



European
Commission

Technology factsheet: Competitiveness of clean energy technology - Novel thermal energy storage technologies

December 2023

Key technologies

Several technologies are already commercially available, including in some hard-to-abate sectors such as steel and glass. Molten salt storage is often combined with Concentrated Solar Power plants.

tech 1

Technological Readiness Level (TRL) 3-5: Thermo-chemical storage; Solid Media Thermal Energy Storage (SMTES) for novel power plant and concrete-based sensible storage; Latent thermal energy storage (LTES) (for non-food/pharmaceuticals); Reversible-based reaction thermal energy storage (RBRTES)

tech 2

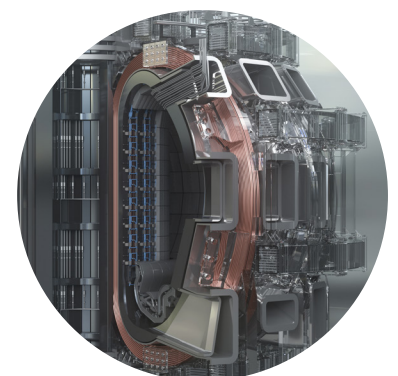
TRL 5-7: Latent Heat Storage (LHS) – sub-zero/low-temperature/high-temperature Phase-Change Materials (PCM); Sorption-based thermal energy storage (SBTES); Pumped Heat Electricity Storage; Adiabatic Compressed Air Energy Storage; Liquid Air Energy Storage

tech 3

TRL 9: Molten salts thermal energy storage (MSTES); Water Tank Thermal Energy Storage (WTES); SMTES in steel and glass industries and ceramic brick storage; Borehole Thermal Energy Storage (BTES); Tank-Pit thermal energy storage (TPTES); Aquifer thermal energy storage (ATES); LTES for food and pharmaceuticals; Latent Heat Storage (LHS) – ice

Key value chain figures

- **Marked size:** USD 23.7 billion (2021), with sensible thermal energy storage constituting approximately 85% of this market.



Key facts

Fact 1

Thermal energy storage help to balance energy supply and demand. MSTES has been used commercially since 2010 to store energy in CSP plants, especially in Spain and South Africa (together 53% of global capacity). Research is ongoing to improve its efficiency and cost-effectiveness.



Fact 2

It can also be used at industrial facilities to store and use excess heat productively.

Fact 3

Several projects have been funded by the EU for the development of high-temperature phase change material as a viable medium of thermal energy storage. In total Horizon Europe funded more than EUR 20 million in 2022 for this technology.



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