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Long-Duration Thermal Energy Storage Market Forecasts to 2034 – Global Analysis By Storage Type (Sensible Heat Storage, Latent Heat Storage and Thermochemical Storage), Storage Material, Technology, Duration, Application, End User and Geography

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Abstracts

According to Stratistics MRC, the Global Long-Duration Thermal Energy Storage Market is accounted for $3.5 billion in 2026 and is expected to reach $8.7 billion by 2034 growing at a CAGR of 12% during the forecast period. Long?duration thermal energy storage systems capture and store heat for extended periods, enabling reliable energy supply when renewable generation is intermittent. They use materials like molten salts, phase?change substances, or solid media to retain thermal energy. Stored heat can later be converted into electricity or used directly for industrial processes. These systems support grid stability, decarbonization, and cost?effective energy management. Their long discharge duration makes them suitable for balancing seasonal demand and integrating large?scale renewable energy sources into power systems.

Market Dynamics:

Driver:

Need for renewable energy storage

The market is driven by the growing need to balance intermittent renewable energy generation with reliable supply. Long-duration thermal energy storage enables multi-hour, daily, and seasonal energy shifting, supporting higher penetration of wind and

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solar power. Fueled by grid decarbonization targets and renewable portfolio standards, utilities increasingly adopt thermal storage to enhance grid resilience. Its ability to deliver dispatchable energy over extended durations strengthens system stability and reduces curtailment risks.

Restraint:

Infrastructure and site constraints

Market growth is restrained by infrastructure intensity and site-specific deployment challenges. Large-scale thermal storage systems require substantial physical space, customized engineering, and specialized materials. High upfront capital expenditure and lengthy permitting processes further constrain adoption. These limitations are particularly pronounced in densely populated regions and urban grids. As a result, project development timelines are extended, slowing commercial scalability despite favorable long-term economics.

Opportunity:

Industrial heat decarbonization

Industrial heat decarbonization presents a significant growth opportunity for long-duration thermal energy storage. The technology enables low-carbon heat supply for energy-intensive industries such as steel, cement, chemicals, and food processing. By replacing fossil-fuel-based boilers, thermal storage supports emissions reduction mandates and net-zero strategies. Spurred by carbon pricing mechanisms and industrial sustainability initiatives, demand for high-temperature thermal storage solutions is expected to expand rapidly.

Threat:

Competition from battery storage

The market faces increasing competition from rapidly advancing battery energy storage technologies. Continuous cost reductions, improving energy density, and shorter deployment cycles make batteries attractive for utilities and grid operators. As battery systems extend toward longer discharge durations, they challenge the economic positioning of thermal storage. Without clear differentiation in lifecycle cost, scalability, or industrial heat applications, thermal energy storage solutions risk slower adoption in

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power-focused markets.

Covid-19 Impact:

The COVID-19 pandemic exerted a mixed impact on the long-duration thermal energy storage market, characterized by short-term disruptions and long-term structural benefits. Supply chain interruptions, delayed infrastructure projects, and constrained capital investments temporarily slowed market momentum during the early phases of the pandemic. However, the crisis accelerated policy emphasis on energy resilience, grid stability, and renewable integration. Post-pandemic recovery strategies increasingly prioritized clean energy storage solutions, reinforcing the strategic relevance of long-duration thermal systems in decarbonized power networks and industrial energy management.

The sensible heat storage segment is expected to be the largest during the forecast period

The sensible heat storage segment is expected to account for the largest market share during the forecast period due to its technological maturity and cost-effectiveness. This storage method benefits from simple system design, high operational reliability, and compatibility with a wide range of heat transfer media such as molten salts and solids. Extensive deployment in concentrated solar power plants and industrial heat recovery applications has strengthened its commercial adoption. Lower capital intensity compared to alternative storage technologies further supports its dominance across utility-scale installations.

The metal alloys segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the metal alloys segment is predicted to witness the highest growth rate, driven by its superior thermal conductivity and high energy density characteristics. These materials enable compact system designs and efficient heat retention over extended durations, making them attractive for next-generation storage solutions. Ongoing material innovation and declining production costs are improving commercial viability. Increasing interest in high-temperature industrial applications and advanced power generation systems is expected to accelerate adoption, positioning metal alloys as a high-growth segment.

Region with largest share:

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During the forecast period, the North America region is expected to hold the largest market share. Strong policy support for renewable energy deployment, grid modernization initiatives, and decarbonization targets has created a favorable investment environment. The region benefits from early adoption of thermal storage technologies, robust R&D ecosystems, and the presence of leading energy technology providers. Additionally, increasing deployment of concentrated solar power and industrial thermal storage projects reinforces North America's leadership position.

Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR. Growing electricity demand, coupled with grid stability challenges, has intensified the need for long-duration energy storage solutions. Governments across the region are implementing supportive policies and large-scale infrastructure investments aimed at clean energy transition. Rising manufacturing activity and increasing adoption of thermal storage in industrial heat applications are further contributing to accelerated regional market growth.

Key players in the market

Some of the key players in Long-Duration Thermal Energy Storage Market include Malakoff Corporation, Siemens Energy, ABB Ltd., GE Vernova, Vattenfall, E.ON SE, ENGIE, Hitachi Energy, RWE AG, Ormat Technologies, Mitsubishi Power, Thermal Energy Storage Inc., Energi Danmark, Danfoss, and Honeywell International.

Key Developments:

In February 2026, Hitachi announced expanded HMAX grid solutions and a $1B investment in U.S. manufacturing for critical grid infrastructure, reinforcing its role in advanced storage integration.

In January 2026, ENGIE secured its first hybrid solar-plus-storage project in India, combining 200 MW solar PV with 100 MW/600 MWh battery storage, enabling 6-hour renewable supply.

In January 2026, Ormat co-led a Series B investment in Sage Geosystems to advance next-generation geothermal storage. In 2025, Ormat reported 108% YoY growth in its energy storage segment, driven by hybrid solar-plus-storage projects.

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Storage Types Covered:

- Sensible Heat Storage
- Latent Heat Storage
- Thermochemical Storage

Storage Materials Covered:

- Molten Salts
- Phase Change Materials (PCMs)
- Ceramics & Concrete
- Metal Alloys

Technologies Covered:

- Concentrated Solar Power (CSP) Storage
- Cryogenic Thermal Storage
- Electric-to-Heat Storage
- Heat-to-Power Systems

Durations Covered:

- 8–24 Hours
- 24–72 Hours
- More than 72 Hours

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Applications Covered:

- Renewable Power Integration
- District Heating & Cooling
- Industrial Process Heat
- Grid Load Balancing

End Users Covered:

- Utilities
- Industrial Manufacturing
- Commercial Infrastructure
- District Energy Operators

Regions Covered:

- North America
  - United States
  - Canada
  - Mexico
- Europe
  - United Kingdom
  - Germany

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- France
- Italy
- Spain
- Netherlands
- Belgium
- Sweden
- Switzerland
- Poland
- Rest of Europe

Asia Pacific

- China
- Japan
- India
- South Korea
- Australia
- Indonesia
- Thailand
- Malaysia
- Singapore

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- Vietnam
- Rest of Asia Pacific

South America

- Brazil
- Argentina
- Colombia
- Chile
- Peru
- Rest of South America

Rest of the World (RoW)

- Middle East
  - Saudi Arabia
  - United Arab Emirates
  - Qatar
  - Israel
  - Rest of Middle East
- Africa
  - South Africa
  - Egypt
  - Morocco

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Rest of 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 2023, 2024, 2025, 2026, 2027, 2028, 2030, 2032 and 2034
- 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)

Competitive Benchmarking

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

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Note: Tables for North America, Europe, APAC, South America, and Rest of the World (RoW) Regions are also represented in the same manner as above.

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