

# Data Insight

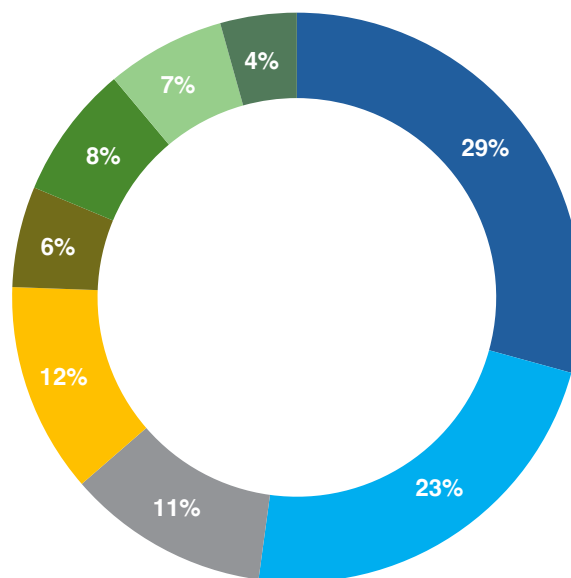
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## Status of Global Concentrated Solar Power Installations

Concentrated solar power (CSP) is a type of renewable energy that uses mirrors to concentrate solar irradiation onto a receiver and convert it into heat. The heat can then be used directly or indirectly for thermal or electrical applications. CSP technologies store energy, which makes them a flexible and dispatchable source of renewable energy. This is why there is a growing trend of co-deploying CSP with PV as hybrid renewable energy projects. Despite the high potential of and announced targets for CSP technology, the actual number of installations is still low compared with photovoltaic (PV) and wind power.

In 2021, only two CSP projects were commissioned globally (in China and Chile). There are 114 operational CSP projects around the world, with a total capacity of only 6.3 gigawatts (GW).

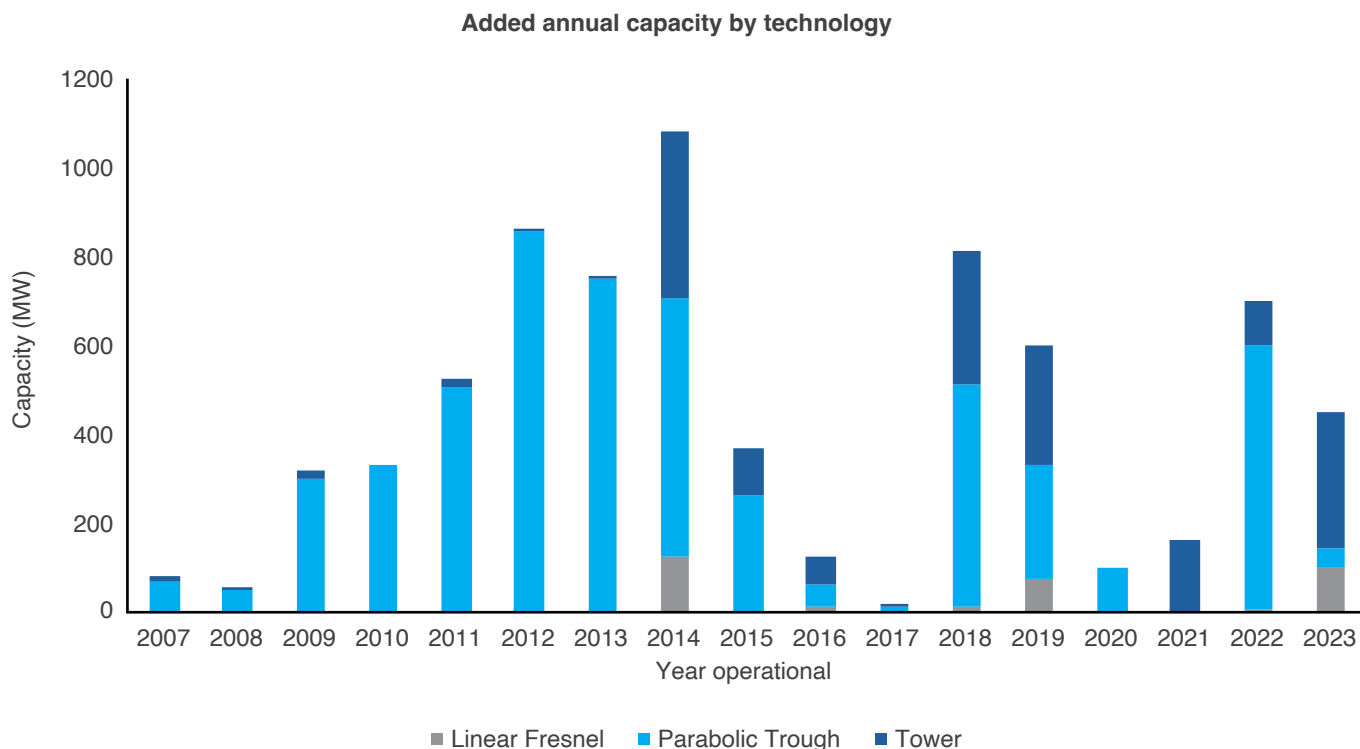
Operational capacity (MW)



■ Spain ■ United States ■ China ■ GCC ■ Others ■ South Africa ■ Morocco ■ India

Source: CSP Guru.  
 Note: MW = megawatts.

The deployment of CSP technologies is strongly influenced by incentive programs. China accounted for most of the new/expected installations between 2018 and 2023. This was part of the country’s base projects initiative to support demonstration programs. The United Arab Emirates (UAE) is due to bring the largest capacity online in 2022, in the form of a 700-megawatt (MW) CSP system in the Noor Energy 1 project. The costs of the technology have not decreased by much, except for the Chinese projects where a 10 cents per kilowatthour (kWh) levelized cost of energy is being achieved.



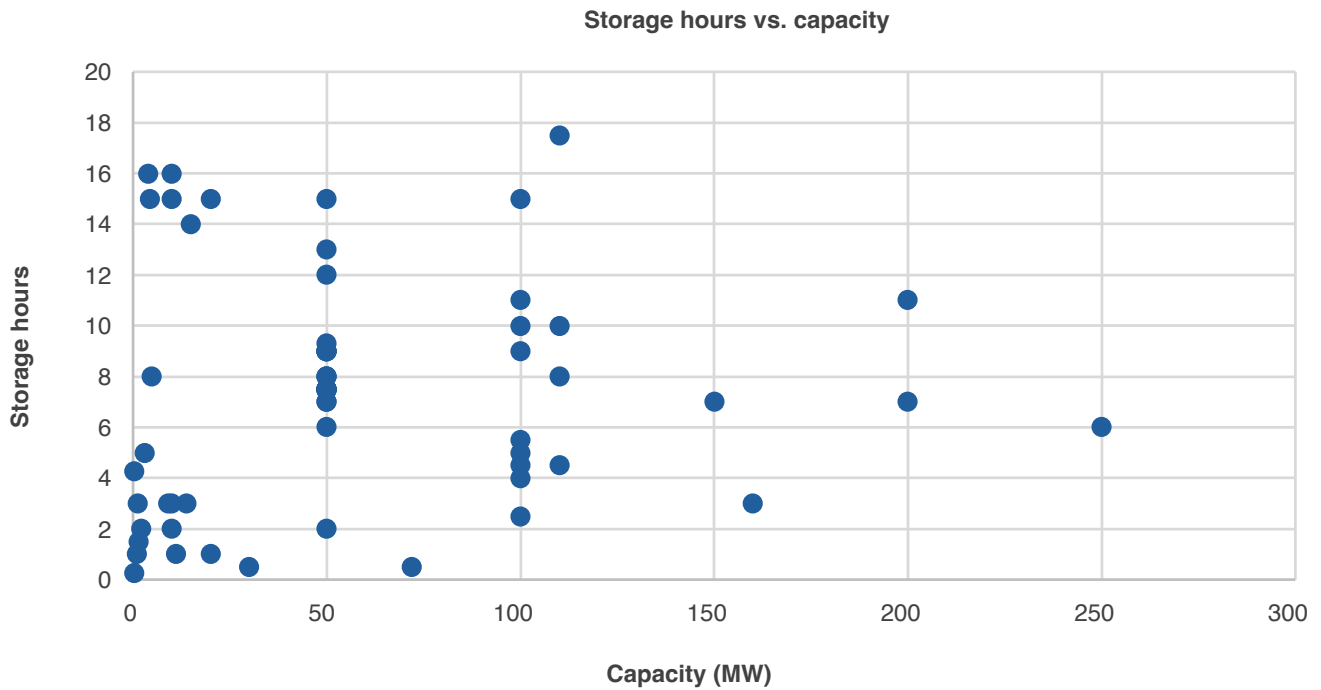
Source: CSP Guru.

In the Middle East and North Africa (MENA) region, several countries have deployed or are planning to utilize CSP either as stand-alone systems or as part of hybrid renewable energy projects. These projects aim to capture a high direct nominal irradiance given the region’s high solar irradiance.

Power station	Country	Year operational	Capacity (MW)	Technology
<b>Shams 1</b>	United Arab Emirates	2013	100	Parabolic trough
<b>ISCC Waad Al Shamal</b>	Saudi Arabia	2018	50	Parabolic trough - part of an integrated solar combined cycle
<b>Shagaya CSP Project</b>	Kuwait	2019	50	Parabolic trough - co-located with PV
<b>ISCC Duba 1</b>	Saudi Arabia	2023	43	Parabolic trough - part of an integrated solar combined cycle
<b>Noor Energy 1 / DEWA IV - 100 MW tower segment</b>	United Arab Emirates	2022	100	Power tower - co-located with PV
<b>Noor Energy 1 / DEWA IV - 3x 200 MW trough segment</b>	United Arab Emirates	2022	600	Parabolic trough - co-located with PV

Source: CSP Guru.

Recent projects worldwide have a storage capacity of more than eight hours, with the largest storage capacity (17.5 hours) at the Atacama I 110MW CSP and 100 MW PV project in Chile. Molten salt remains the dominant heat transfer medium in CSP systems.



Source: CSP Guru.

Source: This data insight uses a dataset maintained and updated annually by CSP Guru (<https://csp.guru>). The database presents information on CSP projects worldwide.

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