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Thermal Energy Storage System Market Forecasts to 2032 – Global Analysis By Storage Material (Water, Molten Salt, Phase Change Materials (PCM) and Other Storage Materials), Technology (Sensible Heat Storage, Latent Heat Storage, Thermochemical Storage and Other Technologies), Application, End User and By Geography

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Abstracts

According to Stratistics MRC, the Global Thermal Energy Storage System Market is accounted for $61.92 billion in 2025 and is expected to reach $103.40 billion by 2032 growing at a CAGR of 7.6% during the forecast period. Systems for thermal energy storage (TES) are made to store thermal energy for later use. This helps control energy consumption and boost productivity in a number of applications, including power generation, heating, and cooling. These systems function by storing excess thermal energy when it is available, which is usually off-peak hours, and releasing it during periods of high demand or energy scarcity. Different technologies, such as sensible heat storage, latent heat storage, and thermo chemical storage, can be used to implement TES.

According to the International Renewable Energy Agency (IRENA), thermal energy storage (TES) is projected to experience significant growth, with the global market potentially tripling by 2030.

Market Dynamics:

Driver:

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Implementation of renewable energy

There is an urgent need for effective energy storage systems like TES due to the growing reliance on renewable energy sources like solar and wind. Because these sources are variable, their output varies depending on the weather. Wind energy varies according to wind patterns, while solar energy is only produced during the day. TES makes it possible to store extra energy produced during times of high production for later use, guaranteeing a steady supply of energy even during periods of low renewable energy generation. Additionally, TES systems support a cleaner, more sustainable energy mix by easing the grid's transition to renewable energy, which lessens dependency on traditional fossil fuel power plants.

Restraint:

High installation costs and initial investment

The substantial upfront costs associated with installing TES systems are one of the main obstacles to their widespread use. Installing and buying TES systems can come with hefty upfront costs, particularly for large-scale applications. TES systems have the potential to reduce energy costs over the long run, but many businesses, utilities, and residential customers are still put off by the high initial cost of installation. The need for specialized materials and infrastructure is especially evident in advanced TES technologies like molten salt storage. Furthermore, the requirement for a significant upfront capital investment persists despite the fact that the costs of TES technologies have been declining over time.

Opportunity:

Integrating to smart grids

An additional noteworthy opportunity for the TES market is the expansion of smart grids. Energy distribution is optimized, grid reliability is increased, and energy consumption is decreased with smart grids owing to cutting-edge technology and data analytics. TES systems can be incorporated into these smart grids to offer adaptable and effective storage options that enhance energy supply and demand management. TES can help utilities increase grid stability, lower energy losses, and boost overall grid efficiency when combined with smart grid infrastructure. Moreover, energy storage and distribution can be facilitated by smart grid integration, which can also help balance the demand for renewable energy with consumer demand.

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Threat:

Competition from alternative energy storage technologies

The efficiency, affordability, and ease of integration of alternative energy storage technologies pose a serious threat to TES systems. Battery energy storage systems, or BESS, are a major rival. Recent developments in solid-state and lithium-ion technologies have resulted in significant cost savings and enhanced performance. TES systems are not as flexible in terms of installation and scalability as batteries, which also have a higher energy density and faster response times. Furthermore, alternative thermal storage technologies like pumped hydro storage and liquid air energy storage (LAES) offer advantages over TES in specific applications.

Covid-19 Impact:

The COVID-19 pandemic affected the market for Thermal Energy Storage (TES) systems in a variety of ways. Due to workforce constraints and supply chain disruptions, the pandemic's worldwide disruption resulted in delays in TES system installation, project execution, and manufacturing. Lockdowns implemented in numerous nations caused a delay in the uptake of new TES technologies and other renewable energy infrastructure. However, the pandemic also highlighted the need for more sustainable and resilient energy systems, which raised interest in energy storage technologies like TES that promote consistency and dependability in energy resources.

The molten salt segment is expected to be the largest during the forecast period

The molten salt segment is expected to account for the largest market share during the forecast period because of its high thermal storage capacity, molten salt finds extensive application, particularly in concentrating solar power (CSP) plants. When necessary, it can effectively release thermal energy that has been stored at high temperatures. It offers substantial benefits in terms of cost-effectiveness and energy efficiency, making it the perfect choice for large-scale applications. Moreover, molten salt TES systems' dominant market share is a result of their growing use in utility-scale renewable energy projects.

The thermochemical storage segment is expected to have the highest CAGR during the forecast period

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Over the forecast period, the thermochemical storage segment is predicted to witness the highest growth rate. It is a very effective choice for long-duration storage because it can store energy at a significantly higher density than other storage types. Better heat retention over long periods of time is made possible by thermochemical storage, which absorbs and releases heat through reversible chemical reactions. Additionally, thermochemical storage is becoming popular as industries look for more sustainable and effective energy storage options, especially for large-scale uses in renewable energy systems.

Region with largest share:

During the forecast period, the North America region is expected to hold the largest market share. This is mostly because of the large investments made in infrastructure for renewable energy, especially in the US, where solar energy and energy storage technologies are highly valued. The dominance of TES technologies is a result of the region's well-established policies encouraging the development of renewable energy as well as a growing focus on grid stability and energy efficiency. Furthermore, the demand for large-scale TES systems is still being driven by North America's industrial sector, especially in the utility and commercial sectors, which further solidifies its dominant market position.

Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR. Rapid urbanization, industrialization, and rising investments in renewable energy in nations like China, India, and Japan are the main drivers of this growth. To meet rising energy demands and cut carbon emissions, these nations are concentrating on sustainable energy solutions. The need for TES systems is also being fueled by government initiatives like incentives for the adoption of renewable energy and the creation of smart grids. Moreover, the region's growing emphasis on energy storage and solar power generation also supports the market's strong expansion.

Key players in the market

Some of the key players in Thermal Energy Storage System Market include Siemens Gamesa Renewable Energy, S.A., Abengoa S.A., Evapco, Inc., Caldwell Energy Company, Fafco, Inc., Dunham-Bush Limited, Baltimore Aircoil Company, Calmac, L&T Energy GreenTech and Steffes, LLC.

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Key Developments:

In March 2025, Siemens Gamesa Renewable Energy S.A. has entered into an agreement with a group of investors led by TPG Capital to divest 90% of its onshore wind operations in India and Sri Lanka. The transaction includes the manufacturing, installation, and servicing of wind turbines, along with two production facilities and approximately 1,000 employees.

In March 2025, L&T Energy GreenTech Limited (LTEGL) and John Cockerill signed a Memorandum of Understanding (MoU) to explore various technologies in Concentrated Solar Power (CSP) and Thermal Energy Storage (TES). LTEGL, a wholly owned subsidiary of L&T, is dedicated to sustainable energy solutions, including Green Hydrogen, its derivatives, and Electrolyser Manufacturing.

In August 2021, Steffes, LLC of Dickinson, North Dakota, a leader in the development and production of innovative energy technology and advanced manufacturing has announced their decision to expand into the southeast through the acquisition of a manufacturing facility in the town of Shelby, North Carolina. This investment of $20.9 million in Cleveland County will create 130 new, full-time jobs over the next five years.

Storage Materials Covered:

- Water
- Molten Salt
- Phase Change Materials (PCM)
- Other Storage Materials

Technologies Covered:

- Sensible Heat Storage
- Latent Heat Storage
- Thermochemical Storage

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- Other Technologies

Applications Covered:

- Power Generation
- District Heating & Cooling
- Process Heating & Cooling
- Ice Storage Air-Conditioning
- Other Applications

End Users Covered:

- Residential
- Commercial
- Utilities
- Industrial

Regions Covered:

- North America
  - US
  - Canada
  - Mexico
- Europe

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- Germany
- UK
- Italy
- France
- Spain
- Rest of Europe

Asia Pacific

- Japan
- China
- India
- Australia
- New Zealand
- South Korea
- Rest of Asia Pacific

South America

- Argentina
- Brazil
- Chile
- Rest of South America

Middle East & Africa

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Saudi Arabia

UAE

Qatar

South Africa

Rest of Middle East & Africa

What our report offers:
- Market share assessments for the regional and country-level segments
- Strategic recommendations for the new entrants
- Covers Market data for the years 2024, 2025, 2026, 2028, and 2032
- Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)
- Strategic recommendations in key business segments based on the market estimations
- Competitive landscaping mapping the key common trends
- Company profiling with detailed strategies, financials, and recent developments
- Supply chain trends mapping the latest technological advancements

Free Customization Offerings:

All the customers of this report will be entitled to receive one of the following free customization options:

Company Profiling

Comprehensive profiling of additional market players (up to 3)

SWOT Analysis of key players (up to 3)

Regional Segmentation

Market estimations, Forecasts and CAGR of any prominent country as per the client's interest (Note: Depends on feasibility check)

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Competitive Benchmarking

Benchmarking of key players based on product portfolio, geographical presence, and strategic alliances

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