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The Global Market for Thermal Energy Storage 2024-2035

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Abstracts

Thermal energy storage (TES) is a rapidly growing sector within the broader energy storage industry, offering unique solutions for managing and optimizing energy supply and demand. TES technologies enable the capture, storage, and release of thermal energy, allowing for more efficient and sustainable energy utilization across various applications. As the world transitions towards cleaner energy sources and seeks to reduce greenhouse gas emissions, TES is poised to play a crucial role in decarbonizing power generation, industrial processes, and building energy systems.

TES technologies leverage the principles of thermodynamics to store energy in the form of heat or cold, using a variety of materials and systems. The three main categories of TES technologies are sensible heat storage, latent heat storage, and thermochemical energy storage. Sensible heat storage, the most mature and widely adopted TES technology, utilizes materials such as molten salts, concrete, and solid materials to store thermal energy through temperature changes. Latent heat storage employs phase change materials (PCMs) that absorb or release heat during phase transitions, offering higher energy densities and more stable storage temperatures. Thermochemical energy storage, an emerging technology, harnesses reversible chemical reactions to store and release thermal energy, providing the highest energy densities and long-term storage capabilities.

The TES market encompasses a diverse range of applications, including concentrated solar power (CSP), industrial process heat, district heating and cooling, residential and commercial buildings, and long-duration energy storage. In the power sector, TES enables the integration of renewable energy sources, such as solar thermal and geothermal, by providing a means to store and dispatch energy when needed. Industrial manufacturing processes can benefit from TES by recovering and reusing waste heat,

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improving energy efficiency, and reducing fuel consumption. District heating and cooling networks leverage TES to optimize supply and demand, while residential and commercial buildings can utilize TES for space heating, cooling, and domestic hot water production. Additionally, TES is emerging as a promising solution for long-duration energy storage, complementing batteries and other storage technologies in grid-scale applications.

The global TES market is driven by several factors, including the increasing adoption of renewable energy, the need for energy efficiency and cost savings, and supportive government policies and regulations. The decarbonization of the power and industrial sectors, coupled with the integration of intermittent renewable energy sources, is creating a growing demand for TES solutions. Energy efficiency measures, such as peak shaving, load shifting, and waste heat recovery, are further driving the adoption of TES across various end-use sectors. Moreover, government initiatives, renewable energy mandates, and emissions trading schemes are providing incentives and support for TES projects worldwide.

As the TES market continues to evolve, several key trends and opportunities are emerging. Advancements in materials science are leading to the development of novel TES materials with improved performance, durability, and cost-effectiveness. Innovations in system design, such as modular and scalable TES solutions, are enabling easier integration and deployment across diverse applications. Furthermore, the increasing focus on long-duration energy storage is opening up new market segments for TES technologies, particularly in grid-scale applications and the integration of renewable energy sources.

This report provides a comprehensive analysis of the global TES market, covering the period from 2024 to 2045. It offers insights into the current market landscape, technology trends, key applications, and regional developments. The report includes market size and growth projections, segmented by technology, application, and region, along with a detailed value chain analysis and competitive landscape assessment. Additionally, it features in-depth profiles of leading TES companies, highlighting their product offerings, strategic initiatives, and market positioning. With its extensive coverage and strategic insights, this report serves as an invaluable resource for stakeholders across the TES value chain, including technology providers, project developers, utilities, industrial end-users, investors, and policymakers.

Contents include:

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Comprehensive overview of TES technologies, including sensible heat storage, latent heat storage, and thermochemical energy storage

In-depth analysis of TES applications, such as concentrated solar power, industrial process heat, district heating and cooling, residential and commercial buildings, and long-duration energy storage

Market size and growth projections for the global TES market, segmented by technology, application, and region, from 2024 to 2045

Detailed value chain analysis, identifying key players and their roles in the TES market

Competitive landscape assessment, featuring profiles of leading TES companies and their product offerings, strategic initiatives, and market positioning. Companies profiled include 1414 Degrees, Alumina Energy, Antora, Bedrock Energy, Build to Zero, Cartesian, Echogen, Electrified Thermal Solutions, EnergyNest, Fourth Power, Harvest Thermal, Heliogen, Highview Power, Hyme Energy, Kraftblock, Kyoto Group, Lumenion, MGA Thermal, Polar Night Energy, Rondo Energy, and Sunamp.

Discussion of key market drivers, opportunities, and challenges, including the decarbonization of the power and industrial sectors, integration of renewable energy sources, and supportive government policies and regulations

Analysis of regional TES markets, including North America, Europe, Asia-Pacific, and the Rest of the World, highlighting key projects, installations, and market trends

Identification of emerging trends and opportunities in the TES market, such as advancements in materials science, modular and scalable system designs, and the growing focus on long-duration energy storage

Strategic insights and recommendations for stakeholders across the TES value chain, including technology providers, project developers, utilities, industrial end-users, investors, and policymakers

The Global Market for Thermal Energy Storage (TES) 2024-2045 is an essential

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resource for anyone seeking to understand the current state and future potential of the TES market. With its comprehensive coverage, in-depth analysis, and strategic insights, this report provides a solid foundation for making informed decisions and developing effective strategies in the dynamic and rapidly evolving TES industry.

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Ultracold ULT25NEU portable freezer.
Figure 33. HI-FLOW Phase Change Materials.

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