

Thermal Energy Storage Market to Hit \$56.4 Billion by 2033 Driven by Renewable Adoption

Global Thermal Energy Storage Market Expands with Government Support and Clean Energy Demand □

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According to a new report published by Allied Market Research, the [thermal energy storage market](#) size reached \$25.6 billion in 2023 and is projected to grow to \$56.4 billion by 2033, registering a CAGR of 8.4% from 2024 to 2033. This growth is primarily driven by the rising shift toward renewable energy systems, increasing focus on energy efficiency, and the growing need for enhanced grid reliability.

Report Insights



Market was valued at
\$25.6 Billion
2023

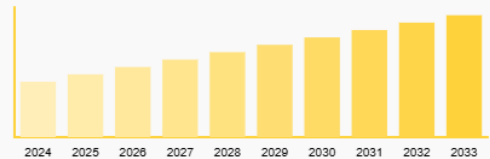


Projected to reach
\$56.4 Billion
2033



Growing at a CAGR
8.4% From
2024-2033

CAGR 8.4%



Thermal Energy Storage Market
Report Code: A01868

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The global thermal energy storage market is growing due to renewable energy adoption, grid stability needs, and government incentives worldwide."

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Thermal energy storage (TES) refers to the technology used to store energy in the form of heat for later use in heating, cooling, or power generation. TES systems help balance energy supply and demand, improve system efficiency, and support the seamless integration of renewable energy sources. These systems are widely utilized in [solar thermal](#)

[power plants](#), commercial building HVAC systems, industrial process heating, and district heating applications.

Market Drivers □

1. Rising Adoption of Renewable Energy Sources

The global transition toward clean energy has accelerated the deployment of solar and wind

power. However, both energy sources are intermittent. Solar energy, for example, is only generated during daylight hours, while wind power depends on wind availability. This mismatch between energy production and demand creates instability in power supply.

The thermal energy storage market addresses this challenge by storing excess energy generated during periods of high renewable output and making it available during peak demand. By doing so, TES systems improve grid reliability and maximize the utilization of renewable generation assets. The need for efficient energy balancing is a major factor fueling TES market growth.

2. Demand for Improved Energy Efficiency in Buildings □

Commercial and industrial buildings are adopting TES systems to reduce electricity costs and optimize heating and cooling operations. TES systems allow buildings to store thermal energy during low-cost off-peak hours and use it during peak hours, reducing utility expenses and strain on the power grid. The integration of smart building management technologies further enhances this capability, creating new opportunities for market expansion.

Challenges Hindering Market Growth □□

Competition from Lithium-Ion Batteries

Electrochemical batteries—particularly lithium-ion—pose a competitive challenge to the thermal energy storage market, especially in grid-scale and short-duration storage applications. Lithium-ion batteries offer:

High energy density

Fast response time

Portability and modularity

Moreover, declining battery production costs make them more attractive for certain applications. In sectors where space efficiency and rapid energy cycling are key priorities, lithium-ion systems may replace TES solutions.

However, for long-duration storage, heating processes, and industrial thermal applications, TES systems remain cost-effective and technically superior, which will sustain future growth.

Opportunities for Market Expansion □

Government Incentives and Funding Support

Governments worldwide are supporting TES technology deployment through:

Tax credits

Grants & subsidies

R&D funding

Low-interest financing programs

These policies reduce upfront investment barriers and encourage businesses and utilities to adopt TES systems. Increasing national commitments toward carbon neutrality and net-zero emissions further strengthen the outlook for the thermal energy storage market during the forecast period.

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<https://www.alliedmarketresearch.com/checkout-final/92883197ae559d10eb7099294bad7a40>

Segment Highlights □

The thermal energy storage market is categorized based on technology, storage material, application, end user, and region. In terms of technology, the market primarily includes latent heat storage and sensible heat storage, along with a few emerging methods. Sensible heat storage is the most widely implemented technology as it uses commonly available storage media such as water or rocks, making it cost-effective and highly reliable for large-scale systems. Latent heat storage, on the other hand, utilizes phase change materials (PCMs) that absorb and release heat during state transitions, offering high energy density and compact storage solutions. This makes latent heat storage particularly suitable for modern applications where space efficiency and precise temperature control are essential.

When considering storage materials, the market includes options such as water, molten salts, phase change materials, and specialized thermal fluids. Among these, molten salt is gaining significant traction, especially in [concentrated solar power \(CSP\) plants](#), due to its ability to retain heat at very high temperatures and deliver energy over extended periods. Water remains the most economical and commonly used material in building heating and cooling systems, while PCMs are increasingly being adopted in advanced thermal management systems for commercial and industrial use.

In terms of applications, the power generation sector represents a key area of demand, particularly in solar thermal energy projects where TES is essential for maintaining stable power output even when sunlight is not available. The heating segment benefits from the rising adoption of district heating networks and industrial process heating, both of which require efficient and continuous thermal energy supply. The cooling application is also growing steadily, driven by the demand for cost-effective HVAC solutions in commercial buildings, data centers,

and manufacturing facilities, where TES systems help shift energy loads to off-peak hours and lower operational expenses.

Regarding end users, the residential, commercial & industrial, and utility sectors all contribute to market expansion. Utilities are currently the dominant segment due to the increasing need for grid stability and large-scale renewable integration. The commercial and industrial sector is witnessing strong growth as businesses adopt TES solutions to reduce energy costs and comply with sustainability targets. Meanwhile, residential adoption is gradually increasing, supported by rising awareness of energy efficiency and government-backed energy-saving initiatives.

Regionally, the thermal energy storage market is experiencing notable growth across North America, Europe, Asia-Pacific, and LAMEA. Europe remains a frontrunner due to strong policy support for decarbonization and the widespread implementation of district heating networks. North America is experiencing an increase in TES deployment in commercial HVAC and utility grid applications. Asia-Pacific is projected to be the fastest-growing region, driven by rapid industrialization, expanding renewable power capacity, and government-led clean energy targets. In LAMEA, large-scale solar energy investments are contributing to gradual market development, especially in countries with high solar irradiance.

Key Growth Regions □

Europe leads in solar thermal power storage.

North America sees rising adoption in commercial HVAC and utility-scale energy storage.

Asia-Pacific is expected to witness the fastest growth due to industrial expansion and renewable installation mandates.

Competitive Landscape □

Key players actively enhancing product efficiency, scalability, and integration include:

Aalborg CSP

Abengoa

Cartesian

Enel Spa

EVAPCO, Inc.

Kraftblock GmbH

Lumenion GmbH

Magaldi Green Energy

Man Energy Solutions

PCM Products Ltd.

Phelas GmbH

Spirax Sarco Limited

Sunamp Ltd.

Thermofin

These companies focus on adopting molten salts, phase change materials, and advanced thermal fluids to extend storage duration and improve heat retention.

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Conclusion □

The thermal energy storage market is set for significant expansion as the world accelerates its transition toward renewable energy. TES systems play a crucial role in stabilizing energy supply, improving grid resilience, and reducing carbon emissions. Although competition from lithium-ion batteries remains, increasing government incentives, industrial demand for energy efficiency, and growth of solar thermal applications will continue to drive TES market penetration in the coming decade.

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