



Joint Programme on **CSP**

EERA Joint Programme on CSP

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(CIEMAT)

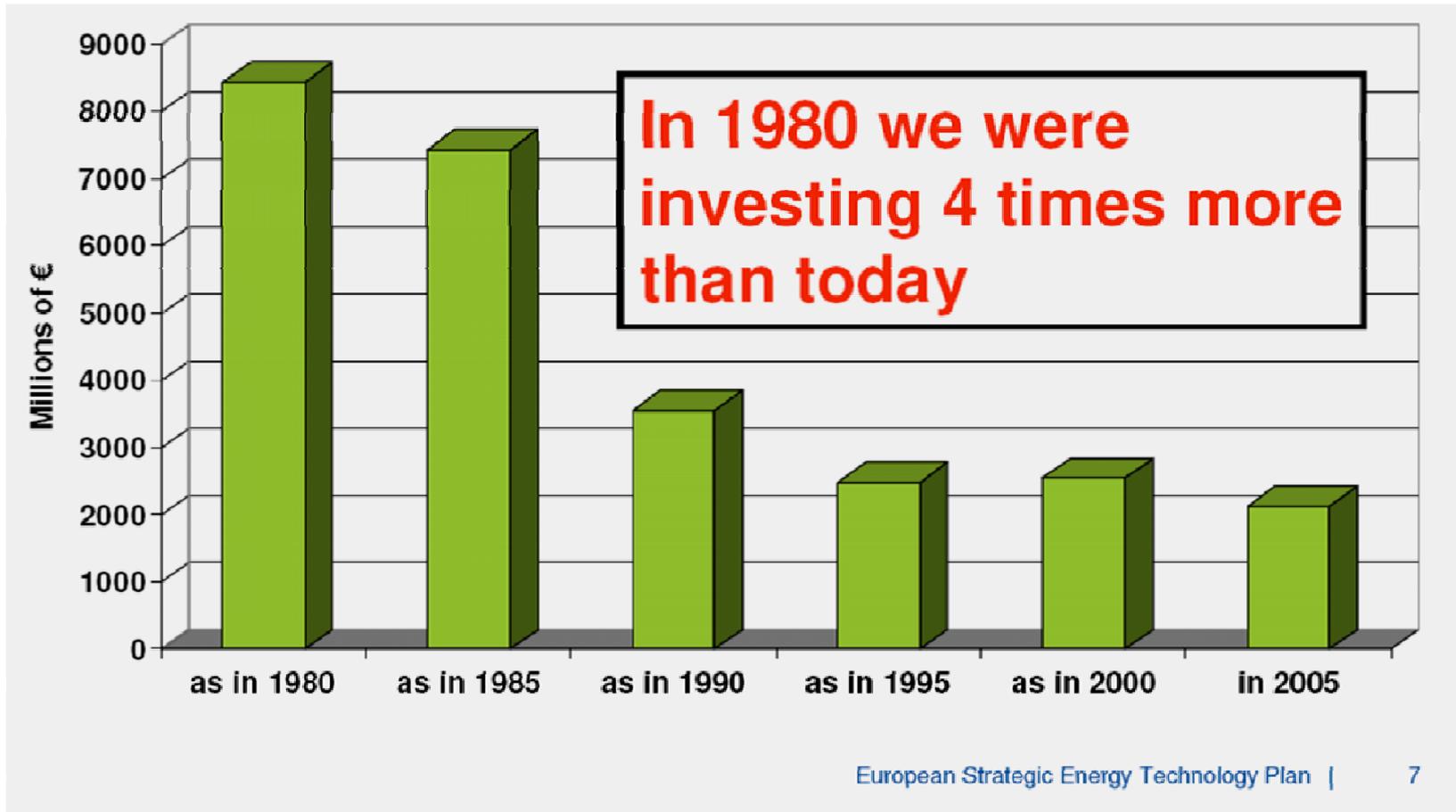
SolarPACES Symposium
Granada, 20 September 2011

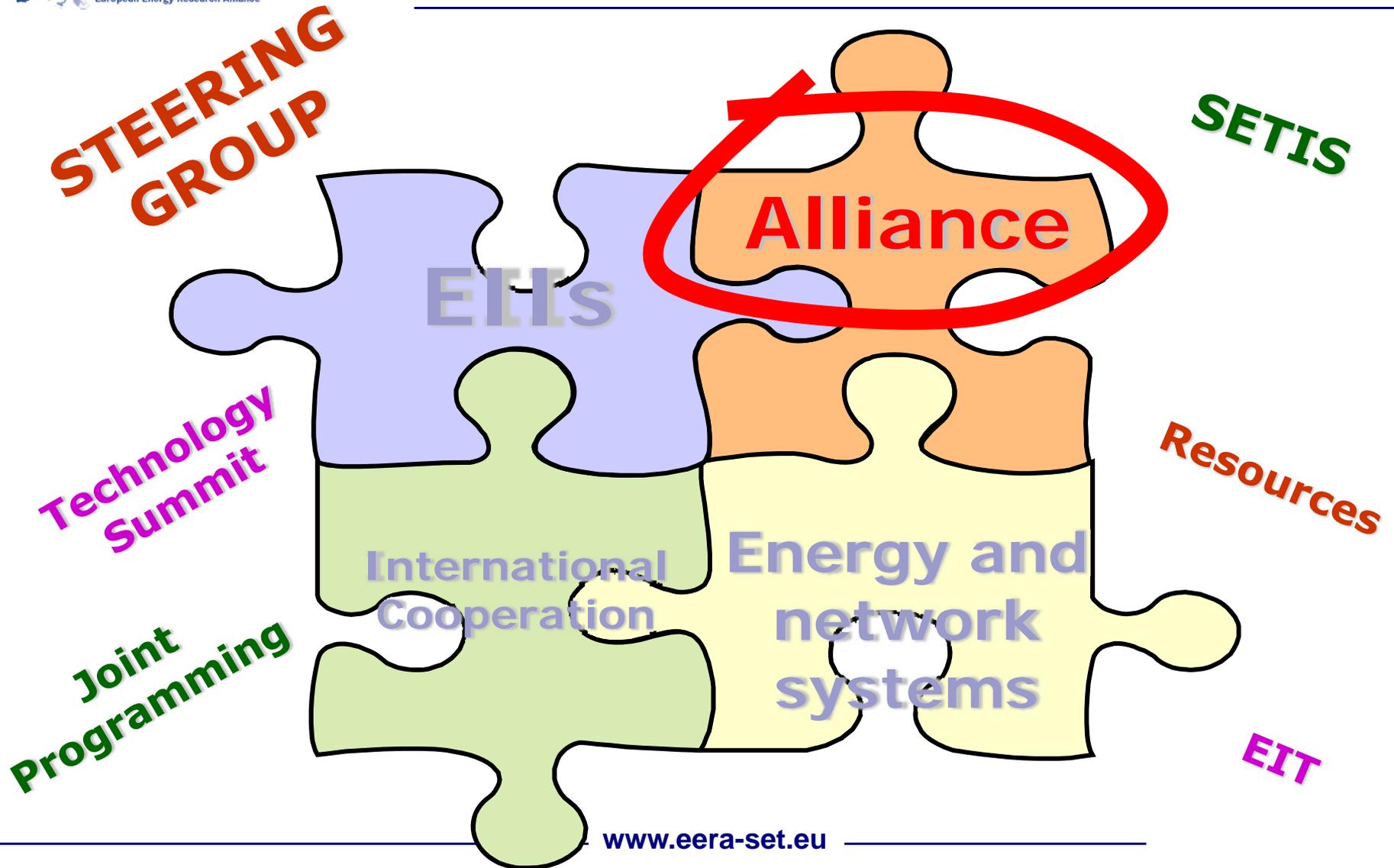
Context

- Challenges are increasing
 - Climate change
 - Security of supply
 - Economic competitiveness (sustainable growth)
- Change is needed
 - Goals and ambitions can not be met using today's technologies
- A next generation of energy technologies needs to be developed
 - From fundamental research to commercialisation phase
 - SET-plan, industry groupings and technology platforms

The urgency

Development of energy RTD investments in the EU





Why do we need the Alliance?

- **To tackle fragmentation and optimise resources:**
 - **The National Research Institutes represent a huge resource for Europe, both in terms of researchers and facilities;**
 - **BUT, even if they pursue similar objectives, they define strategies and work plans individually;**
 - **Sub-critical teams working on the same technologies, scattered across Europe (problem of duplication);**
 - **Collaboration at EU level on a project-by-project basis – adhoc rather than systematic**
- **We need a different model of cooperation**

- From collaborating on projects to jointly implementing programmes
- **Vision:** Europe's energy research community working together to lead the world in developing sustainable energy solutions
- **Mission:** To strengthen, expand and optimise EU energy research capabilities through the sharing of world-class national facilities in Europe and the joint realisation of pan-EU programmes

● Key Objectives

- Conceive and implement *Joint Programmes of research in support of the SET-Plan priorities*
- *To work towards a long term, durable integration* overcoming fragmentation, optimising the use of resources, building additional research capacity and developing a comprehensive range of pan-European research infrastructures
- To develop *links and sustained partnerships with industry* to strengthen the interplay between research outcomes and innovation
- To develop *training, education* and outreach activities, encouraging researcher mobility

- **Top-level dialogue with the most representative Research Institutes in the EU**
- **Commission is a facilitator – helping a process that is driven by the Research Institutes themselves**
- **Gradual build-up rather than a ‘big bang’ approach**
- **‘Learning by doing’ yet in a limited number of areas**
- **Avoid locking into cooperation models or legal structures too early**

Steering Group : 27

Member States



Public RTOs

**Founding Group :
12-15
members**

Level 1



Industry
>>

Level 2

**Program
level**

Partners a, b, d, x

Partners a, c, y, z

Partners b, e, m, n..



Level 3

Project level

Project A

Project B

Project C

- Starting point: putting 'own resources' together to create joint programmes (variable geometry)
- Organisation of workshops to:
 - **Identify research areas where to jointly invest/collaborate**
 - **Identify the gaps and need for additional resources**
 - **Open to all that can bring in real implementing capacity**
- Workshops Themes defined by the founding group

Towards and EERA

- **History: EERA announced in SET-plan**
- **Initiative by 10 leading institutes to found an EERA**
 - Total annual turnover on energy research approx 1,300 M€ and over 10,000 scientists
 - Supported by EUA and EUROHORCS and facilitated by EC
- **Aim: accelerate development of new energy technologies**
 - Strengthen, expand and optimise research capabilities
 - Harmonisation of national and EC programmes, decrease fragmentation
 - Draw on results from fundamental research
 - Mature technologies to hand over to industry driven research (industry groupings)

Towards and EERA

- **Participation in EERA in principle open to all research organisations**
 - Not just a membership need to bring in significant R&D capacity
 - Governance structure: programme level and steering committee
 - New Member States in particular invited to join

Towards an EERA

Founding partners:



With the support of:



Vision and general structure of the Joint Programme

Background and objectives:

As far as solar thermal electricity (STE) generation is concerned, the installed capacity in Europe is expected to be of **2 GW by 2012** and around 30 GW by 2020, but there is room for many technical improvements yet, mainly dealing with **increasing efficiencies and decreasing costs**.

PROTERMO
SOLAR



STATUS:

- 9 plants in operation (332 MW)
- 25 plants under construction (1217 MW)
- 2339 MW foreseen till 2013

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Vision and general structure of the Joint Programme

Background and objectives (II)

'Solar Thermal Electricity-European Industrial Initiative' (STE-EII) has been proposed by the European Solar Thermal Electricity Association (ESTELA), in order to contribute to the achievement of the SET-Plan goals (www.estelasolar.eu). Such a STE-EII presents four technology objectives:

- 1.Reduction of generation, operation and maintenance costs*
- 2.Improvement of operational flexibility and energy 'dispatchability'*
- 3.Improvement in the environmental and water-use footprint*
- 4.Advanced concepts and designs*

Number of subprogrammes: 4

- Concentrated Solar Power plus Desalination (CSP+D)*
- Thermal Energy Storage for CSP plants (TES)*
- Accelerated Aging of Materials (AAM)*
- Solar Thermochemical Production of Fuels (STPF)*

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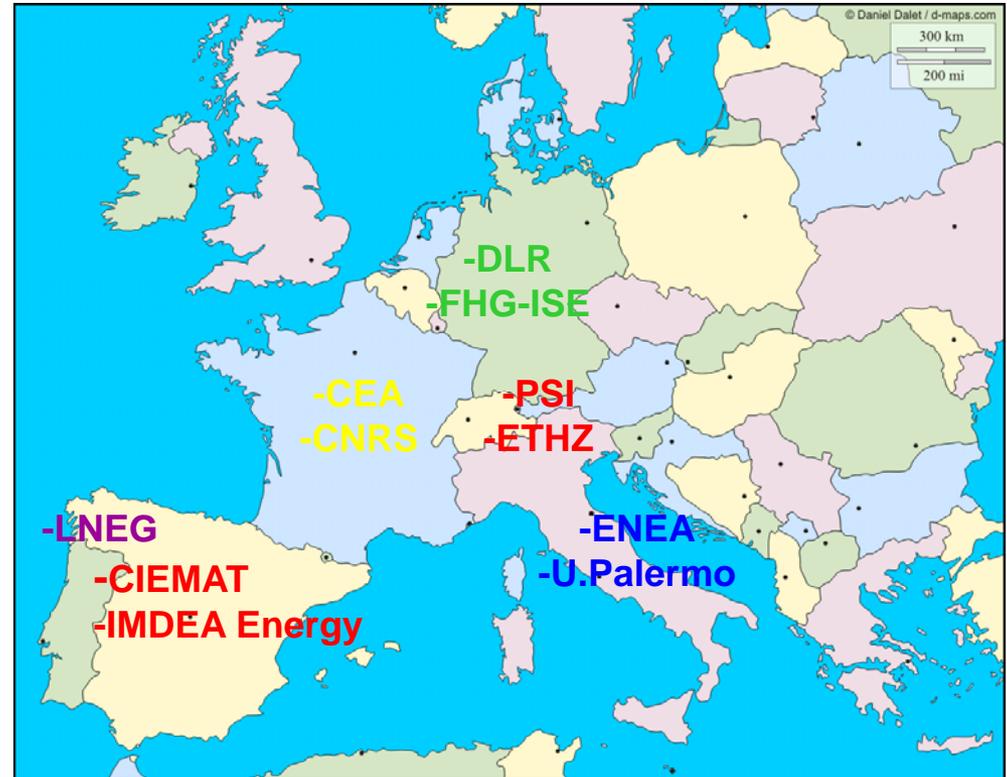
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Partnership and Resources

- *Number of participants:* 9+2
- *Number of countries involved:* 6 (E, IT, FR, D, PT, CH)
- *Resources committed - how many men years/year:* 80
- *Potential new participants:*
- ***Already expressed interest:***
 - Virtual Walloon Institute of Research in Energy (CREW)
 - Cyprus Institute
 - Consiglio Nazionale delle Ricerche (CNR)
- ***Potentially interested:***
 - The industry, through ESTELA, PROTERMOSOLAR or individually...



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Added value

- *Though some of the partners already cooperate in some formal projects / initiatives, these are strongly focused on ‘Research Infrastructures’. Hopefully, this JP will attract partners with a higher scientific profile, thus widening the scope of R&D activities.*
- *As investment is high for new commercial plants (approx. 250 M€), promoters tend to use the same plant configuration always, i.e. PTC with synthetic oil and molten salts as storage (if any). This initiative and its links with the Industrial Associations will boost the deployment of new technologies.*
- *Of course, the two following targets must be considered as ‘default’ for all EERA JPs:*
 - *Strategic leadership in the field*
 - *To contribute to a faster achievement of SET-Plan goals, through STE-EI, in this case*

Main Activities and Outcomes

Thermal Energy Storage

- *Subprogramme – coordinator: Fabrizio Fabrizi (ENEA)*
- *Number of participants: 8+1 (ENEA, PSI, CIEMAT, LNEG, CNRS, IMDEA, FHG-ISE, ETHZ (A))*
- *Number of countries involved: 6*
- *Resources committed - how many men years/year: 30,5*
- *Expected outcomes:*
 - To perform a general review of the state-of-the-art on Heat Transfer Fluids (HTFs) and Heat Storage Media (HSMs), to identify potential improvements.
 - To develop tools such as physical-mathematical models and computer codes in order to perform analysis, modelling and simulation of the new solutions proposed.
 - To realize small-scale test apparatuses in order to perform experimental tests for the new concepts and solutions proposed under real solar irradiation conditions, with the goal to validate the physical-mathematical models.
 - Set-up of infrastructures to perform experimental tests, that can be either shared by partners, or purpose-designed and built with funds to be acquired.

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13th April, 2011,

Brussels

Belgium

Main Activities and Outcomes

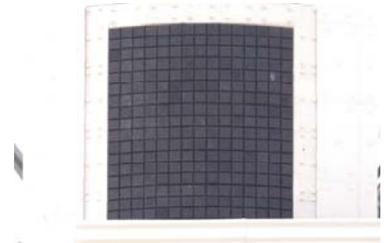
Concentrated Solar Power plus Desalination

- *Subprogramme – coordinator: Julián Blanco (CIEMAT)*
- *Number of participants: 6 (CIEMAT, LNEG, ENEA, CEA, FHG-ISE, U. Palermo)*
- *Number of countries involved: 5*
- *Resources committed - how many men years/year: 17*
- *Potential new participants: Cyprus Institute*
- *Expected outcomes:*
 - Optimizing heat extraction in different CSP technologies to drive desalination processes
 - Reducing cooling requirements of solar power cycle without penalising cycle thermodynamic efficiency
 - Energy and exergy optimization of combined power and seawater desalination processes
 - Desalination technologies optimization to better matching solar power cycles conditions

Main Activities and Outcomes

Accelerated Aging of Materials

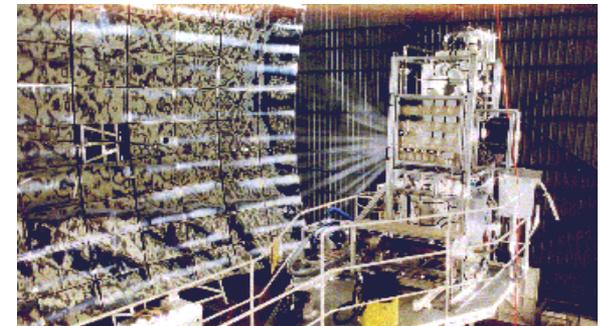
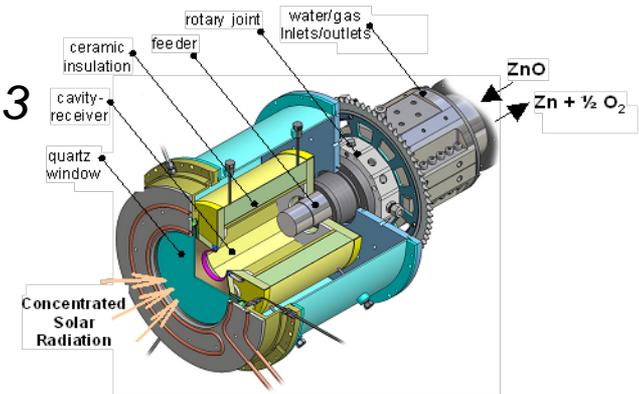
- *Subprogramme – coordinator: Karl-Heinz Funken (DLR)*
- *Number of participants: 5 (DLR, CIEMAT, ENEA, CEA, CNRS)*
- *Number of countries involved: 4*
- *Resources committed - how many men years/year: 6,5*
- *Expected outcomes:*
 - Analysis of degradation mechanisms of reflectors and absorbers
 - Development of the methodology for accelerated aging
 - Improve the facilities infrastructure to realize accelerated aging tests
 - Improve the diagnostic capabilities of all partners
 - Development of empirical models for accelerated aging



Main Activities and Outcomes

Solar Thermochemical Production of Fuels

- *Subprogramme – coordinator: Anton Meier (PSI)*
- *Number of participants: 6+1 (PSI, DLR, CIEMAT, ENEA, CNRS, IMDEA, ETHZ (A))*
- *Number of countries involved: 5*
- *Resources committed - how many men years/year: 23*
- *Expected outcomes:*
 - Survey of solar thermochemical technologies currently under development
 - Identification, development and assessment of materials for efficiently running thermochemical processes for the production of solar fuels
 - Development and optimization of the research infrastructure for large-scale solar testing of selected thermochemical processes (10 MW)



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JP Governance: Interactions and collaborations

Governance scheme: As suggested by the Secretariat:

- Steering Committee,
- Management Board and
- Sub-Programme Managers

Already existing collaboration among participants:

- Relying on large research infrastructures management:

- the '**SoILAB**' agreement (www.sollab.eu)
- the '**SFERA**' (Solar Facilities for the European Research Area) Integrating Initiative at the FP7-Capacities programme (<http://sfera.sollab.eu>)
- **ESFRI's EU-SOLARIS** initiative (very preliminary approach)

- In other fora:

- the **Task VI** on 'CSP+D' of the IEA's **SolarPACES** Implementing Agreement.
- the **Task II** on 'Solar Chemistry' of the IEA's **SolarPACES** Implementing Agreement
- Project '**OPTS**' selected at FP7-Energy-2011

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Next steps

- *Kick-off meeting. Establishment of governing bodies and agreement on first joint projects. (asap)*
- *Address ESTELA to formally present the JP and look for interested industries.*
- *Workshop at the ‘SolarPACES Symposium 2011’, to be held in Granada, on 20-23 September*
- *Address KIC ‘Innoenergy’ to discuss on a possible international master on CSP.*
- *Looking for the right EC calls for funding of the activities...*

What to do if we want to join ?

- Fill in the (short) form and submit to the Co-ordinator
- The application will be considered by the ExCo.

www.eera-set.eu