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Steam Turbines Market ? Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Type (Steam Cycle and Combined Cycle), By Rated Capacity (1-120 Mw, 121-350 Mw, 351-750 Mw and Above 750 Mw), By Exhaust Type (Condensing and Non-Condensing), By Fuel Type (Coal, Biomass, Nuclear and Others), By Region & Competition, 2021-2031F

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Abstracts

The Global Steam Turbines Market is projected to expand from USD 24.81 Billion in 2025 to USD 31.12 Billion by 2031, reflecting a compound annual growth rate of 3.85%. Functioning as essential mechanical devices, steam turbines convert thermal energy from pressurized steam into rotary motion to drive electrical generators within power plants. The primary impetus for this market is the escalating global requirement for reliable base-load electricity, which compels the ongoing development of thermal power generation infrastructure. Furthermore, the increasing adoption of geothermal and biomass energy initiatives, which rely on steam for power conversion, provides critical support for sustained market demand, ensuring the technology's continued relevance amidst diversifying global energy mixes.

Despite these drivers, the market faces a substantial obstacle in the form of accelerated decarbonization mandates that prioritize renewable energy sources such as wind and solar, which function without steam cycles. This transition redirects capital expenditure away from fossil-fuel-based power plants, potentially hindering new installations. However, the technology remains integral to the energy sector, as evidenced by the World Nuclear Association's report that nuclear reactors globally produced 2,667 TWh

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of electricity in 2024. This record-breaking output underscores the significant and continuing operational reliance on steam turbine systems within critical energy industries.

Market Driver

The rising demand for electricity in emerging economies is driving the continued development of robust thermal power infrastructure, serving as a major catalyst for steam turbine procurement. As nations undergo industrialization and urban populations increase, the need for reliable base-load power fuels the construction of new coal and nuclear facilities, where steam turbines remain vital for energy conversion. This surge requires significant capacity additions within the thermal generation sector to ensure grid stability and foster economic growth. Reinforcing this trajectory, the International Energy Agency's 'Electricity Mid-Year Update' from July 2024 forecasts that global electricity demand will rise by approximately 4% in 2024, marking the fastest growth rate recorded since 2007.

Concurrently, the proliferation of combined cycle natural gas power plants bolsters market expansion by employing steam turbines to capture waste heat from gas turbines, thereby maximizing thermal efficiency. This configuration attracts investment as utilities strive to reconcile decarbonization objectives with the necessity for dispatchable power, securing the relevance of steam cycle technology within a transforming energy landscape. Demonstrating the continued reliance on gas-fired infrastructure, the U.S. Energy Information Administration's 'Short-Term Energy Outlook' from November 2024 projects that natural gas will contribute roughly 42% of total U.S. electricity generation in 2024. Furthermore, indicative of significant commercial activity, Bharat Heavy Electricals Limited secured orders exceeding INR 11,000 Crore in 2024 to supply supercritical thermal power equipment for three domestic projects.

Market Challenge

The global steam turbines market encounters a significant hurdle arising from the swift implementation of decarbonization mandates that prefer non-thermal renewable energy sources. Governments worldwide are establishing policy frameworks that aggressively incentivize the adoption of wind and solar photovoltaic systems, neither of which utilizes steam turbine technology for power conversion. This regulatory pressure shifts vital capital investment away from traditional fossil-fuel-based thermal power plants, resulting in the cancellation or postponement of new coal and gas infrastructure projects that would otherwise incorporate steam turbine units.

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This disruption is measured by recent shifts in the industry landscape. According to the International Energy Agency, the share of coal in global electricity generation is expected to drop below 33% in 2025 for the first time in a century, as renewable output overtakes it. This contraction in coal-fired generation is directly linked to a diminished demand for the steam turbines customarily installed in such facilities. As utilities prioritize asset portfolios that exclude steam cycles to align with net-zero goals, the market is witnessing a tangible deceleration in new orders for conventional thermal applications.

Market Trends

The deployment of steam turbines in waste-to-energy (WtE) and biomass facilities is increasing as nations emphasize circular economy models over traditional landfilling methods. Unlike conventional thermal plants dependent on finite fossil fuels, these facilities utilize steam cycles to transform municipal solid waste into dispatchable renewable electricity, effectively separating base-load generation from carbon-intensive feedstocks. This transition necessitates that manufacturers engineer specialized turbine geometries capable of managing the variable steam conditions inherent in incineration processes while ensuring high availability. Evidence of this market traction is seen in Doosan ?koda Power's February 2025 press release, 'Doosan ?koda Power Delivers Third Turbine for R?union,' which details a contract to supply a DST-G10 steam turbine with a 19 MW capacity for the Pierrefonds waste-to-energy plant, designed to process 148,000 tonnes of waste per year.

Simultaneously, the strategic retrofitting and modernization of aging thermal power plants has become a cost-efficient alternative to commissioning new greenfield infrastructure. Utilities are increasingly directing investment toward advanced turbine upgrades to prolong the operational lifespan of existing coal and gas assets, thereby improving thermodynamic efficiency and flexibility to handle intermittent renewable injection. This strategy enables operators to maximize the value of sunk capital while adhering to stricter environmental regulations through enhanced heat rates and output. Highlighting the efficacy of such interventions, Siemens Energy reported in the June 2025 article 'Power plant modernization: The fast track to more power' that implementing an advanced turbine upgrade package at the Cane Run Generating Station increased power output by an average of 30 MW per turbine, significantly boosting plant performance without the need for new construction.

Key Market Players

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Siemens Energy AG

General Electric Company

Mitsubishi Power, Ltd.

Toshiba Energy Systems & Solutions Corporation

Doosan Skoda Power s.r.o.

Ansaldo Energia S.p.A.

Fuji Electric Co., Ltd.

MAN Energy Solutions SE

Harbin Electric Corporation

Elliott Group

Report Scope

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

Steam Turbines Market, By Type

Steam Cycle

Combined Cycle

Steam Turbines Market, By Rated Capacity

1-120 Mw

121-350 Mw

351-750 Mw

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- Above 750 Mw

Steam Turbines Market, By Exhaust Type

- Condensing
- Non-Condensing

Steam Turbines Market, By Fuel Type

- Coal
- Biomass
- Nuclear
- Others

Steam Turbines Market, By Region

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

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Spain

Asia Pacific

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 Steam Turbines Market.

Available Customizations:

Global Steam Turbines Market report with the given market data, TechSci Research

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offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

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

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