

Operational Experience of Spanish CSP plants



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Global Facts & Figures

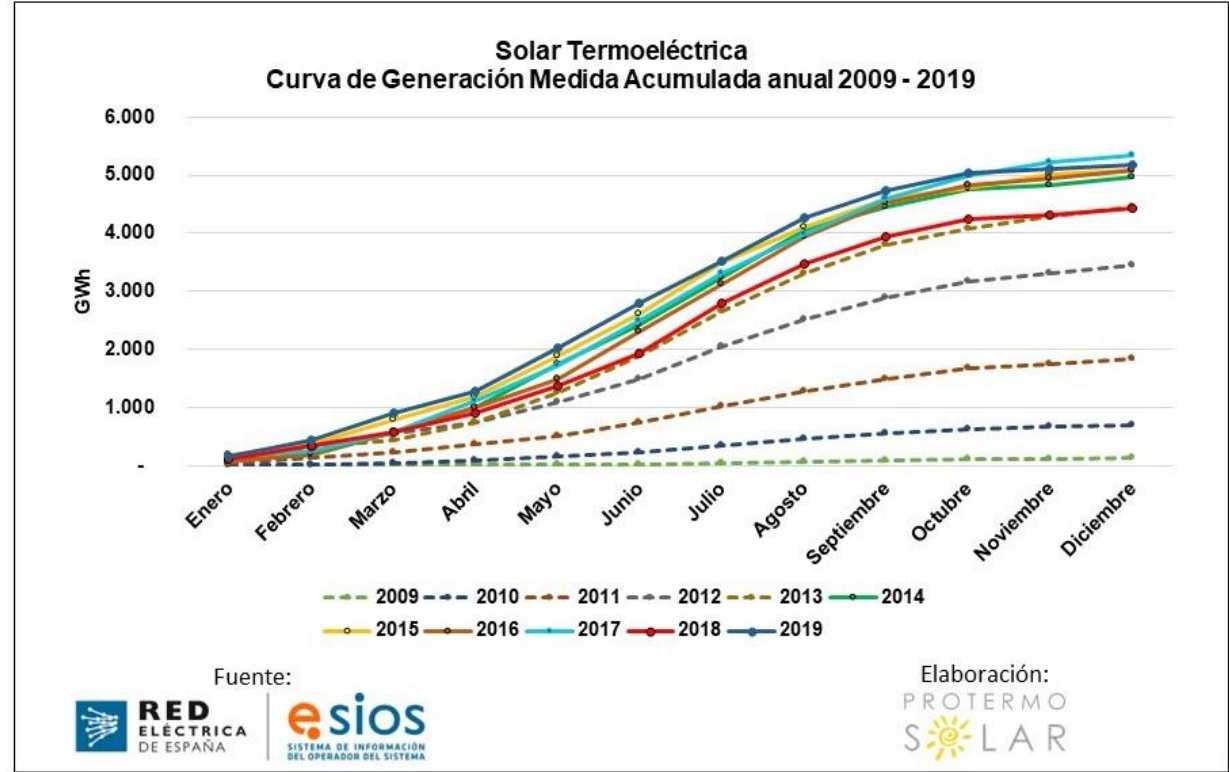
The Spanish CSP operational fleet consist of 49 Plants with 2.300 MW. These plants entered in operation between 2007 - 2013

The plants doesn't show degradation signs and they are continuously producing above 5 TWh per year

Type	Plants	Power (MW)
Parabolic Trough 50 MW without Storage	27	1350
Parabolic Trough 50 MW With storage	17	850
Saturated Steam Tower	2	31
Molten Salt tower with storage	1	20
Fresnel	1	30
Hybrid Solar/Biomass	1	22
TOTAL	49	2303

Historic records

- ✓ 10% of instantaneous contribution
- ✓ 8% is often achieved in summer months
- ✓ Several plants have been running for 3 weeks in a non stop 24/7 mode



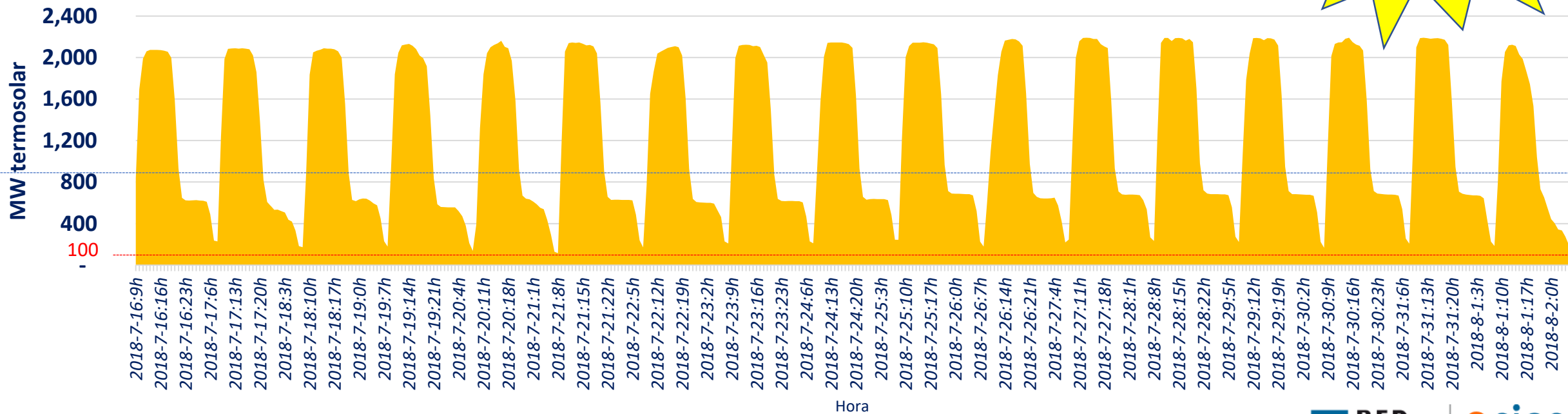
Example of 24/7 operation (17 días)

Although the Spanish plants were not designed for continuous operation, several plants (50 MW - 7 h. storage) reduce the power output after sunset and keep them running until sun rise next day.

Thus the number of star/stop cycles is reduced and the turbine overhaul inspection is delayed

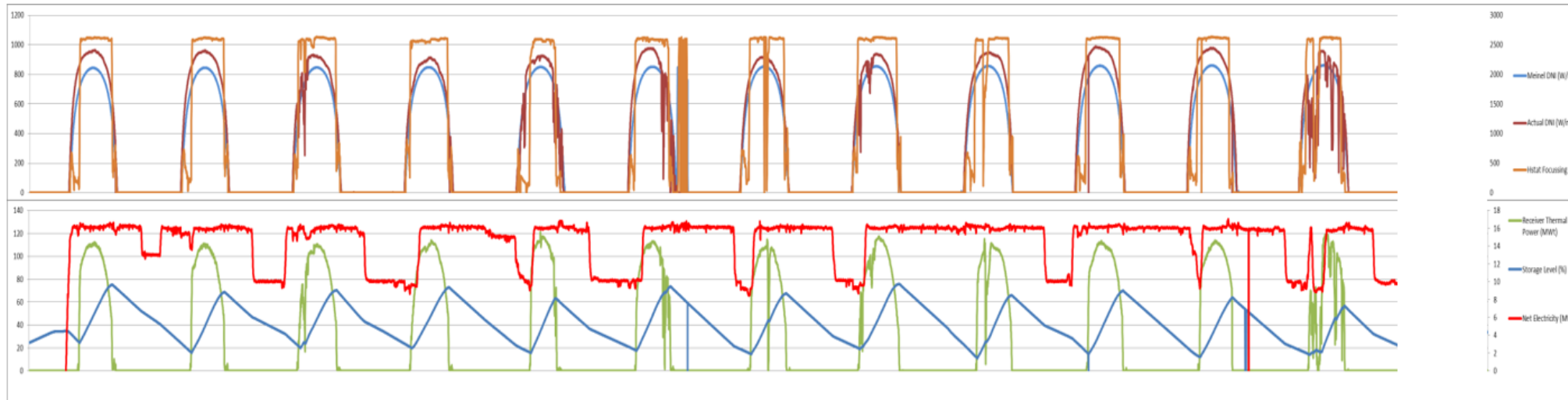
Record Gemasolar:
36 days non stop
at nominal power

Example of continuous operation record over 100 MW: 405h = 17 días



870 MW with storage > 7h

Examples of GEMASOLAR production in specific circumstances



Data of continuous production in February (Winter time)

