



Green hydrogen is a sustainable energy carrier produced through water electrolysis using renewable energy sources like solar or wind power. This process generates hydrogen without emitting greenhouse gases, making it a clean alternative to traditional hydrogen production methods that rely on fossil fuels. Green hydrogen is crucial for decarbonizing various sectors, including transportation, industry, and heating, by serving as a versatile and environmentally friendly energy source. Its production and utilization significantly reduce carbon emissions and advance the transition toward a more sustainable and carbon-neutral economy. According to MarketsandMarkets the [green hydrogen market](#) is projected to grow from USD 1,088.7 million in 2023 to USD 30,626.8 million by 2030, at a CAGR of 61.1% during the forecast period. Europe is the largest consumer of green hydrogen, with Germany leading the regional market. The growing use of green hydrogen in mobility, such as fuel cell vehicles and hydrogen refuelling stations, also contributes to market growth in Germany. The green hydrogen market, by end-use is segmented into mobility, chemical, power, grid injection, industrial, and other end-use industries. Mobility the largest segment in the green hydrogen market, projected to grow from USD 639.8 million in 2023 to USD 19,677.5 million 2030, at a CAGR Of 63.1% during the forecast period.

 <p>DRIVERS</p>	<ul style="list-style-type: none">▪ Low variable electricity costs▪ Technological advancements▪ Global plans for net-zero emissions by 2050▪ High demand from fuel cell vehicles and power industry
 <p>RESTRAINTS</p>	<ul style="list-style-type: none">▪ High cost of green hydrogen▪ Lack of transportation infrastructure▪ Energy loss in value chain▪ Sustainability management
 <p>OPPORTUNITIES</p>	<ul style="list-style-type: none">▪ Decreasing costs of electrolyzers▪ Increasing government investments▪ Announcement of large capacity green hydrogen projects▪ Favorable policies for green hydrogen
 <p>CHALLENGES</p>	<ul style="list-style-type: none">▪ High initial investment▪ Under-developed market

MIDDLE EAST & AFRICA

The [green hydrogen market](#) in the Middle East & Africa covers Saudi Arabia, UAE, and the Rest of the Middle East & Africa. The market in this region is expected to show significant growth in terms of both volume and value by 2030. Mobility, power, industrial, grid injection, and chemical are the major end-use industries of green hydrogen. The Middle East & Africa present lucrative opportunities for green hydrogen manufacturing companies as it is one of the emerging markets. The increasing power industry includes projects supplying electricity to the grid with a turbine or fuel cell. Renewable energy is replacing conventional fossil fuels-based power plants. This is expected to the Middle East & Africa green hydrogen market.

IMPACT OF RECESSION

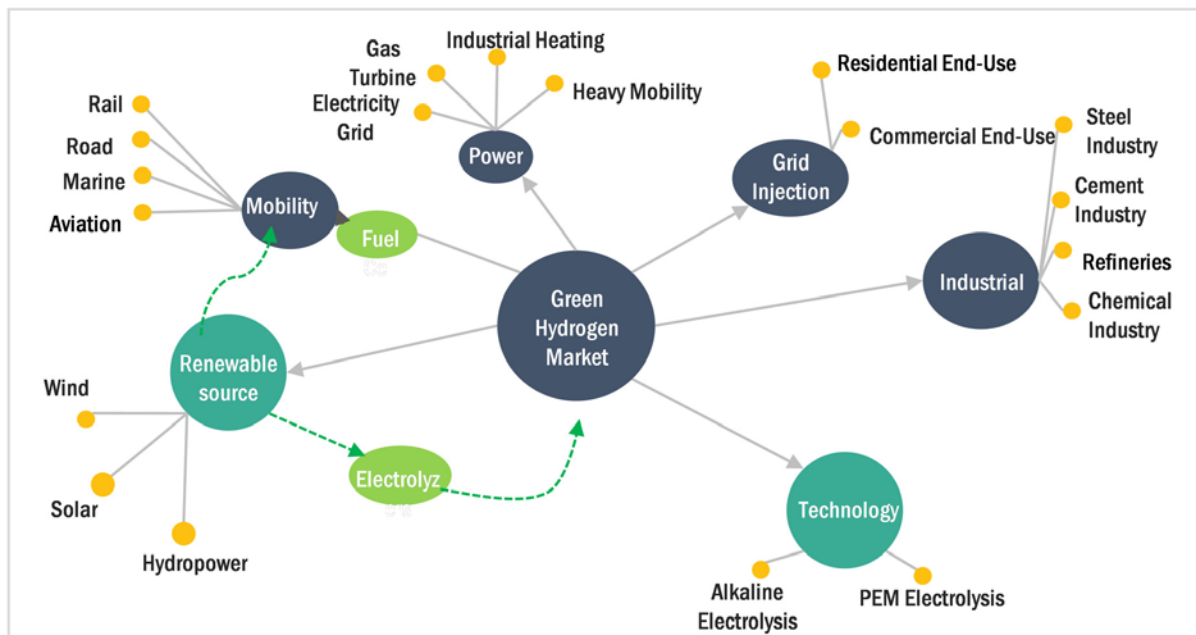
The recession could impact the Middle East & Africa green hydrogen market by potentially delaying or scaling back projects related to green hydrogen production and infrastructure development. Reduced funding during a recession may hinder the progress of initiatives aimed at expanding the use of green hydrogen in various sectors such as transportation, utilities, and industrial applications. Disrupted supply chains could also lead to delays in the delivery of essential components for green hydrogen production systems, affecting the overall growth and development of the market.

DRIVERS

LOW VARIABLE ELECTRICITY COST

The primary expense involved in the production of green hydrogen is linked with the energy input. However, in the last ten years, the cost of generating renewable energy from all sources has reduced considerably. The significant decline observed in the cost of solar energy, which is almost 25% of what it was earlier. This reduction is due to technological advancements, lower raw material production efficiencies, and higher product efficiency. With the development of new composites, solar and wind energy costs are continuously declining. The cost associated with renewable energy mainly consists of a fixed cost of installation and marginal maintenance. Therefore, the cost of producing green hydrogen is also expected to decrease with continuous operations.

GREEN HYDROGEN MARKET: ECOSYSTEM



TECHNOLOGICAL ADVANCEMENTS

With the development of electrolysis technologies, the efficiency of producing hydrogen has increased. This is directly reflected in the price of the product with more than 60% production cost decline, green hydrogen now more economical. Continuous investments in the research and development (R&D) of green hydrogen production processes are expected to further reduce the cost. The application technology has also developed over the past years, with fuel cells now achieving 90% efficiency. This is expected to result in increasing demand and a better ecosystem for green hydrogen.



GLOBAL PLANS FOR NET-ZERO EMISSIONS BY 2050

Nearly seven countries have net-zero in their legislation, while more than 120 countries have pledged to adopt the same. This pledge taken by the countries will prove to be a turning point in the development of green hydrogen. While most industries can switch directly to alternate sources, some sectors, such as power plants and transportation industries, will find green hydrogen a viable substitute.

OPPORTUNITIES

DECREASING COST OF ELECTROLYZERS

The cost of electrolyzers dropped to nearly half its value five years ago. This fall is expected to continue in the current decade. Another factor affecting the final cost is reducing the of renewable energy sources. The major reason for this fall in is the investments in research and development (R&D) Of the technology to make it more efficient. The recent development of solid oxide electrolyzers that can give 100% efficiency at a high-temperature range shows the potential of the technology.

INCREASING GOVERNMENT INVESTMENTS

The governments of many emerging countries are corning forward to develop infrastructure for green hydrogen. This is mainly seen in Asia and the European Union, With some American and Middle Eastern countries. The development of infrastructure Will facilitate manufacturers to expand their reach and capacity, Which Will assist them in lowering the price of green hydrogen. The government's involvement is crucial for developing an ecosystem that accepts green hydrogen as an alternate fuel; hence, these investments from governments are expected to prove to be the pathways on which the green hydrogen industry may thrive.

ANNOUNCEMENT OF LARGE-CAPACITY GREEN HYDROGEN PROJECTS

The announcement of large-scale hydrogen projects has had a significant impact on the acceptance of green hydrogen. As more projects are set up, companies plan to accommodate and utilize green hydrogen in their value chain. More private players are expected to venture into the field with such projects and attract new and innovative companies to advance the technologies. Asia, Europe, and Australia are at the forefront of developing green hydrogen and associated technologies.

FAVORABLE POLICIES FOR GREEN HYDROGEN

Governments are forming alliances to promote the production of green hydrogen. This involves financial support instruments to existing hydrogen producers to motivate them toward green hydrogen production. It would also include the development of green hydrogen transportation infrastructure. Currently, the major sectors of the green hydrogen value chain that receive incentives to promote green hydrogen adoption are electrolysis, refuelling industries, transportation, buildings, and power. Some countries, such as India, have imposed minimum green hydrogen purchase regulations to increase its demand. On the other hand, Japan is providing subsidies to fuel cell vehicles and filling stations. It is also making international research collaborations and pilot projects to develop a green hydrogen supply chain in the country. Europe has launched The Renewable Energy Directive and Alternative Fuels Infrastructure Directive to develop green hydrogen infrastructure. It is planning to develop its mobility sector to adopt green hydrogen-using fuel cells.