+357 96 030922
info@marketpublishers.com

PEM Water Electrolyzer Market – Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Type (Small Scale Type, Middle Scale Type, Large Scale Type), By Application (Power Plants, Steel Plant, Electronics and Photovoltaics, Industrial Gases, Energy Storage or Fueling for FCEVs, Others), By Region & Competition, 2021-2031F

https://marketpublishers.com/r/PF02031001ADEN.html
Date: May 2026
Pages: 177
Price: US$ 4,500.00 (Single User License)
ID: PF02031001ADEN

Abstracts

The global market for PEM water electrolyzers is projected to expand significantly, rising from USD 7.91 billion in 2025 to USD 11.88 billion by 2031, demonstrating a Compound Annual Growth Rate (CAGR) of 7.01%. A Proton Exchange Membrane (PEM) water electrolyzer functions as an electrochemical system, employing a solid polymer electrolyte to efficiently convert water into hydrogen and oxygen through the application of electricity. These systems are distinguished by their compact size, high current density, and rapid responsiveness to power fluctuations, rendering them exceptionally suitable for integration with intermittent renewable energy sources.

The market's primary drivers include the increasing global imperative for industrial decarbonization, particularly evident in heavy industries such as steel and transport, alongside the critical demand for efficient energy storage solutions. Reflecting this robust growth, the Hydrogen Council reported that by 2025, the global pipeline of committed clean hydrogen capacity reached 6 million tonnes annually, underscoring a substantial industrial scaling that supports PEM technology's expansion.

Market Driver

The expansion of PEM water electrolyzers is primarily spurred by government policies

+357 96 030922
info@marketpublishers.com

and financial incentives that alleviate the economic hurdles of high initial capital costs. These frameworks narrow the price difference between green hydrogen and fossil-fuel alternatives, encouraging long-term supply agreements from industrial consumers. Mechanisms such as regional auctions and subsidies are particularly effective in fast-tracking Final Investment Decisions for major PEM initiatives by directly subsidizing clean hydrogen production. For instance, the European Commission's 'European Hydrogen Bank Pilot Auction Results' in April 2024 allocated nearly €720 million to seven renewable hydrogen projects across Europe, injecting crucial public funding that enables developers to transition from pilot to commercial-scale operations.

Additionally, the accelerating global demand for green hydrogen, driven by strict decarbonization targets in challenging sectors, further boosts PEM adoption. Industries like heavy transport and chemical refining are replacing conventional grey hydrogen, valuing PEM systems' rapid dynamic response for integration with variable renewable energy sources. This operational adaptability helps stabilize grids while ensuring steady hydrogen output, necessitating infrastructure growth. The International Energy Agency reported in October 2024 that global installed electrolyzer capacity is projected to hit 5 GW by the end of 2024, reflecting substantial operational growth. To meet this escalating need, manufacturers are scaling up production, with global electrolyzer manufacturing capacity reaching approximately 25 GW per year in 2024, demonstrating a strong supply chain response.

Market Challenge

The most significant challenge facing the Global PEM Water Electrolyzer Market is the excessively high capital expenditure, primarily due to the technology's reliance on scarce platinum group metals, notably iridium and platinum. These noble metals are essential for the anode and cathode catalysts in PEM electrolyzers, crucial for maintaining efficiency and durability, unlike alkaline systems. Iridium, being exceptionally rare and produced only as a byproduct of platinum mining, creates a severe supply bottleneck. As industrial demand grows, this scarcity leads to extreme price volatility and supply chain instability, directly undermining efforts to reduce costs and achieve parity with fossil-fuel-derived hydrogen.

This material dependency creates a gap between ambitious global deployment goals and practical manufacturing scalability. The inability to quickly increase the supply of iridium and platinum to align with electrolyzer production schedules forces manufacturers into a high-cost operating environment, discouraging broad investment. In 2024, demand for platinum in hydrogen applications, including electrolyzers, surged

+357 96 030922
info@marketpublishers.com

by 123% year-on-year, according to the World Platinum Investment Council, putting immense strain on existing limited mineral inventories. This dependence on critical raw materials consequently restricts the deployment rate of PEM technology for decarbonizing heavy industry, effectively impeding the sector's wider commercialization despite a robust project pipeline.

Market Trends

The PEM electrolyzer market is undergoing a transformative shift towards automated gigafactory-scale manufacturing, replacing traditional manual assembly with high-throughput industrial processes. This involves significant investments in robotics and digitalization to standardize stack production, leading to considerable reductions in unit costs and improved quality control. Such a transition is crucial for fulfilling the gigawatt-scale orders demanded by major industrial decarbonization projects, steering the industry away from specialized, smaller-scale fabrication. For example, Nel Hydrogen's fully automated PEM electrolyzer production facility in Connecticut, opened in October 2024, boasts an annual manufacturing capacity of 500 MW, setting a new standard for automated production efficiency.

Concurrently, direct coupling with offshore wind power is becoming a key deployment strategy. This approach capitalizes on PEM systems' compact design and dynamic responsiveness to circumvent onshore land limitations. By integrating electrolyzers directly onto offshore platforms or artificial islands, developers can harness extensive wind resources and transport energy through pipelines, thereby avoiding congested electrical grids. This decentralized production of green hydrogen at its source effectively bypasses transmission bottlenecks. A notable example is Lhyfe's HOPE project, highlighted in October 2024, which involves installing a 10 MW PEM electrolyzer on a converted North Sea platform to validate commercial-scale offshore operations for the world's first production of hydrogen at sea with wind power.

Key Market Players

L'AIR LIQUIDE S.A.

Air Products and Chemicals, Inc.

Cummins Inc.

Erre Due s.p.a.

+357 96 030922
info@marketpublishers.com

LARSEN & TOUBRO LIMITED

Nel ASA

ostermeier H2ydrogen Solutions GmbH

Siemens Energy AG

Report Scope

In this report, the Global PEM Water Electrolyzer Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

PEM Water Electrolyzer Market, By Type

Small Scale Type

Middle Scale Type

Large Scale Type

PEM Water Electrolyzer Market, By Application

Power Plants

Steel Plant

Electronics and Photovoltaics

Industrial Gases

Energy Storage or Fueling for FCEVs

Others

PEM Water Electrolyzer Market, By Region

+357 96 030922
info@marketpublishers.com

North America

- United States
- Canada
- Mexico

Europe

- France
- United Kingdom
- Italy
- Germany
- Spain

Asia Pacific

- China
- India
- Japan
- Australia
- South Korea

South America

- Brazil
- Argentina

+357 96 030922
info@marketpublishers.com

Colombia

Middle East & Africa

South Africa

Saudi Arabia

UAE

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global PEM Water Electrolyzer Market.

Available Customizations:

Global PEM Water Electrolyzer Market report with the given market data, TechSci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

Detailed analysis and profiling of additional market players (up to five).

+357 96 030922
info@marketpublishers.com

Contents

+357 96 030922
info@marketpublishers.com

6. NORTH AMERICA PEM WATER ELECTROLYZER MARKET OUTLOOK

7. EUROPE PEM WATER ELECTROLYZER MARKET OUTLOOK

+357 96 030922
info@marketpublishers.com

8. ASIA PACIFIC PEM WATER ELECTROLYZER MARKET OUTLOOK

+357 96 030922
info@marketpublishers.com

+357 96 030922
info@marketpublishers.com

10. SOUTH AMERICA PEM WATER ELECTROLYZER MARKET OUTLOOK

+357 96 030922
info@marketpublishers.com

+357 96 030922
info@marketpublishers.com

+357 96 030922
info@marketpublishers.com

I would like to order

Product name: PEM Water Electrolyzer Market – Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Type (Small Scale Type, Middle Scale Type, Large Scale Type), By Application (Power Plants, Steel Plant, Electronics and Photovoltaics, Industrial Gases, Energy Storage or Fueling for FCEVs, Others), By Region & Competition, 2021-2031F

Product link: https://marketpublishers.com/r/PF02031001ADEN.html

Price: US$ 4,500.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer Service:
info@marketpublishers.com

Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page https://marketpublishers.com/r/PF02031001ADEN.html