North America Pumped Hydro Storage - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts (2025 - 2030)

Market Report | 2025-04-28 | 110 pages | Mordor Intelligence

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Report description:

The North America Pumped Hydro Storage Market is expected to register a CAGR of 4.2% during the forecast period.

The market was negatively impacted by the COVID-19 pandemic in 2020. Presently, the market has reached pre-pandemic levels.

Key Highlights
- Over the long term, various factors, such as the integration of variable renewable energy sources and ensuring grid stability, are expected to drive the pumped hydro storage (PHS) market during the forecast period.
- On the other hand, the environmental and social impacts of PHS projects, coupled with increasing competition from other energy storage technologies, are expected to restrain the market studied during the forecast period.
- Nevertheless, several novel PSH technologies are currently under development in the United States and Canada, which are expected to increase the development and deployment of PSH technology for energy storage while reducing costs and environmental impacts in the future, thus creating several opportunities for the market during the forecast period.
- The United States is expected to dominate the market due to growing pumped hydro storage projects across the country.

North America Pumped Hydro Storage Market Trends

Closed-loop Segment Expected to Dominate the Market

- In closed-loop systems, pumped hydro storage plants are created, in which one/both the reservoirs are artificially built, and no

natural inflows of water are involved with either reservoir. The only way to store a substantial amount of energy is by locating a large body of water near the second body of water but as high above as possible. In some places, this happens naturally. In others, one or both water bodies are artificial. The moderately low energy density of pumped storage systems entails either large differences in height or large flows between reservoirs.
- Closed-loop pumped hydro storage offers high flexibility, reliability, and high-power output. Since the closed-loop pumped-hydro systems are not connected to existing river systems, their impact on the environment is less compared to open-loop pumped hydro storage systems. Moreover, they can be located where support to the grid is required and therefore do not need to be positioned near an existing river.
- As of 2021, the pumped hydro storage capacity of the United States reached around 21.912 GW, which is growing compared with recent years. According to a study published by scientists from the US Department of Energy's Pacific Northwest National Laboratory (PNNL) in 2021, the number of preliminary permits and licensing applications for closed-loop systems has considerably increased in recent years.
- Furthermore, in June 2022, the US Department of Energy's Water Power Technologies Office researched and stated that thousands of locations across the country are suitable for closed-loop pumped storage hydropower. The closed-loop pumped storage hydropower resource assessment for the United States is a large-scale study to identify closed-loop PSH sites and an important reference for developers and stakeholders. The study used spatial mapping at 30-meter resolution and identified nearly 15,000 sites where this PSH technology can be best deployed in the future.
- Owing to the above points and recent developments, the closed loop segment is expected to dominate the market during the forecast period.

United States to Dominate the Market

- The United States is the largest user of hydropower in the region and a considerable user of modern water energy storage systems like pumped hydro storage. The government is pushing to increase the installed hydro capacity of the country.
- Pumped-storage hydroelectric systems generally use more electricity to pump water to upper water storage reservoirs than they produce with stored water. In 2021, the top five states in the United States with respect to pumped-storage hydroelectricity net summer generation capacity were California, Virginia, South Carolina, Michigan, and Georgia.
- Going forward, in May 2022, the Federal Energy Regulatory Commission reported 27 licensed pumped storage projects with a total installed capacity of nearly 18.9 GW. Of these, 24 are in operation with a total capacity of about 16.5 GW. Furtherly, FERC has issued licenses for three proposed pumped storage projects since the beginning of 2014. The remaining pumped storage plants are federally owned facilities, like the Tennessee Valley Authority's Raccoon Mountain plant, and several operated by the US Army Corps of Engineers.
- Furthermore, in October 2022, the US Department of Energy's Water Power Technologies Office announced an opportunity for power developers and other stakeholders to receive technical assistance to advance hydropower's role on the electric grid through the Hydropower and Water Innovation for a Resilient Electricity System (HydroWIRES) initiative. The technical assistance opportunity aims to provide the developers and stakeholders with national lab expertise and capabilities to address valuation hurdles in pumped hydro storage project development.
- Owing to the above points, the United States is expected to dominate the pumped hydro storage market during the forecast period.

North America Pumped Hydro Storage Industry Overview

The North American pumped hydro storage market is moderately fragmented. Some of the key players in the market (in no particular order) include General Electric Company, Siemens AG, Enel SpA, Duke Energy Corporation, and Voith GmbH & Co.

KGaA, among others.

Additional Benefits:

- The market estimate (ME) sheet in Excel format
- 3 months of analyst support

Table of Contents:

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