

Bioenergy with Carbon Capture (BECCS) Market Forecasts to 2032 – Global Analysis By Feedstock (Forestry Biomass, Agricultural Residues, Energy Crops, Municipal Solid Waste (MSW), Industrial Waste, Algae and Other Feedstocks), Capture Method, Storage Method, Technology, End User and By Geography

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Abstracts

According to Statistics MRC, the Global Bioenergy with Carbon Capture (BECCS) Market is accounted for \$312.75 million in 2025 and is expected to reach \$1246.6 million by 2032 growing at a CAGR of 21.84% during the forecast period. The method known as Bioenergy with Carbon Capture and Storage (BECCS) lowers atmospheric CO₂ levels by combining biomass-based energy generation with carbon capture and storage. In BECCS, fuels or electricity are produced using organic resources such as wood, crop wastes, or energy crops. The CO₂ that is produced during processing or combustion is trapped before it can reach the atmosphere and is kept underground in geological formations. BECCS is a crucial tactic for reducing climate change and reaching carbon neutrality targets since plants absorb CO₂ during growth, and storing and collecting the emissions from their use can provide net negative emissions.

Market Dynamics:

Driver:

Global push for net-zero emissions

BECCS is being adopted by governments and businesses more frequently in order to

achieve strict carbon reduction targets. By actively removing CO₂ from the atmosphere and producing renewable energy, BECCS has two advantages. This encourages investments and policy assistance in line with global climate agreements like the Paris Accord. Global deployments of BECCS projects are accelerating due to financial incentives and technological breakthroughs. BECCS is becoming a crucial component of international decarbonisation plans as the need for negative emission solutions increases.

Restraint:

High operational and capital costs

A significant upfront investment in carbon capture technologies, biomass supply networks, and infrastructure is needed to establish BECCS operations. Large-scale deployment is frequently discouraged by these exorbitant costs for both public and private interests. Project feasibility is further strained by operational costs such as skilled labour, energy input, and maintenance. In addition, BECCS is less appealing than other low-carbon options due to its inconsistent financial incentives and unpredictable returns. Consequently, market growth is still constrained, particularly in developing nations.

Opportunity:

Integration with carbon credit markets and green financing

The economic viability of BECCS facilities can be improved by monetising carbon extracted through tradable credits. Green financing lowers initial funding obstacles by providing sustainability-linked bonds and low-interest loans. The advantages of BECCS's renewable energy and low emissions attract investors. The implementation of BECCS across industries and geographical areas is accelerated by regulatory assistance, which promotes broader adoption and private sector involvement and innovation.

Threat:

Sustainability concerns and land-use competition

The conversion of natural ecosystems into energy crop farms, according to critics, may jeopardise climate goals. Concerns about food security are exacerbated by land-use

competition that results from the conversion of agricultural land from food production to biomass. Public and policy support for BECCS deployment is constrained by this dilemma. Environmental issues are brought up by the extensive use of fertiliser and water in energy crops. Together, these obstacles impede BECCS investment and market growth.

Covid-19 Impact

The Covid-19 pandemic disrupted the Bioenergy with Carbon Capture (BECCS) market by delaying project timelines, hindering supply chains, and reducing investments in clean energy initiatives. Many governments shifted focus to immediate public health and economic recovery, resulting in slowed deployment of BECCS technologies. However, the crisis also highlighted the importance of sustainable and resilient energy systems. As economies began to recover, interest in BECCS revived, driven by strengthened climate commitments and stimulus packages supporting low-carbon technologies.

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 by offering an abundant and cost-effective biomass source. These residues, such as crop stalks, husks, and straws, are readily available and reduce reliance on fossil fuels. Utilizing them in BECCS systems supports sustainable waste management while minimizing environmental pollution. Their high carbon content enhances energy output during combustion or gasification processes. Additionally, converting agricultural waste into energy with carbon capture contributes to negative emissions, advancing climate goals.

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

Over the forecast period, the gasification segment is predicted to witness the highest growth rate, due to the efficient conversion of biomass into syngas, which enhances energy yield. This process supports cleaner energy generation with reduced emissions, aligning with global decarbonization goals. Gasification allows for easier integration with carbon capture technologies due to its concentrated CO₂ stream. Its flexibility in feedstock usage makes it suitable for various regions, boosting scalability. Additionally, ongoing technological advancements in gasification improve system efficiency and lower operational costs, driving its adoption in the BECCS sector.

Region with largest share:

During the forecast period, the Asia Pacific region is expected to hold the largest market share due to increasing government commitments to carbon neutrality, especially in countries like Japan, China, and South Korea. Investments in renewable bioenergy infrastructure and pilot-scale CCS projects are accelerating, supported by favorable policy frameworks and international collaborations. The region's large agricultural base offers significant biomass feedstock potential. Japan is a front-runner, integrating BECCS into its decarbonization roadmap. However, high deployment costs and technology readiness barriers still persist, requiring more R&D efforts and public-private funding models to ensure long-term scalability.

Region with highest CAGR:

Over the forecast period, the North America region is anticipated to exhibit the highest CAGR, due to mature carbon capture technologies, strong policy support like the U.S. Inflation Reduction Act, and abundant biomass feedstock. The U.S. leads in full-scale commercial deployments, driven by incentives such as 45Q tax credits. Private sector involvement and federal R&D funding continue to boost innovation. Canada is also investing in BECCS as part of its net-zero emissions strategy. Unlike Asia Pacific, the region benefits from established carbon transport and storage networks, though concerns about public acceptance and land use remain challenges.

Key players in the market

Some of the key players profiled in the Bioenergy with Carbon Capture (BECCS) Market include Drax Group, Orsted, Stockholm Exergi, Summit Carbon Solutions, Archer Daniels Midland (ADM), Carbon Clean Solutions, Aker Carbon Capture, Mitsubishi Heavy Industries (MHI), Carbon Engineering, Climeworks, Charm Industrial, LanzaTech, Svante, CarbonCure Technologies, Calix, Capsol Technologies and Carbon8 Systems.

Key Developments:

In September 2024, Orsted signed a ten-year agreement to sell 330,000 tonnes of carbon dioxide removal (CDR) credits to Equinor. The credits originate from Orsted's BECCS project, capturing and permanently storing CO₂ from sustainable biomass, further validating the commercial market for BECCS-derived carbon credits.

In June 2024, Stockholm Exergi partnered with Fimpec Sweden to leverage their expertise in project management and piping design for the BECCS Stockholm initiative. Fimpec will support the implementation of complex engineering solutions, ensuring efficient construction and integration of the carbon capture infrastructure within the existing bioenergy facility.

In January 2024, Drax partnered with Molpus Woodlands Group, securing an option to purchase up to 1 million green tons of sustainably sourced fiber annually from the U.S. Southeast. This agreement aims to supply biomass feedstock for Drax's planned BECCS facilities, supporting its large-scale carbon removal and renewable energy goals.

Feedstocks Covered:

Forestry Biomass

Agricultural Residues

Energy Crops

Municipal Solid Waste (MSW)

Industrial Waste

Algae

Other Feedstocks

Capture Methods Covered:

Pre-Combustion Capture

Post-Combustion Capture

Oxy-Fuel Combustion Capture

Storage Methods Covered:

Geological Storage

Utilization

Mineralization

Technologies Covered:

Combustion

Gasification

Pyrolysis

Fermentation

Anaerobic Digestion

Other Technologies

End Users Covered:

Power Plants

Biofuel Producers

Pulp & Paper Industry

Cement Industry

Chemical Industry

Waste Management Companies

Government & Research Institutions

Other End Users

Regions Covered:

North America

US

Canada

Mexico

Europe

Germany

UK

Italy

France

Spain

Rest of Europe

Asia Pacific

Japan

China

India

Australia

New Zealand

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

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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Note: Tables for North America, Europe, APAC, South America, and Middle East & Africa Regions are also represented in the same manner as above.

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