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Bioenergy Power Generation Market Forecasts to 2032 – Global Analysis By Source (Solid Biofuels, Biogas, Liquid Biofuels, and Municipal Solid Waste), Technology (Combustion, Gasification, Anaerobic Digestion, Landfill Gas Recovery, and Other Technologies), Application, End User, and By Geography

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Abstracts

According to Stratistics MRC, the Global Bioenergy Power Generation Market is accounted for $134.1 billion in 2025 and is expected to reach $219.6 billion by 2032, growing at a CAGR of 7.3% during the forecast period. Bioenergy power generation converts biomass wood residues, agricultural waste, and biogas into electricity and heat through combustion, gasification, or anaerobic digestion. It offers dispatchable renewable energy and waste diversion benefits, often used in combined heat and power setups. Sustainability depends on feedstock sourcing, lifecycle emissions, and land-use impacts. Technology trends include co-firing with coal, advances in gas cleanup, and integration with carbon capture for negative emissions potential.

According to IRENA and the IEA Bioenergy reports, bioenergy power capacity was ~151 GW by 2024.

Market Dynamics:

Driver:

Growing need for sustainable waste management solutions

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The pressing global challenge of mounting municipal and agricultural waste is a significant market driver. Bioenergy facilities directly address the matter by converting organic waste, such as crop residues and forestry by-products, into valuable electricity. This process not only diverts waste from landfills, reducing methane emissions, but also creates a circular economy model. Consequently, governments and industries are increasingly investing in bioenergy as a dual-purpose solution for clean power generation and effective waste management, thereby accelerating market expansion.

Restraint:

Complex supply chain logistics and seasonal variability

The intricate and often costly logistics of sourcing, transporting, and storing biomass feedstocks hinder the market growth. Unlike fossil fuels, biomass is bulky, has a low energy density, and can be highly seasonal, resulting in supply inconsistencies and price volatility. These challenges necessitate significant investment in infrastructure and inventory management, which can erode profit margins and deter new entrants, ultimately restraining the pace of market development, especially in regions with underdeveloped supply networks.

Opportunity:

Integration with carbon capture for carbon-negative power generation

The emerging integration of bioenergy with carbon capture and storage (BECCS) presents a transformative opportunity. This technology combination enables the generation of power while removing carbon dioxide from the atmosphere, creating a carbon-negative energy cycle. This positions bioenergy as a crucial technology in global net-zero strategies, potentially unlocking substantial value and new revenue streams from carbon credits. This strategic advantage can attract significant investment and policy support, propelling the market into a new phase of growth.

Threat:

Competition from solar and wind with declining costs

Many regions have achieved grid parity with these intermittent renewables, often prioritizing them due to their lower levelized cost of energy. This intense competition for grid capacity and renewable energy investments can limit the growth potential for

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bioenergy projects, which typically require higher capital and operational expenditures, thereby challenging their economic viability and market share in the broader clean energy landscape.

Covid-19 Impact:

The pandemic first hurt the bioenergy market by causing delays in project construction, labor shortages, and supply chain problems. Lockdowns impeded the collection and transportation of biomass feedstocks, while economic uncertainty temporarily slowed investment. However, the sector demonstrated resilience, as bioenergy is a dispatchable power source essential for grid stability. Furthermore, the crisis amplified the focus on sustainable recovery and energy security, leading to renewed governmental support that has helped the market rebound and reinforced its long-term strategic importance.

The solid biofuels segment is expected to be the largest during the forecast period

The solid biofuels segment is expected to account for the largest market share during the forecast period, attributed to the widespread availability and established conversion technologies, such as direct combustion, which are well-understood and commercially mature. Furthermore, the segment directly supports waste-to-energy initiatives, providing a reliable and baseload power source. Its extensive use in industrial heat and power applications, particularly in European forest-rich nations, solidifies its leading position in the market landscape.

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

Over the forecast period, the anaerobic digestion segment is predicted to witness the highest growth rate, driven by its efficient ability to process wet organic waste, like animal manure and food scraps, into biogas and digestate. The process simultaneously addresses waste management regulations and produces renewable energy. Also, helpful government rules, like payments for biogas energy and the important by-product of organic fertilizer, are major reasons why this area is growing quickly around the world.

Region with largest share:

During the forecast period, the Europe region is expected to hold the largest market

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share. This leadership is firmly rooted in stringent EU-wide renewable energy and waste diversion directives, such as the Renewable Energy Directive (RED II). Strong policy support, coupled with advanced infrastructure and significant investments in both solid biofuel and biogas technologies, drives the market. Moreover, the region's well-established forestry and agricultural sectors provide a consistent feedstock supply, cementing Europe's dominant position in the bioenergy generation sector.

Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR, fueled by rapidly increasing energy demand, supportive government policies in countries like China and India, and a pressing need to manage agricultural and municipal waste. The region's vast biomass potential from its extensive agricultural activities presents a significant untapped resource. Key drivers behind this exceptional growth trajectory include investments in new bioenergy capacity that enhance energy security and reduce coal dependency.

Key players in the market

Some of the key players in Bioenergy Power Generation Market include Drax Group plc, Veolia Environnement S.A., ANDRITZ AG, W?rtsil? Corporation, ENGIE SA, RWE AG, Covanta Holding Corporation, Enviva Inc., Fortum Oyj, Enel S.p.A., Abengoa S.A., Renewable Energy Group, Inc., POET LLC, Stora Enso Oyj, Babcock & Wilcox Enterprises, Inc., Hitachi Zosen Inova AG, and Siemens Energy AG.

Key Developments:

In October 2025, Drax, the renewable energy business, is partnering with NGIS, a global leader in Geospatial technology, to model and monitor the carbon stocks of the US and Canadian forests that Drax sources its sustainable biomass from.

In October 2025, Drax launched a partnership with NGIS to map and monitor carbon stocks across its North American biomass sourcing areas.

In July 2025, Veolia signed a three-year strategic partnership with the Agence Fran?aise de D?veloppement to accelerate ecological transformation including local renewable energy and biomass projects.

Sources Covered:

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- Solid Biofuels
- Biogas
- Liquid Biofuels
- Municipal Solid Waste (MSW)

Technologies Covered:

- Combustion (Steam Turbines)
- Gasification
- Anaerobic Digestion
- Landfill Gas Recovery
- Other Technologies

Applications Covered:

- Baseload Power Generation
- Peak Load Shaving
- Combined Heat and Power (CHP)/Cogeneration

End Users Covered:

- Utilities/Centralized Power Plants
- Independent Power Producers (IPPs)
- Commercial & Industrial (C&I)

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- Residential

Regions Covered:

- North America
  - US
  - Canada
  - Mexico
- Europe
  - Germany
  - UK
  - Italy
  - France
  - Spain
  - Rest of Europe
- Asia Pacific
  - Japan
  - China
  - India
  - Australia
  - New Zealand

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South Korea

Rest of Asia Pacific

South America

Argentina

Brazil

Chile

Rest of South America

Middle East & Africa

Saudi Arabia

UAE

Qatar

South Africa

Rest of Middle East & 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 2024, 2025, 2026, 2028, and 2032
- 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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Free Customization Offerings:

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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