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Turbo Generator Market ? Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Type (Gas Turbine Generator, Steam Turbine Generator, and Water Turbine Generator), By End User (Coal-fired Power Plant, Gas-fired Power Plant, Nuclear Power Plant, and Others), By Cooling Type (Air Cooled, Hydrogen Cooled, and Water-hydrogen Cooled), By Region & Competition, 2021-2031F

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Abstracts

The Global Turbo Generator Market is projected to expand from USD 13.01 Billion in 2025 to USD 18.11 Billion by 2031, reflecting a compound annual growth rate of 5.67%. This industry encompasses the production and supply of electric generators that utilize gas or steam turbines to transform mechanical energy into electricity, serving as essential components in hydrological, nuclear, and thermal power facilities. The market's growth is largely underpinned by the increasing global requirement for dependable electricity to support industrial operations and urban expansion. Furthermore, the critical need for stable baseload power to counterbalance the intermittent nature of renewable energy sources ensures a sustained dependence on these generators for maintaining grid security.

This sector also gains momentum from a revival in nuclear power capabilities and capital allocation toward cleaner thermal energy infrastructure. Data from the World Nuclear Association indicates that in 2024, nuclear reactors worldwide produced a total of 2,667 TWh of electricity, representing an increase of 66 TWh over the previous year. However, despite these favorable trends, the market confronts a substantial obstacle regarding strict environmental compliance mandates. These regulatory pressures often

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lead to increased operational expenses and delays in the approval of conventional power generation projects, which could potentially hinder broader market growth.

Market Driver

The rising global appetite for electrical energy acts as a major catalyst for the turbo generator market. As nations enhance their industrial infrastructure and urban centers expand, the necessity for consistent baseload power grows, directly driving the acquisition of high-capacity generation equipment. This trend is especially apparent in the persistent reliance on gas-based and thermal power stations, which employ turbo generators to convert mechanical energy into electricity. According to the International Energy Agency's 'Electricity Mid-Year Update' released in July 2024, global electricity demand is projected to increase by approximately 4% in 2024, marking the fastest annual growth rate since 2007. This surge obliges utilities to optimize the output of their current fleets and commission new facilities, thereby maintaining a steady stream of orders for steam and gas turbine generators.

Simultaneously, the renovation and upgrade of aging power infrastructure are generating significant market activity. Many developed regions are managing power plants that are nearing the end of their operational lifecycles, necessitating either refurbishment or complete replacement to guarantee grid stability and operational efficiency. This replacement cycle is vital for integrating modern turbo generators that meet stricter performance standards. The US Energy Information Administration?s 'Preliminary Monthly Electric Generator Inventory' from February 2024 reports that developers intend to add 62.8 GW of new utility-scale electric-generating capacity in the United States in 2024, signaling a strong push for infrastructure renewal. Furthermore, reinforcing the market's trajectory, the Energy Institute noted that in 2024, global electricity generation increased by 2.5% to reach a record high the previous year, ensuring turbo generators remain central to the changing energy landscape.

Market Challenge

Stringent environmental compliance standards constitute a significant hurdle for the Global Turbo Generator Market, actively restricting growth by forcing the premature retirement of conventional thermal power plants. As governments enforce tighter limits on nitrogen oxides and carbon dioxide emissions, utility operators face prohibitive costs associated with retrofitting aging coal and gas-fired facilities with necessary abatement technologies. This regulatory environment diminishes the economic feasibility of

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traditional steam and gas turbines, leading to the deferral or cancellation of new thermal capacity additions. Consequently, the addressable market for turbo generators contracts as investment capital is increasingly redirected toward renewable energy technologies that do not require these conventional mechanical drivetrains.

The consequences of these regulations are evident in the sharp reduction of fossil fuel-based generation within major industrial regions. According to Eurelectric's Power Barometer 2024, renewable energy generation in the European Union reached a historic 50% share during the first half of 2024, significantly displacing output from fossil fuels. This structural shift, driven by compliance mandates, reduces both the operational hours and the replacement demand for turbo generators in the thermal sector, thereby stalling market expansion in developed economies.

Market Trends

Utilities and developers are increasingly favoring the deployment of modular and skid-mounted distributed energy units to meet the urgent requirement for flexible, rapidly deployable power generation assets. Unlike traditional stick-built facilities, these pre-engineered systems facilitate quick installation and commissioning, making them suitable for firming variable renewable energy grids and ensuring reliability in remote locations. This move toward modularity notably lowers civil work requirements and on-site construction risks. For example, a March 2024 report by Gas Turbine World on industry orders highlights that CS Energy?s 400 MW Brigalow Peaking Power Plant in Australia will utilize aeroderivative gas turbines that are 95% factory-assembled into modules, thereby accelerating the project timeline and supporting the local energy transition.

Concurrently, the sector is experiencing a robust adoption of hydrogen-cooled generators for high-capacity power plants, driven primarily by the soaring energy intensity of the digital economy. Hyperscale data centers require substantial, reliable baseload power that renewable sources cannot yet fully guarantee, necessitating the procurement of large-frame turbo generators known for their superior cooling capabilities and high thermal efficiency. This specific demand segment is reshaping the order books of major original equipment manufacturers. As reported by Energy Connects in August 2024 regarding Siemens Energy's financial performance, demand from data center operators represented roughly 60% of the company?s gas turbine orders, which totaled 14 GW year-to-date, underscoring the critical role of high-capacity thermal infrastructure in the modern grid.

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Key Market Players

Alstom S.A.

Andritz AG

Ansaldo Energia S.p.A.

Ebara Corporation

General Electric Company

Mitsubishi Heavy Industries, Ltd.

Siemens AG

Suzlon Energy Ltd.

Toshiba Corporation

Dongfang Electric Corporation

Report Scope

In this report, the Global Turbo Generator Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

Turbo Generator Market, By Type

Gas Turbine Generator

Steam Turbine Generator

Water Turbine Generator

Turbo Generator Market, By End User

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- Coal-fired Power Plant
- Gas-fired Power Plant
- Nuclear Power Plant
- Others

Turbo Generator Market, By Cooling Type

- Air Cooled
- Hydrogen Cooled
- Water-hydrogen Cooled

Turbo Generator Market, By Region

- North America
  - United States
  - Canada
  - Mexico
- Europe
  - France
  - United Kingdom
  - Italy
  - Germany
  - Spain
- Asia Pacific

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China

India

Japan

Australia

South Korea

South America

Brazil

Argentina

Colombia

Middle East & Africa

South Africa

Saudi Arabia

UAE

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global Turbo Generator Market.

Available Customizations:

Global Turbo Generator Market report with the given market data, TechSci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

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Company Information

Detailed analysis and profiling of additional market players (up to five).

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