



Summary of SolarPACES 2012 Exco meeting for Eskom Executive Committee

Exco 7/8 November 2012

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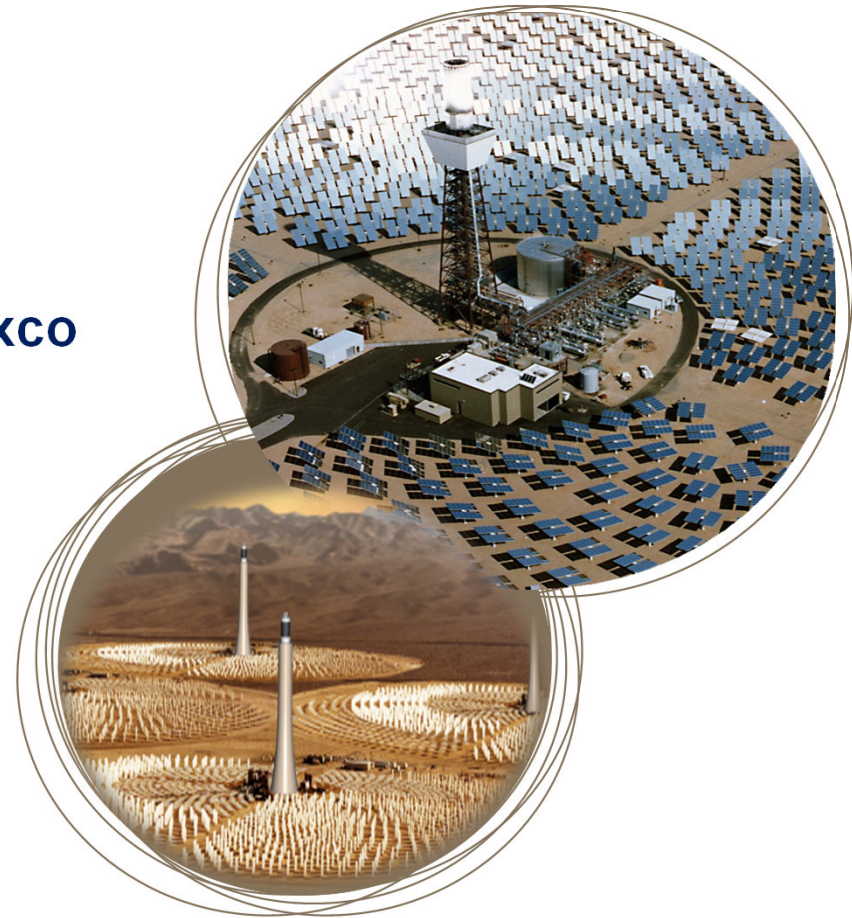
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- **Background**
- **SolarPACES 2012 - Summary of Exco presentations**
- **Summary of Tasks**



- SolarPACES is an international cooperative network bringing together teams of national experts from around the world to focus on the development and marketing of concentrating solar power systems (also known as solar thermal power systems).
- It is one of a number of collaborative programs, called Implementing Agreements, managed under the umbrella of the International Energy Agency to help find solutions to worldwide energy problems.
- All SolarPACES' activities are overseen by an Executive Committee (ExCo) composed of individuals nominated from each member country. ExCo meetings are held twice each year.
- This presentation provides a summary of the feedback given to ExCo by each member country in a meeting held in Marrakech in September 2012, prior to the SolarPACES annual conference.

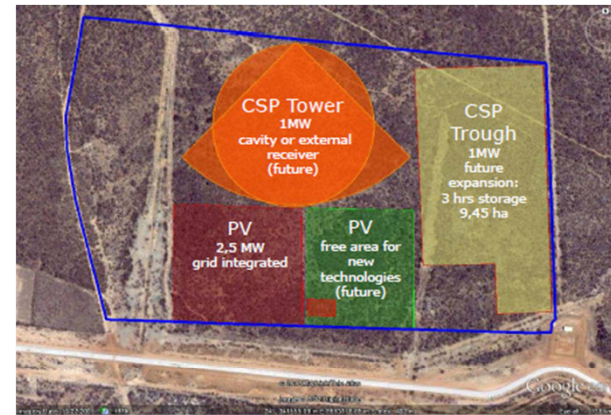
- Australia
- Govt. policy prefers grants over FIT.
 - CO₂ tax in place, pricing link with Europe credit market.
 - Govt through ARENA (Australia Renewable Energy Agency) has funded nearly \$150M of PV and CSP R&D projects over last 3 yrs, and has committed \$3.2b; all renewables; R&D, demonstration, commercial plant support.
 - Projects
 - Solar Dawn
 - Kogan Ck
 - Transfield Novatec
 - Graphite Energy, Vast Solar, CSIRO



National Solar Energy Centre
Newcastle, Australia

Brazil

- Ministry of Mines and Energy (MME) and Ministry of Science, Technology and Innovation (MCTI) have agreed to inclusion of CSP in their strategic planning.
- First funding received for construction of a solar energy research facility called HELIOTERM in two phases:
 - Phase I: construction of a 1MW CSP plant - trough technology, without storage.
 - Futures phases: storage, other technologies (central tower, linear Fresnel reflectors, parabolic dishes, PV)



HelioTerm project: Petrolina - PE

China

- 2005-2010
 - Tower/1mw in Beijing,
 - Solar air receiver,1 mwth
 - Trough concentrator , tube development
 - Basic research program on high efficiency for CSP
- 2011-2015
 - Solar tower: 2 x 10MW, molten salt
 - Trough plant: 1MW - 10MW hybrid with coal.
 - Distributed plant, dish/stirling, Fresnel with saturated steam
 - Focus on thermal storage.



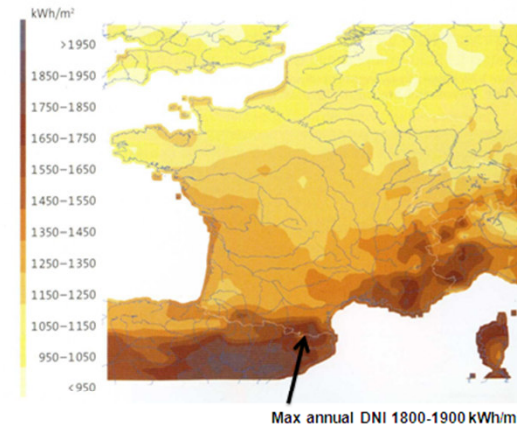
Beijing Badaling Solar Tower
Once Through Direct Superheat Steam
Generate



Huiyin RCE receivers

France

- CSP is not an option for large scale deployment on the French territory due to low solar resource.
- High potential of CSP for exporting technology.
- Sufficient Resource (DNI and land) for R&D activities and demonstration units in southern regions.
- R&D in solar thermochemistry continued.
- Research institutions active in CSP: leadership by CNRS, CEA
- Big industrial groups have invested largely in CSP projects: TOTAL, AREVA, ALSTOM



Japan

- In June 2012, established society of Concentrating Solar Thermal Energy, with 26 member companies.
- CSP is not an option for large deployment in Japan due to low solar resource.
- Advanced with development of Japan's first project for overseas concentrating solar power generation as part of the Tunisia Solar Plan promoted by the Tunisian government.
- Japan provides various components like steam turbines, drives, etc. for CSP plants.
- R&D continuing on component enhancement like reflective coatings, mirror washing etc.

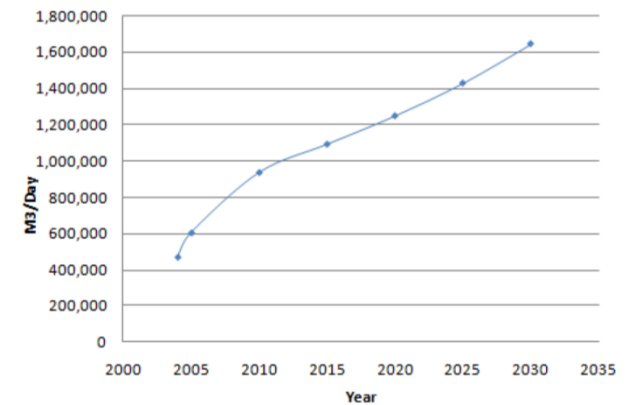


NEDO test facility in Japan 1MW Trough;
1 MW Tower

Qatar

- Looking to solar energy to free oil and gas for more profitable uses.
- Water demand is expected to double by 2030, implying a doubling of the energy consumption dedicated for desalination plants.
- A/C system consume about 60 % of the peak generate electricity in summer.
- First project: DohaSOL (II) with a yield of 2 MWe plus 60 m³/h of distilled water- now selecting an EPC contractor.

Water Demand forecasting (M3/Day)



Israel

- Ashalim Tender for CSP - negotiations underway for each of the following technologies: 110 MW Parabolic Trough technology – by Negev (Siemens) and 110 MW for the Tower technology – by Megalim (Consortium by ALSTOM and BrightSource). The negotiation is in the final stage of decision.
- Several new pilot projects were initiated during the past year.
- Remains a leader in superheated DSG tower plants with the pilot plant at Solar Energy Development Center (SEDC)



SEDC Facility in Israel

Republic
of Korea

- Solar resource does not allow for large scale CSP project development.
- Focus on R&D on CSP.
- Development of 200 kW solar power tower using air receiver.
- R&D continuing on 5kWth-Solar demonstration of a Ferrite Foam Device Reactor for Thermo-Chemical Two-Step Water Splitting process.
- Since 1994 CSP technologies have been developed mainly on Dish type and now moves to central tower type for making large scale power generation



Korea Institute of Energy Research

Spain

- The feed-in tariff implemented in 2007 was cancelled by the Government in January 2012 for new plants, so that it will not be awarded to new STE plants beyond the 2.4 GWe approved in 2010 to enter into operation before 2014.
- The Spanish STE sector is looking for opportunities in emerging markets.
- The Spanish Government has launched the idea of implementing a special tax for RES. A public debate is taking place specially in the media.



Gemasolar plant. Achieved 75 % Capacity factor with molten salt in first year of operation

United
Arab
Emirates

- The Shams 1 CSP plant near Abu Dhabi is in last stages of construction. It uses parabolic trough technology and will have a capacity of 100 MW.
- R&D Activities continued.
- No specific CSP incentive schemes are yet present, although the UAE government is working on a proposal in that regard.



100 MW Shams 1 project

In addition to discussions on CSP developments internationally, the Exco also reviews research activities conducted under various tasks, summarised as follows:

- **Task I (CSP Guidelines)**

- **System Performance Test Guidelines and Standards.**
- **CSP System Performance Modeling Guidelines and Standardization.**
- **International Project Database.**

- **Task II (Solar Chemistry Research)**

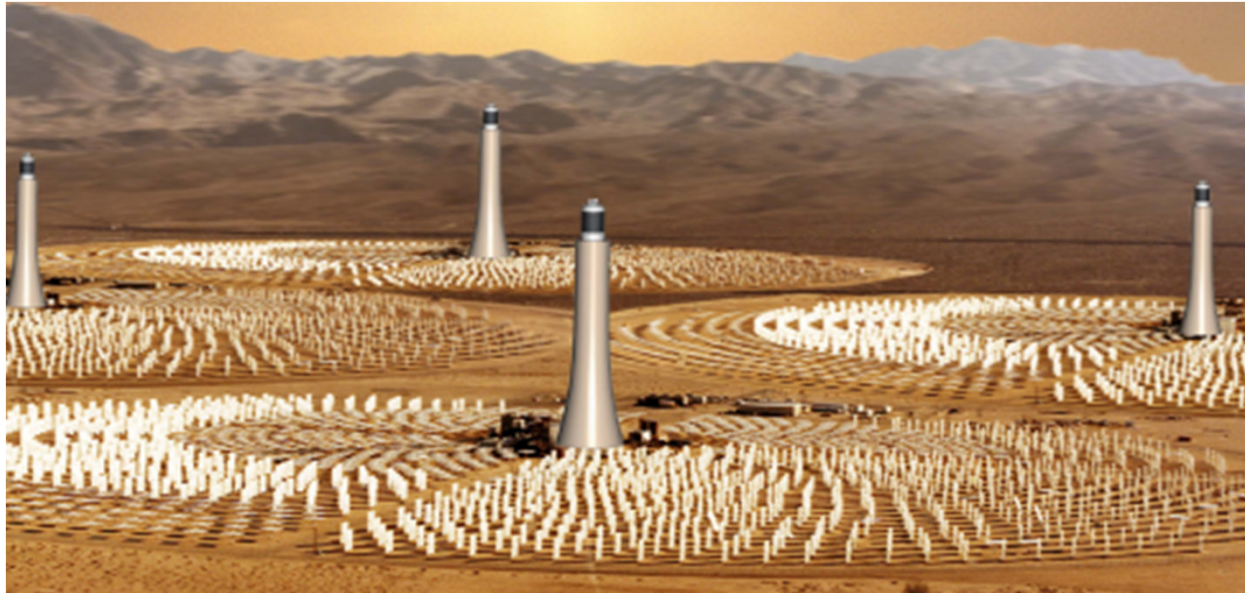
- **Develop and optimize solar-driven thermo-chemical processes for the production of fuels and materials.**
- **Demonstrate—at an industrial scale—their technical and economic feasibility.**

- **Task III (Solar Technology and Advanced Applications)**
 - **Prioritization of R&D activities with high impact on cost reduction.**
 - **Reliability Evaluation of solar components and systems.**
 - **Methods for durability and life time predictions.**
 - **Tools and methods for quality assurance of concentrator systems.**
 - **Guidelines for component performance measurements.**
 - **Component performance in desert environment (soiling, extinction, cleaning)**
- **Task IV -Solar Process Heat for Production and Advanced Applications**
 - **Subtask A: Process heat collector (SPF)**
 - **Subtask B: Process integration and Process Intensification combined with solar process heat (AEE INTEC)**
 - **Subtask C: Design Guidelines, Case Studies and Dissemination (ISE)**

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- **Task V (Solar Process Heat for Production and Advanced Applications)**
 - **Standardizing and Benchmarking of Model-Derived DNI-Products**

- **Task VI (Solar Energy and Water Processes and Applications)**
 - **First Phase: Technical assessment of possible configurations of CSP plants with Desalination facilities in the MENA region, considering specific coastal DNI potential and water and energy needs, using Egypt as reference country.**
 - **Second Phase: Preliminary feasibility study of a integrated CSP+D plant at the Egyptian location selected within the previous study (Port Safaga, Red Sea) and over the selected configurations**



THANK YOU

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