

Carbon Capture Gains Momentum in Power Sector, Reaching \$450.5 Million by 2032

CCS market grows with climate focus and tech advances, but high costs and policy gaps remain key hurdles to wider adoption in power generation.

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According to a new report published by Allied Market Research titled, "Global Carbon Capture and Storage (CCS) in Power Generation Market by Fuel Type, Service and Technology: Global Opportunity Analysis and Industry

Forecast, 2022–2032." The CCS in power generation market size was valued at \$ 131.2 million in 2022 and is projected to reach \$450.5 million by 2032, growing at a CAGR of 11.7% from 2023 to 2032. Canada is the dominating country with the largest share.



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CCS technology is vital for achieving net-zero targets while maintaining energy security in fossil-fuel dependent regions.” – International Energy Agency (IEA)”

Allied Market Research

Carbon Capture and Storage (CCS) is an advanced technology aimed at minimizing carbon dioxide (CO₂) emissions from power generation and industrial processes. It works by capturing CO₂ released during the combustion of fossil fuels or biomass, then transporting it—usually via pipelines—to designated storage sites. These sites are typically deep underground geological formations where the CO₂ can be securely contained for long periods.

By preventing the release of CO₂ into the atmosphere, CCS

plays a critical role in combating climate change and supporting global carbon neutrality goals. It is widely recognized as a vital solution for reducing the environmental footprint of power generation while enabling the continued use of existing energy infrastructure in a cleaner and more sustainable way.

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Market Dynamics

1. Drivers:

The key driver for the CCS in power generation market is the increasing need to reduce carbon emissions from fossil fuel-based power plants. International climate agreements, such as the Paris Agreement, have compelled nations to adopt low-carbon technologies, making CCS an essential component of long-term emission reduction strategies. Moreover, technological advancements and decreasing costs of capture and storage solutions have enhanced the feasibility of CCS projects globally.

2. Restraints:

Despite its potential, the market faces several challenges. High upfront capital investment and operational costs associated with CCS projects pose a significant barrier, especially in regions with limited financial resources. Additionally, the absence of robust regulatory frameworks and economic incentives in some countries hampers the widespread adoption of the technology.

3. Opportunities:

There is growing interest in combining CCS with bioenergy (BECCS), which can result in net-negative emissions—an attractive solution for meeting climate targets. Furthermore, the development of carbon trading markets and carbon pricing mechanisms offers additional incentives for power companies to invest in CCS. Emerging economies are also opening new avenues for CCS deployment as they work toward cleaner power generation infrastructures.

4. Technological Advancements:

Recent progress in solvent and membrane-based carbon capture techniques, digital monitoring of CO₂ storage, and hybrid power-CCS systems is improving the efficiency and scalability of CCS solutions. These innovations are expected to lower costs and improve performance, increasing investor and stakeholder confidence in CCS applications.

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5. Policy and Regulatory Support:

Government initiatives and public-private partnerships play a vital role in the growth of the CCS market. Programs such as the U.S. Department of Energy's CarbonSAFE, the EU Innovation Fund, and similar schemes in Asia-Pacific support the development and commercialization of CCS projects. Strong policy backing enhances the market outlook, particularly in OECD countries.

Segment Overview

The [CCS in power generation market analysis](#) is segmented based on technology, service, and region. By technology, the market includes pre-combustion, post-combustion, and oxy-fuel combustion. Among these, post-combustion capture holds a dominant share due to its compatibility with existing power plants. Based on services, the market is categorized into capture, transportation, and storage. The capture segment is the most significant, as it involves

advanced systems to separate CO₂ from power plant emissions. Regionally, the market is analyzed across North America, Europe, Asia-Pacific, and LAMEA.

North America leads the global CCS in power generation market, driven by early adoption, government support, and a mature power sector. The U.S. in particular has made considerable investments in CCS projects, especially for coal and gas-fired plants. Europe follows closely with strong climate commitments and funding for clean energy transitions. Meanwhile, Asia-Pacific shows strong growth potential due to rapid industrialization, rising power demand, and increasing emissions. Countries like China and India are expected to be major markets due to their reliance on fossil fuels and growing focus on climate change mitigation.

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The CCS in power generation market is characterized by the presence of several major players focusing on partnerships, innovation, and capacity expansion. Companies such as MITSUBISHI HEAVY INDUSTRIES, LTD., Linde plc, Shell plc, Exxon Mobil Corporation, JGC HOLDINGS CORPORATION, NRG Energy, Inc., Honeywell International Inc., General Electric, Fluor Corporation, Siemens Energy are investing heavily in R&D to develop cost-effective and scalable CCS technologies. These players are also actively involved in collaborations with governments and research institutions to deploy large-scale pilot and demonstration projects.

Strategic initiatives such as joint ventures, acquisitions, and new project launches are helping key players strengthen their market presence. For instance, major CCS projects like Petra Nova in the U.S., Northern Lights in Europe, and Gorgon CO₂ Injection in Australia serve as benchmarks in the market. The competitive landscape is expected to intensify with more players entering the market and as governments enforce stricter carbon regulations, making CCS integration imperative for power generators.

Key findings of the study

- Post-combustion capture technology holds the largest market share due to its retrofitting capabilities for existing power plants.
- North America remains the leading region for CCS adoption in power generation, driven by strong policy support and major pilot projects.
- High installation and operational costs remain a significant barrier to wider CCS implementation.
- Technological advancements and integration with renewables offer promising opportunities for market expansion.
- Government support through incentives and carbon pricing mechanisms is crucial for accelerating CCS deployment.

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David Correa

Allied Market Research

+15038946022 ext.

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