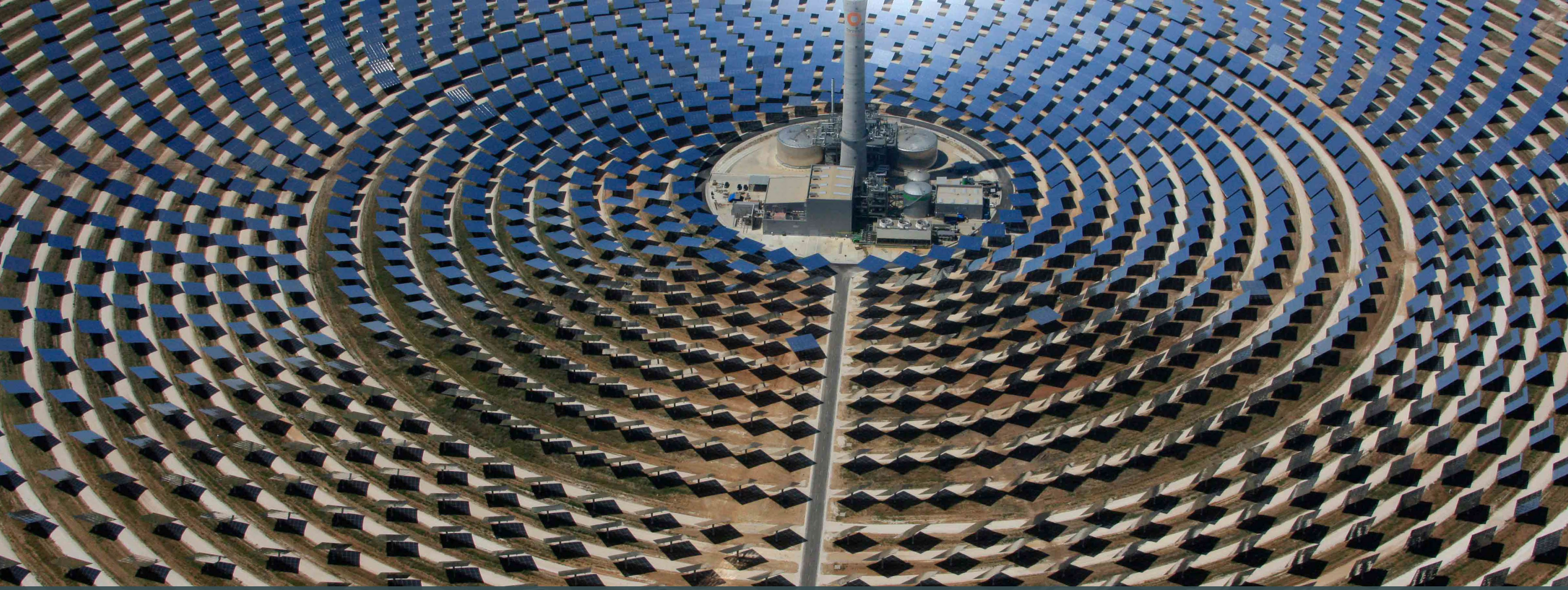

THE CURRENT EUROPEAN PERSPECTIVES FOR CSP

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CONTENT

- Context
- Role of CSP for electricity systems
- What is the industry potential?
- Why does the socio-economic dimension of CSP matter?
- Conclusions

ROLE OF CSP FOR ELECTRICITY SYSTEMS

Large heat storage systems (TES)

- Technically proven-continuously improved (R&I) incl. still unused operation patterns
- Industrially mature
- Most used worldwide as storage technology
- For storage of approx. 6 h/d and beyond, TES more cost effective compared to batteries

Objective: CSP + PV or wind = low power generation costs + best storage capabilities with costs of 4-6 €cts/kWh during more than 7000 full-load hours/year in sunbelt countries

ROLE OF CSP FROM AN INDUSTRIAL PERSPECTIVE

New GREEN hydrogen markets

- Hybrid plants can provide cost-effective energy for GREEN hydrogen production around the clock
- This will allow installing significantly smaller electrolysers close to production site, leading to a more efficient use of existing pipeline capacities

ROLE OF CSP FROM AN INDUSTRIAL PERSPECTIVE (2)

Heat for industrial processes as well as local and district heating

- CSP can directly supply industrial process heat (high temp) but also for local and district heating (adjustable heat between 50 and 550 °C)
- CSP towers deliver higher temperature heat of up to 1,000°C
- CSP use also for local and district heating bring together existing heat networks and building efficiency technologies. When seasonal storage is used, 80-90% “solar coverage” of needs can be achieved (instead of 10-20% without storage)
- CSP heat storage systems can be effectively combined with biomass or other thermal source (e.g. geothermal)

THE MACRO-ECONOMIC AND SOCIAL DIMENSION

- CSP is a **European technology** with a significant know-how component for which R&I research is conducted
- Europe holds still **technology leadership** for this value chain, but without a European home market widely opening doors to non-European competitors
- During construction, the **contribution to national GDP** is more than €1 million per MW
- During operation, CSP generates 33% more **local employment** per installed MW than the average renewable industry contributing 3 x higher to national GDP compared to other RES projects

CONCLUSIONS

CSP and PV (or wind) are complementary, not competing technologies

- Future solar plants should be **hybrid concepts with large low-cost storage**
- A higher penetration of CSP would **already now** lead to a dramatic reduction of variable RES curtailments, which means a contribution to:
  - solving system operation challenges (duck curve, etc)
  - mitigating associated “market dysfunctionalities”
  - reducing the need of natural gas …
- CSP uses for heat & solar fuels is a real opportunity for the industry to take stronger roots in Europe, to innovate & demonstrate and so create local jobs to support the needs and ambitions of EU countries or economically stressed regions
- **However, all this potential deployment of CST in Europe depends on the design of the next auctions in EU member states (technology focused, recognition of system value, required local content, support to innovative concepts)**

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