SCOTTS INTERNATIONAL

Synchronous Condenser Market by Cooling Type (Hydrogen-cooled, Air-Cooled, Water-Cooled), Type (New & Refurbished), Starting Method (Static Frequency Converter, Pony Motor), End User, Reactive Power Rating, and Region - Global Forecast to 2030

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Report description:

The synchronous condenser market is estimated to grow from USD 0.72 billion in 2025 to USD 0.84 billion by 2030, at a CAGR of 3.3% during the forecast period. The acceleration of infrastructure development and the expansion of transmission networks in major economies are significantly increasing the demand for synchronous condensers to enhance grid stability and reliability. In India, this demand is driven by ambitious national initiatives, such as the Revamped Distribution Sector Scheme (RDSS), as well as substantial investments in ultra-high-voltage transmission corridors, renewable energy corridors, and smart grid programs. These projects require advanced reactive power management and inertia support, placing synchronous condensers at the forefront of efforts to eliminate voltage instability, ensure fault ride-through, and facilitate secure and efficient power flow in rapidly growing high-voltage networks.

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In the US, extensive federal programs, including major funding under the Bipartisan Infrastructure Law and the Inflation Reduction Act, are aimed at modernizing the grid, connecting remote renewable energy sources, and improving resilience to extreme weather events. This encourages the widespread use of synchronous condensers, which provide critical momentary circuit strength, dynamic voltage control, and artificial inertia in established transmission systems. These advancements enable the significant integration of variable generation sources while reducing curtailment and ensuring reliable delivery of clean energy across interconnected grids, addressing the limitations of traditional infrastructure.

"By cooling technology, the hydrogen-cooled synchronous condenser segment is expected to be the largest cooling technology segment in the synchronous condenser market during the forecast period."
The hydrogen-cooled segment is expected to account for the largest share of the synchronous condenser market during the forecast period, as it offers superior thermal conductivity, enhanced heat dissipation, and the ability to support high-capacity operations in large-scale utility and transmission projects. Hydrogen-cooled synchronous condensers offer high power density, low energy loss, and higher performance under heavy loads, and are suitable for grids with high inertia requirements and high demand for high-MVAR-rated units (usually above 200 MVAR). These systems offer reduced windage loss, enhanced overall efficiency, longer equipment lifespan, and better thermal control than air-cooled or water-cooled systems, which are typically chosen for smaller ratings or cost-sensitive installations. The shift to hydrogen-cooled synchronous condensers has become a key trend in modern power system designs. This is particularly important for large-scale renewable energy integration and high-voltage direct current (HVDC) interconnection, as utilities and grid operators prioritize reliable, high-performance solutions for voltage regulation and grid stability.
"By starting method, the static frequency converter segment is projected to register the fastest growth in the synchronous condenser market during the forecast period."
The static frequency converter segment is expected to be the fastest-growing starting method in the synchronous condenser market throughout the forecast period as a result of a broad combination of growing demands in efficient and reliable grid stabilization solutions, development of power electronics technologies, and compliance with global trends in the direction of modernized transmission infrastructure and integration of renewable energy. The static frequency converter offers very accurate, independent control of starting frequency and voltage, can be started smoothly without relying on grid conditions or load changes, has a lower noise level, requires less space, and is more reliable than pony motor methods. These properties contribute to the fact that SFCs are especially well adapted to large-scale utility use with high capacity synchronous condensers, in which they can be used to provide increased inertia, respond to reactive power requirements, and control voltages in grids with high levels of renewable penetration better than pony motor options which in most cases have a limited range of applications to simpler and smaller locations.
"By region, Europe is estimated to account for the second-largest market share during the forecast period."
Europe is expected to become the second-largest market for synchronous condensers during the forecast period. This expectation is supported by aggressive renewable energy targets, significant investments in grid modernization, and the need for improved grid stability due to the high penetration of intermittent energy sources like wind and solar. Synchronous condensers can provide essential services such as inertia, reactive power compensation, and voltage regulation, aligning with Europe's decarbonization goals and the need for a reliable power supply in an evolving energy landscape. The robust policy framework in Europe, including the EU Green Deal, ambitious renewable integration targets, and initiatives to support grid upgrades and high-voltage direct current (HVDC) expansions, drives the demand for synchronous condensers. These systems help minimize transmission losses, manage voltage fluctuations, and enhance the resilience of utility networks and transmission infrastructure.

In-depth interviews have been conducted with key industry participants, subject-matter experts, C-level executives of leading market players, and industry consultants, among others, to obtain and verify critical qualitative and quantitative information and to assess future market prospects. The distribution of primary interviews is as follows:
By Company Type: Tier 1 - 65%, Tier 2 - 24%, and Tier 3 - 11%
By Designation: C-level Executives - 30%, Directors - 25%, and Others - 45%
By Region: North America - 33%, Europe - 27%, Asia Pacific - 20%, Middle East & Africa - 8%, and South America - 12%
Notes: The tiers of the companies are defined based on their total revenues as of 2024. Tier 1: > USD 1 billion, Tier 2: USD 500 million to USD 1 billion, and Tier 3: < USD 500 million.
Other designations include sales managers, engineers, and regional managers.

ABB (Switzerland), Siemens Energy (Germany), GE Vernova (US), Eaton (Ireland), and WEG (Brazil) are some of the major players in the synchronous condenser market. The study includes an in-depth competitive analysis of these key players, including their company profiles, recent developments, and key market strategies.

Research Coverage:
The report defines, describes, and forecasts the global synchronous condenser market by type, reactive power rating, cooling technology, starting method, end user, and region. It also offers a detailed qualitative and quantitative analysis of the market. The report comprehensively reviews the major market drivers, restraints, opportunities, and challenges. It also covers various important aspects of the market. These include an analysis of the competitive landscape, market dynamics, market estimates in terms of value, and future trends in the synchronous condenser market.
Key Benefits of Buying the Report
- It provides an analysis of key drivers (rapid expansion of renewable energy and grid-scale capacity additions, increasing emphasis on modernization aging grid infrastructure), restraints (technical and Integration challenges in modern power grids), opportunities (conversion of synchronous generators into synchronous condensers, rising adoption of high-voltage direct current systems), challenges (availability of low-cost substitutes) influencing the growth of the synchronous condenser market.
- Market Development: Comprehensive information about lucrative markets - the report analyses the synchronous condenser market across varied regions.
- Market Diversification: Exhaustive information about new products and services, untapped geographies, recent developments, and investments in the synchronous condenser market.
- Competitive Assessment: In-depth assessment of market shares, growth strategies, and service offerings of leading players like ABB (Switzerland), Eaton (Ireland), Siemens Energy (Germany), GE Vernova (US), WEG (Brazil), Mitsubishi Electric Power Products, Inc. (US), Andritz (Austria), Ansaldo Energia (Italy), Voith GmbH & Co. KGaA (Germany), Bharat Heavy Electricals Limited (India), Doosan Skoda Power (Czech Republic), Baker Hughes (US), IDEAL ELECTRIC POWER CO. (US), Power Systems & Controls, Inc. (US), Electromechanical Engineering Associates, Inc. (US), Anhui Zhongdian Electric Co., Ltd. (China), Shanghai Electric (China), Ingeteam (Spain), Hitachi Energy Ltd. (Switzerland), and Wolong Electric Group (China), among others, in the synchronous condenser market.
- Product Innovation/Development: The synchronous condenser market is witnessing high product introduction and upgrades, especially with the introduction of digital control systems and predictive maintenance functionalities. With more use cases in renewable energy integration, smart grids, and high-voltage transmission networks, sustainable advancements such as hydrogen-cooled systems, advanced materials for greater efficiency, and modular/compact designs are gaining significant traction. The evolution of hybrid solutions (synchronous condensers with power electronics such as STATCOMs or battery energy storage) is also moving forward, as in solutions from the advanced energy producers such as Siemens Energy and GE Vernova, which feature enhanced digital controls, artificial intelligence (AI)-enabled predictive maintenance, and optimized rotor/insulation designs to simplify deployment, reduce footprints, and provide enhanced inertia and reactive power supports for modern power systems.

Table of Contents:

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