

Liquid Hydrogen - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts (2025 - 2030)

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Report description:

The Liquid Hydrogen Market size is estimated at 176.45 kilotons in 2025, and is expected to reach 287.69 kilotons by 2030, at a CAGR of 10.27% during the forecast period (2025-2030).

COVID-19 negatively impacted the market as all the industries halted their manufacturing processes. Lockdowns, social distances, and trade sanctions triggered massive disruptions to global supply chain networks. However, the condition is recovered in 2021, which is expected to benefit the market during the forecast period.

Key Highlights

- In the medium term, the major factors driving the market studied are the growing demand for liquid hydrogen for space exploration and the increasing adoption of hydrogen fuel cells in commercial vehicles.
- On the flip side, the high cost associated with handling and storage is likely to restrain the market growth.
- Growing emphasis on utilizing hydrogen as a marine fuel and increasing innovations in the aerospace industry are likely to act as opportunities for the market in the coming years.
- Asia-Pacific accounted for the highest market share, and the region is likely to dominate the market during the forecast period.

Liquid Hydrogen Market Trends

Aerospace Industry to Dominate the Market

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- Aerospace industries imply the application of liquid hydrogen for various applications ranging from airport baggage handling to hydrogen aircraft propulsion to cryogenic engines in the space industry.
- In propulsion applications, liquid hydrogen is used in combination with an oxidizer, such as liquid oxygen, to serve as fuel. This combination yields the highest specific impulse, or efficiency in relation to the amount of propellant consumed, of any known rocket propellant.
- According to the International Air Transport Association (IATA), the global revenue for commercial airlines was valued at USD 472 billion in 2021 and USD 727 billion in 2022, registering a growth rate of 43.6% Y-o-Y. Furthermore, the revenue is expected to reach USD 779 billion by the end of 2023.
- As air traffic recovers from the pandemic slowdown, the regulations on controlling greenhouse gas emissions are being tightened in different economies to head forward with the transition to carbon neutrality in the aviation sector. For instance, the Federal Aviation Administration, in June 2022, proposed new climate rules for curtailing GHG emissions. The new rules will be applied to planes already in service, allowing manufacturers to improve aerodynamics and engine efficiency. The rules would enforce efficiency requirements for new subsonic jet aircraft, large turboprop and propeller planes that are not yet certified, and planes built after January 2028.
- Space programs across the world rely on liquid hydrogen as the rocket fuel for various aerospace operations. The recent growth in space programs has been driving the demand for liquid hydrogen in recent years.
- In 2022, global government expenditure for space programs in various countries increased considerably. For instance, in the United States, government spending grew from USD 54.59 billion in 2021 to USD 61.97 billion in 2022.
- Rapid growth in technological advancements is creating the demand for more advanced satellites. As a result, in 2022, over 186 attempts of orbital launches, of which 180 were successful.
- According to the National Aeronautics and Space Administration (NASA), for each launch, the rocket engines of each shuttle flight burn about 500,000 gallons of cold liquid hydrogen, with another 239,000 gallons depleted by storage boil-off and transfer operations. The large volume of consumption per operation, coupled with the growing frequency of launches, is propelling the demand for liquid hydrogen.
- Therefore, the demand for liquid hydrogen is expected to grow in the aerospace industry during the forecast period.

Asia-Pacific Region to Dominate the Market

- The Asia-Pacific region is expected to be the largest market for liquid hydrogen during the forecast period owing to the growing liquid hydrogen demand in China, India, and Japan, among others.
- China's strong inclination toward alternative fuels, particularly in the aerospace and automotive industries, positions the country as a robust and favorable market for liquid hydrogen. With substantial growth in the aerospace sector, including increased satellite launches and rocket missions, the demand for liquid hydrogen has witnessed a positive surge due to its essential role in rocket fuel.
- The rising sales and production of fuel cell vehicles in China have also contributed to the growing demand for liquid hydrogen-based fuel cells. According to the China Association of Automobile Manufacturers, the production and sales of hydrogen fuel cell vehicles in 2022 more than doubled compared to the previous year, with 3,626 and 3,367 units produced and sold, respectively.
- Hydrogen fuel presents opportunities for powering aircraft and automobiles, and significant developments and initiatives are taking place in India to advance hydrogen-powered engines. For instance, in February 2023, Reliance Industries Limited and Ashok Leyland launched India's first Hydrogen Internal Combustion Engine (H2-ICE) powered heavy-duty truck. This truck operates on hydrogen while maintaining a conventional diesel combustion engine architecture. With a 19 to 35 tons loading capacity, the H2-ICE truck enables a swift transition to cleaner energy at a relatively lower cost differential.
- According to the Automobile Inspection & Registration Information Association (AIRIA), as of March 31, FY 2022, Japan had approximately 7.11 thousand hydrogen fuel cell vehicles in use, representing an increase from 5.28 thousand in FY 2021. The

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majority of these hydrogen-fuel cell vehicles are hydrogen-fueled passenger cars.

- Hence, due to the abovementioned factors, the demand for liquid hydrogen in the Asia-Pacific region is expected to increase over the forecast period.

Liquid Hydrogen Industry Overview

The liquid hydrogen market is highly consolidated in nature. Some of the major companies in the market (not in any particular order) include Air Liquide, Air Products and Chemicals Inc., Linde PLC, Iwatani Corporation, and Messer Group GmbH.

Additional Benefits:

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

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