

Energy Storage Power Electronics Cooling Market Forecasts to 2034 – Global Analysis By Cooling Type (Solution Type and Cooling Medium), Component, System Configuration, Technology, Application, End User and By Geography

<https://marketpublishers.com/r/E31D108ED100EN.html>

Date: February 2026

Pages: 200

Price: US\$ 4,150.00 (Single User License)

ID: E31D108ED100EN

Abstracts

According to Statistics MRC, the Global Energy Storage Power Electronics Cooling Market is accounted for \$2.3 billion in 2026 and is expected to reach \$6.3 billion by 2034 growing at a CAGR of 13.4% during the forecast period. Energy Storage Power Electronics Cooling encompasses thermal management systems designed to regulate heat in batteries, inverters, and converters used in energy storage applications. Efficient cooling ensures optimal performance, prevents overheating, and extends equipment lifespan. Techniques include liquid cooling, phase?change materials, and advanced heat sinks. By maintaining safe operating temperatures, these solutions improve energy efficiency, reliability, and safety in large?scale storage facilities, electric vehicles, and renewable integration projects, enabling stable grid operation and supporting the transition to clean energy.

Market Dynamics:

Driver:

Rising energy storage system deployments

Growth in the Energy Storage Power Electronics Cooling Market has been driven by expanding deployments of battery energy storage systems across grid-scale, commercial, and industrial applications. As storage installations scale in capacity and density, effective thermal management has become critical to performance and safety.

Demand momentum has been reinforced by renewable energy integration and frequency regulation requirements. Cooling solutions have increasingly been embedded as core system components rather than auxiliary add-ons within modern energy storage architectures.

Restraint:

Thermal management technology complexity

Technological complexity associated with advanced thermal management systems has restrained market expansion to some extent. Integration challenges, design customization requirements, and compatibility issues across diverse power electronics platforms have increased engineering burdens. High-performance cooling solutions often demand specialized materials and precise thermal modeling, raising development costs. Smaller system integrators face barriers in adopting sophisticated cooling architectures, which can delay commercialization timelines despite strong underlying demand drivers.

Opportunity:

Efficient cooling system innovations

Innovations in liquid cooling, phase-change materials, and advanced heat dissipation technologies have opened new growth avenues. Market participants have increasingly focused on efficiency optimization to extend component lifespan and enhance energy density. Cooling system advancements have been propelled by the need to support higher power loads while minimizing footprint. As energy storage systems evolve toward higher performance thresholds, cooling innovation remains a critical differentiator enabling next-generation deployment scalability.

Threat:

Rapid component degradation risks

Rapid degradation of power electronics components due to thermal stress presents a persistent threat to market stability. Inadequate cooling performance can accelerate failure rates, reduce system reliability, and increase warranty liabilities. Environmental factors such as ambient temperature fluctuations further exacerbate thermal risks. Despite technological progress, ensuring long-term cooling efficiency across diverse

operating conditions remains a challenge that can influence buyer confidence and system lifecycle economics.

Covid-19 Impact:

The COVID-19 pandemic disrupted manufacturing schedules and delayed energy storage project timelines, temporarily affecting cooling system demand. Supply chain constraints impacted availability of specialized materials and components. However, post-pandemic recovery phases saw accelerated investment in grid-scale storage as utilities prioritized energy security. Cooling solutions benefited indirectly from renewed storage deployment momentum, reinforcing long-term market recovery and growth trajectories.

The solution type segment is expected to be the largest during the forecast period

The solution type segment is expected to account for the largest market share during the forecast period, resulting from its comprehensive role in addressing system-wide thermal requirements. Integrated cooling solutions offering modular design and scalability were widely adopted across storage applications. System integrators favored solution-based offerings that reduced engineering complexity and ensured compliance with safety standards. Demand strength was supported by standardized performance benchmarks and compatibility across diverse power electronics platforms.

The cooling plates & cold plates segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the cooling plates & cold plates segment is predicted to witness the highest growth rate, propelled by their superior heat transfer efficiency and compact design. These components enable direct thermal contact with power modules, enhancing cooling performance under high load conditions. Adoption has expanded across high-density energy storage configurations where air cooling proves insufficient. Technological refinements and material innovations have further improved cost efficiency, accelerating penetration across both stationary and mobile storage systems.

Region with largest share:

During the forecast period, the Asia Pacific region is expected to hold the largest market share, attributed to large-scale energy storage installations supporting renewable integration and grid stability initiatives. Strong manufacturing ecosystems, particularly in

China, Japan, and South Korea, supported rapid adoption of advanced cooling solutions. Regional focus on energy transition infrastructure and industrial energy storage deployments reinforced demand. Competitive pricing and high-volume production capabilities further strengthened the region's market leadership.

Region with highest CAGR:

Over the forecast period, the North America region is anticipated to exhibit the highest CAGR associated with accelerating grid-scale battery projects and stringent safety regulations. Utilities and developers have emphasized advanced cooling technologies to ensure system reliability and regulatory compliance. Federal incentives for energy storage deployment have further stimulated demand. The region's focus on high-performance storage applications has driven adoption of premium cooling solutions, supporting robust growth momentum.

Key players in the market

Some of the key players in Energy Storage Power Electronics Cooling Market include Danfoss A/S, Schneider Electric SE, ABB Ltd, Siemens AG, Boyd Corporation, Aavid Thermalloy (Boyd), Mahle GmbH, Hanbell Precise Machinery Co., Ltd., Laird Thermal Systems, Sanhua Holding Group, Mitsubishi Electric Corporation, Vertiv Group Corp., Rittal GmbH & Co. KG, Johnson Controls International plc, and Parker Hannifin Corporation.

Key Developments:

In November 2025, Eaton Corporation plc signed a definitive agreement to acquire the Boyd Thermal business from Boyd Corporation for approximately \$9.5 billion, significantly expanding its liquid cooling and thermal management technology offerings that support high-performance data centers and energy storage systems.

In November 2025, Vertiv Group Corp. announced plans to acquire PurgeRite Intermediate for about \$1 billion, extending its liquid cooling and HVAC services portfolio tailored for data centers and industrial applications; this strategic move enhances Vertiv's capacity to deliver comprehensive thermal management solutions that improve uptime and efficiency for energy-intensive power electronics and storage cooling deployments.

In November 2025, Danfoss A/S showcased its latest high-performance HVAC and

liquid cooling components and fluid conveyance technologies at SuperComputing?2025 in St. Louis, emphasizing energy-efficient cooling solutions, leak-tested coolant distribution, and smart valve train systems for data centers and energy storage environments.

Cooling Types Covered:

- Solution Type
- Cooling Medium

Components Covered:

- Heat Exchangers
- Cooling Plates & Cold Plates
- Pumps & Fluid Circulation Units
- Fans & Blowers
- Sensors & Monitoring Devices

System Configurations Covered:

- Passive Cooling Systems
- Active Cooling Systems
- Closed-Loop Cooling Systems
- Open-Loop Cooling Systems

Technologies Covered:

- Advanced Thermal Management Technologies
- AI-Enabled Thermal Monitoring

- Digital Thermal Modeling & Simulation
- Smart Cooling Control Technologies

Applications Covered:

- Battery Energy Storage Systems (BESS)
- Power Conversion Systems
- Grid-Scale Energy Storage
- Renewable Energy Integration
- Data Centers & Critical Infrastructure

End Users Covered:

- Utilities & Grid Operators
- Renewable Energy Developers
- Energy Storage System Integrators
- Industrial & Commercial Facilities
- Data Center Operators

Regions Covered:

- North America
 - o US
 - o Canada
 - o Mexico
- Europe

- o Germany
- o UK
- o Italy
- o France
- o Spain
- o Rest of Europe
- Asia Pacific
 - o Japan
 - o China
 - o India
 - o Australia
 - o New Zealand
 - o South Korea
 - o Rest of Asia Pacific
- South America
 - o Argentina
 - o Brazil
 - o Chile
 - o Rest of South America

- Middle East & Africa

- o Saudi Arabia

- o UAE

- o Qatar

- o South Africa

- o 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 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

- o Comprehensive profiling of additional market players (up to 3)

- o SWOT Analysis of key players (up to 3)

- Regional Segmentation

- o Market estimations, Forecasts and CAGR of any prominent country as per the client's

interest (Note: Depends on feasibility check)

- Competitive Benchmarking

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

Contents

1 EXECUTIVE SUMMARY

2 PREFACE

- 2.1 Abstract
- 2.2 Stake Holders
- 2.3 Research Scope
- 2.4 Research Methodology
 - 2.4.1 Data Mining
 - 2.4.2 Data Analysis
 - 2.4.3 Data Validation
 - 2.4.4 Research Approach
- 2.5 Research Sources
 - 2.5.1 Primary Research Sources
 - 2.5.2 Secondary Research Sources
 - 2.5.3 Assumptions

3 MARKET TREND ANALYSIS

- 3.1 Introduction
- 3.2 Drivers
- 3.3 Restraints
- 3.4 Opportunities
- 3.5 Threats
- 3.6 Technology Analysis
- 3.7 Application Analysis
- 3.8 End User Analysis
- 3.9 Emerging Markets
- 3.10 Impact of Covid-19

4 PORTERS FIVE FORCE ANALYSIS

- 4.1 Bargaining power of suppliers
- 4.2 Bargaining power of buyers
- 4.3 Threat of substitutes
- 4.4 Threat of new entrants
- 4.5 Competitive rivalry

5 GLOBAL ENERGY STORAGE POWER ELECTRONICS COOLING MARKET, BY COOLING TYPE

- 5.1 Introduction
- 5.2 Solution Type
 - 5.2.1 Air Cooling Systems
 - 5.2.2 Liquid Cooling Systems
 - 5.2.3 Immersion Cooling Systems
 - 5.2.4 Hybrid Cooling Solutions
 - 5.2.5 Direct-to-Chip Cooling
 - 5.2.6 Phase-Change Cooling Systems
- 5.3 Cooling Medium
 - 5.3.1 Air-Based Cooling
 - 5.3.2 Water-Based Cooling
 - 5.3.3 Dielectric Fluids
 - 5.3.4 Refrigerant-Based Cooling
 - 5.3.5 Nanofluid Cooling Media

6 GLOBAL ENERGY STORAGE POWER ELECTRONICS COOLING MARKET, BY COMPONENT

- 6.1 Introduction
- 6.2 Heat Exchangers
- 6.3 Cooling Plates & Cold Plates
- 6.4 Pumps & Fluid Circulation Units
- 6.5 Fans & Blowers
- 6.6 Sensors & Monitoring Devices

7 GLOBAL ENERGY STORAGE POWER ELECTRONICS COOLING MARKET, BY SYSTEM CONFIGURATION

- 7.1 Introduction
- 7.2 Passive Cooling Systems
- 7.3 Active Cooling Systems
- 7.4 Closed-Loop Cooling Systems
- 7.5 Open-Loop Cooling Systems

8 GLOBAL ENERGY STORAGE POWER ELECTRONICS COOLING MARKET, BY

TECHNOLOGY

- 8.1 Introduction
- 8.2 Advanced Thermal Management Technologies
- 8.3 AI-Enabled Thermal Monitoring
- 8.4 Digital Thermal Modeling & Simulation
- 8.5 Smart Cooling Control Technologies

9 GLOBAL ENERGY STORAGE POWER ELECTRONICS COOLING MARKET, BY APPLICATION

- 9.1 Introduction
- 9.2 Battery Energy Storage Systems (BESS)
- 9.3 Power Conversion Systems
- 9.4 Grid-Scale Energy Storage
- 9.5 Renewable Energy Integration
- 9.6 Data Centers & Critical Infrastructure

10 GLOBAL ENERGY STORAGE POWER ELECTRONICS COOLING MARKET, BY END USER

- 10.1 Introduction
- 10.2 Utilities & Grid Operators
- 10.3 Renewable Energy Developers
- 10.4 Energy Storage System Integrators
- 10.5 Industrial & Commercial Facilities
- 10.6 Data Center Operators

11 GLOBAL ENERGY STORAGE POWER ELECTRONICS COOLING MARKET, BY GEOGRAPHY

- 11.1 Introduction
- 11.2 North America
 - 11.2.1 US
 - 11.2.2 Canada
 - 11.2.3 Mexico
- 11.3 Europe
 - 11.3.1 Germany
 - 11.3.2 UK

- 11.3.3 Italy
- 11.3.4 France
- 11.3.5 Spain
- 11.3.6 Rest of Europe
- 11.4 Asia Pacific
 - 11.4.1 Japan
 - 11.4.2 China
 - 11.4.3 India
 - 11.4.4 Australia
 - 11.4.5 New Zealand
 - 11.4.6 South Korea
 - 11.4.7 Rest of Asia Pacific
- 11.5 South America
 - 11.5.1 Argentina
 - 11.5.2 Brazil
 - 11.5.3 Chile
 - 11.5.4 Rest of South America
- 11.6 Middle East & Africa
 - 11.6.1 Saudi Arabia
 - 11.6.2 UAE
 - 11.6.3 Qatar
 - 11.6.4 South Africa
 - 11.6.5 Rest of Middle East & Africa

12 KEY DEVELOPMENTS

- 12.1 Agreements, Partnerships, Collaborations and Joint Ventures
- 12.2 Acquisitions & Mergers
- 12.3 New Product Launch
- 12.4 Expansions
- 12.5 Other Key Strategies

13 COMPANY PROFILING

- 13.1 Danfoss A/S
- 13.2 Schneider Electric SE
- 13.3 ABB Ltd
- 13.4 Siemens AG
- 13.5 Boyd Corporation

- 13.6 Aavid Thermalloy (Boyd)
- 13.7 Mahle GmbH
- 13.8 Hanbell Precise Machinery Co., Ltd.
- 13.9 Laird Thermal Systems
- 13.10 Sanhua Holding Group
- 13.11 Mitsubishi Electric Corporation
- 13.12 Vertiv Group Corp.
- 13.13 Rittal GmbH & Co. KG
- 13.14 Johnson Controls International plc
- 13.15 Parker Hannifin Corporation

List Of Tables

LIST OF TABLES

Table 1 Global Energy Storage Power Electronics Cooling Market Outlook, By Region (2025-2034) (\$MN)

Table 2 Global Energy Storage Power Electronics Cooling Market Outlook, By Cooling Type (2025-2034) (\$MN)

Table 3 Global Energy Storage Power Electronics Cooling Market Outlook, By Solution Type (2025-2034) (\$MN)

Table 4 Global Energy Storage Power Electronics Cooling Market Outlook, By Air Cooling Systems (2025-2034) (\$MN)

Table 5 Global Energy Storage Power Electronics Cooling Market Outlook, By Liquid Cooling Systems (2025-2034) (\$MN)

Table 6 Global Energy Storage Power Electronics Cooling Market Outlook, By Immersion Cooling Systems (2025-2034) (\$MN)

Table 7 Global Energy Storage Power Electronics Cooling Market Outlook, By Hybrid Cooling Solutions (2025-2034) (\$MN)

Table 8 Global Energy Storage Power Electronics Cooling Market Outlook, By Direct-to-Chip Cooling (2025-2034) (\$MN)

Table 9 Global Energy Storage Power Electronics Cooling Market Outlook, By Phase-Change Cooling Systems (2025-2034) (\$MN)

Table 10 Global Energy Storage Power Electronics Cooling Market Outlook, By Cooling Medium (2025-2034) (\$MN)

Table 11 Global Energy Storage Power Electronics Cooling Market Outlook, By Air-Based Cooling (2025-2034) (\$MN)

Table 12 Global Energy Storage Power Electronics Cooling Market Outlook, By Water-Based Cooling (2025-2034) (\$MN)

Table 13 Global Energy Storage Power Electronics Cooling Market Outlook, By Dielectric Fluids (2025-2034) (\$MN)

Table 14 Global Energy Storage Power Electronics Cooling Market Outlook, By Refrigerant-Based Cooling (2025-2034) (\$MN)

Table 15 Global Energy Storage Power Electronics Cooling Market Outlook, By Nanofluid Cooling Media (2025-2034) (\$MN)

Table 16 Global Energy Storage Power Electronics Cooling Market Outlook, By Component (2025-2034) (\$MN)

Table 17 Global Energy Storage Power Electronics Cooling Market Outlook, By Heat Exchangers (2025-2034) (\$MN)

Table 18 Global Energy Storage Power Electronics Cooling Market Outlook, By Cooling

Plates & Cold Plates (2025-2034) (\$MN)

Table 19 Global Energy Storage Power Electronics Cooling Market Outlook, By Pumps & Fluid Circulation Units (2025-2034) (\$MN)

Table 20 Global Energy Storage Power Electronics Cooling Market Outlook, By Fans & Blowers (2025-2034) (\$MN)

Table 21 Global Energy Storage Power Electronics Cooling Market Outlook, By Sensors & Monitoring Devices (2025-2034) (\$MN)

Table 22 Global Energy Storage Power Electronics Cooling Market Outlook, By System Configuration (2025-2034) (\$MN)

Table 23 Global Energy Storage Power Electronics Cooling Market Outlook, By Passive Cooling Systems (2025-2034) (\$MN)

Table 24 Global Energy Storage Power Electronics Cooling Market Outlook, By Active Cooling Systems (2025-2034) (\$MN)

Table 25 Global Energy Storage Power Electronics Cooling Market Outlook, By Closed-Loop Cooling Systems (2025-2034) (\$MN)

Table 26 Global Energy Storage Power Electronics Cooling Market Outlook, By Open-Loop Cooling Systems (2025-2034) (\$MN)

Table 27 Global Energy Storage Power Electronics Cooling Market Outlook, By Technology (2025-2034) (\$MN)

Table 28 Global Energy Storage Power Electronics Cooling Market Outlook, By Advanced Thermal Management Technologies (2025-2034) (\$MN)

Table 29 Global Energy Storage Power Electronics Cooling Market Outlook, By AI-Enabled Thermal Monitoring (2025-2034) (\$MN)

Table 30 Global Energy Storage Power Electronics Cooling Market Outlook, By Digital Thermal Modeling & Simulation (2025-2034) (\$MN)

Table 31 Global Energy Storage Power Electronics Cooling Market Outlook, By Smart Cooling Control Technologies (2025-2034) (\$MN)

Table 32 Global Energy Storage Power Electronics Cooling Market Outlook, By Application (2025-2034) (\$MN)

Table 33 Global Energy Storage Power Electronics Cooling Market Outlook, By Battery Energy Storage Systems (BESS) (2025-2034) (\$MN)

Table 34 Global Energy Storage Power Electronics Cooling Market Outlook, By Power Conversion Systems (2025-2034) (\$MN)

Table 35 Global Energy Storage Power Electronics Cooling Market Outlook, By Grid-Scale Energy Storage (2025-2034) (\$MN)

Table 36 Global Energy Storage Power Electronics Cooling Market Outlook, By Renewable Energy Integration (2025-2034) (\$MN)

Table 37 Global Energy Storage Power Electronics Cooling Market Outlook, By Data Centers & Critical Infrastructure (2025-2034) (\$MN)

Table 38 Global Energy Storage Power Electronics Cooling Market Outlook, By End User (2025-2034) (\$MN)

Table 39 Global Energy Storage Power Electronics Cooling Market Outlook, By Utilities & Grid Operators (2025-2034) (\$MN)

Table 40 Global Energy Storage Power Electronics Cooling Market Outlook, By Renewable Energy Developers (2025-2034) (\$MN)

Table 41 Global Energy Storage Power Electronics Cooling Market Outlook, By Energy Storage System Integrators (2025-2034) (\$MN)

Table 42 Global Energy Storage Power Electronics Cooling Market Outlook, By Industrial & Commercial Facilities (2025-2034) (\$MN)

Table 43 Global Energy Storage Power Electronics Cooling Market Outlook, By Data Center Operators (2025-2034) (\$MN)

Note: Tables for North America, Europe, APAC, South America, and Middle East & Africa Regions are also represented in the same manner as above.

I would like to order

Product name: Energy Storage Power Electronics Cooling Market Forecasts to 2034 – Global Analysis
By Cooling Type (Solution Type and Cooling Medium), Component, System
Configuration, Technology, Application, End User and By Geography

Product link: <https://marketpublishers.com/r/E31D108ED100EN.html>

Price: US\$ 4,150.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer
Service:

info@marketpublishers.com

Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click
button on product page <https://marketpublishers.com/r/E31D108ED100EN.html>