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Green Hydrogen and Power-to-Gas Market Forecasts to 2034 – Global Analysis By Technology (Electrolysis, Methanation and Hydrogen Storage & Transport), Application, End User and By Geography

https://marketpublishers.com/r/G4124C5B5C9AEN.html
Date: June 2026
Pages: 200
Price: US$ 4,150.00 (Single User License)
ID: G4124C5B5C9AEN

Abstracts

According to Stratistics MRC, the Global Green Hydrogen and Power-to-Gas Market is accounted for $3.1 billion in 2026 and is expected to reach $34.3 billion by 2034 growing at a CAGR of 35.0% during the forecast period. Green hydrogen and power-to-gas systems are gaining importance as key enablers of clean energy transitions and efficient energy storage. Green hydrogen is generated by splitting water using renewable electricity, producing no direct emissions. Power-to-gas processes transform excess renewable power into hydrogen or synthetic gases that can be stored or distributed through existing gas infrastructure. These approaches improve energy system flexibility, connect different energy sectors, and address variability in renewable sources. Their growing use across industries, mobility, and storage applications strengthens energy resilience and sustainability, playing a significant role in advancing a low-carbon and environmentally friendly global energy landscape.

According to the IEA, more than 1,000 low-emissions hydrogen projects were announced worldwide by 2023, but fewer than 5% had reached final investment decision (FID) or were operational.

Market Dynamics:

Driver:

Rising demand for decarbonization

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The global push toward lowering greenhouse gas emissions is significantly boosting the green hydrogen and power-to-gas market. Nations and industries are setting strict environmental goals, encouraging the adoption of cleaner energy solutions. Green hydrogen serves as a sustainable fuel for sectors that are difficult to electrify, including heavy industries. Meanwhile, power-to-gas technologies help convert renewable energy into storable fuels, decreasing dependence on fossil-based sources. This heightened focus on achieving carbon neutrality is driving funding, technological advancements, and infrastructure expansion, supporting widespread adoption and long-term growth of hydrogen-based energy systems across various regions and applications.

Restraint:

High production costs

Elevated production expenses act as a key barrier to the growth of the green hydrogen and power-to-gas market. The electrolysis process consumes large amounts of electricity, and using renewable sources often raises total costs due to installation and operational requirements. In comparison with traditional hydrogen generation techniques, green hydrogen is currently more expensive. The need for costly electrolyzers and supporting systems further increases investment requirements. These economic limitations restrict adoption, especially in cost-sensitive markets. Broader commercialization will depend on reducing expenses through innovation, improved efficiency, and large-scale deployment that can bring down overall production and infrastructure costs over time.

Opportunity:

Rising demand for green fuels in transportation

Growing interest in environmentally friendly fuels for transportation is creating significant opportunities for the green hydrogen and power-to-gas market. Hydrogen fuel cell technology is being increasingly adopted in trucks, buses, rail systems, and marine transport because of its efficiency and fast refueling. Additionally, power-to-gas processes support the creation of synthetic fuels for aviation and shipping industries. With stricter emission regulations in place, the transition toward cleaner mobility options is gaining momentum. This shift is encouraging investments in fueling infrastructure and advanced vehicle technologies, contributing to the expansion and innovation of hydrogen-based solutions in the transport sector.

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Threat:

Competition from alternative technologies

The presence of competing clean energy technologies represents a major challenge for the green hydrogen and power-to-gas market. Options such as battery storage and direct electrification are often more efficient and cost-effective in many use cases. Businesses and energy providers may choose these alternatives because they are already widely deployed and provide faster financial returns. In areas where electrification is practical, hydrogen solutions may struggle to gain traction. This competition can hinder market growth and reduce investment interest, particularly if alternative technologies continue to improve quickly and achieve greater affordability compared to hydrogen-based systems worldwide.

Covid-19 Impact:

The pandemic created both challenges and opportunities for the green hydrogen and power-to-gas market. Early impacts included disrupted supply chains, delayed projects, and decreased industrial demand, which slowed market progress. Economic uncertainty caused many investments to be postponed, affecting infrastructure expansion. Despite these setbacks, the situation encouraged governments to prioritize sustainable energy in recovery plans, boosting support for hydrogen initiatives. Increased funding and favorable policies emerged as part of green recovery strategies. As economic activities resumed, interest in clean energy grew, strengthening the role of hydrogen technologies in developing resilient and environmentally sustainable energy systems across global markets.

The electrolysis segment is expected to be the largest during the forecast period

The electrolysis segment is expected to account for the largest market share during the forecast period because it is the key method used to produce hydrogen from renewable energy. This process separates water into hydrogen and oxygen using electricity, forming the basis of green hydrogen production. Its importance lies in enabling clean energy generation and reducing carbon emissions. Ongoing improvements in electrolyzer performance, capacity, and affordability have reinforced its leading position. The ability to connect directly with renewable sources likes wind and solar further enhances its value, making electrolysis a fundamental technology in advancing sustainable and environmentally friendly energy systems worldwide.

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The mobility & transport segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the mobility & transport segment is predicted to witness the highest growth rate, driven by rising demand for cleaner transportation options. Hydrogen-based fuel cells are increasingly used in heavy vehicles like buses, trucks, rail, and maritime transport, where conventional electric solutions may not be practical. Factors such as extended range, quick refuelling and emission reduction are boosting adoption. Increased investments in fuelling stations and hydrogen-powered vehicle technologies are supporting this growth. As the shift toward sustainable mobility continues, hydrogen is becoming an important solution in transforming the global transportation landscape.

Region with largest share:

During the forecast period, the Europe region is expected to hold the largest market share, driven by robust regulations, clear decarbonization goals, and proactive adoption of clean energy solutions. The region benefits from well-defined hydrogen roadmaps, financial incentives, and supportive policies that encourage development. Key countries like Germany, France, and the Netherlands are actively investing in hydrogen technologies, infrastructure, and innovation projects. Strong integration between renewable energy and hydrogen systems improves grid stability and energy resilience. Additionally, coordinated initiatives across the European Union support expansion, making Europe a leading region in advancing hydrogen-based solutions and promoting a sustainable, low-carbon energy future globally.

Region with highest CAGR:

Over the forecast period, the Asia-Pacific region is anticipated to exhibit the highest CAGR, supported by expanding industrial activities, rising energy needs, and favorable government initiatives. Major economies including China, Japan, South Korea, and Australia are promoting hydrogen through investments in production facilities and infrastructure. Strategic policies and increasing renewable energy deployment are boosting market expansion. Efforts to cut emissions and strengthen energy independence are also encouraging adoption. In addition, partnerships and large demonstration projects are driving progress, establishing Asia-Pacific as a rapidly growing and influential region in the development of hydrogen-based energy solutions.

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Key players in the market

Some of the key players in Green Hydrogen and Power-to-Gas Market include Nel ASA, Siemens Energy, ITM Power, McPhy Energy, ENGIE, Plug Power, Cummins, thyssenkrupp nucera, Green Hydrogen Systems, Hydrogenics, MAN Energy Solutions, Electrochaea, Ineratec, Exytron, Hitachi Zosen Inova Etogas, Uniper, Fuelcell Energy and Linde.

Key Developments:

In November 2025, Siemens Energy has signed a contract to design and deliver the power conversion system for Oklo's Aurora powerhouse reactors. The contract will see Siemens Energy conduct detailed engineering and layout activities for a condensing SST-600 steam turbine, an SGen-100A industrial generator, and associated auxiliaries to support Oklo’s first advanced reactor, the Aurora powerhouse at Idaho National Laboratory.

In October 2025, Plug Power Inc. announced the execution of a binding supply agreement with Allied Biofuels FE LLC (ABF) for up to 2 gigawatts (GW) of Plug’s GenEco PEM electrolyzer systems. The agreement supports ABF’s development of sustainable aviation fuel (SAF), electro-sustainable aviation fuel (eSAF) and green diesel, with a final investment decision expected in the fourth quarter of 2026.

In August 2025, Engie SA has recently signed its first 100% virtual storage agreement in the Australian market, a five-year, derivatives-only deals with Australia’s AGL Energy Limited. The contract represents a financial structure that replicates how a battery works on the market. The agreement enables the French company to offer firming capacity to its customers without relying on physical storage assets.

Technologies Covered:

Electrolysis

Methanation

Hydrogen Storage & Transport

Applications Covered:

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Power Generation & Grid Balancing

Industrial Feedstock

Mobility & Transport

Residential & Commercial Heating

End Users Covered:

Utilities & Grid Operators

Industrial Manufacturers

Transport & Mobility Providers

Commercial & Residential Consumers

Regions Covered:

North America

United States

Canada

Mexico

Europe

United Kingdom

Germany

France

Italy

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Spain

Netherlands

Belgium

Sweden

Switzerland

Poland

Rest of Europe

Asia Pacific

China

Japan

India

South Korea

Australia

Indonesia

Thailand

Malaysia

Singapore

Vietnam

Rest of Asia Pacific

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South America

Brazil

Argentina

Colombia

Chile

Peru

Rest of South America

Rest of the World (RoW)

Middle East

- Saudi Arabia
- United Arab Emirates
- Qatar
- Israel
- Rest of Middle East

Africa

- South Africa
- Egypt
- Morocco
- Rest of Africa

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What our report offers:

- Market share assessments for the regional and country-level segments
- Strategic recommendations for the new entrants
- Covers Market data for the years 2023, 2024, 2025, 2026, 2027, 2028, 2030, 2032 and 2034
- Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)
- Strategic recommendations in key business segments based on the market estimations
- Competitive landscaping mapping the key common trends
- Company profiling with detailed strategies, financials, and recent developments
- Supply chain trends mapping the latest technological advancements

Free Customization Offerings:

All the customers of this report will be entitled to receive one of the following free customization options:

- Company Profiling
- Comprehensive profiling of additional market players (up to 3)
- SWOT Analysis of key players (up to 3)
- Regional Segmentation
- Market estimations, Forecasts and CAGR of any prominent country as per the client's interest (Note: Depends on feasibility check)
- Competitive Benchmarking

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Benchmarking of key players based on product portfolio, geographical presence, and strategic alliances

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Contents

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9 STRATEGIC MARKET INTELLIGENCE

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List Of Tables

LIST OF TABLES

Note: Tables for North America, Europe, APAC, South America, and Rest of the World (RoW) Regions are also represented in the same manner as above.

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