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Global Solid-State Hydrogen Storage Devices Supply, Demand and Key Producers, 2026-2032

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Abstracts

The global Solid-State Hydrogen Storage Devices market size is expected to reach $ 672 million by 2032, rising at a market growth of 23.6% CAGR during the forecast period (2026-2032).

Solid-state hydrogen storage devices are hydrogen storage equipment and systems that reversibly absorb, store, and release hydrogen using solid materials. Major technology routes include metal hydrides, magnesium-based hydrides, TiFe-based alloys, AB5/AB2 hydrogen storage alloys, and selected complex hydride systems. Unlike compressed gaseous hydrogen storage or liquid hydrogen storage, solid-state hydrogen storage fixes hydrogen in a solid phase through lattice absorption, chemical bonding, or adsorption structures, and enables hydrogen charging and discharging under controlled temperature, pressure, and heat-transfer conditions. A complete system typically includes solid hydrogen storage materials, storage vessels or modules, heat exchangers, heating and cooling units, valves, sensors, control systems, hydrogen purification and interface units, safety interlocks, and structured cabinets or containers. The scope of this study mainly covers stationary solid-state hydrogen storage systems, mobile solid-state hydrogen storage containers, metal hydride storage tanks, fuel-cell backup power storage modules, laboratory and industrial low-pressure hydride cylinders, and ton-scale magnesium-based solid-state hydrogen storage devices. Its core value lies in low-pressure safety, high volumetric storage density, low long-duration storage loss, reduced leakage risk, and compatibility with fuel cells and electrolyzers, making it suitable for renewable energy storage, distributed hydrogen supply, backup power, industrial hydrogen use, laboratory gas supply, and selected mobility applications.

In 2025, the global hydrogen storage capacity of solid-state hydrogen storage devices

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was 21.5 tons, with an average price of US$6,750 per kilogram and an average gross profit margin of 31.8%.

Based on our research, the solid-state hydrogen storage device market is still transitioning from technical demonstration to early commercialization and should not be merged with the broader hydrogen storage and transportation market. Compressed hydrogen, liquid hydrogen, pipelines, LOHC, ammonia, and methanol remain the dominant hydrogen logistics routes. The distinctive value of solid-state hydrogen storage lies in low-pressure operation, intrinsic safety, high volumetric density, low long-duration storage loss, and compatibility with distributed fuel-cell and electrolyzer systems. Its near-term role is not to fully replace compressed hydrogen cylinders or liquid hydrogen tanks, but to serve applications where safety, compactness, long storage duration, and controlled hydrogen release are more important than lightweight mobility performance.

From a supply perspective, the industry is characterized by fragmented technologies, a limited number of commercial equipment suppliers, and strong demonstration-project dependence. China is advancing rapidly in magnesium-based solid-state storage and ton-scale transport containers, with Hydrexia’s MHX system representing one of the most visible commercialization efforts. Chinese research-to-industry players such as GRIMAT have also demonstrated solid-state storage devices for renewable energy storage and vehicle-related applications. In Europe, GKN Hydrogen, GRZ Technologies, H2planet, Hystorsys, Mincatec Energy, and other companies focus on stationary energy storage, backup power, low-pressure metal hydride cylinders, hydrogen compression, and system integration. Japan, Korea, and Taiwan have strong alloy and hydride technology foundations, but their commercial equipment revenue remains relatively small compared with conventional hydrogen storage technologies.

From a demand perspective, the short-term market is driven by demonstration projects, research institutions, fuel-cell backup power, off-grid energy systems, telecom backup power, industrial pilot users, hydrogen parks, and laboratory gas supply. Over the medium to long term, growth will depend on three groups of applications: long-duration storage of renewable hydrogen, short- and medium-distance industrial hydrogen delivery, and distributed hydrogen use in fuel cells, forklifts, small vehicles, drones, remote power, and island energy systems. Solid-state systems are less attractive where weight is the dominant constraint, but they can be highly relevant where safety, storage duration, low leakage, compact volume, and low-pressure handling are prioritized.

From a technology perspective, the industry mainly follows two routes: low- to medium-

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temperature metal hydride systems and high-capacity magnesium-based solid-state systems. AB5, AB2, and TiFe-based metal hydrides are more suitable for smaller systems, laboratory gas supply, low-pressure fuel-cell applications, and distributed energy storage because of their relatively mild operating conditions. Magnesium-based hydrides offer higher storage capacity and better potential for large transport modules, but they require more advanced thermal management and higher operating temperatures. Future competition will depend not only on material-level hydrogen capacity, but also on heat exchange design, charging and discharging rates, cycle life, system cost, certification, modularity, safety compliance, and integration with electrolyzers and fuel cells.

From a risk perspective, solid-state hydrogen storage devices still face important barriers in cost, weight, thermal management, system standardization, and customer acceptance. Metal hydride systems are safe and compact, but they are often heavy and may not suit passenger vehicle applications. Magnesium-based systems have stronger capacity potential, but system-level heat management and charging/discharging efficiency remain critical. Certification and transport rules are also still evolving, and many customers lack operating experience with solid-state hydrogen equipment. Over the long term, solid-state hydrogen storage is likely to become a complementary route within hydrogen infrastructure, especially in safety-sensitive and distributed applications, rather than a universal substitute for compressed or liquid hydrogen.

This report studies the global Solid-State Hydrogen Storage Devices production, demand, key manufacturers, and key regions.

This report is a detailed and comprehensive analysis of the world market for Solid-State Hydrogen Storage Devices and provides market size (US$ million) and Year-over-Year (YoY) Growth, considering 2025 as the base year. This report explores demand trends and competition, as well as details the characteristics of Solid-State Hydrogen Storage Devices that contribute to its increasing demand across many markets.

Highlights and key features of the study
Global Solid-State Hydrogen Storage Devices total production and demand, 2021-2032, (Tons)
Global Solid-State Hydrogen Storage Devices total production value, 2021-2032, (USD Million)
Global Solid-State Hydrogen Storage Devices production by region & country, production, value, CAGR, 2021-2032, (USD Million) & (Tons), (based on production site)

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Global Solid-State Hydrogen Storage Devices consumption by region & country, CAGR, 2021-2032 & (Tons)
U.S. VS China: Solid-State Hydrogen Storage Devices domestic production, consumption, key domestic manufacturers and share
Global Solid-State Hydrogen Storage Devices production by manufacturer, production, price, value and market share 2021-2026, (USD Million) & (Tons)
Global Solid-State Hydrogen Storage Devices production by Type, production, value, CAGR, 2021-2032, (USD Million) & (Tons)
Global Solid-State Hydrogen Storage Devices production by Application, production, value, CAGR, 2021-2032, (USD Million) & (Tons)

This report profiles key players in the global Solid-State Hydrogen Storage Devices market based on the following parameters - company overview, production, value, price, gross margin, product portfolio, geographical presence, and key developments. Key companies covered as a part of this study include Hydrexia, GKN Hydrogen, GRZ Technologies, H2planet, HBank Technologies, Tellus Materials, GRIMAT Engineering Institute, Jiangsu Huamei Shidai Technology, Ergenics, Hystorsys, etc.

This report also provides key insights about market drivers, restraints, opportunities, new product launches or approvals.

Stakeholders would have ease in decision-making through various strategy matrices used in analyzing the World Solid-State Hydrogen Storage Devices market

Detailed Segmentation:

Each section contains quantitative market data including market by value (US$ Millions), volume (production, consumption) & (Tons) and average price (US$/Kg) by manufacturer, by Type, and by Application. Data is given for the years 2021-2032 by year with 2025 as the base year, 2026 as the estimate year, and 2027-2032 as the forecast year.

Global Solid-State Hydrogen Storage Devices Market, By Region:

United States

China

Europe

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Japan

South Korea

ASEAN

India

Rest of World

Global Solid-State Hydrogen Storage Devices Market, Segmentation by Type:

Metal Hydride Cylinder

Solid-state Hydrogen Storage Module

Stationary Storage Cabinet

Containerized Storage System

Mobile Solid-state Storage Trailer

Integrated Storage and Power System

Other

Global Solid-State Hydrogen Storage Devices Market, Segmentation by Technology Route:

Metal Hydride Storage

Magnesium-based Hydride Storage

TiFe-based Alloy Storage

AB5/AB2 Alloy Storage

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Complex Hydride Storage

Adsorbent-based Solid Storage

Other

Global Solid-State Hydrogen Storage Devices Market, Segmentation by Storage Capacity:

Below 1kg

1–10kg

10–100kg

100–500kg

500–1000kg

Above 1000kg

Other

Global Solid-State Hydrogen Storage Devices Market, Segmentation by Application:

Renewable Energy Storage

Fuel Cell Backup Power

Industrial Hydrogen Supply

Hydrogen Transport and Distribution

Laboratory Gas Supply

Mobility and Special Vehicles

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Hydrogen Refueling Station Buffering

Other

Companies Profiled:

Hydrexia

GKN Hydrogen

GRZ Technologies

H2planet

HBank Technologies

Tellus Materials

GRIMAT Engineering Institute

Jiangsu Huamei Shidai Technology

Ergenics

Hystorsys

H2Store

Mincatec Energy

Methydor

Hydrogenera

Japan Metals & Chemicals

The Japan Steel Works

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Mitsubishi Corporation Technos

Hydrolux

Wonil T&I

Shanghai Hyfun Energy Technology

Hefei Sinopower Technologies

Baotou Research Institute of Rare Earths

Antai Chuangming New Energy Materials

Haoyun Jinneng Technology

Key Questions Answered:
1. How big is the global Solid-State Hydrogen Storage Devices market?
2. What is the demand of the global Solid-State Hydrogen Storage Devices market?
3. What is the year over year growth of the global Solid-State Hydrogen Storage Devices market?
4. What is the production and production value of the global Solid-State Hydrogen Storage Devices market?
5. Who are the key producers in the global Solid-State Hydrogen Storage Devices market?
6. What are the growth factors driving the market demand?

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