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PEM Electrolyzer Market Forecasts to 2032 – Global Analysis By Component (Bipolar Plates, Membrane Electrode Assembly (MEA), End Plates & Gaskets, Balance of Plant (BoP) and Other Components), Capacity, Application, End User and By Geography

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Abstracts

According to Stratistics MRC, the Global PEM Electrolyzer Market is accounted for $1.3 billion in 2025 and is expected to reach $10.9 billion by 2032, growing at a CAGR of 35.5% during the forecast period. A PEM electrolyzer is a device that utilizes electrical energy to perform the electrolysis process, effectively separating water into its constituent elements, hydrogen and oxygen. The system uses a strong polymer membrane as the electrolyte, allowing protons to pass through while blocking gases. PEM electrolyzers exhibit high efficiency, rapid response times, and a compact design, making them suitable for the integration of renewable energy and the production of green hydrogen. Their applications are particularly relevant in transportation, industrial processes, and grid balancing.

According to the International Energy Agency (IEA), globally installed electrolyzer capacity reached 1.4 GW at the end of 2023, nearly doubling from the previous year. Proton Exchange Membrane (PEM) electrolyzers accounted for approximately 300 MW of this capacity.

Market Dynamics:

Driver:

Growing demand for green hydrogen

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The demand for green hydrogen is being driven by the global move toward renewable energy sources and the growing emphasis on decarbonization. PEM electrolyzers, which use renewable energy sources like sun and wind to split water into hydrogen and oxygen, are essential to the production of green hydrogen. Transportation, power generation, and chemical industries all depend on this clean hydrogen. Green hydrogen is becoming a key component of sustainable energy transitions as a result of encouraging government policies and financial incentives that are speeding up investments in hydrogen infrastructure.

Restraint:

Limited availability of critical materials

One major issue is the lack of essential materials for PEM electrolyzers, namely platinum and iridium. Despite being costly and scarce, these materials are essential for the membrane electrode construction. PEM electrolyzers are more costly to manufacture as a result of this restriction, making them less accessible to smaller market players. The dependence on these uncommon elements creates supply chain vulnerabilities, further hindering PEM technology's scalability in cost-sensitive sectors.

Opportunity:

Integration with renewable energy sources

PEM electrolyzers provide a substantial growth potential when combined with renewable energy sources. PEM electrolyzers can produce green hydrogen using extra electricity from solar and wind energy, helping to stabilize the power grid and support efforts to reduce carbon emissions. Furthermore, improvements in electrolyzer technology are lowering expenses and increasing effectiveness, allowing for wider industry usage. Long-term market expansion is anticipated due to the synergy between hydrogen generation and renewable energy.

Threat:

Policy uncertainty and lack of long-term vision

Inconsistent rules and a lack of a coherent long-term strategy for hydrogen adoption threaten market expansion. Numerous governments are funding green hydrogen projects, but inconsistent laws and underdeveloped infrastructure hinder their

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advancement. Also, competition from other technologies like alkaline electrolysis makes the rules more complicated and could delay the widespread use of PEM electrolyzers.

Covid-19 Impact:

Due to supply chain disruptions and project timeline delays, the COVID-19 pandemic caused disruptions in the PEM electrolyzer business. Key hydrogen consumers like steel, chemicals, and oil refining saw a reduction in activities during lockdowns, which affected the need for electrolyzers. But the epidemic also highlighted the necessity of robust energy networks, which led to a resurgence of clean energy technology investments after the recovery. The emphasis on sustainable infrastructure increased as economies recovered, making PEM electrolyzers essential parts of green recovery strategies.

The membrane electrode assembly (MEA) segment is expected to be the largest during the forecast period

The membrane electrode assembly (MEA) segment is expected to account for the largest market share during the forecast period. This is due to its crucial role in facilitating electrochemical processes during hydrogen production. MEAs integrate cutting-edge catalysts like platinum and iridium to guarantee outstanding efficiency and durability in PEM systems. The fact that sectors such as transportation and electricity generation widely use them highlights their relevance. Furthermore, continued R&D efforts to enhance MEA performance while lowering costs will further support their adoption during the projection period.

The hydrogen generation for industrial use segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the hydrogen generation for industrial use segment is predicted to witness the highest growth rate. This growth rate is attributed to the increasing demand from industries such as chemicals, steel, and ammonia production. In these sectors, green hydrogen provides a sustainable substitute for conventional fossil fuels that supports international decarbonization objectives. Government incentives for clean technology adoption are also encouraging industries to switch to green hydrogen solutions. This pattern emphasizes how crucial industrial applications are becoming to market growth.

Region with largest share:

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During the forecast period, the Europe region is expected to hold the largest market share due to its strong commitment to becoming carbon neutral by 2050. This leadership is demonstrated by the European Union's large investments in green hydrogen infrastructure and renewable energy initiatives. Initiatives to use PEM electrolyzers in transportation networks and industrial processes are being led by nations like France and Germany. Additionally, encouraging laws like tax breaks and subsidies fosters an atmosphere that is conducive to market expansion in this area.

Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR because of increased investments in renewable energy and growing demand for green hydrogen across end-use industries, including power generation and transportation. Leading this expansion are nations like China, South Korea, Japan, and India, which are putting ambitious hydrogen plans into action with the help of public-private partnerships. Furthermore, the growing use of fuel cell cars in this area is driving up demand for PEM electrolyzers.

Key players in the market

Some of the key players in PEM Electrolyzer Market include Plug Power Inc., Nel ASA, Cummins Inc., ITM Power PLC, Hitachi Zosen Corporation, Elogen, Siemens Energy AG, Ningbo Vet Energy Technology Co., Ltd., Ohmium International, Inc., Hystar, H-TEC SYSTEMS GmbH, Bloom Energy Corporation, McPhy Energy S.A., Giner Inc., Areva H2Gen, Thyssenkrupp Nucera, and Proton On-Site.

Key Developments:

In January 2025, Plug Power Inc., a global leader in comprehensive hydrogen solutions for the green hydrogen economy, today announced a landmark purchase agreement with Allied Green Ammonia (AGA). This agreement will see Plug supplying an impressive three gigawatts (GW) of electrolyzer capacity to AGA's state-of-the-art green hydrogen-to-ammonia plant, currently under development in Australia. In a significant step towards a clean energy future, AGA will install a 4.5 GW solar plant to power the Plug electrolyzers with zero emission clean electricity. The green hydrogen produced will be used to make green ammonia. With the agreement now signed and sealed, Plug will develop a Basic Engineering and Design Package (BEDP), providing crucial technical details and engineering specifications to attract investors and finalize

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financing.

In October 2024, Nel's expanded and automated PEM manufacturing facility in Wallingford, Connecticut, was officially opened by Senator Richard Blumenthal. The new facility will have the capacity to produce 10 times as many PEM electrolysers at 30% lower cost than the old factory.

In May 2024, Nel Hydrogen Electrolyser AS, a fully owned subsidiary of Nel ASA has entered into a technology licensing agreement with Reliance Industries Limited (RIL). The agreement provides RIL with an exclusive license for Nel's alkaline electrolysers in India and also allows RIL to manufacture Nel's alkaline electrolysers for captive purposes globally.

Components Covered:

- Bipolar Plates
- Membrane Electrode Assembly (MEA)
- End Plates & Gaskets
- Balance of Plant (BoP)
- Other Components

Capacities Covered:

- Small Scale (
  Medium Scale (1 MW #- #10 MW)
- Large Scale (> 10 MW)

Applications Covered:

- Power Generation
- Transportation

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- Industry Energy Storage
- Hydrogen Generation for Industrial Use
- Other Applications

End Users Covered:

- Industrial
- Mobility
- Power & Energy
- Other End Users

Regions Covered:

- North America
  - US
  - Canada
  - Mexico
- Europe
  - Germany
  - UK
  - Italy
  - France

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- Spain
- Rest of Europe

Asia Pacific

- Japan
- China
- India
- Australia
- New Zealand
- South Korea
- Rest of Asia Pacific

South America

- Argentina
- Brazil
- Chile
- Rest of South America

Middle East & Africa

- Saudi Arabia
- UAE
- Qatar
- South Africa

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Rest of Middle East & Africa

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 2024, 2025, 2026, 2028, and 2032
- 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

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

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