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Pumped Hydro Storage Market Forecasts to 2032 – Global Analysis By Type (Open-loop, and Closed-loop), Capacity (Small-Scale (Less than 100 MW), Medium-Scale (100 MW to 500 MW), and Large-Scale (More than 500 MW)), Application, End User, and By Geography

https://marketpublishers.com/r/PCDE21BE6718EN.html
Date: December 2025
Pages: 200
Price: US$ 4,150.00 (Single User License)
ID: PCDE21BE6718EN

Abstracts

According to Stratistics MRC, the Global Pumped Hydro Storage Market is accounted for $59.0 billion in 2025 and is expected to reach $144.2 billion by 2032, growing at a CAGR of 13.6% during the forecast period. The pumped hydro storage covers large-scale facilities that pump water to an upper reservoir when electricity is abundant and release it through turbines to generate power during peak demand. It involves site development, civil works, turbines, generators, and grid integration. Benefits include long-duration, cost-effective energy storage, grid stability, frequency regulation, and support for high shares of intermittent renewables by balancing supply and demand over hours or days.

According to the IEA and hydropower authorities, pumped-storage hydropower (PSH) is the world’s largest utility-scale storage technology with roughly 160–200 GW of installed capacity globally.

Market Dynamics:

Driver:

Government Support & Policies

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Through substantial financial incentives, renewable energy mandates, and long-term revenue stabilization mechanisms, policymakers are de-risking investments and creating a favorable economic landscape. Furthermore, national strategies targeting grid stability and energy security are explicitly prioritizing PHS as a cornerstone for integrating intermittent renewables like wind and solar. This top-down support is crucial for unlocking the massive capital required and ensuring the technology's central role in the energy transition, directly accelerating market development and project commissioning globally.

Restraint:

High Capital Cost & Long Lead Times

The significant upfront investment and protracted development cycles for PHS projects present a major barrier to market growth. These projects require extensive civil works, specialized equipment, and lengthy environmental approvals, often spanning over a decade from planning to operation. Such a capital-intensive and time-consuming process deters private investment, especially when compared to faster-deploying alternatives like battery storage. Consequently, this high barrier to entry limits the number of new projects initiated, restraining the overall pace of market expansion despite the clear long-term need for the technology.

Opportunity:

Modernization of Existing Dams

Retrofitting non-powered dams with PHS capabilities presents a significant opportunity for market growth. This approach bypasses many of the traditional restraints by utilizing existing infrastructure and pre-approved water rights, dramatically reducing both capital costs and development lead times. Moreover, it offers a path to add significant grid-scale storage capacity with a lower environmental footprint than greenfield projects. This opportunity allows for a more efficient expansion of energy storage assets, providing a compelling and cost-effective strategy for utilities and governments to bolster grid resilience.

Threat:

Climate Change Impacts

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Intensified droughts can drastically reduce water reservoir levels, crippling a plant's ability to generate power when it is most needed. Conversely, extreme flooding events can damage critical infrastructure and threaten dam safety. These climate vulnerabilities introduce significant operational uncertainty and financial risk, potentially undermining the long-term business case for new investments and challenging the perceived role of PHS as an unwavering bedrock of grid reliability.

Covid-19 Impact:

The pandemic severely disrupted the pumped hydro storage market, causing extensive delays in project timelines. Nationwide lockdowns and social distancing mandates halted construction activity and disrupted complex global supply chains for critical components like turbines and transformers. This led to significant cost overruns and postponed commissioning dates for major projects worldwide. However, the crisis also underscored the indispensable value of long-duration energy storage for grid resilience, leading to a renewed governmental focus on PHS in economic recovery packages as a strategic infrastructure asset.

The open-loop segment is expected to be the largest during the forecast period

The open-loop segment is expected to account for the largest market share during the forecast period due to its superior energy generation capacity and generally lower specific cost per megawatt compared to closed-loop systems. These projects, often connected to naturally flowing rivers or existing reservoirs, benefit from existing hydrological studies and can leverage pre-existing water bodies, which simplifies planning and reduces initial capital outlay. Their proven technology and ability to provide massive, gigawatt-scale storage make them the preferred solution for large-scale grid stabilization and integrating utility-scale renewable energy farms, securing their leading market position.

The small-scale (Less than 100 MW) segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the small-scale (less than 100 MW) segment is predicted to witness the highest growth rate due to its flexibility and reduced financial and environmental hurdles. These projects require a smaller land footprint, face less stringent regulatory scrutiny, and have significantly shorter development cycles, making them attractive for private investment and for addressing localized grid constraints. Additionally, they are ideal for servicing remote microgrids, enhancing grid stability in

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specific regions, and supporting the integration of distributed renewable resources, a market niche that is expanding quickly and driving high growth rates.

Region with largest share:

During the forecast period, the Asia Pacific region is expected to hold the largest market share, anchored by massive investments in China and India, where national energy security policies and ambitious renewable energy targets are driving the development of colossal PHS projects. The region's rapid economic growth, escalating electricity demand, and urgent need to manage the intermittency of its vast new wind and solar capacity create an unparalleled demand for bulk energy storage, solidifying Asia Pacific's position as the global PHS market leader for the foreseeable future.

Region with highest CAGR:

During the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR, fueled by the ongoing rollout of ambitious government plans and supportive policies across emerging economies. Countries like India, Australia, and several in Southeast Asia are in the early to mid-stages of their PHS development cycles, leading to a flurry of new project announcements and construction starts. This represents a wave of new capacity additions that will drive a growth rate exceeding that of more mature markets, which have a larger established base.

Key players in the market

Some of the key players in Pumped Hydro Storage Market include Voith GmbH & Co. KGaA, ANDRITZ AG, Siemens AG, General Electric Company, Enel SpA, Electricit? de France SA, Iberdrola SA, NextEra Energy, Inc., Duke Energy Corporation, Mitsubishi Heavy Industries, Ltd., Toshiba Energy Systems & Solutions Corporation, China Three Gorges Corporation, Power Construction Corporation of China, PJSC RusHydro, Engie SA, Black & Veatch Corporation, Fluor Corporation, Sinohydro Corporation Limited, Tata Power Company Limited, and Genex Power Limited.

Key Developments:

In September 2025, International technology group ANDRITZ has received an order from Adani Green Energy Limited (AGEL), India’s largest renewable energy company and a leading global player, to equip the new Gandikota pumped storage plant in the YSR Kadapa district of Andhra Pradesh, India.

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In September 2025, ANDRITZ announced an order to supply reversible pump-turbines, motor-generators and related electromechanical equipment for the new Gandikota pumped storage plant in Andhra Pradesh.

In April 2023, Voith Hydro wins order to expand Kruonis pumped storage plant in Lithuania. To offset the volatility of these energy sources, the partially state-owned Ignitis Group company Ignitis Gamyba is investing around EUR 150 million in the expansion of the Kruonis pumped storage hydropower facility, where an additional, fifth unit will be installed.

Types Covered:

- Open-loop
- Closed-loop

Capacities Covered:

- Small-Scale (Less than 100 MW)
- Medium-Scale (100 MW to 500 MW)
- Large-Scale (More than 500 MW)

Applications Covered:

- Energy Balancing
- Frequency Regulation
- Seasonal Storage
- Renewable Capacity Firming
- Black Start Services

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Other Applications

End Users Covered:

Utilities and Independent Power Producers (IPPs)

System Operators

Regions Covered:

North America

US

Canada

Mexico

Europe

Germany

UK

Italy

France

Spain

Rest of Europe

Asia Pacific

Japan

China

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India

Australia

New Zealand

South Korea

Rest of Asia Pacific

South America

Argentina

Brazil

Chile

Rest of South America

Middle East & Africa

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

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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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Africa Regions are also represented in the same manner as above.

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