Triveni has installed over 200 steam turbo-generators in the RE power plants

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In an era of rising energy demand and environmental consciousness, Triveni Turbines stands at the forefront, pioneering sustainable energy solutions and turbine innovations.

Steam turbines benefits

At this critical juncture, India's energy landscape is currently characterised by soaring energy demand and stringent environmental regulations. As the population grows, industrialisation and business activities expand, and with the pressing need to achieve clean energy objectives, relying on conventional energy sources is no longer a feasible choice. Renewable energy sources and advanced energy management have emerged as vital strategies for navigating this complex landscape, and steam turbines have proven to be a dependable source of heat and power generation.

Steam turbines offer numerous benefits in various industrial applications, primarily due to their outstanding reliability. This results in reduced operational costs and contributes to a decrease in greenhouse gas emissions. The rotary design of steam turbines makes them especially well-suited for driving electric generators. Leveraging technological advancements such as renewable energy sources, energy-efficient machinery, and smart grid systems can transition towards greener and more sustainable energy solutions.

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By incorporating IoT (Internet of Things) devices into steam turbines, valuable data-driven insights into power generation and consumption patterns are obtained, aiding utilities in making well-informed decisions. This not only lessens the environmental impact but also guarantees a stable and dependable energy supply, reducing the vulnerability of production processes to energy shortages or price fluctuations.

Innovative strategies

Innovative strategies integrating multiple renewable sources provide a reliable approach to clean power generation. The lower mass flow rates of steam turbines necessitate a comparison to gas turbines, enabling them to produce the same power with fewer input resources. This approach is more environmentally conscious, curtailing fuel consumption and emissions while concurrently delivering cost savings.

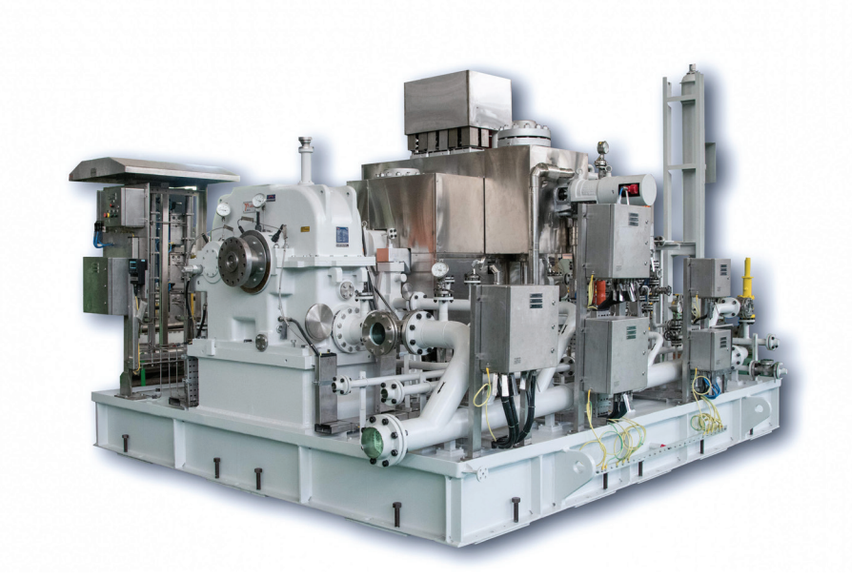
Manufacturers with in-house research and development capabilities have effectively demonstrated that they can expedite product development while delivering enduring value. Through the adoption of this innovative R&D methodology, which customised product development to meet market requirements such as efficiency, cost-effectiveness, and serviceability, prominent Indian capital goods manufacturers like Triveni Turbines have significantly expanded its global presence with installation in 80 countries and serve as a testimony for unlocking new business opportunities.

Triveni Turbines is strongly committed to a continuous and rigorous examination of product development strategies, to reduce the environmental impact of manufacturing operations through effective power generation. Over the years, the company has remained dedicated to providing economically viable and environmentally sustainable steam turbine solutions for various manufacturing industries. It has played a pivotal role in assisting carbon-intensive industries in lowering their carbon emissions.

Global energy transition

Globally, governments are transitioning from fossil/conventional energy sources to non-fossil/ renewable energy sources in pursuit of renewable energy objectives. With its extensive manufacturing infrastructure, the turbine industry is also aggressively embracing energy conservation and renewable thermal sources.

The growing emphasis on replacing existing coal-fired power plants with clean fuel power plants to reduce the carbon footprint will further boost the future demand for renewable power generation. Triveni Turbines accounts



for nearly 80% of its business from renewable and thermal energy sources. In the export sector, biomass and waste-to-energy projects drive demand. At the same time, in the domestic market, order finalisations primarily revolve around sugar co-generation (bagasse-based biomass) and waste heat recovery for steel and cement plants.

Bioenergy

Sources like municipal solid waste, agricultural waste, algae, dedicated energy crops, etc., have shifted the base from traditional sources like wood and crop residue and provided a sustainable and more versatile resource base. While some bioenergy technologies are already under development, achieving their commercial viability and scalability poses a challenge. Biomass-based fuels are also difficult to store and transport because of their lower energy density.

Triveni Turbines, the world's largest industrial turbine player, has been able to help companies set up turbines for MSW-based IPPs in India, Europe, Thailand, and South Korea. These turbines operate within MSW plants and help their main function of disposing of municipal solid waste. Further, Triveni has installed over 200 steam turbo-generators in the renewable energy power plant sector. With decades of expertise in the field, Triveni provides Condensing and Extraction Condensing Multi-stage steam turbines that are carefully designed to comply with the individual operating parameters of each waste-to-energy power plant. These turbines have the flexibility to generate power both during the process plant running and during the total shutdown.

Bioenergy is expected to remain a dominant source of renewable energy. The industrial use of bioenergy, particularly from sugar and palm oil mills, is conducive to producing power from biomass. Triveni's steam turbines significantly generate energy from renewable sources, resulting in a greener environment.

Turbine lifespan

As operational requirements evolve or turbines age, they become inefficient, negatively impacting overall costs. Triveni's REFURB (multi-brand refurbishing service) team, equipped with specialised 3D scanners, creates the necessary drawings for enhancing the efficiency of existing turbines from any brand or make. This process enables customers to achieve up to a 15 percent improvement in efficiency with their existing turbines without altering the civil foundation. This results in a return on investment of under 2 years and an extension of the turbine's lifespan by up to 100,000 hours.

Triveni REFURB is a global leader in refurbishing and repairing rotating equipment of any brand and age. The services range from complex re-engineering for efficiency improvements using advanced technology to basic tasks like overhauls, health checks, and spare parts supply. With a team of experienced design engineers and field service experts, the team has successfully executed projects for over 15 brands globally