

Carbon Capture and Storage for Power Generation Market Forecasts to 2034 – Global Analysis By Capture Technology (Pre-combustion Capture, Post-combustion Capture and Oxy-fuel Combustion Capture), Storage Type, Transportation Mode, Power Generation Source, End User and By Geography

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Abstracts

According to Statistics MRC, the Global Carbon Capture and Storage for Power Generation Market is accounted for \$14.3 billion in 2026 and is expected to reach \$42.1 billion by 2034 growing at a CAGR of 14.4% during the forecast period. Carbon Capture and Storage (CCS) used in power generation captures carbon dioxide emissions from fossil fuel-based electricity plants before they enter the atmosphere. The captured CO₂ is then transported through pipelines or ships and stored safely in deep underground geological formations such as depleted oil and gas reservoirs or saline aquifers. This method reduces greenhouse gas emissions while allowing continued use of existing power infrastructure and supporting climate targets. It is increasingly combined with coal and natural gas plants to enhance environmental performance and comply with stricter regulations worldwide and promotes long-term decarbonization in global energy systems sector transition goals.

According to the International Energy Agency (IEA), announced capture capacity for 2030 is around 435 million tonnes (Mt) of CO₂ per year, while announced storage capacity is about 615 Mt CO₂ per year—only ~40% and ~60% of what is required to meet the Net Zero Emissions by 2050 Scenario.

Market Dynamics:

Driver:

Stringent emission regulations and climate policies

Strict environmental regulations and climate policies significantly drive the CCS market in power generation. Many governments are implementing tough restrictions on CO₂ emissions from fossil-fuel power plants to address global warming. Rules like emission limits, sustainability standards, and mandatory disclosure systems encourage power producers to integrate CCS technologies. These regulatory measures aim to lower greenhouse gas emissions while still permitting the operation of existing energy infrastructure. With rising environmental pressure, meeting compliance requirements has become crucial. This is accelerating the deployment of CCS solutions across global electricity generation and encouraging cleaner practices within traditional industrial energy and utility operations worldwide.

Restraint:

High capital and operating costs

The high cost of installation and operation significantly restricts the growth of the CCS market in power generation. Implementing CCS requires heavy upfront spending on capture systems, transport networks, and storage infrastructure, making projects financially demanding. In addition, continuous operational and maintenance expenses add to the overall economic pressure on power companies. Without strong policy support or carbon pricing benefits, many utilities struggle to invest in CCS. This financial challenge limits adoption, particularly in developing economies with limited funding capacity. Consequently, poor cost competitiveness continues to be one of the biggest obstacles to widespread CCS deployment in global power generation.

Opportunity:

Expansion of low-carbon power infrastructure

Growing development of low-carbon energy infrastructure creates a strong opportunity for CCS in power generation. As nations shift toward cleaner energy, CCS is being added to existing fossil fuel plants to reduce emissions without shutting them down. This enables a gradual move toward decarbonization while ensuring stable energy supply. Increasing investment in hybrid systems that combine CCS with renewable energy sources is further boosting adoption. Power companies are integrating CCS into long-

term sustainability plans, driving demand for advanced carbon capture solutions. This trend supports global emission reduction goals while maintaining reliable and flexible electricity generation across global energy markets.

Threat:

Competition from renewable energy sources

Rapid growth of renewable energy sources poses a strong threat to CCS in power generation. Solar, wind, and hydropower are becoming more affordable and widely used, reducing dependence on fossil fuel-based plants. Unlike CCS, renewable technologies generate minimal emissions, making them more favorable for achieving long-term climate goals. Continuous cost reductions and improvements in energy storage systems further enhance their competitiveness. As governments and utilities shift focus toward clean energy, investment in CCS could decline. This growing preference for renewables may restrict CCS expansion and limit its role in the global transition toward low-carbon electricity generation systems worldwide.

Covid-19 Impact:

The COVID-19 pandemic created both challenges and opportunities for the CCS market in power generation. In the early stages, restrictions, disrupted supply chains, and workforce limitations caused delays in CCS projects and reduced investment activity. Lower energy and industrial demand also temporarily slowed carbon capture operations. However, the crisis increased attention on environmental sustainability and reinforced long-term climate goals. Many governments responded with green recovery programs that supported clean energy technologies, including CCS. As economies recovered, interest in low-carbon solutions grew stronger, positioning CCS as a key technology for building resilient, sustainable, and future-ready global power generation systems.

The post-combustion capture segment is expected to be the largest during the forecast period

The post-combustion capture segment is expected to account for the largest market share during the forecast period. It is preferred because it can be directly added to existing coal and gas power plants without significantly altering their combustion systems. This method removes carbon dioxide from flue gases after fuel has been burned, making it suitable for upgrading older facilities. Its ease of integration and

flexibility give it a strong commercial advantage over other capture techniques. Continuous technological advancements and strict emission reduction policies are further encouraging its use. As a result, post-combustion capture remains the most widely implemented CCS approach in global power generation systems.

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

Over the forecast period, the ship transport segment is predicted to witness the highest growth rate. It is increasingly preferred because it allows flexible movement of carbon dioxide across long distances, particularly where pipeline systems are not available. This method supports large-scale and international CCS projects by connecting regions to offshore storage facilities. It also enhances global carbon management and cross-border emissions reduction initiatives. Rising cooperation between countries on climate goals and growing investment in liquefied CO₂ shipping technologies are accelerating its expansion. As a result, ship transport is emerging as the fastest-growing CO₂ transportation option in CCS networks worldwide.

Region with largest share:

During the forecast period, the North America region is expected to hold the largest market share because of strong policy frameworks, advanced infrastructure, and high levels of investment in clean energy solutions. The United States leads the region with several large CCS projects supported by incentives like tax benefits and emission reduction programs. In addition, the availability of appropriate underground storage formations and well-developed transport networks supports large-scale CCS implementation. Increasing commitments to achieving net-zero emissions are further accelerating the adoption of CCS technologies across the power generation sector in North America.

Region with highest CAGR:

Over the forecast period, the Asia-Pacific region is anticipated to exhibit the highest CAGR, driven by rapid industrial growth, increasing electricity demand, and stronger environmental regulations. Major economies like China, India, Japan, and South Korea are heavily investing in low-carbon technologies to reduce emissions from coal-based power plants. Government support, favorable policies, and global partnerships are further encouraging CCS development. The expansion of power infrastructure and rising focus on sustainability are strengthening market growth. Moreover, the region's

continued reliance on fossil fuels creates a strong need for CCS adoption to support long-term emission reduction and clean energy transition goals.

Key players in the market

Some of the key players in Carbon Capture and Storage for Power Generation Market include Shell, Carbon Engineering, Aker Carbon Capture, Climeworks, CarbFix, ExxonMobil, Chevron, Equinor ASA, Fluor Corporation, GE Vernova, Linde PLC, Sulzer Ltd., Aker Solutions, Mitsubishi Heavy Industries, Occidental Petroleum, ION Clean Energy, Carbon Clean Solutions and TotalEnergies.

Key Developments:

In April 2026, ExxonMobil strengthens collaboration with QatarEnergy to expand international LNG partnership portfolio. The enhanced partnership with QatarEnergy signals ExxonMobil's intent to secure long-term supply stability and expand its international LNG portfolio, showing how major players position themselves to meet energy needs, technological developments, and market growth.

In November 2025, Mitsubishi Heavy Industries, Ltd. and ICM, Inc. have entered into a strategic alliance to accelerate innovation in ethanol dehydration. The collaboration focuses on integrating MHI's Mitsubishi Membrane Dehydration System (MMDS™) with ICM's bioethanol process design. Together, the companies aim to increase efficiency in ethanol production by reducing energy consumption, enhancing process reliability, and supporting the industry's efforts to lower carbon intensity.

In January 2024, Linde announced it has expanded its existing long-term agreement for the supply of industrial gases with Steel Authority of India Limited (SAIL), one of the largest steelmaking companies in India. Under the terms of the new agreement, Linde will now build, own and operate an additional 1,000 tons per day ASU, nearly doubling Linde's on-site production at Rourkela. Linde's investment is expected to be approximately \$60 million.

Capture Technologies Covered:

Pre-combustion Capture

Post-combustion Capture

Oxy-fuel Combustion Capture

Storage Types Covered:

Geological Storage

Mineral Carbonation

Ocean Storage

Transportation Modes Covered:

Pipeline Transport

Ship Transport

Truck Transport

Power Generation Sources Covered:

Coal-based Power Plants

Natural Gas-based Power Plants

Biomass-based Power Plants

End Users Covered:

Utility-scale Power Producers

Independent Power Producers (IPPs)

Industrial Captive Power Plants

Regions Covered:

North America

United States

Canada

Mexico

Europe

United Kingdom

Germany

France

Italy

Spain

Netherlands

Belgium

Sweden

Switzerland

Poland

Rest of Europe

Asia Pacific

China

Japan

India

South Korea

Australia

Indonesia

Thailand

Malaysia

Singapore

Vietnam

Rest of Asia Pacific

South America

Brazil

Argentina

Colombia

Chile

Peru

Rest of South America

Rest of the World (RoW)

Middle East

Saudi Arabia

United Arab Emirates

Qatar

Israel

Rest of Middle East

Africa

South Africa

Egypt

Morocco

Rest of 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 2023, 2024, 2025, 2026, 2027, 2028, 2030, 2032 and 2034
- 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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