EUROSUNMED - *Euro-Mediterranean Cooperation On Research & Training In Sun Based Renewable Energies*

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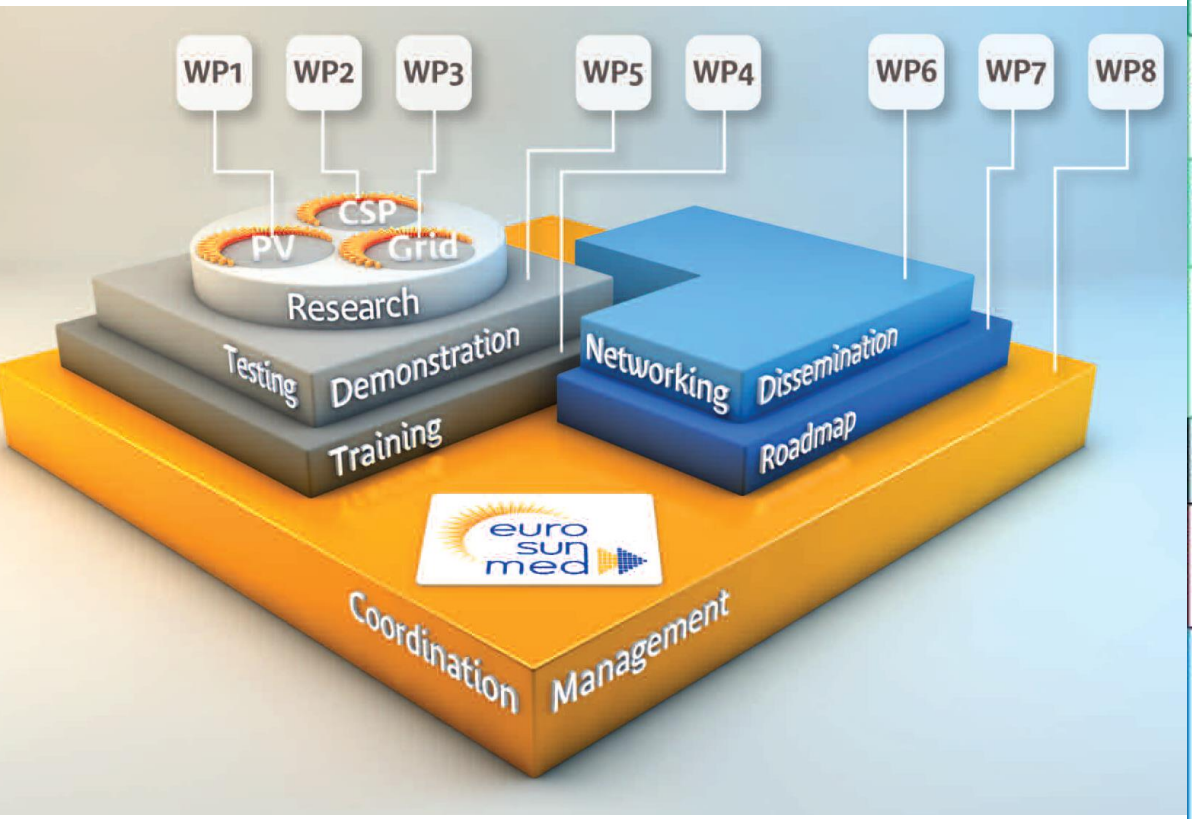
Project Goals

Developing new technologies in **3 energy field areas,** namely photovoltaics, concentrated solar power and grid integration, at the EU research centres, national agencies and SMEs in **strong collaboration** with MPC universities, research organizations and SMEs from Morocco and Egypt.

- Testing innovative materials and structures (PV cells/modules, heliostats...) **under specific conditions** of MPCs (irradiation, hot climate, dust…); providing technology transfer and research infrastructure development in the targeted areas.
- Establishing a **strong network** between EU and MPCs through exchange of students, senior researchers/engineers for transferring knowledge and technologies. This requirement will be realized via involvement of PhD and PostDoc researchers into all innovative developments, which will be done within the project.
- **Disseminating** the results of the project through the organization of summer schools, workshops and conferences open to a large public from universities, engineering schools and stakeholders involved in the 3 selected energy areas and beyond.

Workpackages



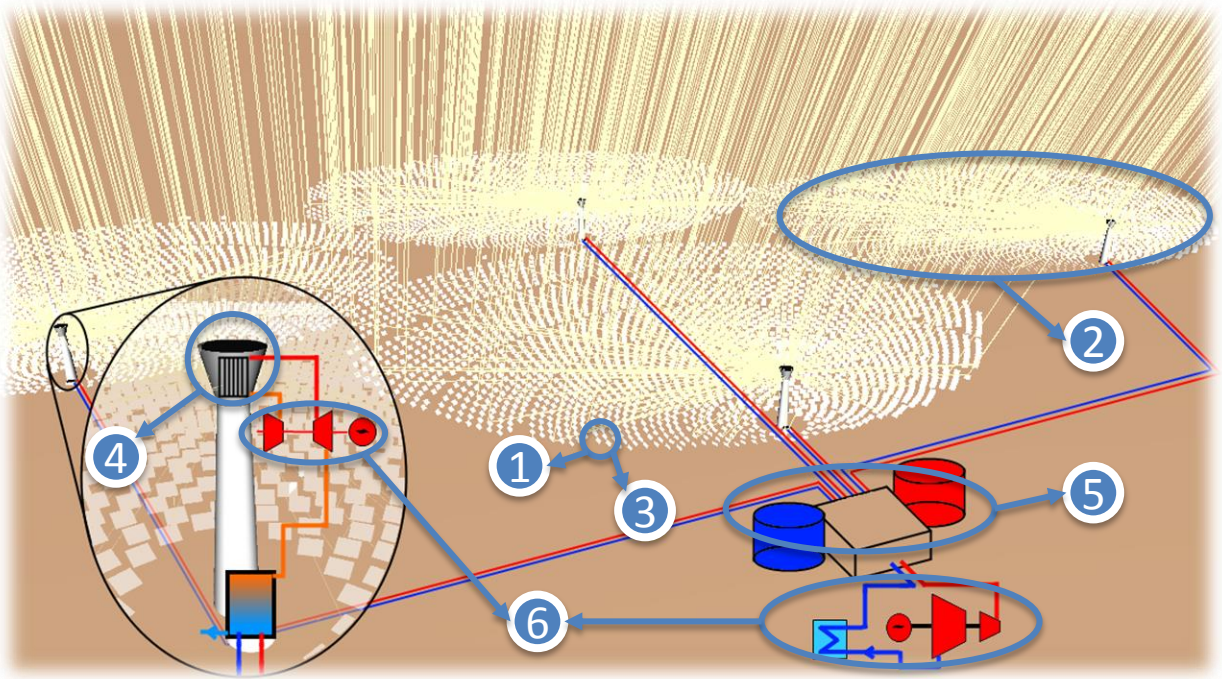
Workpackage (WP) and type of activity	Short description of WP	Overall objectives of WP
WP1 Photovoltaics (RTD)	Synthesis and processing of thin film materials (a-Si, pc-Si, c-Si, CZTS) and solar cells/module fabrication	Development of thin film (Si, CZTS) based solar cells and modules with efficiencies approaching 12%
WP2 Concentrated Solar Power (RTD)	Development of a new generation of Solar Tower power plants and an efficient thermal storage system	Design of advanced/improved heliostats and identification of an optimized decoupled combined cycle scheme based on innovative integrated storage systems
WP3 Grid Integration (RTD)	Analysis of grid integration issues relevant for MPCs with an emphasis on future large-scale grid integration of renewable energies	Conducting studies on grid integration of energy sources from PV and CSP in Morocco and Egypt, developing strategies for power balancing for Grids
WP4 Training (OTHER)	Training of students and exchange of in field of renewable energies	Training PhD students and Post-Docs in PV, CSP and Grid in close collaboration between academic institutions and industry from EU and MPCs, developing joint research and obtaining joint results, products, patents and publications
WP5 Testing and Demonstration (DEM)	Testing the different components developed in WP1 and WP2	Testing the different prototypes developed for PV and CSP under the specific conditions of the MPC (hot climate, absence of water, etc.)
WP6 Networking and Dissemination (OTHER)	Communicating and delivering information about the project results and achievements	Disseminating the results of the project through the organization of summer schools, workshops and conferences towards large public, managing IPR and exploitation related issues
WP7 Roadmap (OTHER)	Creating a long-standing cooperation between the involved partners both from EU and MPC	Developing a proposal for a roadmap (identifying R&D needs in the selected technology areas, quantifying related financial needs, recommending adequate instruments for funding and facilitating the identification of industrial projects), creating an Associated International Lab between EU/MPCs involved and launching an EU-Med Master Degree on renewable energies
WP8 Management (MGT)	Organisation of the project management work	Organizing the daily management work, management meetings, supporting the Supervisory Board, implementing the consortium agreement and maintaining the integrity of the project

Expected results:

- Boosting the Research and Development activities on PV and CSP technologies in EU & MPCs
- Setting strategies for power balancing for Grids in Morocco & Egypt
- Welcoming and training high qualified people on RenEn
- Creating paths for long term EU/MPC-collaborations through instruments (Associated labs, EUMed Master degree, EUROSUNMED conf.…)

WP2 – Concentrating Solar Power

✓ The **technical goal** of WP2 is **to develop a new generation of solar tower power plants** based in the use of decoupled Brayton and Rankine combined cycles, as main innovative concept for achieving a **substantial cost reduction in the solar electricity production**.



Specific technical Goals:

1. New cost-effective heliostat concept.
2. Optimized heliostat field layouts.
3. Protective/optical coatings for harsh environments.
4. New receiver concepts for high temperature.
5. New storage configurations and materials.
6. Advanced combined cycles

Leaders of WP2 – CSP

CENER

Participants in WP2 – CSP

Helwan University (HU)

WP2 – Concentrating Solar Power

Main technical achievements:

- Design and manufacture of a **low-cost small heliostat** including the control and calibration system.
- Identification and characterization of different materials **for protective coatings**.
- Development of an innovative **stacked-plate volumetric air solar receiver**.
- Identification and characterization of different materials **for medium temperature applications (<600ºC)**.
- Identification and characterization of different materials **for high temperature applications (>1000ºC)**.
- Proposal and analysis of several decoupled solar combined cycles – **DSCC plant schemes**.

But also…

- **Knowledge and technology transfer**:
  - **Heliostat prototypes** manufactured by Nile Valley Engineering **and testing site** in Helwan University.
  - More than **30 international exchanges** for training and cooperation in technical work.
- **Networking**: new projects and opportunities for further collaboration continuously considered.
- **Training and dissemination**:
  - Participation in several international schools, courses and training events **reaching 600+ students**.
  - **More than 10 communications** in congresses, conferences and journals.

Partners


Norway
• Sintef Energi AS, SINTEF E
• Stiftelsen Sintef, SINTEF
Belgium
• The Association of European Renewable Energy Research Centres, EUREC
France
• Centre National de la Recherche Scientifique, CNRS
• European Materials Research Society, EMRS
Spain
• IK4-Tekniker, IK4
• National Renewable Energy Center, CENER
Italy
• TURBODEN
Morocco
• Al Akhawayn University, AUI
• Centre National de l'Energie des Sciences et Techniques Nucléaires, CNESTEN
• Moroccan Foundation for Advanced Sciences, Innovation and Research, MAScIR
• Moroccan Agency for Solar Energy, MASEN
• University Mohammed-V, UM5a
Egypt
• Alexandria University, AU
• Helwan University, HU
• Nile Valley Engineering, NVE