

Workshop

**THE POWER CHALLENGES OF  
MEGA - SCIENCE INFRASTRUCTURES:  
THE EXAMPLE OF SKA**

# Industry Forecasts



# INDUSTRY ASSOCIATION – ENERGYIN



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ENERGIA



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## ENERGYIN – 5 ACTION LINES

- **Offshore Energy** coord. Prof. António Sarmento (IST)
- **Solar Energy** coord. Engº António Mano (EDP-P)
- **Energy Efficiency** coord. Prof. Carlos S. Silva (MIT-PT)
- **Smart Grids** coord. Engº António Carrapatoso (EFACEC)
- **Energies for Sust. Mobility** coord. Prof. Tiago Farias (IST)

**Other areas under consideration (H2, bioenergy, geothermal, CO2)**

## The Future of POWER INDUSTRY ?

“The problem of our times is that  
FUTURE is not anymore  
what it use to be”

Paul Valery  
(French Poet 1871-1945)

## Challenges of Power Supply for SKA ?

- Widely geographical distributed
- Far from power & urban centers
- Sustainability
- Enviromental friendliness
- Reliability (garanty of supply).
- Economy (in budget)

## Candidates ?

- Fossil based ?
- Nuclear ?
- Renewable : Geothermal; Wind; **Solar**

## Solar power:

- Widely geographical distributed ✓ ok
- Far from power & urban centers ✓ ok (local availability)
- Sustainability ✓ ok
- Enviromental friendliness ✓ ok
- Reliability (garanty of supply). ✓ Regular intermitency.  
(Energy Storage required if stand alone)
- Economy ✓ decreasing costs  
(x2 <> -24% Si; -13% t-f)

# Solar power technologies:

- Photovoltaic
  - Flat panels (conventional)
  - Optical concentration (CPV)
  - wide range of substrate materials (... thin films)
- Thermal-electric (CSP)
  - optical concentration (linear and point focus)
  - thermal energy storage



# Concentrating Solar Thermal Power Technologies

Sun light → mirrors → heat → steam → electricity

parabolic trough



solar tower



linear Fresnel



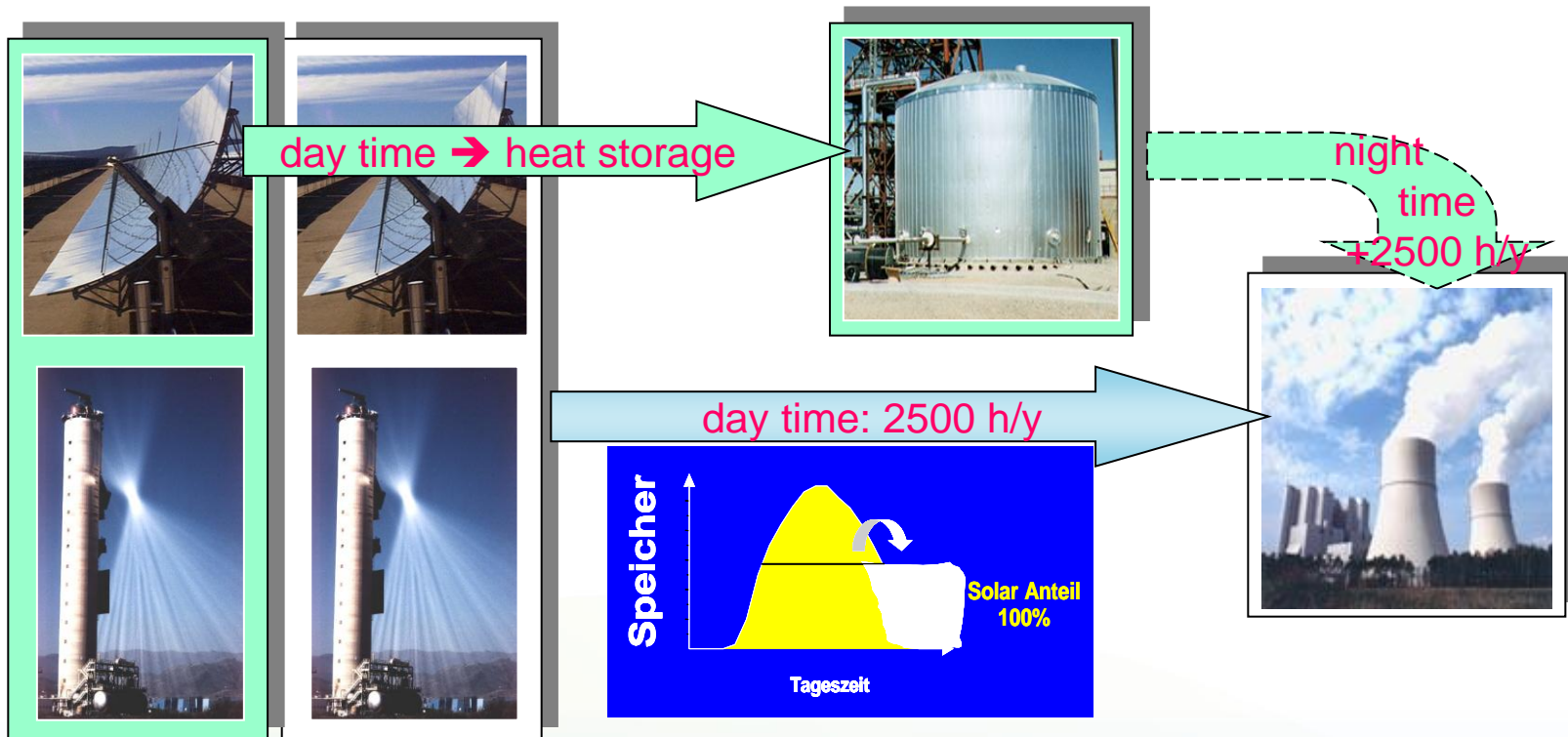
parabolic dish



# Solar heat storage

just more storage-collectors, but no additional power-plants:

Thermal power plants → solar power day + night! The strength of CSP



Thermal Storage = More operating hours = Cost reduction = Delivery by demand

# Solar power industry from PORTUGAL:

examples

Power plant contractor and operator:

GENERG



21 MW - Quality certified

PV panel manufacturers, project and installation:

Martifer Solar



[www.martifersolar.com](http://www.martifersolar.com)

<http://www.youtube.com/watch?v=gdHkNMR6ZW0>

Lobo Solar



[www.lobosolar.com/](http://www.lobosolar.com/)

# Solar power innovation from PORTUGAL:

## Concentrating Solar

- Low & Medium **WS ENERGIA Lda**  
[www.ws-energia.com](http://www.ws-energia.com)



- High CPV (x800) **MAGPOWER**  
[www.magpower.pt](http://www.magpower.pt)



- CSP Troughs with molten salt:



+ **SIEMENS**

- Advanced Linear Fresnel

+ **UNIV. ÉVORA**

The Future of POWER INDUSTRY ?

## Conclusion:

Provided that **intermitency** is overcome with

energy storage <> transmission

and relative **cost** keeps decreasing,

**Solar Power** is becoming the

“obvious” adequate option for the **sustainable future**.



## Energy Storage<>transmission: a crucial enabling factor



# Thank You