

# ACS

ACS

## Industrial Services and Energy

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Renewable dispatchable projects  
for low carbon economies

José Alfonso Nebrera, Managing Director



# ACS Industrial Services and Energy

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## Renewable Energy

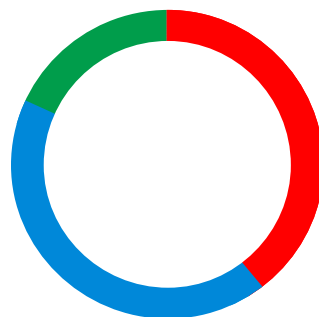
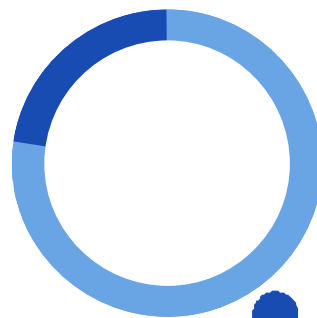
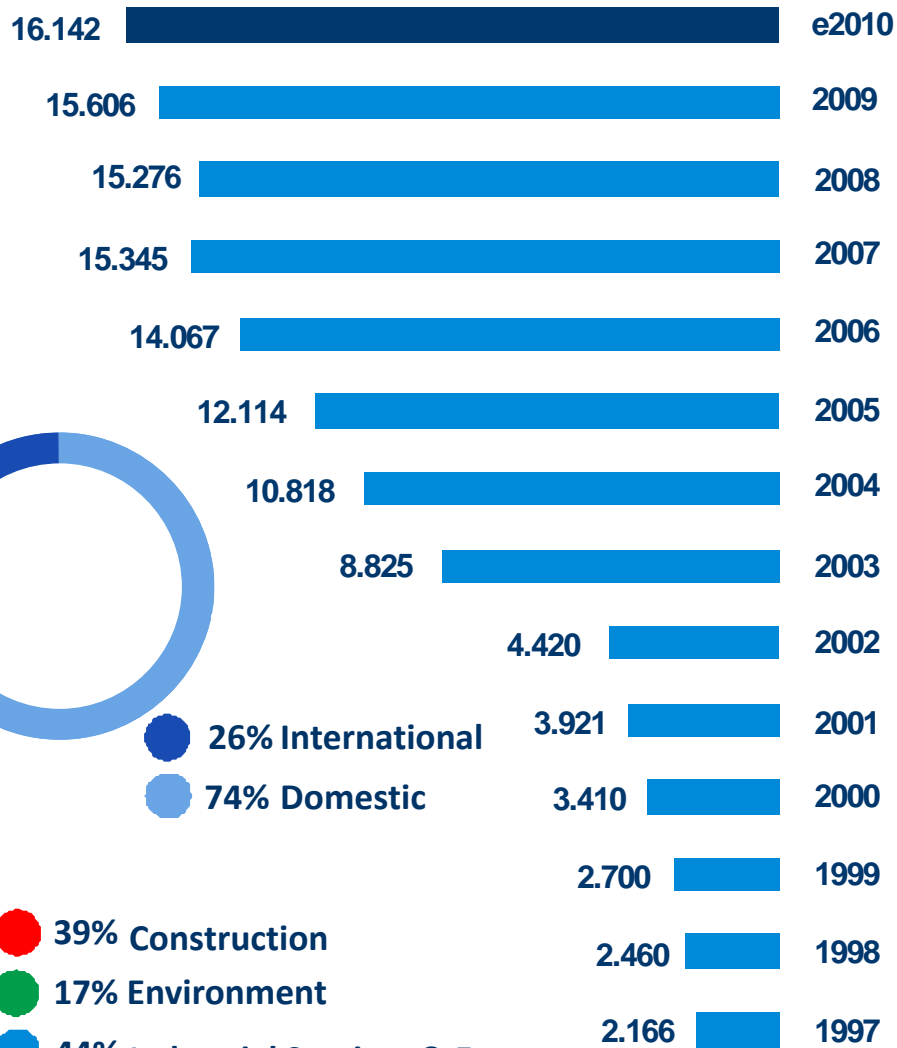
ACS Role in Renewable Energy

Dispatchable Renewable Energy

# ACS: Main Figures



## Turnover Evolution (M€)



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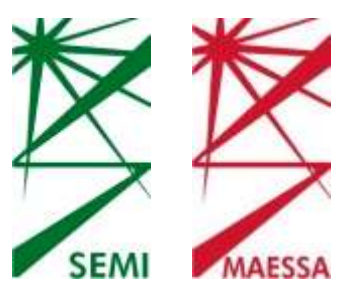
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## Renewable Energy

ACS Role in Renewable Energy

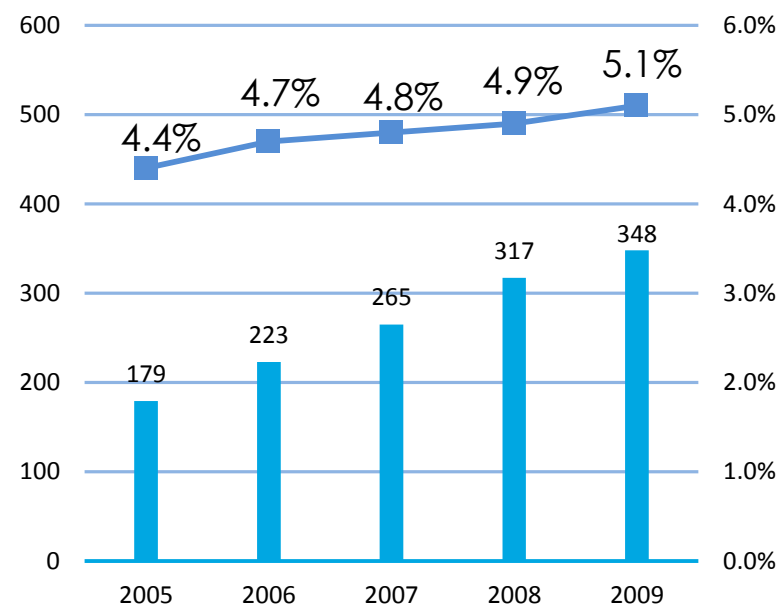
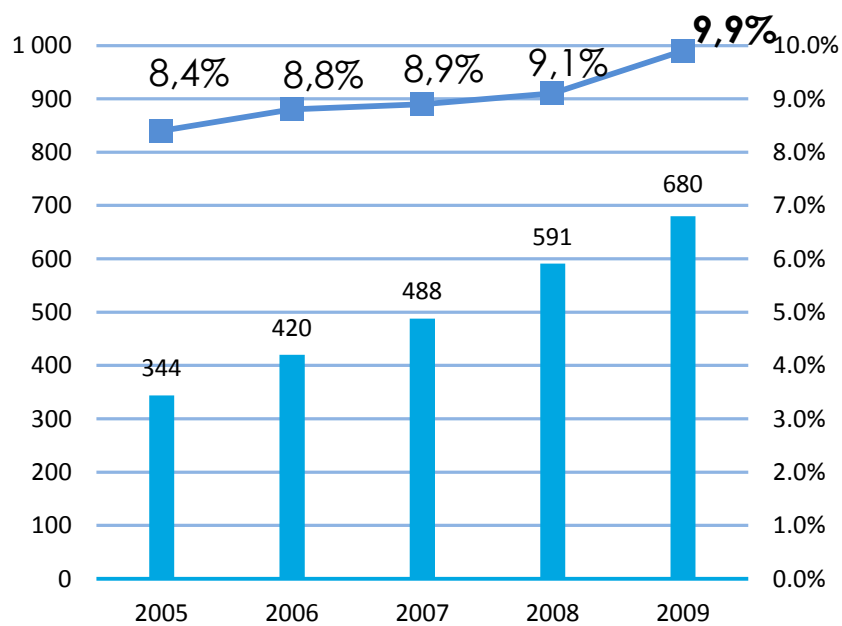
Dispatchable Renewable Energy



## Key Figures

(Million Euros)

	2007	2008	2009	Var.
Revenue	5.489	6.477	6.862	+6 %
EBITDA	488	591	680	+15,1 %
Net Profit	265	317	348	+9,8 %



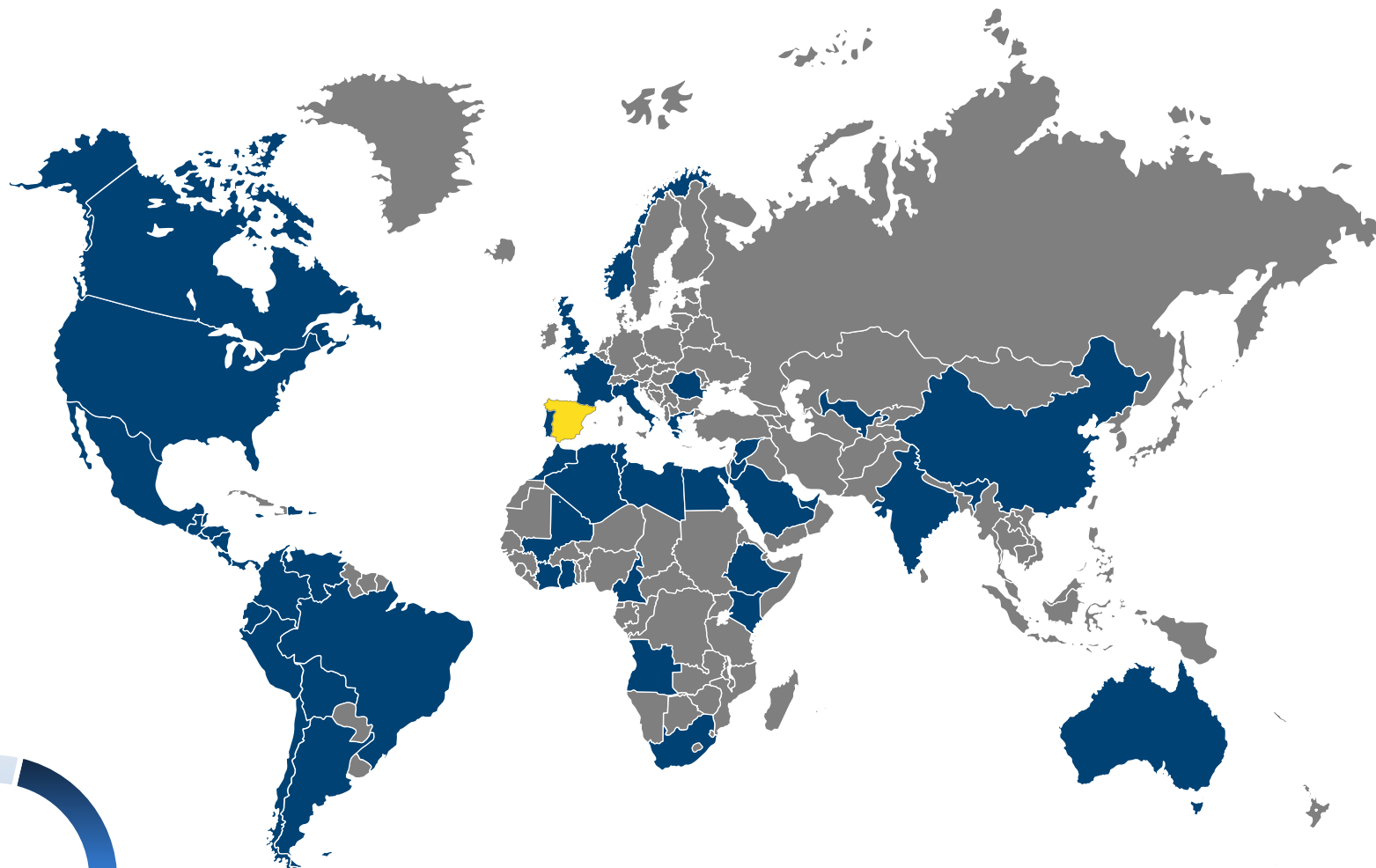
EBITDA

EBITDA margin

Net Profit

Net Profit margin

# International presence



■ 33 % International Turnover  
■ 67 % National Turnover

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## Renewable Energy

ACS Role in Renewable Energy

Dispatchable Renewable Energy

- Promotion
- Development
- Turnkey Construction
- Operation
- Maintenance of CSP plants



- **ACS** contributes to achieve the **European Goal**: 20% of energy consumption to come from renewable resources by 2020
- **ACS** generated **2,575 GWh** in **2009**, which represents a **4,8%** of the total Renewable Energy generated in Spain

## □ CSP trough Power Plants

■ 3 in operation (**150 MW**)

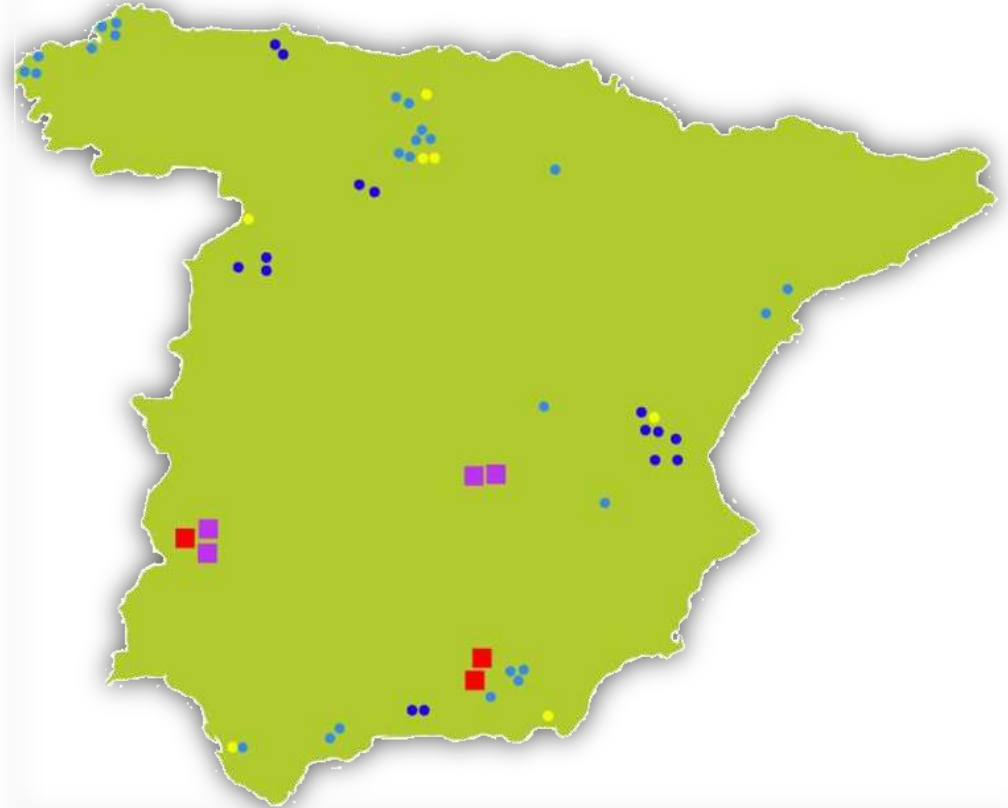
■ 4 in construction (**200 MW**)

## ○ Wind Farms

● 43 in operation (**1.175 MW**)

● 6 in constructionn (**288 MW**)

● 19 in promotion (**1.452 MW**)



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## Renewable Energy

ACS Role in Renewable Energy

Dispatchable Renewable Energy

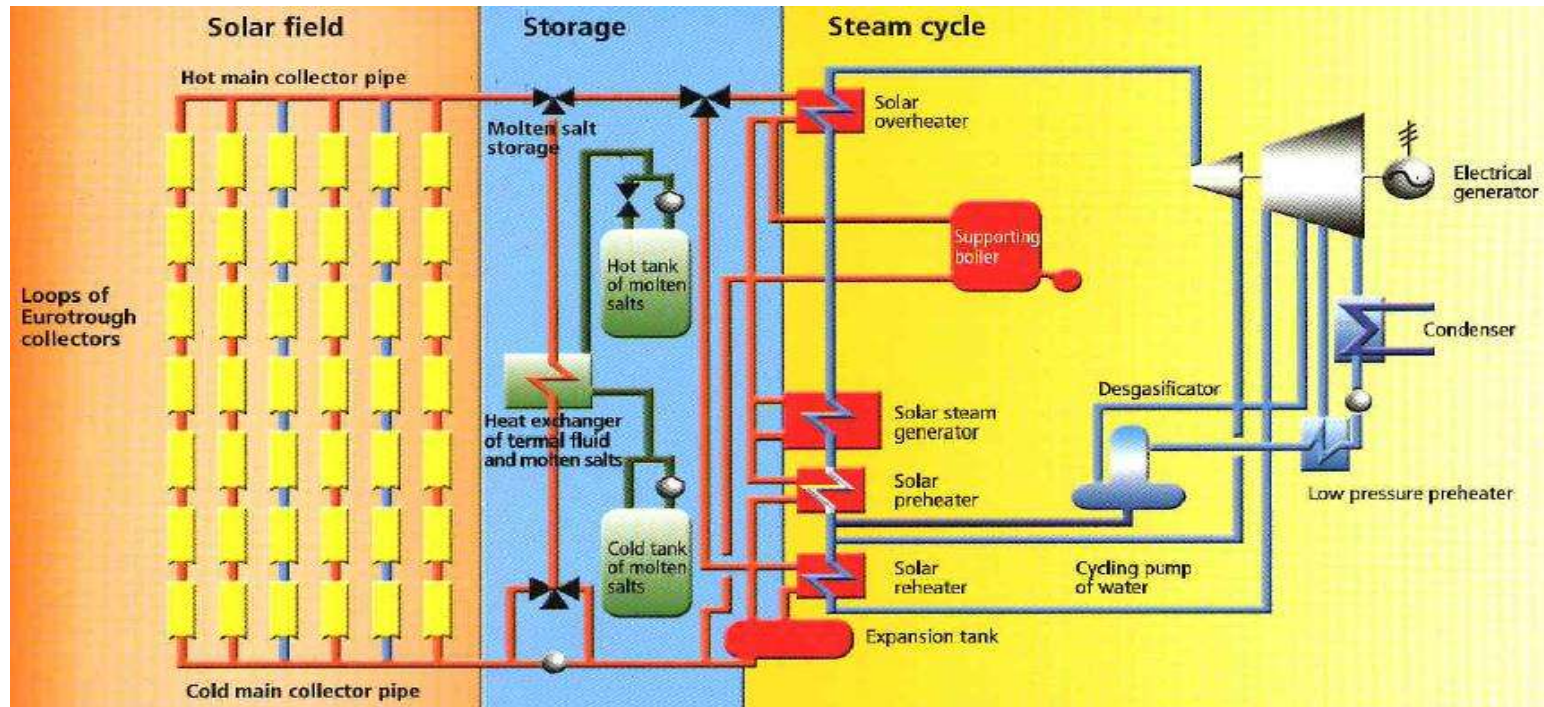
- In **March 2009** the **andasol-1** project started operating , it was the first commercial power plant with thermal storage
- Our company goal was to develop a **DISPATCHABLE** renewable electricity production which positioned us as the **leaders** in CSP new generation technologies



- Power: 50 MWe.
- Solar field: Parabolic trough
- Collectors aperture surface: 510.100 m<sup>2</sup>
- Total plant surface: 200 Ha aprox.
- Heat Transfer Fluid: Thermal Oil
- Molten Salts Thermal storage: 7,5 h
- Steam Cycle generation system
- Annual Production: 175 GW/h/year
- Emissions avoided 152.000 t/year CO<sub>2</sub>
- Gas Hybridization



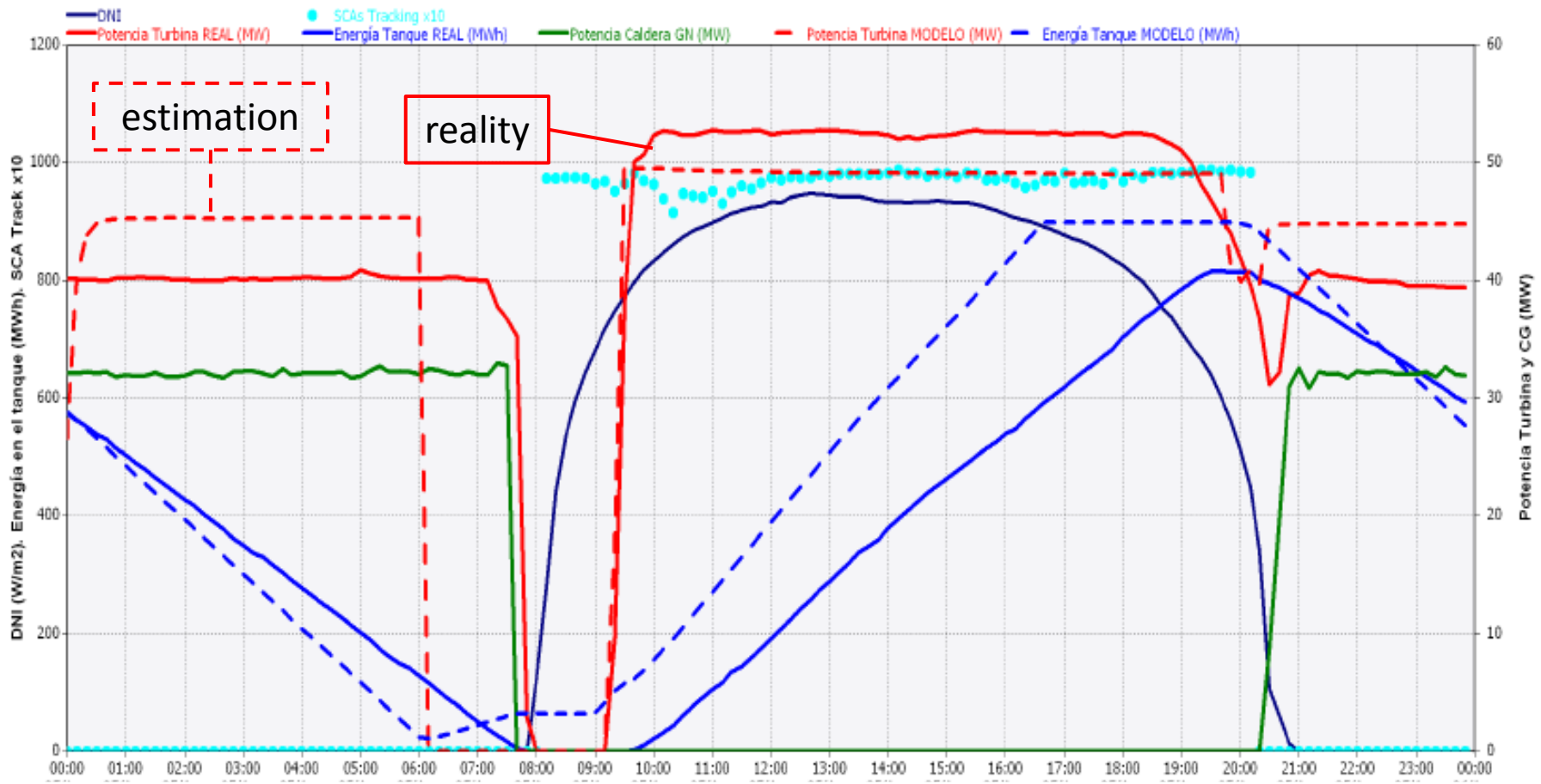
- The main principle of this technology is to transform the **solar energy into electricity**
- The solar radiation is **concentrated** in the parabolic troughs where the **heat transfer fluid is heated**.
- The **heat** produced is either **stored** or used to **generate steam**
- The steam produced is used to generate up to **50 MW of electricity**



- The key milestone of our CSP plants
- The 7.5h thermal storage allows us to operate more than **3,500 h/year** in a **flexible** and **dispatchable** way
- The energy is stored in a **two tank** system with **molten salts** as storage medium:
  - The Hot tank works at **384 °C**
  - The “Cold” tank work at **292 °C**



- After one year operating **andasol-1** we have achieved a great success, generating even more energy than the one initially estimated...



25/08/2010 Operation



**José Alfonso Nebrera**

ACS Industrial Services and Energy

Managing Director

[janebrera@acsindustria.com](mailto:janebrera@acsindustria.com)