

Power-to-X Market Size, Share & Trends Analysis Report By Technology (Power-to-H2, Power-to-Methanol), By End-use (Agriculture, Manufacturing), By Region, And Segment Forecasts, 2023 - 2030

<https://marketpublishers.com/r/PB1CBF4E819CEN.html>

Date: July 2023

Pages: 100

Price: US\$ 4,950.00 (Single User License)

ID: PB1CBF4E819CEN

Abstracts

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Power-to-X Market Growth & Trends

The global power-to-X market size is expected to reach USD 645.3 million by 2030, according to a new report by Grand View Research, Inc. It is expected to grow at a CAGR of 10.6% from 2023 to 2030. Power-to-X (P2X) technologies enable the integration of renewable energy sources, such as wind and solar, into sectors traditionally reliant on fossil fuels. This trend is expected to accelerate as countries increase their renewable energy capacity and reduce their dependence on fossil fuels. Simultaneously, the increasing deployment of renewable energy sources, such as wind and solar, provides a reliable and abundant source of electricity for power-to-X processes. As renewable energy costs continue to decline, the economic viability of power-to-X technologies improves.

An increasing number of industries across various sectors have recognized the potential of green hydrogen, which is generated via power-to-X processes. Green hydrogen, produced by utilizing renewable energy sources splitting water into hydrogen and oxygen, offers many applications and benefits. As the world struggles with the urgent need to mitigate climate change and reduce carbon emissions, green hydrogen has emerged as a critical solution in the transition toward a sustainable and decarbonized future. Green hydrogen presents a viable alternative, as it can be used in fuel cell electric vehicles (FCEVs) to power cars, trucks, and even trains, emitting only water

vapor as a byproduct.

Power-to-X processes have emerged as game-changers in producing synthetic fuels, chemicals, and materials supporting the ongoing efforts to mitigate climate change, reduce carbon emissions, and foster the adoption of carbon-neutral alternatives. The COVID-19 pandemic created various challenges and uncertainties, affecting the market dynamics and growth trajectory of power-to-X technologies. However, it has also presented opportunities for innovation and resilience in the crisis. A notable impact of the COVID-19 pandemic on the industry has been the disruption of supply chains. Travel restrictions, lockdown measures, and reduced economic activity have affected the availability and transportation of essential components and materials required for power-to-X processes.

This disruption has led to delays in project development and deployment, as well as increased costs and logistical challenges. COVID-19 has also demonstrated the importance of resilience, sustainability, and accelerating energy transition. Governments and international bodies have recognized the opportunity to align economic recovery efforts with clean energy investments and decarbonization goals. As part of stimulus packages and recovery plans, many countries have announced increased commitments to renewable energy and green technologies, including power-to-X solutions. This focus on sustainable recovery could significantly boost the power-to-X industry in the long term.

Power-to-X Market Report Highlights

The power-to-H₂ segment led the market in 2022 accounting for over 40% of the global revenue owing to its capacity to integrate more renewable energy into these sectors, fostering the transition towards a low-carbon economy

The transportation segment held the largest revenue share of over 35% in 2022. Power-to-X technologies enable the production of low-carbon or carbon-neutral energy carriers, such as hydrogen or synthetic fuels, from renewable sources. Using these energy carriers, greenhouse gas emissions can be significantly reduced

The potential of power-to-X technologies in emerging transportation trends, such as hydrogen fuel cell vehicles, synthetic fuel, electric vehicles (EVs), and in shipping & aviation, with low carbon emissions, is immense

These technologies enable the integration of different industrial sectors within the energy system, fostering sector coupling. Excess electricity from renewable sources can be used to produce energy carriers, such as hydrogen, synthetic natural gas, or even synthetic liquid fuels, through power-to-gas or power-to-liquid processes

Europe held the largest revenue share of over 40% in 2022. As R&D efforts continue, the costs associated with PtX systems are expected to decline, making them more competitive and attractive for the European market

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