Growing Renewable Energy Adoption is Creating Opportunities for the Growth of the Global Thermal Energy Storage Market

Global Thermal Energy Storage Market Valued USD 4.3 Bn in 2022, with an Estimated CAGR of 16.3% (2023- 2031)

WILMINGTON, DELAWARE, UNITED STATES, December 1, 2023 /EINPresswire.com/ -- Global Thermal Energy Storage Market Introduction Thermal energy storage (TES) is a technology that allows for the storage of thermal energy in a way that it can be later retrieved and used for various applications, including heating, cooling, and electricity generation. TES systems are particularly valuable for addressing the intermittent nature of renewable energy sources like solar and wind, as well as for improving the overall efficiency of energy systems.

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The thermal energy storage market is at the forefront of a transformative shift in the global energy landscape. As the world tackles with the challenges of climate change and the imperative to reduce greenhouse gas emissions, TES emerges as a key enabler of sustainable energy solutions. The Niche Research provides in-depth analysis of growth trajectory, technological innovations, market drivers, and the pivotal role it plays in shaping the energy systems of tomorrow and the growth of the overall global thermal energy storage market.

Global Thermal Energy Storage Market Snapshot

Market Value in 2022 : USD 4.3 Billion
Market Value Forecast 2031: USD 22.6 Billion
Growth Rate: 16.3%
Historical Data: 2015-2021
Base Year: 2022
Forecast Data: 2023-2031

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Future of Global Thermal Energy Storage Market
Future research in thermal energy storage and conversion will most likely concentrate on a few significant areas. Advanced functional materials are projected to significantly improve upon existing technology. Furthermore, there is on-going advanced research on novel materials that can store and release heat more effectively and at greater temperatures, such as high-temperature phase transition materials and thermochemical storage materials.
Additionally, Researchers are attempting to increase the efficiency and cost-effectiveness of thermal energy conversion systems, which create both electricity and useable heat at the same time. Innovative heat exchanger designs that can transfer heat more effectively across fluids at different temperatures will play an important role in the rapid commercialization of TECs technology. AI and machine learning will be combined to improve the control and management of future thermal energy storage and conversion systems, making them more efficient and cost-effective, which is propelling the global thermal energy storage market demand.

Global Thermal Energy Storage Market Segmentation Analysis
Global Thermal Energy Storage Market, By Energy Storage Systems
- Sensible Heat Storage
- Latent Heat Storage
- Thermochemical Storage

Sensible heat storage systems had the highest share in the global thermal energy storage market in 2022 as it utilizes functional materials' specific heat capacity to store the heat without causing any phase change in the material. Sensible heat storage systems can operate over a wide temperature range, from relatively low temperatures to high temperatures, depending on the choice of storage medium. This flexibility makes them suitable for various applications, from residential heating to industrial processes and even concentrating solar power (CSP) plants. On the other hand, in cases where extremely high-temperature storage is required or where space and weight constraints are significant factors, other thermal energy storage technologies like latent heat storage or molten salt TES are highly being adopted.

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Global Thermal Energy Storage Market, By Storage Medium
- Molten Salt
- Water
- Phase Change Materials

For numerous reasons, molten salt is widely favoured in thermal energy storage (TES), making it one of the most often utilised thermal energy storage materials. One method, which uses the extremely efficient features of molten salt for heat transfer, insulates power generation from weather instability and, more crucially, provides the capacity to dispatch energy as needed

without the usage of natural gas. This is a concentrated solar power (CSP) technique based on a molten salt loop and a customised central receiver tower. While on the other hand, the use of phase change materials (PCMs) for thermal energy storage is a very promising storage medium because it can collect and release a substantial quantity of latent heat during the phase transition process.

Global Thermal Energy Storage Market, By End Users
- Residential
- Commercial
- Industrial

The industrial segment in the thermal energy storage market had the highest share in 2022. Major heavy industries such as manufacturing, refining, and chemical processing often produce significant amounts of waste heat during various processes. With low- and medium-temperature heat accounting for 45% of total industrial process heat demand, renewable H/C systems paired with thermal energy storage have the potential to significantly contribute to the sector's decarbonization. Thermal energy storage systems for industrial applications must not only be small, but also have a quick reaction time and a high charging/discharging power to meet peak heat needs and process startup.

Global Thermal Energy Storage Market, By Region
- North America
- Europe
- Asia Pacific
- Middle East & Africa
- Latin America

The Asia Pacific region is a promising market for thermal energy storage technology. There are nine TES initiatives in the area, with three each in Australia, China, and India. In the near future, India is likely to emerge as one of the most powerful players in the Asia Pacific thermal energy storage technologies market. Furthermore in 2022, The Australian Renewable Energy Agency (ARENA) has announced a $1.27 million funding for MGA Thermal Pty Ltd's Medium Duration Thermal Energy Storage (MDTES) project. Many Asian governments are implementing policies and incentives to encourage the adoption of clean energy technologies, including TES systems which has led to the overall growth of the thermal energy storage market.

Key Companies in the Global Thermal Energy Storage Market:
- Abengoa
- Baltimore Aircoil Company
- Brenmiller Energy Ltd
- Caldwell Energy Company
- Deepchill Solutions Inc.
- DN Tanks

- Dunham-Bush
- Enesoon Holding Group Company
- Fitzer Incorporation
- EVAPCO, Inc
- Goss Engineering
- Terrafore Technologies LLC
- Trane
- Other market participants

Key Developments in the Global Thermal Energy Storage Market
In September 2023, Kyoto Group and Brenmiller, both thermal energy storage businesses, have launched and received funding approval for projects in Denmark and Israel, respectively. Kyoto Group announced the formal launch of their Heatcube thermal energy storage system at Denmark's Norbis Park, a power plant complex that presently includes the coal and gas-fired Nordjylland Power Station but is aiming to transition to renewables.
In September 2023, Brenmiller Energy Ltd., a well-known provider of thermal energy storage systems, has made record by creating the world's first gigafactory dedicated to thermal energy storage. This ground-breaking plant represents a big step forward in the company's pursuit of sustainable energy solutions.

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