The Solar Thermal Electricity European Industry Initiative

5th General Assembly of the European Photovoltaic Technology Platform

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Secretary General of ESTELA

About ESTELA

European Solar Thermal Electricity Association
Represents 90% of the STE EU Industry

- 60 Members (PROTERMOSOLAR, the Spanish national association representing 100 Members)
- 12 Countries represented

Algeria	Italy
Belgium	Netherlands
France	Portugal
Germany	Spain
Greece	Switzerland
Ireland	United Kingdom

INDUSTRY MEMBERS OF ESTELA

ESTELA´s Objectives

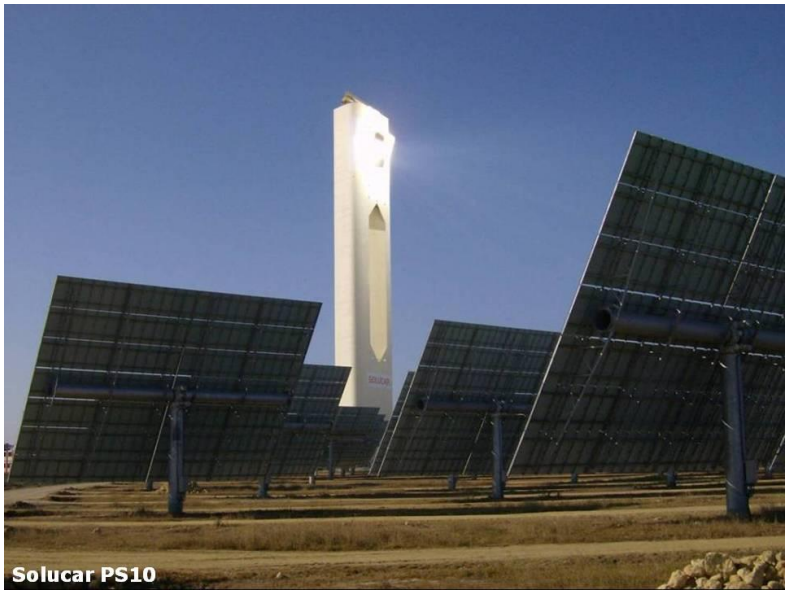
ESTELA:

- **Supports the emerging European Solar Thermal Electricity Industry**
- **Promotes the generation of solar power in Europe and abroad, mainly in the Mediterranean area**
- **Collaborates with EU institutions, MS authorities and UfM countries' Administrations**

STE Technology: Parabolic Trough

- Size → 50 to 300 MW
- Proven utility scale technology
- Commercial operation since 1984
- Preferred technology for new plants in the USA, Europe and North Africa
- More than 30 plants under construction

STE Technology: Central Receiver



- Size → 10 to 50 MW
- Demo plants built in the 1980's
- First commercial 10 MW and 20 MW plants in operationin Spain and another one under construction (17 MW + 15h storage)
- Larger projects announced in the USA

STE Technology: Dish Stirling

- Size → 10 kW to to 50 MW
- Several small scale installations in operation
- Utility-scale installations slated for construction in 2010
- Applications appropriate for both utility-scale projects and stand-alone distributed energy projects

STE Technology: Linear Fresnel

- Operating plant in Spain (1.4MW) and larger plants under construction (30MW)
- Current demo projects up to 6 MW
- Larger plants under development (up to 150 MW)

STE: Sector

THE REASONS BEHIND THE EUROPEAN LEADERSHIP ON STE

- ✓ The encouraging feed-in tariffs established by the Spanish Government
- ✓ The past research and innovation efforts made by the EU Institutions and some Member States, in particular Spain and Germany
- ✓ The previous experience of the US (SEGS plants)

SOME FACTS AND FIGURES

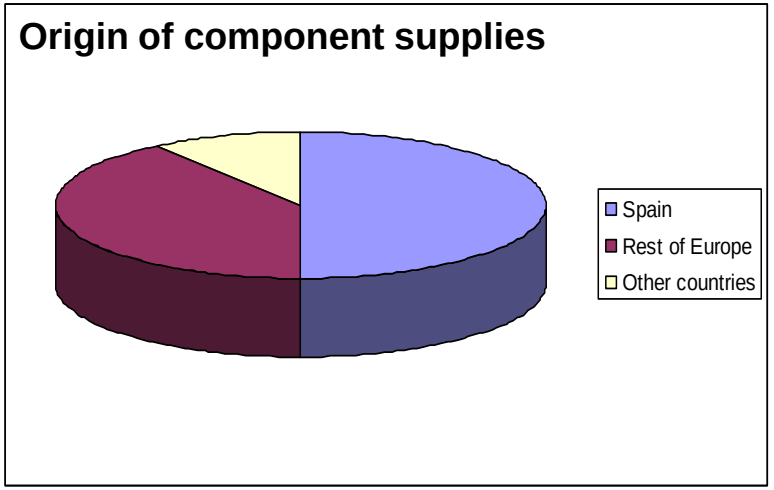
- ✓ The **European industry will invest more than 10 billion €** in the 2007-2013 period
- ✓ European institutions, especially the Directorates for Energy and Research and the EIB, are significantly contributing to such a success

STE: an EU dimension

Today:

STE plants are being built in Spain

- ✓ 9 Plants in operation (332 MW)
- ✓ 25 Plants under construction (1217 MW)
- ✓ 2339 MW FIT pre-assigned, tbc till 2013



The STE component supply structure has a large European share

Tomorrow:

STE plants are planned in Southern European countries (Portugal, Italy, Turkey..) and probably in MENA region in the near future with national and European supports, through the Meditarranean Solar Plan

STE European Industrial Initiative (STE-EII)

THE SOLAR THERMAL ELECTRICITY EUROPEAN INDUSTRY INITIATIVE (STE-EII)

- The European STE Industry is providing through ESTELA updated proposals to the Commission for the implementation of the European Solar Industry Initiative since 2007
- The STE-EII is mostly concentrated on innovative actions related to commercial plants in order to have the greatest and quickest contribution to reaching the competitive goals
- The STE-EII also provides room for advanced component designs
- The success of STE is key for the achievement of the Cost Roadmap predictions which the forthcoming A.T. Kearny study is anticipating

STE European Industrial Initiative (STE-EII)

THE SOLAR THERMAL ELECTRICITY EUROPEAN INDUSTRY INITIATIVE (STE-EII)

- The STE-EII should accelerate the development and deployment of cost-effective low carbon technologies: the IEA CSP Technology Roadmap forecasts that 11% of the world electricity will come from STE plants by 2050

- STE is a strategic resource for planning the sustainable European electricity system for 2020 and beyond. As per the IEA study, the consumption of STE electriicity in EU+Turkey wiil be 98 TWh in 2020

- The requested Core **Focus 2010 -2012** from the Commission and the approved Spanish legal framework are the main boundary conditions for the current STE-EII Implementation 2012-2012 proposal

STE-EII: 2010-2020

TECHNOLOGY OBJECTIVES 2010 -2020

Short Term Priority

1.- Increase efficiency and reduce generation costs

To improve the conversion efficiency and cost at system level as well as the reliability, efficiency and cost of individual components

2.- Increase dispatchability

To develop and improve thermal energy storage, as well as hybridisation of the power plants with natural gas and potentially with biomass

3.- Improve the environmental footprint

To reduce the cooling water consumption through innovative cycles, by developing dry cooling systems and optimising land use

To demonstrate CSP-specific water desalination processes

4.- Longer term R&D

To work on advanced components, concepts and systems

We still keep the budget estimation for the STE-EII during the 2010-2020 period

STE-EII: 2010-2012

The Commission has requested ESTELA an Action Plan for the period **2010-2012**

HOW TO FIT THE ACTION WITH THE EXISTING AND PLANNED STE PLANTS?

The following cases regarding implementation should be taken into account:

A. Projects to be **incorporated** as a part of plants already built or being built

B. New plants expected to start construction/operation along the period 2010-2012 already **authorized** in the framework of the current national regulations

C. **Brand new projects**, where the permitting process has not started, or not been completed, and where new concepts or designs could be tested and demonstrated at commercial size

They require changes in both EU and National legislation, additional quotas, new feed-in tariff or MSP support.

STE-EII: Innovative Actions 2010-2012

PROJECT TYPOLOGIES according to innovative concepts:

I. **Demonstration of innovative components** (A & B) <5 M€, < 2 years
i.e. absorbing tubes, reflective surfaces, supporting structures, driving devices for troughs and heliostats, Stirling systems, …

II. **Demonstration of innovative systems** (A & B) 5-20 M€, < 3 years
i.e. storage systems, hybridization, HTF types, Dry cooling systems …

III. **Demonstration of innovative plant configurations** (B&C) 20-150 M€, < 4 yr
i.e. hybridisation with gasified biomass, LH/PCM storage concept, trough and tower combined designs, …

IV. **Demonstration of innovative concepts** (C) > 100 M€, < 5 years
i.e. troughs with steam, hot air to gas turbine, …

STE-EII: 2010-2012 Proposed Action

Summary of the investment costs in innovation (in million €) for the period 2010-2012

Status of plants	Total budget	Grants	S.L or R.S	Private Invst. Capital
A In operation or under construction	225	111	54	60
B Authorised new plants	160	59	60	41
C Brand new projects	3220	400	2266	554
TOTAL	**3605**	**570**	**2380**	**655**

STE-EII: Funding and Financial Support

- Cost reduction can be achieved only trough a combination of mass production and innovation

- For mass production, a clear streamline of projects, with the proper FiT or other support mechanism should be in place.

- For innovative projects, additional incentives should be set-up trough the SET Plan

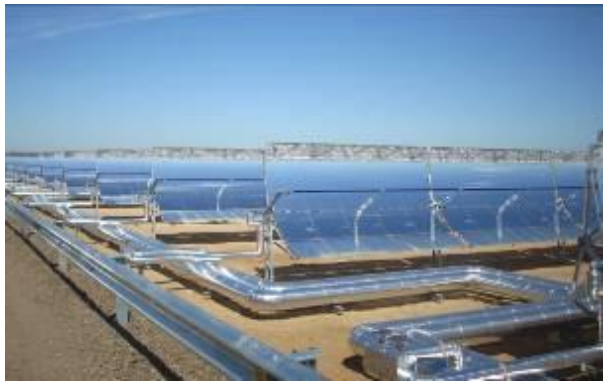
- For each type of project, different support mechanisms should be made available to promoters

- The NER300 will finance a minimum of 5 innovative STE projects, including all 4 STE technologies

STE-EII: Funding

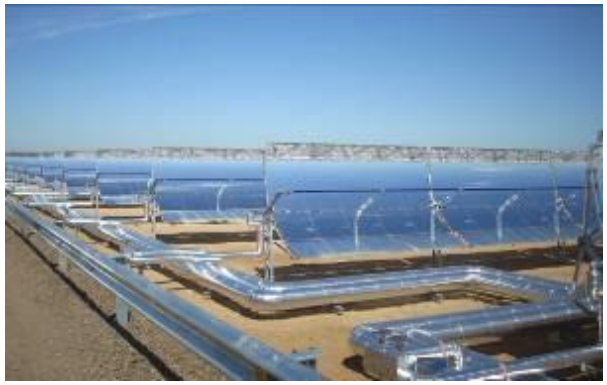
STE-EII: COM (2009) 519 final: Investing in the Development of Low Carbon Technologies (SET-Plan)

- The STE Industry welcomes the EC´s Communication: « *Investment in Energy Technology development has to increase inmmediately at EU and national level* »
- These resources should be made available without delay for the successful implementation of the SET-Plan
- The industry welcomes the proposal for a risk-sharing approach, the increase of pooling resources and the proposed Public-Private-Partnerships
- However, an increase of the EU budget is needed within the current Financial Perspectives



The European industry believes that the STE European Industry Initiative within the SET Plan will effectively contribute to improve the competitiveness of the Solar Thermal Electricity Technology.

STEII full document in www.estelasolar.eu



Thank you for your attention!
Gracias!