

Hydropower Turbines Market to Hit \$5.2 Billion by 2033, Driven by Clean Energy Expansion and Modernization Projects

□□ *Global Hydropower Turbines Market Set for 4.9% CAGR Growth as Demand for Renewable Power Rises Worldwide*

WILMINGTON, DE, UNITED STATES,
October 24, 2025 /EINPresswire.com/ --

According to a new report by Allied Market Research, the global

[hydropower turbines market](#) size was valued at \$3.2 billion in 2023 and is

projected to reach \$5.2 billion by 2033, registering a CAGR of 4.9% from 2024 to 2033.

Hydropower turbines are critical components in hydroelectric power plants, converting the kinetic energy of flowing water into mechanical energy, which is then transformed into electricity.

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The global hydropower turbines market will reach \$5.2 billion by 2033, growing at 4.9% CAGR, driven by renewable energy expansion and modernization.”

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These turbines—such as Francis, Kaplan, Pelton, and Crossflow—play an essential role in generating clean, [renewable energy](#). Their widespread use supports global efforts to reduce carbon emissions and transition away from fossil fuels.



□□ **Market Dynamics: Technological Innovation and Sustainability Driving Growth**

The hydropower turbines market is witnessing strong growth, driven by continuous technological advancements in turbine design and operational efficiency. Modern turbines are engineered for higher energy output, improved reliability, and reduced maintenance costs, making hydropower

projects more economically viable.

Advanced turbine designs now include features that minimize environmental impact, such as fish-friendly blades and sediment management systems. These innovations enhance adaptability to diverse water flow conditions and enable sustainable hydropower expansion across different geographies.

However, the market faces hurdles due to environmental concerns and regulatory challenges. Construction of new hydropower plants often raises ecological and social issues, including habitat disruption and resettlement impacts. Strict regulatory frameworks regarding dam safety, environmental protection, and operational compliance can delay project approvals and increase costs.

Despite these challenges, retrofitting and modernization initiatives for existing hydropower plants present lucrative opportunities. Upgrading older turbines with smart digital systems, automation, and efficiency enhancements helps increase power output without the need for new infrastructure. This approach aligns with global sustainability goals and significantly extends plant lifespans.

□ Market Opportunities: Retrofitting Existing Plants

Retrofitting has emerged as a key strategy for boosting energy efficiency and reducing the environmental footprint of older hydropower plants. Replacing outdated turbines with digitally monitored, high-efficiency models helps increase power output while ensuring better resource utilization.

Modernized hydropower plants also contribute to grid stability, offer reliable renewable energy generation, and support local economies through job creation and infrastructure development. With the global push toward decarbonization, these modernization efforts will continue to shape the future of the hydropower turbines market.

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□ Segment Overview

The hydropower turbines market is segmented by type, application, and region:

By Type: Reaction turbines and impulse turbines. The reaction turbine segment dominated in 2023, accounting for nearly two-thirds of the total market share. Reaction turbines are favored for their efficiency in medium to high water head conditions.

By Application: Power generation, power storage, marine, and aeronautics. The power

generation segment held the largest share in 2023, making up nearly three-fifths of the market.

By Region: North America, Europe, Asia-Pacific, and LAMEA. Among these, Asia-Pacific is expected to maintain its dominance throughout the forecast period, driven by large-scale energy infrastructure projects.

□ Regional Insights: Global Expansion in Hydropower Projects

North America: The U.S. recently approved its largest hydropower project in the northeastern region, aiming to meet growing electricity demand sustainably. Canada's Muskrat Falls Generating Station added 824 MW of capacity, enhancing the nation's renewable energy mix.

Europe: Countries such as Germany, France, Italy, Spain, and the UK are focusing on upgrading aging hydropower infrastructure, with an average operational age of around 45 years. These modernization efforts improve efficiency and help integrate hydropower with other renewable sources like solar and wind.

Asia-Pacific: The region leads globally, with China maintaining over 370 GW of installed capacity. Massive projects like Wudongde (6.8 GW) highlight China's dominance. India and Japan are expanding small-scale and mid-sized hydropower projects to diversify energy portfolios, while South Korea and Australia are optimizing their renewable strategies.

LAMEA: Brazil remains the largest hydropower producer in Latin America with 109 GW of capacity, while South Africa invests in [small-scale hydropower](#) to enhance energy security.

□ Recent Developments: Surge in Global Hydropower Consumption

Countries such as Brazil, Canada, China, India, the UK, and the U.S. recorded significant increases in hydropower consumption between 2021 and 2022, according to IREA data.

Brazil saw a remarkable 27.9% rise, fueled by major hydropower investments.

Canada reported a 374% surge, reflecting its strong renewable energy push.

India experienced a 451% increase, driven by government-led clean energy initiatives.

The U.S. saw a 125% growth due to favorable conditions and modernization of hydropower assets.

However, some countries such as Australia, France, Germany, Italy, and Japan witnessed a decline due to drought conditions, maintenance activities, or a temporary shift toward other renewables.

□ Competitive Landscape

Key players in the hydropower turbines market include: Siemens AG, General Electric Co., ANDRITZ AG, Cornell Pump Co., Toshiba Energy, Harbin Electric Machinery, Canyon Industries Inc., Gilbert Gilkes & Gordon Ltd., Kirloskar Brothers Ltd., and WWS Wasserkraft GmbH.

These companies focus on technological innovations, digital integration, and global expansion to strengthen their market positions.

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□ Conclusion

The hydropower turbines market is set for steady growth as nations accelerate efforts toward clean energy transition and renewable infrastructure upgrades. With Asia-Pacific leading global development and modernization projects gaining traction in Europe and North America, the industry stands at the forefront of sustainable power generation.

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