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Advanced Biofuel Market Assessment, By Type [Biodiesel, Biohydrogen, Bioethanol, Biobutanol, Cellulosic Biofuel, Others], By Raw Materials [Lignocellulose, Camelina, Algae, Jatropha, Others], By Process [Biochemical, Thermochemical], By Application [Heating, Cooking, Cooling, Others], By End-user [Chemical and Petrochemical, Energy and Power, Oil and Gas, Food and Beverages, Automotive, Others], By Region, Opportunities and Forecast, 2017-2031F

https://marketpublishers.com/r/A604B9D1B835EN.html
Date: March 2025
Pages: 218
Price: US$ 4,500.00 (Single User License)
ID: A604B9D1B835EN

Abstracts

Global advanced biofuel market is projected to witness a CAGR of 5.34% during the forecast period 2024-2031, growing from USD 82.15 billion in 2023 to USD 124.55 billion in 2031. The market has experienced substantial growth in recent years and will maintain a strong pace of expansion in the coming years.

The benefits of advanced biofuels include reduced greenhouse gas (GHG) emissions, reduction in dependence on fossil fuels, and potential economic gains for the agricultural sector. The growth of advanced biofuels is driven by increasing demand on fuel, government mandates and policies, and the potential for higher farm income.

Biofuels play a crucial role in the decarbonization of the transport sector, offering substantially lower CO2 emissions compared to conventional gasoline or diesel throughout their 'life cycle.' With the transportation sector's significant growth and rising fuel demand, advanced biofuels are identified as essential for providing low-carbon fuel

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alternatives for planes, marine vessels, and other heavy transport modes. They are particularly vital for sectors such as long-haul transport and aviation, with the potential to triple biofuel consumption in the transport sector by 2030, with two-thirds of that coming from advanced biofuels. Advanced biofuels, derived from sources such as waste products, are seen as an ideal means to decarbonize the current vehicle fleet, as they do not impact land use, thereby making them a long-term sustainable solution for the energy transition.

For example, in December 2023, VARO Energy and Hoegh Autoliners announced a strategic partnership to advance the decarbonization of the maritime sector by supplying 100% advanced biofuels for deep-sea transportation from Europe. This collaboration aligned with both companies' voluntary commitments to superior sustainability standards and showcased H?egh Autoliners as a frontrunner in the industry, thereby paving the way for greener and more environmentally responsible shipping.

Utilization of Biodiesel is Proliferating Market Growth

The utilization of biodiesel helped advance biofuels by decreasing emissions and reducing dependency on imported fossil fuels, while also creating employment in rural areas. This has led to a significant increase in demand for biodiesel as a transport fuel. The use of advanced biofuels, including biodiesel, has been instrumental in addressing the growing demand for transport fuels, with the potential to provide up to 27% of the world's transportation fuel by 2050, thereby contributing to emission reductions and a more sustainable energy future.

For example, in November 2023, Indonesia's request for a dispute panel to review the European Union's (EU) countervailing duties on biodiesel imports from Indonesia was approved by the World Trade Organization's (WTO) Dispute Settlement Body. The EU imposed definitive countervailing duties on biodiesel imports from Indonesia. The establishment of the dispute panel was supported by several countries, including the United States, the United Kingdom, Norway, and China, who reserved their third-party rights to participate in the panel proceedings.

Bioethanol is Aiding the Market Expansion

Bioethanol is an important advanced biofuel due to its several environmental benefits and role in reducing dependency on fossil fuels. It is derived from renewable sources such as sugarcane, corn, sorghum, and wood chips, and can be blended into gasoline to reduce emissions and promote cleaner engine performance. Bioethanol's potential to

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meet reduction requirements for GHG emissions, especially in the Asia Pacific region, is attributed to its lower input of agrochemicals and higher sustainability than traditional fuels.

For example, in October 2023, Sumitomo Corporation and KC&A, a Korean chemical/alcohol manufacturing and trading company with the Korea Alcohol Group, signed a memorandum of understanding to develop the Japanese market for bioethanol. The two companies aimed to expand their applications and ensure stable supplies of bioethanol in Japan as a biomass-derived raw material for plastics and fuels. The demand for bioethanol is rapidly growing in Japan amid efforts to achieve a decarbonized society. Sumitomo Corporation also stated that it would perform all needed marketing functions and develop new applications, while KC&A would supply bioethanol to the automotive fuel industry.

Government Initiatives are Acting as Catalyst

Government initiatives have played a crucial role in advancing the biofuels industry. The federal government has expanded and accelerated its advanced biofuels initiatives, and private investment has increased with the stabilization of the economy. Moreover, the government has established frameworks to ensure that only biofuels that meet stringent sustainability criteria are used, and adherence to sustainability criteria is verified by third-party certification of biofuel production.

For example, in June 2023, the United States Environmental Protection Agency (EPA) announced a final rule to establish biofuel volume requirements and associated percentage standards for cellulosic biofuel, biomass-based diesel (BBD), advanced biofuel, and total renewable fuel for 2023–2025. The final volume targets included steady growth of biofuels for usage in the nation's fuel supply for 2023, 2024, and 2025.

The Automotive Industry is Expediting the Market Prosperity

The automotive industry has been a key driver for the growth of the advanced biofuels market, with various governments also taking initiatives to promote their use. Advanced biofuels serve as substitutes for gasoline and diesel in the automotive sector, motivated by low carbon emissions. The utilization of advanced biofuels in car interiors, plastic components, and tires has also increased due to the continuous need for sustainability.

For example, in May 2023, a Michigan milk producer and a Canadian distillery collaborated to produce ethanol for usage in the automotive industry, especially in cars

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and trucks, by 2025. The Canadian company, Dairy Distillery, planned to invest USD 41 million in a Michigan facility that will turn a milk byproduct known as milk permeate into ethanol. This initiative is expected to help offset carbon emissions and create value for Michigan dairy farmers by repurposing a waste product into a useful and sustainable biofuel.

North America Significantly Led the Market

North America led the advanced biofuel industry due to the continuous rise in demand for cleaner fuels. The region's top producer of advanced biofuels is the United States, which has invested heavily in R&D and holds many biofuel patents. The United States' demand for advanced biofuels is driven by strict regulations, such as California's low carbon fuel standard. Additionally, the prevalence of renowned players and the implementation of marketing strategies by major companies have contributed to North America's dominance in the advanced biofuels market.

For example, the United States Department of Agriculture (USDA) planned to invest up to USD 500 million in President Biden’s Inflation Reduction Act to increase the availability of domestic biofuels and provide Americans with additional cleaner fuel options at the pump. The investment aimed to expand the usage of homegrown biofuels, strengthen energy independence, create new market opportunities and revenue streams for American producers, and bring good-paying jobs and other economic benefits to rural and farm communities. The USDA would grant infrastructure improvements for storing, supplying, and distributing biofuels, including filling stations, convenience stores, etc.

Future Market Scenario (2024 – 2031F)

> In the long term, advanced biofuels are seen as the most sustainable solution for decarbonizing transport sectors such as long-haul transports and aviation. The energy share from renewable sources in gross final energy consumption has almost doubled, mainly driven by binding targets set in the Renewable Energy Directive, which in turn is expected to lead to myriad future growth opportunities.
>
> Biofuel consumption by the transport segment is expected to triple by 2030, with almost two-thirds of that coming from advanced biofuels.
>
> 3rd Generation Biofuels is also projected to experience significant growth

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throughout the previous timeframe, with a focus on industry segmentation and regional revenue forecasts, which is expected to provide the market with ample growth opportunities.

Key Players Landscape and Outlook

Key participants in the advanced biofuel market include Abengoa Bioenergy, Chemtex Company, A2BE Carbon Capture, LLC., Algenol Biotech, Bangchak Petroleum Plc., Clariant AG, and Fujian Zhongde Energy Co., Ltd. These companies are investing heavily in manufacturing highly efficient biofuels and employing competitive strategies such as mergers, acquisitions, and agreements to strengthen their position, in this rapidly changing market environment, thereby driving its growth prospects.

In November 2023, Clariant AG, a focused, sustainable, and innovative specialty chemical company, constructed a flagship sunliquid cellulosic ethanol production plant in Podari, Romania. The plant is the first full-scale commercial sunliquid facility, processing approximately 250,000 tons of straw to produce around 50,000 tons of cellulosic ethanol per year. The cellulosic ethanol produced by the sunliquid technology process supports the decarbonization of the transportation sector, as stipulated by the European Commission's REDII.

In May 2023, Dow and New Energy Blue signed a long-term supply agreement in North America, in which New Energy Blue would create bio-based ethylene from renewable agricultural residues. The agreement is expected to generate plastic source materials and is the first in North America to do so. Nearly 50% of the ethanol produced by New Energy Blue would be turned into bio-based ethylene feedstock for Dow products. The deal would help reduce carbon emissions from agriculture by using bio-based feedstocks from New Energy Blue. The agreement is expected to meet customer demands for bio based plastics by enabling innovations in waste recycling, and strengthening an ecosystem for diverse and low-carbon plastics used in everyday life.

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