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

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

www.eera-set.eu
EERA Congress 2014

• Was held in Brussels on 8-9\textsuperscript{th} 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.
EERA in 2014

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
July 2014: EERA → EERA AISBL (legal entity)

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).

www.eera-set.eu
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*

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

* FTEs (Full-time equivalent)
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

www.eera-set.eu
Membership of the EERA AISBL requires a membership fee

<table>
<thead>
<tr>
<th>Membership Type</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full members (incl. umbrella org.)</td>
<td>3000 €</td>
</tr>
<tr>
<td>Associate members</td>
<td>1000 €</td>
</tr>
<tr>
<td>EERA ExCo members</td>
<td>8000 €</td>
</tr>
</tbody>
</table>

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

www.eera-set.eu
What will the membership fee be used for?

<table>
<thead>
<tr>
<th>General assembly</th>
<th>Communication</th>
<th>Online tools and databases</th>
</tr>
</thead>
<tbody>
<tr>
<td>EERA JP reviews</td>
<td>JP Support</td>
<td>Miscellaneous</td>
</tr>
</tbody>
</table>

The EERA budget is subject to General Assembly approval
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)

www.eera-set.eu
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

<table>
<thead>
<tr>
<th>1. Reviewing our Research Infrastructures</th>
<th>2. Increasing our coordination</th>
<th>3. Developing a joint strategy</th>
<th>4. Collaborating on selected topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Identifying current facilities and equipment</td>
<td>- Benchmarking and organisation of Round Robin tests</td>
<td>Elaborating a roadmap</td>
<td>- Dedicated scientific and technological projects, when sufficient resources available</td>
</tr>
<tr>
<td>- Surveying characterisation procedures</td>
<td>- Understanding the various criteria for improved characterisation</td>
<td>Do some lobbying: at EC at MS levels on priority topics and actions</td>
<td></td>
</tr>
<tr>
<td>- Listing of ongoing projects</td>
<td>- Validating test procedures and characterisation methods</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
37 participants with more than 170 ppy/y from 18 countries

Main full partners

- EER: ECN, IMEC, CEA, CNRS, CIEMAT, UPM, LNEG, ENEA, CHOSE, Günam, AIT, Fraunhofer (ISE, HZB, IHT, IKZ, ZSW), Helmholtz (Juelich, Berlin)

Legend:
- ppy/y
  - > 40
  - 10 – 20
  - 5-10
  - < 5
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
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:
**SP3: Organic PV/hybrids**  ➔ 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 3\textsuperscript{rd} 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
SP5: Systems
- New control strategies based on predictive models of PV irradiation included in converters
- Contribution on new green grids to stabilize, filter harmonics, balance reactors
- 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
- International master of Renewable Energies Science and Technology (Ecole Polytechnique)
- European Schools ATHENS
- National Masters on Renewable energies
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

abdelilah.slaoui@unistra.fr

Merci pour votre attention

www.eera-set.eu
The EERA AISBL: What does it change?

• EERA $\rightarrow$ EERA AISBL

• EERA AISBL $\rightarrow$ able to issue contracts with its partners.
  $\Rightarrow$ 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