



European Energy Research Alliance



www.eera-set.eu



A very short history of EERA

October 27, 2008:
10 founding
members sign
Letter of Intent for
EERA

July the 3rd: First
EERA AISBL
General Assembly

LISBOA

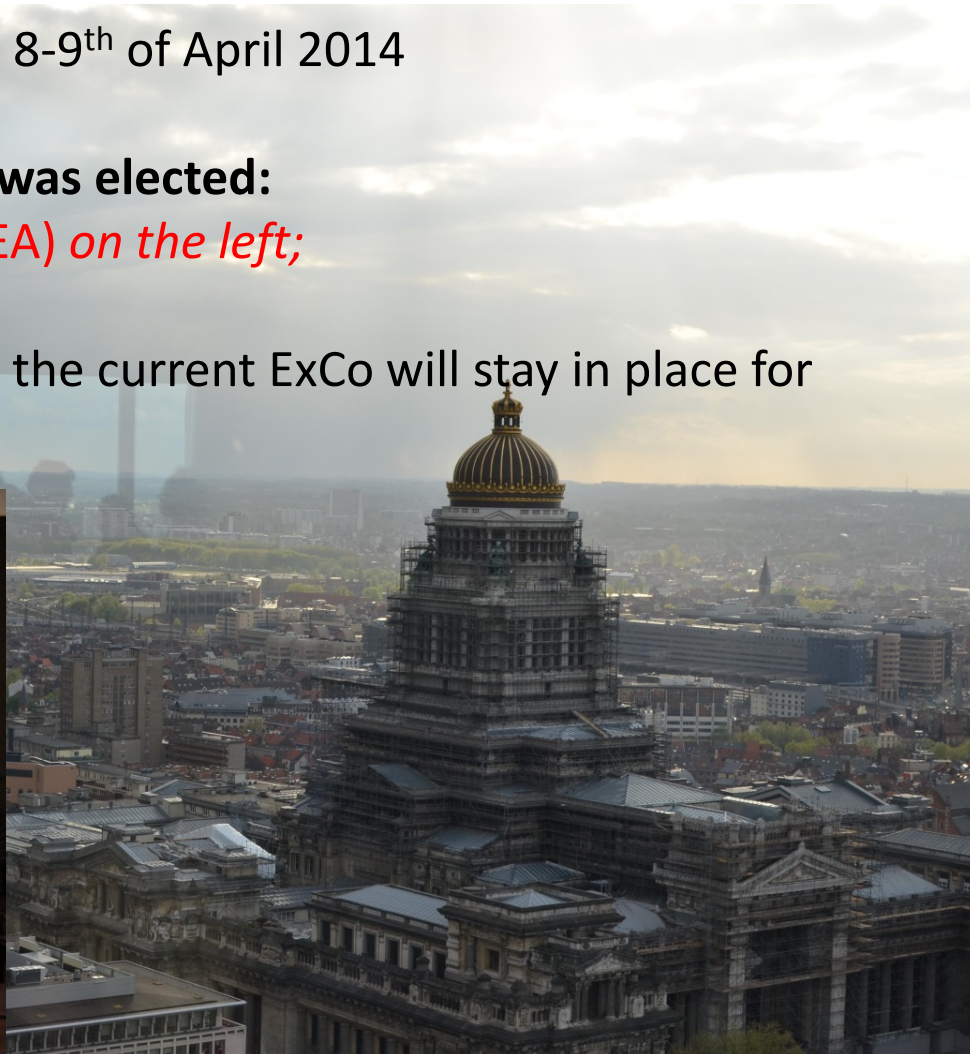
PARIS

BRUSSELS

April 8, 2014:
15 EERA ExCo's
found EERA AISBL

EERA Congress 2014

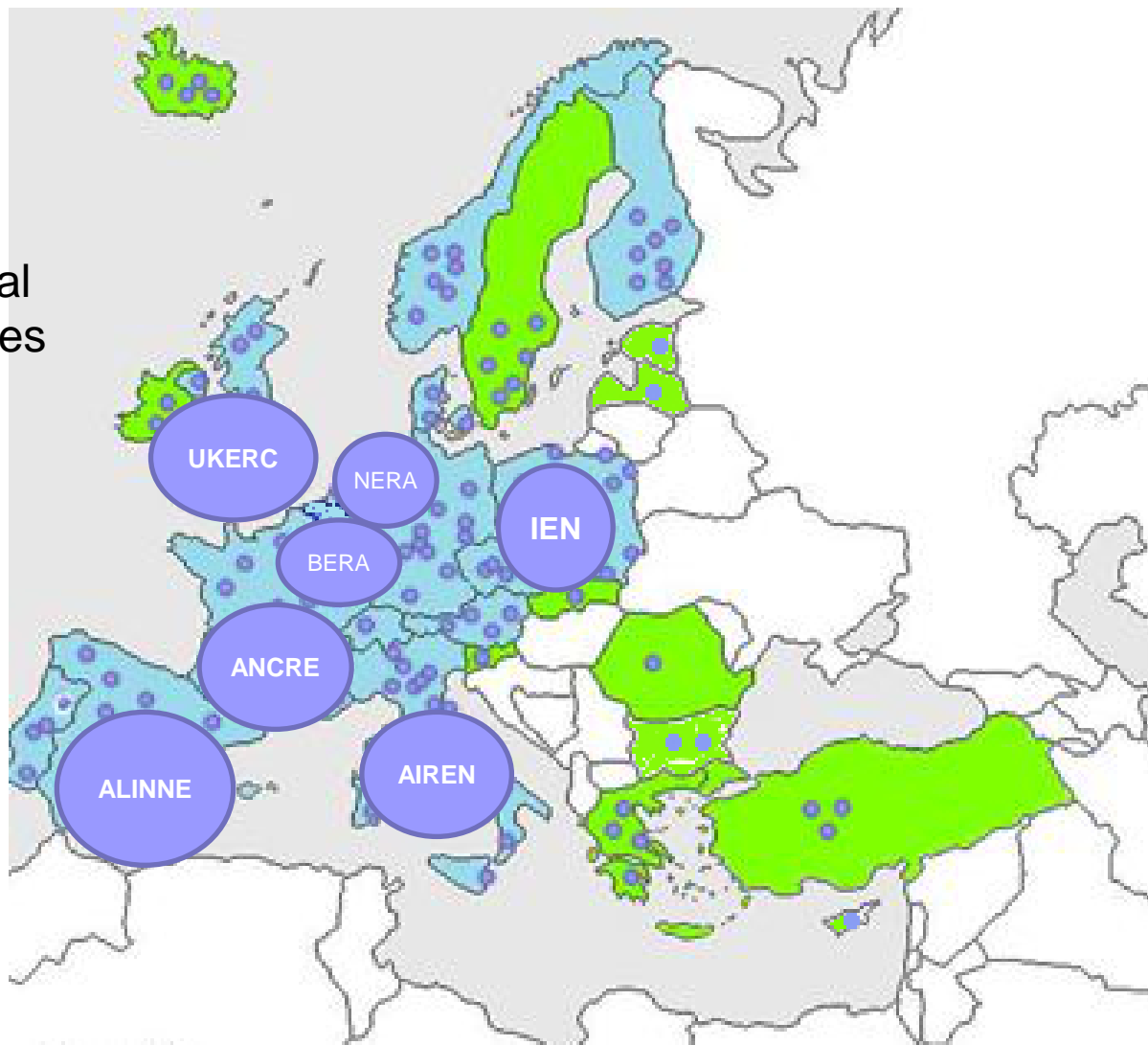
- Was held in Brussels on 8-9th of April 2014
- A new EERA Chairman was elected:
Hervé Bernard (CEA) on the left;
- For a smooth transition, the current ExCo will stay in place for one more year.



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EERA in 2014

National
Alliances



**15 Executive
Committee
Members**

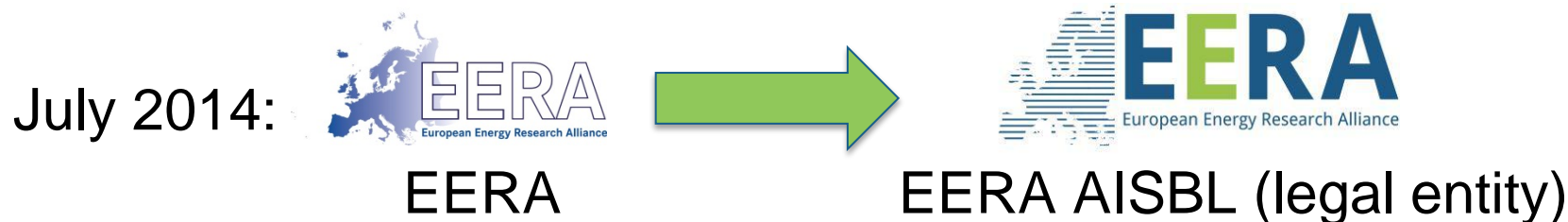
15 Joint Programmes
+2 JPs in preparation

More than 3700
FTE* committed

27 countries involved
(**24** from the EU)

More than 250
members

**Full time equivalent*



Currently only the 15 EERA ExCo org. are members of the AISBL

All EERA JP members need to apply to become a member of the AISBL and continue membership of the EERA JPs

EERA AISBL → able to issue contracts with its partners → possible legal funding from the Commission (at least, that is one of the target).

Current status of EERA JPs

Joint Programmes launched in 2010

- Bioenergy: ≈ 327 professionals*
- CCS: ≈ 361 professionals*
- Geothermal: ≈ 408 professionals*
- Mat. for Nucl.: ≈ 198 professionals*
- PV: ≈ 162 professionals*
- Smart Grids: ≈ 131 professionals*
- Wind: ≈ 301 professionals*

Joint Programmes launched in 2011

- AMPEA: ≈ 522 professionals*
- CSP: ≈ 132 professionals*
- Energy Stor. ≈ 430 professionals*
- FC&H2 ≈ 160 professionals*
- Ocean Ener.: ≈ 45 professionals*
- Smart Cities ≈ 212 professionals*

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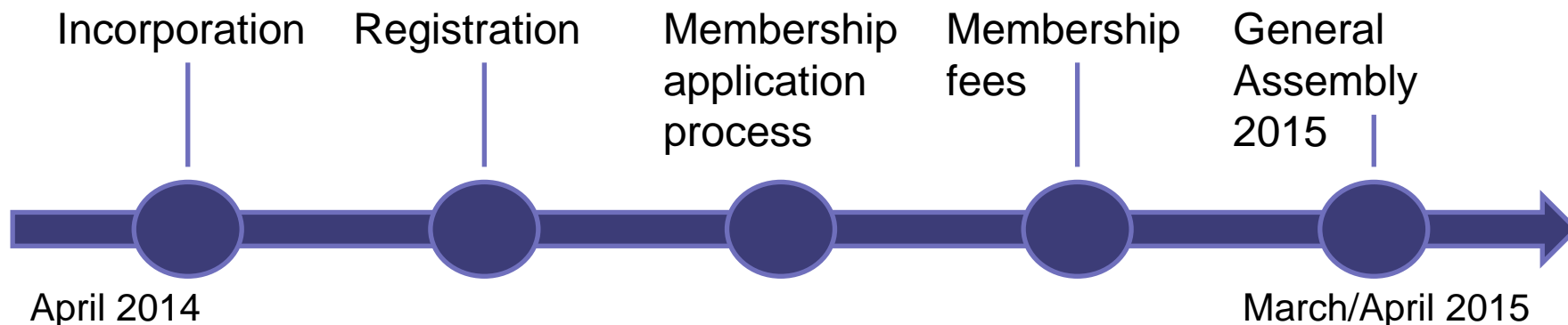
New JPs launched in 2013

- Environmental, economic and social impact analysis "E3S" ≈ 194 professionals *
- Shale gas ≈ 181 professionals *

New JPs under development

- Energy efficiency
- Energy systems integration

Next steps for the EERA AISBL Summary



- European Energy Research Alliance EERA AISBL has legal capacity to operate.
- Online membership application process opens in the Fall 2014.
- Nominal membership fees will be collected.
- You can already save the date for the EERA General Assembly and Congress planned for **29th and 30th of April 2015**

EERA AISBL – Membership fee (1/2)

Membership of the EERA AISBL requires a membership fee

EERA membership fee

Full members
3000 €
(incl. umbrella org.)

Associate
members 1000 €

EERA ExCo
members
8000 €

The membership fee will be *in addition* to existing JP Fees

EERA AISBL – Membership fee (2/2)

What will the membership fee be used for?

General assembly	Communication	Online tools and databases
EERA JP reviews	JP Support	Miscellaneous

The EERA budget is subject to General Assembly approval



dans



CNRS in 7-8 Joint Programs ...

- Carbon Capture & Storage, Energy Storage, Geothermal
- Concentrated Solar Power, Ocean Energy, Wind Energy,
- Advanced Materials Processes for Energy Applications, Fuel Cells and Hydrogen, Smart Grids, Smart Cities,
- Materials for Nuclear, Bioenergy, Photovoltaics

Représentant CNRS
Alain Dollet



EERA Joint research Programme

Photovoltaic Solar Energy

JP Coordinator :

Philippe Malbranche, CEA-INES

CNRS delegate:

Abdelilah Slaoui, Icube (Strasbourg)

J.F. Guillemoles, IRDEP (Chatou)

Ambition of EERA-PV JP

- **Accelerate development of photovoltaic solar energy** towards an energy technology that can be implemented at a very large scale by **increasing effectiveness and efficiency of RD&D** in Europe
- **Contribute to development needs of the Solar Europe Industry Initiative** regarding cost reduction of solar electricity, in support of the SET plan (performance, lifetime/reliability, manufacturing costs)

Through alignment of (national) RD&D programmes by:

- *Conducting joint research (joint programming)*
- *Sharing of infrastructure*
- *Exchange of scientists*
- *Complement Horizon 2020 programmes*



Added value : a gradual approach with several steps

1. Reviewing our Research Infrastructures

- Identifying current facilities and equipment
- Surveying characterisation procedures
- Listing of ongoing projects

2. Increasing our coordination

- Benchmarking and organisation of Round Robin tests
- Understanding the various criteria for improved characterisation
- Validating test procedures and characterisation methods

3. Developing a joint strategy

Elaborating a roadmap

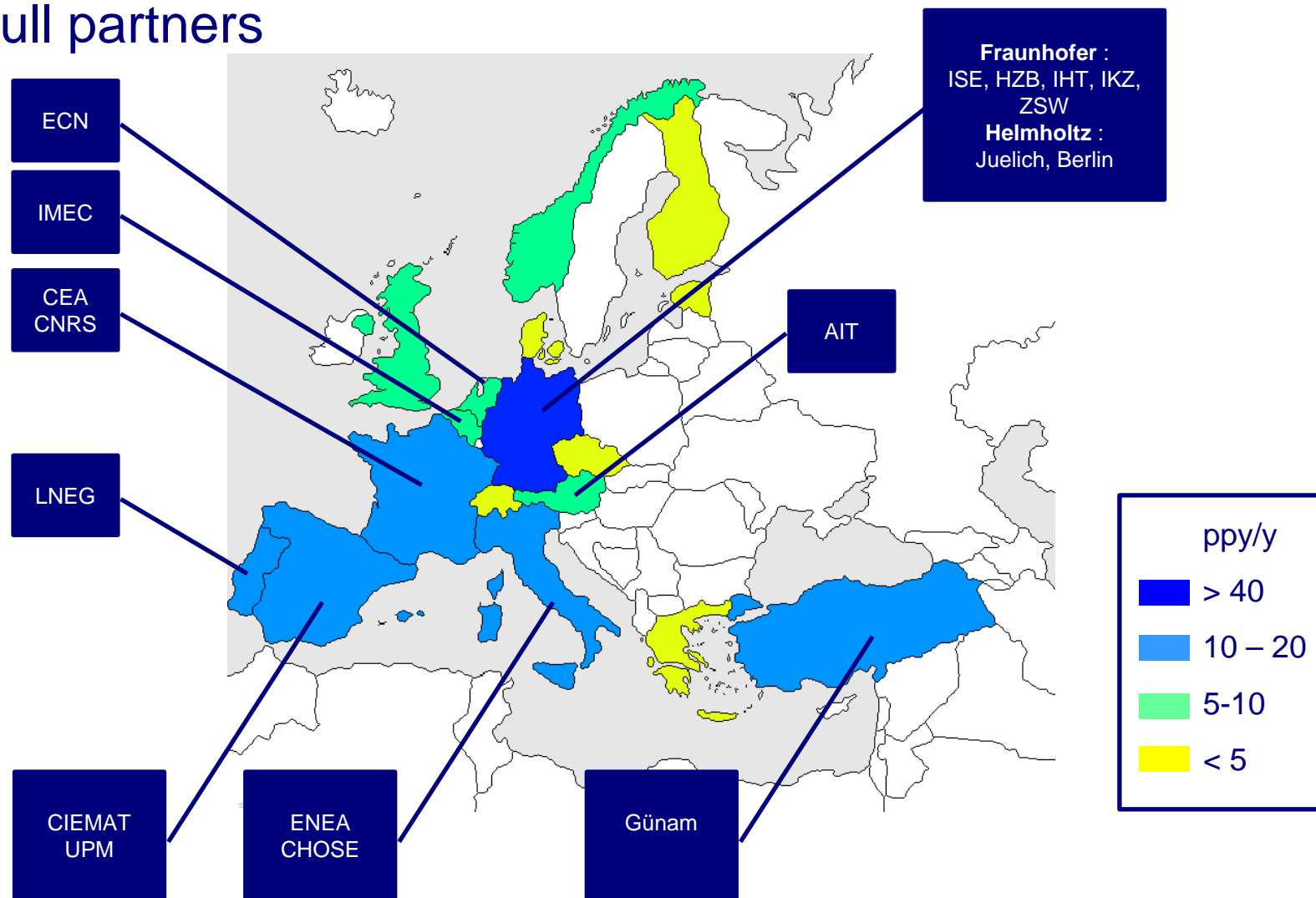
Do some lobbying : at EC at MS levels on priority topics and actions

4. Collaborating on selected topics

- Dedicated scientific and technological projects , when sufficient resources available

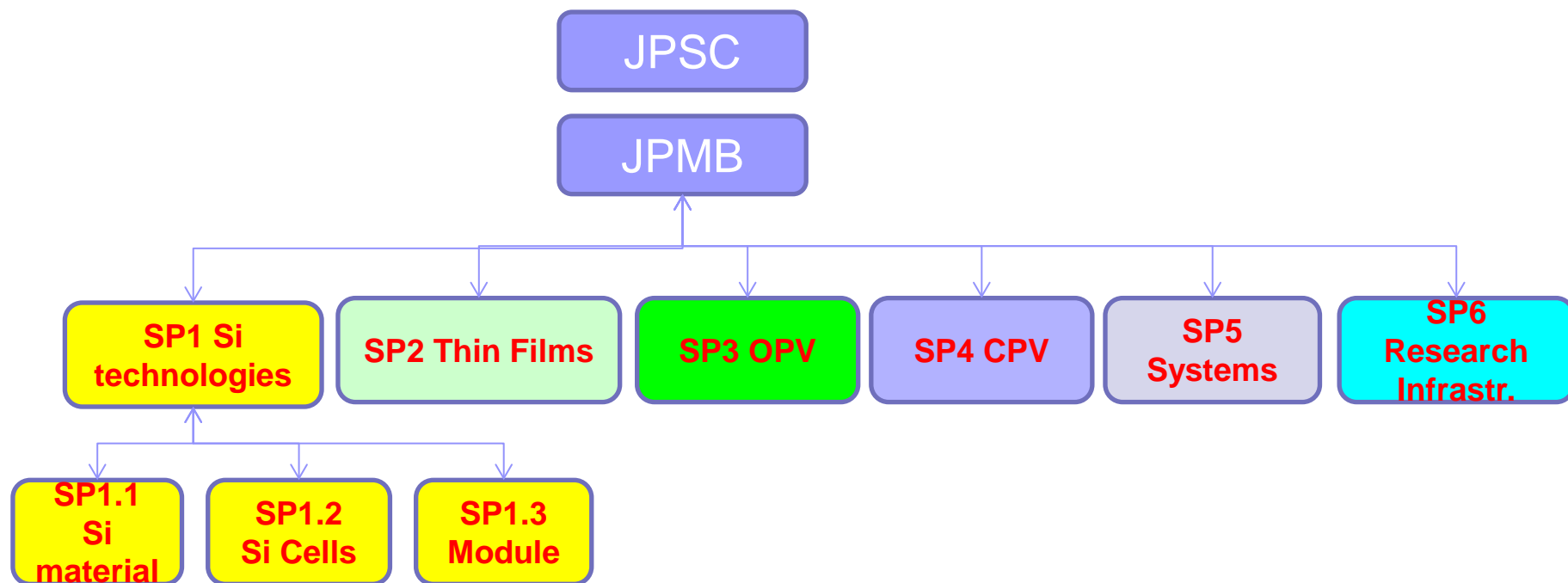
37 participants with more than 170ppy/y from 18 countries

Main full partners



EERA-PV JP Structure

A new JP structure, to cover more aspects of PV value chain:





CNRS & Photovoltaics

~18 « CNRS » laboratories dealing with PV



ICube-Strasbourg
IM2NP-Marseille
IMN-Nantes
INL-Villeurbanne
ILV-Versailles
IRDEP-Chatou
LCOS-Limoges
LPN-Orsay
LAAS-Toulouse
LPICM-Palaiseau
LGEP-Saclay
PROMES-Perpignan
UMI-Metz

...

~ 250 researchers/engineers + ~200 PhD/PD/Fellows



CNRS & Photovoltaics: contribution / SP1

SP1: Silicon Materials → 2 py/y

- Advanced processes for **high efficiency and low cost Silicon** solar cells: Ion implantation, laser processing, dielectric passivation, electroless contacts, Cu contact cells,...
- Towards **ultrathin crystalline silicon wafers** for solar cells (epilayers on porous structures, ribbon silicon, exfoliation...)
- Development of **characterization techniques** for in-line and/or contactless monitoring of wafers and cells.

SP2: Thin Film PV → 2 py/y

- **Epitaxial silicon** layer transfer on low cost substrates
- **Ultra-thin crystalline silicon solar** cells on rigid or flexible substrate by solid or liquid phase crystallization processes
- **Thin film PV based on Si-TF** produced at low temperatures: from layers to nanowires
- Physical chemistry and chemical engineering of **CIGS, CZTS layers**
- **Hybrid organic/Silicon** heterojunctions
- **Optical modeling and light trapping schemes** for thin film solar cells
- **Transport properties and defects** in materials and at interfaces:



CNRS & Photovoltaics: contribution/SP3

SP3: Organic PV/hybrides → 2 py/y

- *Active materials for OPV (synthesis of polymers, small molecules...)*
- *Hybrid structures (nanowires based cells, solid dyes cells, Perovskite ...)*
- *Oxide layers for tandem solar cells*
- *Modelling*
- *Characterization of transport properties and electronically active defects in OSC*

SP4: Concentrated PV → 2 py/y

- Fabrication of **III-V solar cells structures** (InGaN...)
- **Modeling** of MJ cells
- **Characterization** of III-V multijunction cells and 3rd generation solar cells under **ultra-high concentration** (up to 10000 suns by using unique solar facilities of PROMES laboratory)
- Research on **thermal management**, ageing tests on solar cells, heat transfer modelling as well as **CPV module** characterization under real sun conditions



CNRS & Photovoltaics: contribution/SP6

1py/y

SP5: Systems

- *New control strategies based on predictive models of PV irradiation included in converters*
- *Contribution on new green grids to stabilize, filter harmonics them, balance reactor*
- *Coupling with other sources, mix storage*
- *Design of new functionalities to increase robustness, lifetime, facilitate maintenance*
- *Dynamic and distributed power architectures to work on degraded operation point*
- *New systems to help PV integration in urban areas*

SP6: Education, Training, Infrastructures 1py/y

- *International master of Renewable Energies Science and Technology (Ecole Polytechnique)*
- *European Schools **ATHENS***
- *National Masters on Renewable energies*

CNRS & PHOTOVOLTAICS



CNRS & PV industries:

- Through projects with *EDF-PHOTOWATT, SOLARFORCE, DOW, CORNING, OMG ...*
- Joint CNRS-Industry lab: *LPICM-TOTAL (TF-Si and beyond)*
- Joint CNRS-Industry lab: *IRDEP-EDF (TF-Chalcogenides and high efficiency)*

International collaborations of CNRS labs on PV:

- International CNRS Unit : *GeorgiaTech-Metz*
- International CNRS Unit : *L2N-Sherbrooke*
- International Associate Lab: *NextPV with Japan*
- European Projet EUROSUNMED (*CNRS+SINTEF+CENER+...+ Egypt + Morocco*)
- Global Energy Programme with *Univ Yeungnam (S. Korea)*

Added Values of CNRS to EERA-JP-PV



- Basic research on Material synthesis , new compounds, novel structures (especially, in TFs, organics, nanostructures, CPV)
- Development of new concepts for PV → fundamental understanding and realizations
- Development of advanced characterization techniques for PV materials and devices
- Networking with international research institutes/new ideas



EERA Joint research Programme

Photovoltaic Solar Energy

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Merci pour votre attention

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The EERA AISBL: What does it change?

- EERA → EERA AISBL

- EERA AISBL → able to issue contracts with its partners.
⇒ possible legal funding from the Commission (at least, that is one of the target).

- **There is no obligation to become a member:** leaving or staying within the EERA is a free decision

****AISBL: International non for profit association** (Association internationale sans but lucratif) of belgium law*