

Roundtable Discussion on ‘Concentrated Solar Thermal Projects (CSP) with Storage: Exploring way forward for deployment in India’

Background note

1. India demonstrated climate leadership at COP 26 in Glasgow where Hon’ble Prime Minister Shri Narendra Modi announced that India would increase its non-fossil fuel based capacity to 500 GW by 2030. TERI has prepared a Discussion Paper on “Roadmap to India’s 2030 Decarbonization Targets” (<https://www.teriin.org/event/roadmap-indias-2030-decarbonization-target>). For achieving the 500 GW goal the RE capacity has to grow exponentially. For utilising this capacity the Discussion Paper highlights the need for creation of large scale storage capacity. Storage is essential for optimal utilisation of RE capacity as well as for grid stability.
2. The Paper recommends pump storage projects (PSP) as the first priority for creating large scale grid storage. The Ministry of Power has recently issued guidelines for the developments of pump storage projects. The paper recommends creation of solar thermal projects with storage as the next priority for creating large scale grid storage. CSP has now become a mature and cost-effective renewable energy technology. CSP projects use reflectors to concentrate the sun’s rays and store thermal energy in molten salt. The stored thermal energy is used to run a conventional thermal plant turbine to generate electricity. Because of its ability to store solar energy thermally and convert it to power, CSP can deliver power on demand, making it an attractive renewable energy storage technology.
3. Over the period 2010 to 2021, the global weighted-average cost of electricity generated by CSP fell by 68% to USD 0.114/ kWh, driven by reductions in total installation costs and increasing capacity factors and thermal storage hours using molten salt. The 110 MW Cerro Dominador CSP plant in Chile constructed in June 2021, has a 17.5-hour thermal storage capacity using molten salt with an annual capacity factor of at least 80%. By 2024 China is building 30 CSP projects totalling over 2.9 GW.
4. The Paper suggests inviting bids for development of solar thermal projects with storage at identified sites and provide solar radiation data to the bidder to enable him to give optimal price bids.
5. The roundtable would discuss the key issues which need to be addressed for initiating a large programme for development of CSP in India to meet grid storage requirement as the share of RE rises. The key questions which will form the basis of discussion are:
 - (i) Size and number of CSP projects to be taken up initially for price discovery at site.
 - (ii) Preparatory work required for identifying site to enable inviting bids.
 - (iii) Optimal design of bid process.
 - (iv) Domestic content requirement (DCR) for becoming Aatmanirbhar.
