

# Solar Bio-gas Hybrid Power System Market Forecasts to 2030 – Global Analysis By Component (Direct Solar Panel, Bio-gas Generator, Inverter, Battery Storage System, Controller, Other Components), Fuel Type, System Type, Capacity, Technology, End User and By Geography

<https://marketpublishers.com/r/SCE737B41680EN.html>

Date: March 2025

Pages: 150

Price: US\$ 4,150.00 (Single User License)

ID: SCE737B41680EN

## Abstracts

According to Statistics MRC, the Global Solar Bio-gas Hybrid Power System Market is accounted for \$3.19 billion in 2024 and is expected to reach \$6.69 billion by 2030 growing at a CAGR of 13.1% during the forecast period. A Solar Bio-gas Hybrid Power System is a renewable and sustainable energy source that generates power by combining sun and biogas. This system uses solar panels to generate energy and a biogas generator to create power from biogas, which is made from organic waste. By using biogas power at night or during cloudy conditions and solar power during the day, the hybrid system maximises energy output. By guaranteeing a dependable, environmentally responsible, and effective energy source, it lessens reliance on traditional fossil fuels and promotes waste management and environmental sustainability.

According to international energy agency, majority of the electricity demand in the year 2019 came from industrial sectors electricity demand stood at 26.6% and 21.2%, respectively.

Market Dynamics:

Driver:

## Government incentives and subsidies

Programs for government subsidies and incentives lower the high initial installation costs, increasing the technology's accessibility for both enterprises and consumers. Direct financial assistance, tax exemptions, or feed-in tariffs—which set a price for power produced from renewable resources—can all be considered forms of subsidies. These incentives promote broader use of hybrid power systems and boost market expansion by reducing the cost barrier to entry. Additionally, by demonstrating the government's commitment to renewable energy, this assistance encourages more investment and innovation in the field.

### Restraint:

#### Land and resource availability

Large areas of land are needed for these systems in order to place solar panels and biogas facilities. Developments in agriculture, industry, and housing frequently create rivalry for available land. Furthermore, the generation of biogas necessitates the availability of organic waste materials, which might not be easily accessible in some areas. Project viability may be hampered by a lack of suitable land and waste resources, which might raise operating expenses. This imbalance can slow the growth of hybrid power systems in regions with constrained land and resource access.

### Opportunity:

#### Growing focus on circular economy

Waste and dependency on landfills are decreased by the efficient use of waste biomass for biogas generation brought about by the increased emphasis on circular economy concepts. The method of producing biogas closes the circle in agricultural cycles by producing biofertilizer, a desirable byproduct. This strategy promotes resource efficiency and reduces environmental impact, which is consistent with the principles of the circular economy. The demand for these hybrid systems is being driven by consumers' and companies' growing interest in sustainable energy solutions. Market expansion is further accelerated by government regulations and subsidies that encourage renewable energy.

### Threat:

## Climate and weather variability

Sunlight is essential for solar power generation, yet erratic weather conditions like cloud cover or seasonal variations can lower energy production. In turn, humidity and temperature variations affect the generation of bio-gas, which affects the stability of the system. System outages can result from severe weather events like floods or storms damaging infrastructure. Market confidence may be impacted by these interruptions as they may raise questions about the energy supply. Consequently, erratic climatic patterns impede market growth and long-term investments.

## Covid-19 Impact

The COVID-19 pandemic significantly impacted the Solar Bio-gas Hybrid Power System market, causing disruptions in manufacturing and supply chains. Lockdowns and restrictions slowed down project installations and delayed research and development activities. However, as demand for sustainable energy solutions increased post-pandemic, there was a gradual recovery. Governments' focus on clean energy and green recovery initiatives bolstered market growth, driving investments and innovations in hybrid power systems that combine solar and bio-gas technologies for more efficient energy production.

The bio-gas generator segment is expected to be the largest during the forecast period

The bio-gas generator segment is expected to account for the largest market share during the forecast period, due to the intermittent nature of solar power. This continuous generation enhances the overall stability and efficiency of the hybrid system. By utilizing organic waste for bio-gas production, these generators offer a sustainable waste management solution. This process reduces reliance on fossil fuels and lowers greenhouse gas emissions. The integration of bio-gas generators strengthens the economic viability of the hybrid system, as bio-gas can be produced locally, reducing energy costs and dependence on external fuel sources.

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

Over the forecast period, the agricultural sector segment is predicted to witness the highest growth rate, due to the agricultural waste, such as crop residues and livestock manure, provides feedstock for biogas production, fuelling the hybrid system. This reduces waste management issues and creates a valuable energy source.

Simultaneously, solar energy complements biogas generation, ensuring a consistent power supply for agricultural operations. This integrated approach enhances energy independence for farmers and promotes sustainable agriculture. Additionally, government incentives and growing environmental awareness further drive the adoption of these systems within the agricultural sector.

Region with largest share:

During the forecast period, the South America region is expected to hold the largest market share due to the region's abundant solar resources and significant agricultural activity. This market offers a sustainable solution to energy needs, particularly in rural areas with limited grid access. The technology combines solar photovoltaic panels with biogas digesters, utilizing agricultural waste for biogas production. This hybrid approach ensures a more reliable energy supply compared to relying solely on solar or biogas. The market is driven by the need for clean energy, reduced reliance on fossil fuels, and improved waste management practices. As awareness of the benefits increases and costs decrease, the adoption of these systems is expected to rise across South America.

Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR, owing to the increasing energy demands and abundant agricultural resources. Supportive government policies and rising environmental concerns further accelerate market expansion. Technological advancements and decreasing costs make these systems more accessible. Countries like India and China are leading the market with significant investments. The versatility of these systems, suitable for on-grid and off-grid applications, drives their adoption. This trend contributes to sustainable development and energy security in the region.

Key players in the market

Some of the key players profiled in the Solar Bio-gas Hybrid Power System Market include Adani Green Energy Limited, Sterling & Wilson, ReNew Power, JSW Energy, Greenko Group, Tata Power Renewable Energy Limited, NextEra Energy, First Solar, Enphase Energy, WELTEC BIOPOWER, PLANET BIOENERGY, ABJ Inc. and Husk Power Systems.

Key Developments:

In August 2024, ReNew announced a contract for the sale of green attributes amounting to 437.6 MW with Microsoft. The contract will generate over one million units of green electricity annually and includes a commitment of approximately US \$15 million towards community fund initiatives focused on environmental justice.

In June 2023, ReNew Power entered a partnership with WattPower to supply 1.2 GW of string inverters. This collaboration is valued at around INR 200 crores and is aimed at bolstering India's transition to clean energy while supporting ReNew's target of achieving 5 GW of solar projects.

#### Components Covered:

Solar Panel

Bio-gas Generator

Inverter

Battery Storage System

Controller

Other Components

#### Fuel Types Covered:

Agricultural Waste

Animal Manure

Food Waste

Industrial Waste

Municipal Solid Waste (MSW)

Other Fuel Types

### System Types Covered:

Off-grid

On-grid

### Capacities Covered:

Small-scale (up to 10 kW)

Medium-scale (10 kW to 100 kW)

Large-scale (above 100 kW)

### Technologies Covered:

Photovoltaic (PV) Solar Power

Bio-gas Power Generation

Hybrid

### End Users Covered:

Residential Users

Agricultural Sector

Industrial Sector

Commercial Sector

Utilities

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 2022, 2023, 2024, 2026, and 2030
- 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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