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Synchronous Condenser Market Forecasts to 2034 – Global Analysis By Cooling Method (Hydrogen-Cooled, Air-Cooled and Water-Cooled), Reactive Power Rating, Starting Method, Application, End User and By Geography

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Abstracts

According to Stratistics MRC, the Global Synchronous Condenser Market is accounted for $1.7 billion in 2026 and is expected to reach $2.8 billion by 2034 growing at a CAGR of 6.6% during the forecast period. A synchronous condenser functions as a synchronous machine that spins freely without driving a load, delivering controllable reactive power to support electrical grids. By varying field excitation, it can either generate or absorb reactive power, thereby maintaining voltage levels and improving power factor. These machines are valuable in high voltage transmission systems and in networks with significant renewable energy penetration requiring fast, dynamic support. In contrast to static compensation equipment, synchronous condensers contribute inertia and fault current, strengthening system stability. Their operation mitigates voltage fluctuations, enhances reliability, and enables secure, efficient performance across evolving modern power systems and resilience benefits.

According to the International Energy Agency (IEA), global renewable capacity additions reached a record 510 GW in 2023, bringing total installed renewable capacity to 3,700 GW by the end of 2023. Data: This rapid growth increases variability in grid operations, driving demand for inertia and reactive power support technologies such as synchronous condensers.

Market Dynamics:

Driver:

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Increasing integration of renewable energy

Growing adoption of renewable energy, including wind and solar power, is significantly boosting demand for synchronous condensers. These renewable sources produce variable output and do not contribute natural inertia, which can disrupt grid stability and cause voltage variations. Synchronous condensers play a vital role by delivering reactive power, stabilizing voltage levels, and adding rotational inertia to the system. As nations pursue cleaner energy transitions and expand renewable installations, maintaining grid reliability becomes more complex. This drives utilities to deploy synchronous condensers as effective solutions for managing fluctuations and ensuring stable, high-quality electricity supply across modern power networks worldwide consistently.

Restraint:

High capital and maintenance costs

The substantial initial investment and continuous upkeep expenses act as a major challenge for the growth of the synchronous condenser market. Installing these systems requires high spending on equipment, site preparation, and grid integration. Furthermore, since they are mechanical machines with moving parts, they demand periodic servicing and maintenance, adding to long term operational costs. In comparison to modern static compensation technologies like STATCOMs, they may not always be the most economical option. Budget constraints often discourage utilities from adopting them widely, especially in emerging economies where financial limitations and infrastructure gaps influence decision making in the power sector significantly over time.

Opportunity:

Expansion of renewable energy grids

The growing development of renewable energy infrastructure offers a major growth opportunity for the synchronous condenser market. Increasing deployment of wind and solar power introduces variability and reduces natural grid inertia, leading to stability concerns. Synchronous condensers help overcome these issues by supplying reactive power and supporting voltage control in real time. Their capability to provide rotational inertia makes them highly suitable for grids dominated by renewable sources. As

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countries continue to invest in clean energy and grid reinforcement projects, the demand for advanced stabilization technologies rises. This trend positions synchronous condensers as critical components in modernizing and maintaining resilient electricity networks worldwide.

Threat:

Competition from advanced static technologies

Rising preference for static grid stabilization technologies like STATCOMs and SVCs represents a major challenge for the synchronous condenser market. These alternatives provide quick response capabilities, require less physical space, and involve lower maintenance compared to mechanical systems. Power utilities are increasingly choosing such solutions because they are easier to install and adapt to varying grid requirements. Ongoing improvements in static technology performance and affordability further enhance their attractiveness. Consequently, synchronous condensers may experience declining adoption in certain applications, particularly where efficient space usage and rapid implementation are key considerations for infrastructure development and investment planning decisions globally.

Covid-19 Impact:

The outbreak of COVID-19 slightly hindered the growth of the synchronous condenser market due to interruptions in supply chains and delays in energy infrastructure development. Restrictions on movement and industrial shutdowns lowered electricity consumption and postponed grid upgrade investments. Production and deployment activities were disrupted, leading to deferred projects across multiple regions. Despite these challenges, the crisis emphasized the need for dependable and stable power networks, driven by rising reliance on digital and remote operations. During the recovery phase, governments and utilities increased efforts toward grid resilience and renewable energy support, which gradually revived interest and demand for synchronous condenser solutions globally.

The hydrogen-cooled segment is expected to be the largest during the forecast period

The hydrogen-cooled segment is expected to account for the largest market share during the forecast period owing to its high efficiency and suitability for large-scale applications. Hydrogen provides excellent thermal conductivity, enabling effective heat dissipation and improved machine performance. These condensers are widely used in

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major power transmission systems where stable and continuous voltage support is essential. Their relatively compact structure compared to air-cooled alternatives also makes them advantageous for installations with space considerations. Power utilities favor hydrogen-cooled condensers because of their dependable operation, enhanced efficiency, and ability to perform consistently under heavy load conditions, making them a preferred choice in advanced power system networks globally.

The renewable power plants segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the renewable power plants segment is predicted to witness the highest growth rate, driven by increasing deployment of solar and wind energy systems. These renewable sources do not naturally provide grid inertia or consistent voltage regulation, leading to stability challenges. Synchronous condensers help address these issues by supplying reactive power and strengthening grid performance. With the global shift toward sustainable energy, utilities are focusing on integrating reliable stabilization technologies. Rising funding for renewable projects and favorable regulatory support are encouraging the use of synchronous condensers, thereby boosting growth prospects for this segment across modern power networks worldwide.

Region with largest share:

During the forecast period, the Asia Pacific region is expected to hold the largest market share owing to its fast economic growth, rising energy consumption, and ongoing expansion of power infrastructure. Nations across the region are focusing on upgrading grid systems and incorporating renewable energy sources, increasing the demand for effective stabilization technologies. The surge in solar and wind installations has introduced voltage management challenges, prompting greater use of synchronous condensers. Supportive government policies and investments in sustainable energy projects further enhance market development. Additionally, extensive transmission networks and continuous infrastructure improvements play a crucial role in maintaining the region’s leading position in the global market.

Region with highest CAGR:

Over the forecast period, the Europe region is anticipated to exhibit the highest CAGR, driven by its strong commitment to renewable energy expansion and carbon reduction targets. The gradual shutdown of traditional power plants has decreased natural grid stability, increasing the need for advanced support systems. Synchronous condensers

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help manage voltage levels and enhance grid reliability in renewable heavy networks. Supportive policies, funding programs, and strict environmental regulations encourage their adoption. Furthermore, ongoing upgrades in transmission infrastructure and integration of cross country power systems are boosting demand, positioning Europe as the leading region in terms of market growth rate globally.

Key players in the market

Some of the key players in Synchronous Condenser Market include ABB, Siemens Energy, GE Vernova, Eaton, WEG, Hitachi Energy Ltd., Mitsubishi Electric Corporation, Voith Group, ANDRITZ, Ansaldo Energia, Bharat Heavy Electricals Limited (BHEL), Toshiba Energy Systems & Solutions Corporation, Ideal Electric Power Co., NIDEC Corporation, Shanghai Electric, Dongfang Electric, Harbin Electric and Doosan ?koda Power.

Key Developments:

In December 2025, ABB and HDF Energy have signed a joint development agreement (JDA) to co-develop a high-power, megawatt-class hydrogen fuel cell system designed for use in marine vessels. The project targets use of the system on various vessel types, including large seagoing ships such as container feeder vessels and liquefied hydrogen carriers.

In December 2025, GE Vernova has signed an agreement with Greenvolt Power to supply onshore wind turbines for the Gurbanesti wind farm in C?l?ra?i county, Romania. The contractual scope covers the supply, installation, and commissioning of 42 units of 6.1MW, 158m rotor turbines. This marks the second major onshore wind agreement for GE Vernova Romania within two months, following an earlier announcement to deliver another 42 turbines for the Ialomi?a wind farm in the country.

In November 2025, Siemens Energy has signed a contract to design and deliver the power conversion system for Oklo's Aurora powerhouse reactors. The contract will see Siemens Energy conduct detailed engineering and layout activities for a condensing SST-600 steam turbine, an SGen-100A industrial generator, and associated auxiliaries to support Oklo’s first advanced reactor, the Aurora powerhouse at Idaho National Laboratory.

Cooling Methods Covered:

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Hydrogen-Cooled

Air-Cooled

Water-Cooled

Reactive Power Ratings Covered:

Up to 100 MVAR

101-200 MVAR

Above 200 MVAR

Starting Methods Covered:

Static Frequency Converter

Pony Motor

Other Starting Methods

Applications Covered:

Voltage Regulation

Grid Stability

Power Factor Correction

End Users Covered:

Utilities

Industrial

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Renewable 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

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- 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)

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- 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

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- 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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Note: Tables for North America, Europe, APAC, South America, and Rest of the World (RoW) Regions are also represented in the same manner as above.

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