

Biomass Power Generation Market – Global Industry Size, Share, Trends, Opportunity, and Forecast, 2018–2028 Segmented By Technology (Combustion, Pyrolysis, Gasification, Anaerobic Digestion, Landfill gas (LFG), and Others), By Feedstock (Urban Residue, Municipal Solid Waste (MSW), Agricultural and Forest Residue, Energy Crops, Woody biomass, and Others), By End-User (Industrial, Residential & Commercial, and Utilities), By Fuel (Solid, Liquid, and Gaseous), By Region and Competition By Type (Bladder, Piston, Diaphragm, and Spring), By Application (Blow Out Preventers (BOP), Mud Pumps, Offshore Rigs, and Others), By Deployment (Onshore, Offshore), By Region and Competition

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Abstracts

Global biomass power generation market is expected to grow during the forecast period, 2024-2028, the industry has expanded because of countries' increased use of renewable energy in their power mixes because of growing environmental concerns. Many governments have made renewable energy objectives public and expect to one day become carbon-neutral states. Additionally, the industry is driven by increased adoption brought on by favourable laws and regulations.

Advancements in Biomass Power Generation Techniques will Drive the Market Growth

Advancements in biomass power generation techniques have revolutionized the utilization of organic matter as a renewable energy source. These developments have significantly improved the efficiency, sustainability, and environmental impact of biomass power generation. One notable advancement is the introduction of advanced combustion technologies such as fluidized bed combustion and biomass gasification. These techniques allow for the efficient combustion of a wide range of biomass feedstocks, including agricultural residues, forestry waste, and energy crops. They enhance fuel efficiency and reduce emissions of greenhouse gases and air pollutants, making biomass power generation a cleaner alternative to fossil fuels. These advantages propelled the market growth in the forecast period.

Furthermore, the concept of co-firing biomass with coal in existing power plants has gained traction. This approach enables a gradual transition from coal to renewable energy sources, as biomass can be readily mixed with coal during combustion. Additionally, combined heat and power systems have been implemented, which not only generate electricity but also captures and utilizes waste heat for heating and other industrial processes, maximizing energy efficiency.

Some other advancements include the development of anaerobic digestion systems, where organic waste is broken down by microorganisms to produce biogas, a valuable source of renewable energy. Pyrolysis and torrefaction processes have also emerged, converting biomass into biochar, bio-oil, and syngas. These products can be used for heat and power generation, as well as to produce biofuels. Additionally, people are continually exploring new conversion technologies such as hydrothermal carbonization, algae-based biofuels, and microbial fuel cells to further enhance the efficiency and sustainability of biomass power generation. Overall, these advancements have expanded the range of biomass feedstocks, improved energy conversion efficiency, and reduced environmental impacts, making biomass power generation a vital component of the global renewable energy transition.

Reduction in Dependency on Fossil Fuels Fuelling the Market Growth

Over the past few decades, there has been a growing recognition of the need to reduce dependency on fossil fuels and transition towards more sustainable energy sources. The utilization of biomass offers several benefits in terms of reducing reliance on fossil fuels. Firstly, biomass is a renewable resource as it can be continuously grown and harvested. Unlike fossil fuels, which take millions of years to form, biomass can be replenished relatively quickly through sustainable practices, and biomass energy

production can contribute to a significant reduction in greenhouse gas emissions. While the combustion of biomass does release carbon dioxide, the plants used for biomass capture CO₂ from the atmosphere during their growth, creating a carbon-neutral cycle. Moreover, biomass can replace fossil fuels in various sectors, including power generation, heating, and transportation, thereby reducing overall emissions.

Furthermore, biomass provides economic opportunities by promoting local agricultural and forestry industries, creating jobs, and improving energy security by diversifying the energy mix. However, it's essential to ensure sustainable biomass production to avoid negative environmental impacts, such as deforestation or the use of food crops for energy production. Due to all these above-mentioned factors, biomass has the potential to play a significant role in reducing our dependency on fossil fuels. By harnessing this renewable resource, industries can achieve cleaner energy generation, mitigate climate change, and promote sustainable development.

Government-Led Initiatives to Boost Bioenergy Production to Encourage the Market Growth

The development of bioenergy has been significantly influenced by government policies and programmes. Between 2006 and 2021, 62 national-level laws and policies in China were crucial to the development of the biomass energy sector in nation. '13th Five-Year Plan for Biomass Energy Development' of 2016, and the 'Biomass Power Generation Project Construction Work Plan' was released in August 2021 in collaboration with the National Development and Reform Commission, Ministry of Finance, and National Energy Administration. The municipal and federal governments provided USD 3.5 billion in funding to boost biomass power generation.

Global warming is being caused by dangerous greenhouse gases that have been generated due to increased carbon emissions from traditional fossil fuels. The key environmental concern driving the global market for biomass electricity is global warming. European nations like the UK, Germany, and Finland are attempting to phase out coal-based power generation in favour of biomass power as a substitute in response to growing environmental concerns. China, India, are just a few of the Asian nations that are converting to cleaner and more effective energy sources. Additionally, government initiatives and programmes like Feed-in-Tariff (FiT) emphasise the lowering of rates. During the predicted period, these variables will simultaneously support the expansion of the biomass power sector.

Presence of Alternative Renewable Energy Sources to Restraining the Market Growth

The biomass market has witnessed significant growth in recent years as a renewable energy source. However, the presence and increasing adoption of alternative renewable energy sources pose challenges to its continued growth and market share.

One of the primary alternative energy sources affecting the biomass market is solar power. The declining costs of solar photovoltaic (PV) systems and the widespread availability of sunlight in many regions have made solar power an attractive option for electricity generation. Solar energy offers the advantage of scalability, as installations can range from small residential systems to large-scale solar farms. This widespread adoption of solar power reduces the demand for biomass-generated electricity.

Similarly, wind power has emerged as another formidable competitor to biomass. Advances in wind turbine technology, along with favourable wind resources in various locations, have made wind power an increasingly cost-effective and reliable renewable energy option. Large-scale wind farms can generate substantial amounts of electricity, further reducing the demand for biomass-generated power.

Moreover, the development of advanced energy storage technologies, such as lithium-ion batteries, has enhanced the intermittent nature of solar and wind power. This allows for the storage of excess electricity generated during peak production periods, addressing one of the challenges of renewable energy sources. With improved storage capabilities, solar and wind power can provide more reliable and consistent electricity supply, potentially diminishing the need for biomass power plants as a baseload energy source. While biomass remains a valuable renewable energy source, the presence of alternative options such as solar power, wind power, and advanced energy storage technologies poses challenges to its market growth. Continued advancements in these alternative energy sources, along with supportive policies, will likely shape the future of the renewable energy market and influence the relative market share of biomass power generation market.

Market Segmentation

Global biomass power generation market is segmented based on technology, feedstock, end-user, fuel type, and region. Based on technology, the market is divided into combustion, pyrolysis, gasification, anaerobic digestion, landfill gas (LFG), and others. Based on feedstock, the market is divided into urban residue, municipal solid waste (msw), agricultural and forest residue, energy crops, woody biomass, and others. Based on end-user, the market is divided into industrial, residential & commercial, and

utilities. Based on fuel type, the market is divided into solid, liquid, and gaseous. Based on region, the market is further bifurcated into North America, Asia-Pacific, Europe, South America, and Middle East & Africa.

Market player

Major market players in the global biomass power generation market are Mitsubishi Power Ltd., Suez SA, Xcel Energy Inc., Ramboll Group A/S, Babcock & Wilcox Enterprises, Inc., Orsted A/S, Ameresco Inc, General Electric Company, Veolia Environment S.A., and Vattenfall AB.

Report Scope:

In this report, the global biomass power generation market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

Biomass Power Generation Market, By Solution Technology:

Combustion

Pyrolysis

Gasification

Anaerobic Digestion

Landfill gas (LFG)

Others

Biomass Power Generation Market, By Feedstock:

Urban residue

Municipal Solid Waste (MSW)

Agricultural and forest residue

Energy crops

Woody biomass

Others

Biomass Power Generation Market, By End-User:

Industrial

Residential & Commercial

Utilities

Biomass Power Generation Market, By Fuel:

Solid

Liquid

Gaseous

Biomass Power Generation Market, By Region:

North America

United States

Canada

Mexico

Asia-Pacific

China

India

Japan

South Korea

Australia

Europe

Germany

United Kingdom

France

Spain

Italy

South America

Brazil

Argentina

Colombia

Middle East

Saudi Arabia

South Africa

UAE

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the global biomass power generation market.

Available Customizations:

With the given market data, Tech Sci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

Detailed analysis and profiling of additional market players (up to five).

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