“Thermal Energy Storage Applied to Concentrated Solar Power”

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Concentrated Solar Power (CSP)

Concentrated Solar Technologies

- Parabolic trough
- Linear Fresnel Reflector
- Power tower
- Parabolic Dish/Stirling
Concentrated Solar Power (CSP)

Parabolic Trough

Most matured technology
50 to 100 MW (per unit)

SEGS plants, Mojave desert, USA, 354 MW_{el}

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Concentrated Solar Power (CSP)

Parabolic Trough

Shams 1
Parabolic Trough
Shams 1

Shams 1, 100 MW_e,
Abu Dhabi, 2013
2.5 km² = 285 football fields
20,000 homes,
175,000 tons of CO₂
Concentrated Solar Power (CSP)

Parabolic Trough

Shams 1

390°C

540°C

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Why do we need TES?

1. Solar intermitencies

2. Customer side

3. Daily solar curve
Power Tower (or Central Receiver)

- **Central receiver**
- **Heliostats**

1.5 to 100 MW (per unit)

**THEMIS, Targasone, France**  
(2.5 MW<sub>e</sub>, 1983 – 1986)

**SOLAR 2, Mojave desert, CA, USA**  
(12.4 MW<sub>e</sub>, 1995-1999)

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Two-tank Molten Salt Technology

GEMASOLAR, Seville Spain 2011
First commercial molten salt tower
19.9 MW, 15 h TES
25,000 homes

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TES applied to CSP

GEMASOLAR

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Production dates. From 16-08-2011, 00:00 hour to 17-08-2011, 00:00 hour

Source: Juan Ignacio Burgaleta, Director of Sener

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Production dates. From 11-jun-2012 00:00 hour to 17-jun-2012 00:00 hour

Source: Juan Ignacio Burgaleta, Director of Sener

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The Masdar Institute Solar Platform

MISP

Dedicated to CSP & TES Innovation
Masdar Institute Solar Platform Official Inauguration on November 25th 2015
• Reduce significantly the cost
• Increase the working temperature
• Propose Sustainable TES Solutions

2016
LCOE: $0.11/kWh
1st High Temperature Thermal Energy Storage System in the Middle East
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Thank You

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