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Biomass Bioconversion Market Forecasts to 2034 – Global Analysis By Feedstock Type (Agricultural Residues, Forestry Residues, Energy Crops, Municipal Solid Waste and Animal Manure), Conversion Technology, Application, End Product and By Geography

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Abstracts

According to Stratistics MRC, the Global Biomass Bioconversion Market is accounted for $25.0 billion in 2026 and is expected to reach $39.9 billion by 2034 growing at a CAGR of 6.0% during the forecast period. Biomass bioconversion refers to the biological transformation of organic waste materials, including crop residues, animal byproducts, and plant-based biomass, into energy sources, fuels, and valuable bio-chemicals. This process relies on microbes such as bacteria, fungi, and enzymes to decompose complex organic compounds into simpler forms. It is an important technology for producing renewable energy, managing waste efficiently, and lowering greenhouse gas emissions. By replacing conventional fossil fuels, biomass bioconversion promotes sustainability and supports a circular economy. It is commonly applied in biofuel manufacturing, biogas systems, and biochemical industries, enhancing environmental protection and resource efficiency globally with long term benefits today.

According to the IEA (2023), biomass accounts for ~10% of global final energy consumption, making it the largest source of renewable energy worldwide. It is widely used in heating, electricity, and transport fuels.

Market Dynamics:

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Driver:

Rising demand for renewable energy

The increasing need for renewable energy strongly drives the biomass bioconversion market as nation's transition away from fossil fuel dependence. Through bioconversion, organic waste, crop residues, and plant biomass are transformed into renewable fuels like biogas, bioethanol, and biodiesel. Growing energy demand along with rising concerns about greenhouse gas emissions and global warming is encouraging the adoption of cleaner energy solutions. Governments and industries are actively funding bioenergy initiatives to improve energy independence and sustainability. This global push for decarbonization and cleaner fuel alternatives is significantly boosting the development and adoption of biomass bioconversion technologies across various regions.

Restraint:

High initial investment and infrastructure costs

The biomass bioconversion market faces significant limitations due to high upfront investment and infrastructure requirements. Setting up processing facilities involves substantial spending on specialized machinery, bioreactors, storage units, and logistics systems. Ongoing expenses such as skilled workforce, maintenance, and research activities further increase operational costs. Small and medium-sized companies often struggle to enter the market because of these financial challenges. Limited access to funding, especially in developing economies, also slows adoption. The long payback period and high capital burden reduce profitability, making it difficult for many organizations to adopt biomass bioconversion technologies on a large commercial scale worldwide.

Opportunity:

Rising demand for sustainable waste management solutions

The increasing need for effective waste management presents a major opportunity for the biomass bioconversion market. Large quantities of agricultural residues, municipal waste, and industrial organic byproducts require sustainable treatment and disposal solutions. Biomass bioconversion enables the conversion of this waste into useful energy and bio-based materials, reducing landfill use and environmental damage.

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Governments and industries are increasingly adopting circular economy practices to improve resource efficiency and sustainability. Rising environmental concerns and stricter regulations are also encouraging investment in waste-to-energy technologies.

Threat:

Competition from established renewable energy sources

Strong competition from mature renewable energy technologies poses a significant threat to the biomass bioconversion market. Energy sources such as solar, wind, and hydro power are increasingly preferred due to their simplicity, lower operating costs, and rapid scalability. These alternatives also attract greater government incentives and private investments, making them more dominant in the renewable energy sector. In comparison, biomass bioconversion faces challenges in securing funding and market adoption. In many regions where other renewables are already well established, biomass-based solutions struggle to gain traction, thereby restricting their expansion and limiting their overall market growth potential globally.

Covid-19 Impact:

The COVID-19 outbreak affected the biomass bioconversion market in both negative and positive ways. In the early stages, lockdown restrictions disrupted supply chains, delayed biomass collection, and slowed down processing activities. Labour shortages and reduced industrial operations further impacted project execution. However, the pandemic also increased focus on sustainable energy systems and efficient waste management solutions. Governments introduced green recovery initiatives that encouraged investment in renewable energy, including bio energy projects. Ultimately, although COVID-19 caused short-term disruptions, it improved long-term growth opportunities for biomass bioconversion globally.

The agricultural residues segment is expected to be the largest during the forecast period

The agricultural residues segment is expected to account for the largest market share during the forecast period because of their abundant availability and continuous production from farming operations. Crop byproducts such as straw, husks, stalks, and leaves are generated in large quantities across agricultural regions, providing an easily accessible raw material for conversion processes. Their low cost and renewable characteristics make them a preferred feedstock option. These residues are extensively

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utilized in the production of biofuels, biogas, and bio-based chemicals, supporting cleaner energy generation.

The bioplastics segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the bioplastics segment is predicted to witness the highest growth rate, driven by rising demand for sustainable alternatives to traditional plastics. Increasing concerns about plastic pollution and strict regulations limiting single-use plastics are boosting their adoption worldwide. Produced from biomass sources, bioplastics offer biodegradability and a lower environmental impact, making them highly suitable for industries such as packaging, automotive, and consumer goods. Additionally, growing investments from manufacturers and increasing consumer preference for environmentally friendly products are significantly supporting the rapid growth of bioplastics globally.

Region with largest share:

During the forecast period, the North America region is expected to hold the largest market share because of its well-developed bioenergy infrastructure and strong government backing for renewable energy programs. The region has ample availability of agricultural waste and a highly organized supply chain network that supports efficient biomass processing. A strong presence of leading companies and continuous investment in research and innovation further reinforce its market leadership. Moreover, increasing demand for clean and sustainable energy in countries like the United States and Canada continues to drive regional market growth significantly.

Region with highest CAGR:

Over the forecast period, the Asia-Pacific region is anticipated to exhibit the highest CAGR due to strong industrial growth, rising population, and increasing energy requirements. Countries like China, India, and several Southeast Asian nations are actively investing in renewable energy to reduce reliance on fossil fuels. The region produces vast amounts of agricultural waste, offering a rich supply of raw material for bioconversion. Government support for clean energy development and waste-to-energy initiatives is further driving market growth. In addition, growing environmental concerns and favourable regulatory frameworks are encouraging wider adoption of biomass bioconversion technologies across the region.

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Key players in the market

Some of the key players in Biomass Bioconversion Market include POET LLC, DuPont de Nemours, Inc., Beta Renewables, Praj Industries Limited, Gevo, Inc., Novozymes A/S, Archer Daniels Midland Company, LanzaTech, Clenergen, AE Biofuels, Godavari Biorefineries Ltd., Woodland Biofuels Inc., Auro Mira Energy, Shirke Energy, Indus Green Bio Energy Pvt. Ltd., Mission New Energy Limited, Bharat Renewable Energy Ltd. and Inbicon.

Key Developments:

In November 2025, POET Technologies Inc. and Quantum Computing Inc. announced a strategic collaboration to develop 400GLane thin-film lithium niobate (TFLN) modulator-based 3.2Tbps engines that will be designed to lead the next era of computing.

In August 2025, DuPont de Nemours, Inc., The Chemours Company and Corteva, Inc. announced a settlement to comprehensively resolve all pending environmental and other claims by the State of New Jersey against the Companies in various litigation matters and other state directives. The Settlement will resolve all legacy contamination claims related to the companies' current and former operating sites and claims of statewide PFAS contamination unrelated to those sites, including from the use of aqueous film forming foam.

Feedstock Types Covered:

- Agricultural Residues
- Forestry Residues
- Energy Crops
- Municipal Solid Waste
- Animal Manure

Conversion Technologies Covered:

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- Thermochemical
- Biochemical
- Physicochemical
- Hydrothermal Processing

Applications Covered:

- Transportation
- Power Generation
- Heating
- Industrial Use
- Residential Use

End Users Covered:

- Biofuels
- Biochemicals
- Bioplastics
- Bioelectricity
- Biochar

Regions Covered:

- North America

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- United States
- Canada
- Mexico

Europe

- United Kingdom
- Germany
- France
- Italy
- Spain
- Netherlands
- Belgium
- Sweden
- Switzerland
- Poland
- Rest of Europe

Asia Pacific

- China
- Japan
- India
- South Korea

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- Australia
- Indonesia
- Thailand
- Malaysia
- Singapore
- Vietnam
- Rest of Asia Pacific

South America

- Brazil
- Argentina
- Colombia
- Chile
- Peru
- Rest of South America

Rest of the World (RoW)

- Middle East
  - Saudi Arabia
  - United Arab Emirates
  - Qatar

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- Israel
- Rest of Middle East

Africa

- South Africa
- Egypt
- Morocco
- Rest of Africa

What our report offers:

- Market share assessments for the regional and country-level segments
- Strategic recommendations for the new entrants
- Covers Market data for the years 2023, 2024, 2025, 2026, 2027, 2028, 2030, 2032 and 2034
- Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)
- Strategic recommendations in key business segments based on the market estimations
- Competitive landscaping mapping the key common trends
- Company profiling with detailed strategies, financials, and recent developments
- Supply chain trends mapping the latest technological advancements

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All the customers of this report will be entitled to receive one of the following free customization options:

- Company Profiling
  - Comprehensive profiling of additional market players (up to 3)
  - SWOT Analysis of key players (up to 3)
- Regional Segmentation
  - Market estimations, Forecasts and CAGR of any prominent country as per the client's interest (Note: Depends on feasibility check)
- Competitive Benchmarking
  - Benchmarking of key players based on product portfolio, geographical presence, and strategic alliances

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Note: Tables for North America, Europe, APAC, South America, and Rest of the World (RoW) Regions are also represented in the same manner as above.

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