

Pumped Hydro Storage Market - Growth, Trends, Covid-19 Impact, and Forecasts (2023 - 2028)

Market Report | 2023-01-23 | 164 pages | Mordor Intelligence

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Report description:

The pumped hydro storage market installations totaled 159.49 GW in 2020, and it is anticipated to reach 235.07 GW by 2027, recording a CAGR of 5.87% during 2022-2027. The COVID-19 pandemic negatively impacted the global pumped hydro storage market due to disruptions in the international supply chain and a reduction in investments for upcoming projects. In addition, there have been delays in many pumped hydro storage projects (PHS) across the world due to many factors, including lockdown restrictions, unavailability of manpower, and others. The integration of variable renewable energy sources and ensuring grid stability are expected to drive the PHS market during the forecast period. Furthermore, increasing government targets to phase out fossil fuels is likely to aid the market's growth during the forecast period. However, the environmental and social impacts of PHS projects, coupled with increasing competition from other energy storage technologies, are expected to impact the market studied during the forecast period.

? Closed-loop pumped hydro storage power units are expected to lead the market during the forecast period, owing to their advantages over open-loop units and many under-construction projects, which are expected to be completed over the forecast period.

? Several novel PSH technologies are currently under development, which is 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. Further, as per the International Hydropower Association, nearly 240 GW of PSH projects are likely to come online by 2030.

? Asia-Pacific is the largest market for pumped hydro storage, owing to having achieved the highest annual increase in capacity in 2020, continuing the growth trajectory, majorly driven by China.

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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 relatively 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 man-made. 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.

? Over the coming years, closed-loop systems are likely to witness significant growth because of greater certainty in gaining an operating license or permits since they do not interfere with the existing river systems or any water streams. As per the Pacific Northwest National Laboratory (PNNL) under the US Department of Energy (DOE), the number of licensing applications and preliminary permits for closed-loop pumped hydro storage systems has significantly increased in recent years.

? The growing implementation of closed-loop pumped hydro storage projects in countries like the US can institute a favorable business scenario for developers to expand their market presence.

? For instance, Absaroka Energy LLC, a Montana-based renewable energy company, is developing the Gordon Butte closed-loop pumped hydro storage project located in Montana. The project was licensed in 2016, and the construction was set to start in July 2020 but was extended due to the COVID-19 pandemic. As per the Department of Energy (DOE), a new deadline for beginning construction is December 2022. Once commissioned, the project will have an installed capacity of 400 MW, and the estimated average annual energy is likely to reach 1300 GWh. This project might provide ancillary capabilities to Montana's evolving renewable energy market and offer multiple services to provide longevity, reliability, and stability to the existing grid infrastructure.

? Therefore, owing to the above points, the close-loop segment is expected to dominate the market during the forecast period.

Asia-Pacific Expected to Dominate the Market

? According to the International Hydropower Association, as of 2020, Asia-Pacific had around 77.21 GW of hydro storage installed capacity, with China and Japan accounting for the majority share in the region.

? The continued disinvestment from fossil fuels in the Asia-Pacific region has led to the development of renewable energy, hydropower, and pumped hydro storage facilities, especially in China, Japan, the ASEAN region, South Korea, and India.

? Furthermore, China announced its plan to become carbon neutral by 2060 and peak coal consumption by 2025. This led to increased investment in the renewable sector, and in 2020, around 13.76 GW of new hydropower was installed, including 1.2 GW of pumped storage from the last four units of the Jixi project.

? Additionally, the 1.8 GW Jixi Pumped Storage Power Station is the largest pumped hydro storage project with an estimated

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investment of USD 1.61 billion. It was developed by State Grid Xinyuan Company, a subsidiary company of State Grid Corporation of China (SGCC).

? Furthermore, South-East Asia witnessed significant development in the hydropower and pumped hydro storage market. However, many projects were delayed due to persistent lockdowns due to the COVID-19 pandemic. However, the World Bank held a summit to encourage South Asian nations to unlock and invest in sustainable hydropower.

? For instance, in September 2020, General Electric announced that Megha Engineering had selected it to provide and commission four 125 MW fixed speed pumped storage turbines for the Kundah power plant in India, and it is expected to be commissioned in 2023.

? Similarly, Sri Lanka's government is emphasizing pumped hydro storage systems. In 2020, the state-run Ceylon Electricity Board (CEB) was given a project to identify and conduct a feasibility study on pumped storage plants to tide over the time gaps between demand and supply and storage of energy. A preliminary investigation with the Japan International Cooperation fund identified Ma Oya Valley and Wewatenne in Kandy as suitable pump storage unit locations.

? Therefore, owing to the above factors, Asia-Pacific is expected to dominate the pumped hydro storage market during the forecast period.

Pumped Hydro Storage Market Competitor Analysis

The pumped hydro storage market is moderately fragmented. Some of the key players in the market 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

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