Strategic Vision

D2.3 – Contribution of SOPHIA to EERA Work Programme

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Table of contents

1. Executive summary	4
2. Technical sections.....	5
1.1. Introduction.....	5
1.2. EERA-PV	5
1.1.1 Silicon Materials	5
1.1.2 Thin-Film PhotoVoltaics.....	6
1.1.3 Organic Photovoltaics.....	6
1.1.4 Module Technology.....	6
1.1.5 Education and Training and use of Infrastructures	6
1.3. Contribution of SOPHIA to EERA-PV.....	6
3. Conclusions.....	8
Appendix A	8

1. Executive summary

The EERA initiative was launched in 2008 with the mission to accelerate energy technology development in support of the SET 2020 plan. This mission is realised by enhancing cooperation across Europe through the creation and implementation of Joint Programmes. In every Joint Programme, resources and research activities are aligned and integrated to achieve common objectives. The resulting coordination and cooperation is intended to lead to more efficient use of resources and thus helps to accelerate energy technology developments.

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Execution of EERA-PV relies on commitment, funding and coordination. A sub-objective of SOPHIA is to help the implementation of EERA-PV.

The budget for coordinating EERA-PV activities has partly been secured with the SOPHIA project within the FP7-Infrastructures programme. “Partly” meaning only those activities covered by the Description of Work in SOPHIA that overlap with EERA-PV. SOPHIA facilitates a better embedding of EERA-PV in the European innovation system and secures funding for coordination activities and provides some seeding funds for some designated research areas.

The funding of the R&D programs at the individual research institutes is not secured through SOPHIA, neither through EERA-PV. This is still the full responsibility of the individual parties. Therefore, the following specific EERA goals can only be loosely addressed in SOPHIA:

- Creation of an aligned European-wide focus on research activities that are in common agreement between the EERA partners;
- Motivate national research organisations and universities to align their resources and infrastructural investments.

These topics are part of the spirit of EERA and can only be addressed if sufficient funds are available.

Managing of a >10M€ R&D program¹ is not a straightforward activity. A professional secretary is mandatory to initiate, steer and control R&D activities. Within SOPHIA, coordinator CEA-INES is supported by management agency ALMA. Within EERA-PV, the management is carried out by the key researchers, who can only invest a limited amount of time, given their other responsibilities. In the current situation, management and control, especially steering towards deliverables, are difficult to enforce within EERA-PV.

¹ The human resource commitment given by R&D institutes and universities within the EERA-PV program amounts to ~1000 person months per year. Expressed in value, this is in the order of 10M€ per year.

2. Technical sections

1.1. Introduction

The European Energy Research Alliance (EERA, www.eera-set.eu) was founded in 2008. The key objective of EERA is to accelerate the development of new energy technologies by creation and implementation of joint research programmes in support of the Strategic Energy Technology 2020 plan (http://ec.europa.eu/energy/technology/set_plan/set_plan_en.htm). EERA aims at strengthening, expanding and optimising of EU energy research capabilities by pooling and integrating research activities and resources, combining national and European sources of funding and maximising complementarities and synergies.

For this purpose, Joint Programmes have been defined. In every Joint Programme, resources and research activities are aligned and integrated to achieve common objectives. The resulting coordination and cooperation is intended to lead to more efficient use of resources and thus helps to accelerate energy technology developments. Through the Joint Programmes, EERA can support Member States in their efforts to coordinate their long-term energy research activities. Also, the EERA Joint Programmes provide the basis for supporting strategic industrial energy research.

The EERA management board has so far focussed on formulating and launching Joint Programmes. An overall number of 13 Joint Programmes have been launched since EERA's founding:

1. PhotoVoltaics
2. Wind Energy
3. Smart Grids
4. Geothermal
5. Carbon Capture and Storage
6. Materials for Nuclear
7. Bio-energy
8. Concentrated Solar Power
9. Ocean Energy
10. Advanced Materials and Processes for Energy Applications
11. Smart Cities
12. Energy Storage
13. Fuel Cells and Hydrogen

1.2. EERA-PV

The Joint Programme EERA-PV is based on the Strategic Research Agenda and Implementation Plan (<http://www.eupvplatform.org/publications/strategic-research-agenda-implementation-plan.html>) of the EU PV Technology Platform (<http://www.eupvplatform.org>), and aims to contribute to a large extent to the R&D needs of the Solar Europe Industry Initiative regarding PV cost reduction. The following research areas², including key topics of interest, have been launched in February 2011.

1.1.1 Silicon Materials

- Development of silicon for very high efficiency solar cells
- Development of feedstock and wafers from upgraded metallurgical grade (UMG) silicon

² New areas and partners may be introduced during the execution of the EERA-PV programme.

- Development of new approaches to solar wafers characterized by high silicon utilization (g/Wp)

1.1.2 Thin-Film PhotoVoltaics

- Enhancement of efficiency leading to improved performance-to-cost ratio of 0.5 €/Wp
- Development of new materials and technologies for very low-cost, large-area modules
- Development of high-yield, high-throughput manufacturing technologies

1.1.3 Organic Photovoltaics

- Laying foundation for improving performance and lifetime of OPV devices
- Increase effectiveness and efficiency of OPV R&D through building a library of materials and developing common protocols for screening of materials

1.1.4 Module Technology

- Development of new module concepts for low-cost and/or long lifetime modules, and corresponding manufacturing technologies
- Development of new measurement and testing methods and modelling approaches
- Improvement of energy yield predictions over the lifetime of the module

1.1.5 Education and Training and use of Infrastructures

- Optimize use of R&D facilities among the EERA-PV partners by making access easier
- Identify needs for new or upgraded R&D facilities
- Promote exchange of researchers in joint programmes

1.3. Contribution of SOPHIA to EERA-PV

EERA functions optimally if it is well embedded in the European energy innovation system. This is a complex ecosystem with a variety of stakeholders. i.e., the European commission, its member states research organisations and industrial companies. Research organisations and industry typically collaborate through execution of national programmes (research organisations often define and/or steer the national programmes). Meanwhile, industry collectives exist to express the industry needs. This research has typically a short-term character. High-risk, fundamental research and associated complex and expensive research infrastructures are not always of primary concern to industrial companies.

The Joint Programmes were initiated from internal funds of the individual EERA members. This has enabled a quick start of EERA. In order to survive on a longer term, EU funding through the so-called “FP7-Infrastructures programme” was sought by means of acquisition of the SOPHIA project. SOPHIA is an enabler to materialise cooperation, ensure coherence, and motivate the adaptation of national programmes into a more coherent EU programme in the area of EERA-PV. The SOPHIA project was launched in February 2011 subsequently after the kick-off of the EERA-PV programme. More specifically, SOPHIA acts as an enabler to:

- Compensate for coordination efforts in the form of networking activities (NA);
- Designate some “seeding funds” for some designated research activities through joint research activities (JRA).

- Provide a platform for researchers (both inside and outside of the SOPHIA consortium) to get to know research facilities through transnational access (TNA) programmes. Within EERA-PV, this is part of the cross-sectional programme “Education and Training and use of Infrastructures”.

In the table below, the cross-comparison between SOPHIA en EERA-PV is shown, including responsible parties/persons.

	SOPHIA	EERA-PV
Silicon materials	<ul style="list-style-type: none"> •NA2.1 expert group lead by ISE (M. Schubert) •JRA3 improved characterisation procedures lead by ISE (W. Warta) 	<ul style="list-style-type: none"> •SP1 work package lead by ISE (S. Reber)
Organic PV	<ul style="list-style-type: none"> •NA2.2 expert group lead by Risø (P. Sommer-Larsen) 	<ul style="list-style-type: none"> •SP3 work package lead by Risø (P. Sommer-Larsen)
Thin-film technology	<ul style="list-style-type: none"> •NA2.3 expert group lead by HzB (I. Lauer mann, M. Lux-Steiner) 	<ul style="list-style-type: none"> •SP2 work package lead by HzB (I. Lauer mann, M. Lux-Steiner)
Concentrated PV	<ul style="list-style-type: none"> •NA2.4 expert group lead by ISE (G. Siefer) 	<ul style="list-style-type: none"> •Not covered within EERA-PV.
Cell modelling	<ul style="list-style-type: none"> •NA2.5 expert group lead by FzJ (B. Pieters) •JRA4 modelling approaches group lead by FzJ (B. Pieters) 	<ul style="list-style-type: none"> •Not covered within EERA-PV
Lifetime prediction	<ul style="list-style-type: none"> •NA2.6 expert group lead by ECN (I. Bennett) •JRA01 module lifetime lead by ECN (I. Bennett) 	<ul style="list-style-type: none"> •SP4 work package lead by ECN (P. de Jong)
Module & system performance	<ul style="list-style-type: none"> •NA2.7 expert group lead by JRC (N. Taylor) •JRA02 performance prediction lead by INES (J. Merten) 	<ul style="list-style-type: none"> •Module performance part covered in SP4. Sub section lead by CREST (R. Gottschalg) and JRC (T. Sample)
Building Integrated PV	<ul style="list-style-type: none"> •NA2.8 expert group lead by INES (B. Boillot) 	<ul style="list-style-type: none"> •Not covered within EERA-PV
Education and Training	<ul style="list-style-type: none"> •NA04 work package lead by ENEA (F. Roca) 	<ul style="list-style-type: none"> •SP5 work package lead by INES (P. Malbranche)
Use of Infrastructures	<ul style="list-style-type: none"> •TNA work package lead by INES (P. Malbranche) 	<ul style="list-style-type: none"> •SP5 work package lead by INES (P. Malbranche)

The following specific EERA goals are only loosely addressed in SOPHIA:

- Create focus by funding only those research activities that are in common agreement between the EERA partners;
- Motivate national research organisations and universities to align their resources and infrastructural investments.

These topics are part of the spirit of EERA and can only be addressed if sufficient funds are available. Within SOPHIA, these topics can only be touched upon through networking and joint research activities. This allows the different partners in the consortium to get to know each other, and to form

new consortia to acquire new funds through the Commission. This is an improved situation compared to the past, but not yet an ideal situation.

In addition to funding, the EERA-PV subprogrammes can only be successful if the subprogrammes are well organised. Managing of a >10M€ R&D program is not a straightforward activity. A professional secretary is mandatory to initiate, steer and control R&D activities. Within SOPHIA, coordinator CEA-INES is supported by management agency ALMA. Within EERA-PV, the management is still carried out by the key researchers. Therefore, management and control, especially steering towards deliverables, is only weakly enforced within EERA-PV.

3. Conclusions

This document describes the ambition of EERA, in particular EERA-PV and the role of the SOPHIA project to contribute to these goals. Execution of EERA-PV relies on commitment, funding and coordination. The SOPHIA project contributes to the implementation of EERA-PV.

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Appendix A

A leaflet describing the work planned within the Joint Program EERA-PV can be found here:

http://www.eera-set.eu/lw_resource/datapool/items/item_585/flyer_eera_pv_1.pdf