

Biomass Gasification Market to Hit \$188.5 Billion by 2031 | Strong 8% CAGR Growth Forecast

Waste-to-Energy Technologies Drive Biomass Gasification Market Expansion to 2031

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According to a new report published by Allied Market Research, the [biomass gasification market](#) size was valued at \$88.0 billion in 2021 and is projected to reach \$188.5 billion by 2031, registering a strong CAGR of 8% from 2022 to 2031. Growing concerns over carbon emissions, increasing solid waste management efforts, and rising global electrification are driving strong demand for biomass gasification systems worldwide.



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Biomass gasification market to reach \$188.5B by 2031, driven by waste-to-energy adoption, clean power demand, and strong global decarbonization efforts.”

Allied Market Research

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Biomass gasification is an advanced thermochemical process that converts biomass into valuable gases and energy. Using high-temperature partial combustion under controlled oxygen conditions, biomass is broken down to produce carbon monoxide, hydrogen, and carbon dioxide. The resulting hydrogen-rich gas is used as a clean fuel

across power generation, chemical manufacturing, transportation, and industrial applications. Meanwhile, carbon dioxide generated in the process supports agricultural and industrial uses.

□ Key Findings

Europe is projected to grow at 8.3% CAGR during the forecast period.

Power generation accounted for 56.9% market share in 2021.

Solid biomass is expected to grow at a CAGR of 8.2%.

China dominates patent filings with 61.4% share.

□ Introduction: Why Biomass Gasification Matters

Biomass gasification has emerged as a key technology for producing renewable energy, reducing waste, and supporting global decarbonization goals. With abundant biomass availability—including agricultural residue, wood pellets, municipal solid waste (MSW), and [biogas](#)—gasification provides a sustainable alternative to fossil fuels.

Instead of allowing biomass to accumulate in landfills or be burned openly, gasification converts it into clean energy and industrial feedstock. This not only reduces environmental pollution but also enables countries to diversify their energy mix, enhance energy security, and meet climate targets. □

□ Market Dynamics

1. Abundant Biomass Supply Drives Market Growth

The availability of biomass in massive quantities is one of the primary growth drivers for the biomass gasification market. Municipal solid waste (MSW), agricultural waste, forest residues, and organic industrial waste can be gasified to produce heat and gases used as fuel and feedstock. As the volume of global waste continues to rise, converting [waste-to-energy](#) through gasification becomes an essential economic and environmental strategy.

2. Rise in Solid Waste Management Activities

Cities worldwide are investing heavily in advanced waste management. Biomass gasification plays a critical role by transforming organic waste into energy, reducing landfill pressure, and supporting circular economy initiatives. This trend significantly boosts the biomass gasification market.

3. Electrification in Urban and Rural Regions

Increasing electrification demand in both developed and developing economies is propelling the adoption of gasification systems. Biomass gasification helps generate reliable electricity, especially in rural areas where grid connectivity remains limited.

4. Declining Fossil Fuel Reserves

As fossil fuel reserves continue to deplete and volatile prices persist, biomass gasification emerges as an attractive alternative. It offers a consistent, renewable source of energy while supporting national energy independence.

5. Government Support for Clean Energy

Governments globally are promoting biomass gasification as a clean hydrogen and heat production method. The process emits fewer greenhouse gases compared to traditional combustion, supporting efforts to reduce carbon footprints and enhance sustainability.

Challenges

Despite strong market potential, several challenges exist:

High installation cost of gasification plants

Significant maintenance needs for large systems

Technical limitations restricting large-capacity plant deployment

Reducing costs through technological advancements and commercialization remains key to unlocking full market potential.

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□ Market Segments Overview

The biomass gasification market is segmented based on gasifier type, application, source, and region.

1. By Gasifier Type

Moving or Fixed Bed Gasifiers – Dominated the market in 2021. These systems operate at very high temperatures and are widely used due to reliability.

Fluidized Bed Gasifiers – Expected to grow at the highest CAGR due to the ability to produce high-heating-value gas and better efficiency.

Entrained Flow Gasifiers

Others

2. By Application

Power (Dominant Segment, 56.9% share in 2021)

Chemicals

Liquid Fuels

Gas Fuels

The power generation sector is projected to grow fastest as biomass-derived heat is increasingly utilized for electricity production. With the global push to reduce carbon emissions, biomass gasification will play a critical role in enabling cleaner power.

3. By Source

Solid Biomass (Largest segment, 2021)

Liquid Biomass

Biogas

Municipal Waste

Others

Solid biomass such as wood pellets, corncobs, soybeans, switchgrass, and plant residues contributes significantly to market growth due to abundant availability.

4. By Region

Europe (Dominant Market in 2021)

North America

Asia-Pacific

LAMEA

Europe maintains leadership due to strong commitments to reducing fossil fuel dependency, stringent environmental regulations, and advanced waste management systems. The region targets 2030 and 2050 climate goals, making biomass gasification a central part of its renewable

energy strategy.

Notably:

Europe's biomass gasification market is expected to grow at 8.3% CAGR.

China holds 61.4% of global patents, showing rapid innovation in this field.

□ Competitive Landscape

Key players in the biomass gasification market include:

Beltran Technologies, Inc.

Vaskiluodon Voima Oy

EQTEC plc

Chanderpur Works Private Limited

Ankur Scientific Energy Technologies Pvt. Ltd.

Infinite Energy Pvt. Ltd.

Valmet Corporation

KASAG Swiss AG

Goteborg Energi AB

Thyssenkrupp AG

These companies focus on technology updates, system commercialization, cost reduction, and efficiency improvement through R&D investments.

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□ Conclusion

The biomass gasification market is set for robust growth, driven by rising waste-to-energy initiatives, strong government support, and increasing focus on sustainable power generation. As nations move toward low-carbon economies, biomass gasification will play a pivotal role in

turning waste into valuable energy, reducing environmental impact, and strengthening energy security. ☐☐

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