

Green hydrogen: Global markets

The global market for green hydrogen was valued at \$4.4 billion in 2023 and is expected to grow at a compound annual growth rate (CAGR) of 48.7% to reach \$38.1 billion by 2029.

Hydrogen does not produce carbon dioxide when burned, and so it is increasingly seen as an option for decarbonizing sectors where direct electrification or other low-carbon options may not be technologically or economically feasible, such as heavy industry and long-distance transport. The methods used to produce hydrogen, however, greatly determine its overall impact on the environment.

- **Grey hydrogen** is produced by steam methane reforming (SMR) of natural gas or coal gasification and uses methane or coal as feedstock.
- **Blue hydrogen** is produced by SMR of natural gas or coal with carbon capture and uses methane or coal as feedstock.
- **Turquoise hydrogen** is produced by pyrolysis and uses methane as feedstock.
- **Pink hydrogen** is produced by water electrolysis, using nuclear energy as feedstock.
- **Green hydrogen** is produced by water electrolysis, using renewable energy as feedstock.

As of 2024, green hydrogen occupies less than a 1% share of global hydrogen demand. But it is expected to increase to about 15% by 2030 as industries and governments shift toward low-emission fuels to achieve their net-zero emission targets in various sectors (Table 1).

Most green hydrogen is produced using alkaline and PEM electrolyzers. Other technologies, such as solid oxide electrolyzers and anion exchange mem-

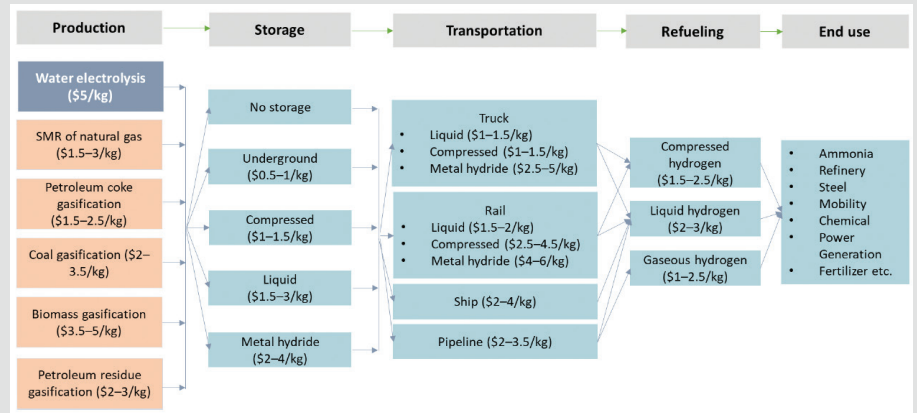


Figure 1. Value chain analysis of the green hydrogen market.

branes, are gaining traction but have not yet been fully commercialized.

The final cost of using green hydrogen is significantly influenced by the costs associated with purification, storage, distribution, and conversion, which vary depending on the specific value chain path. Figure 1 provides a detailed overview of a typical green hydrogen value chain along with cost analysis.

Europe holds by far the largest share of the global market for green hydrogen, with 57.0% in 2023. The Asia-Pacific region is a distant second, with 28% of the market in 2023. However, its share is expected to grow to 31.0% through 2029 due to rising investments by Chinese manufacturers to scale up renewable and electrolyzer manufacturing capacity and increasing interest by

Western companies in the region's green hydrogen sector through joint ventures.

About the author

BCC Publishing Staff provides comprehensive analyses of global market sizing, forecasting, and industry intelligence, covering markets where advances in science and technology are improving the quality, standard, and sustainability of businesses, economies, and lives. Contact the staff at Helia.Jalili@bccresearch.com.

Resource

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Table 1. Global market for green hydrogen, by end-use industry, through 2029 (\$ millions)				
End-use industry	2023	2024	2029	CAGR % (2024-2029)
Chemicals and petrochemicals	2,366.6	2,764.4	17,031.4	43.9
Mobility	939.9	1,201.4	12,471.9	59.7
Power	357.5	470.4	5,146.6	61.4
Other industries	701.0	798.7	3,420.1	33.8
Total	4,365.0	5,234.9	38,070.0	48.7