

The Government's focus on clean fuel has opened up potential for Distilleries in India which require captive power generation. With the launch of the new National Biofuels Policy in the country and incentives offered by the Government (such as soft loans) for setting up of new distilleries and expansion of old distilleries, huge investments are being made by the sugar companies in Greenfield and Brownfield expansions.

As per Industry sources, the Indian paper industry accounts for about 3.7% of the world's total paper production, and the estimated turnover of the industry was ₹ 600 billion with approx. 750 paper mills operating in the country. The Indian paper industry is expanding at a rate of 6-7% and expected to touch 18.5 million tonnes in 2018-19. The Pulp and Paper industry is always focussed on improving energy efficiency in order to deliver energy savings, improved productivity, and reduced environmental pollution. Energy efficiency can be attained through heat recovery, increased use of biomass-based power generation, and efficient usage of steam.

The Indian Chemical industry contributes 3.4-3.5% to the global Chemical industry and is expected to grow at the rate of 9% per annum to reach USD 211 billion by 2020-21 and USD 298 billion by 2024-25. This should lead to fresh capacity creation – both in terms of Greenfield and Brownfield.

India is the 2nd largest Cement producer in the world with production totalling 297.56 million tonnes in 2017-18. According to industry estimates, the cement production capacity as of 2018 was 502 million tonnes per annum (MTPA) and is estimated to touch 550 million tonnes by 2020. In the Cement segment, the demand for steam turbines could accrue both from captive power generation as well as by utilisation of waste heat resulting from the operations to generate power, thereby bringing down the energy cost for manufacturing.

India is the 2nd largest Steel producer in the world, as of 2018. India's steel production is expected to touch 128 MT by 2020-21 from 105 million tonnes in 2017-18. The hot exhaust gas from steel-making and cement production through Waste Heat Recovery Power Generation (WHRPG) system is capable of efficiently recovering thermal energy and transforming it into electric power through installation of steam turbines.

## Market Analysis (5-30 MW)

The Indian Steam turbine market in 2018 held steady, with Fossil fuel applications followed by Biomass, Waste Heat and Waste-to-Energy. Majority of the steam turbines requirement in 2018 was in captive power generation and energy intensive

segments like Steel and Process co-generation segments such as Cement, Sugar, Pulp & Paper, Chemicals and Fertiliser industries etc. With the manufacturing sector on the rise and industries like Steel, Cement, Sugar and Pulp & Paper expected to increase production, the demand for steam turbines should remain robust in the future. In the international market, the demand emanated from Waste-to-Energy, Waste Heat and other renewable-based power generation facilities.

## Business Review

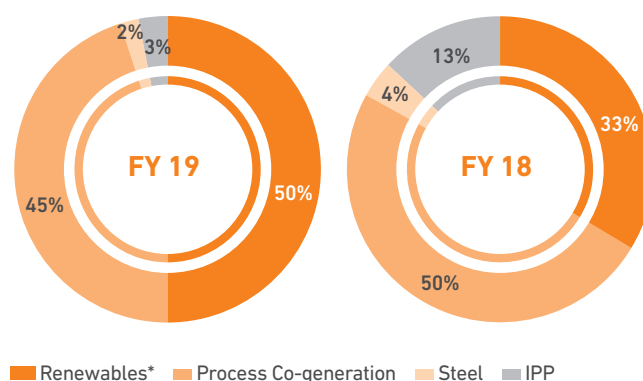
Triveni has consistently strengthened its position in the industrial sector by meeting the captive power requirements of its customers in various Greenfield and Brownfield projects. It has done this by establishing strong global footprint through its network of offices, offering wide range of state-of-the-art steam turbines, coupled with excellent aftermarket portfolio to meet the needs of our customers round-the-clock.

## Domestic Business

In terms of value, the FY 19 domestic order booking showed a growth of 7% compared to FY 18. Due to stiff competition in the market, there has been a pricing pressure but the Company is exploring all options to maintain its margins through value engineering and cost rationalisation. The enquiries from domestic market during FY 19 increased by 3.8% over FY 18 and were spread over multiple user segments such as Sugar, Cement, Steel, Pulp & Paper and other Process industries. The total order booking for products in the domestic market for FY 19 has gone up by 13% at ₹ 3.1 billion.

## Segment-wise Order Booking

(in % Share)



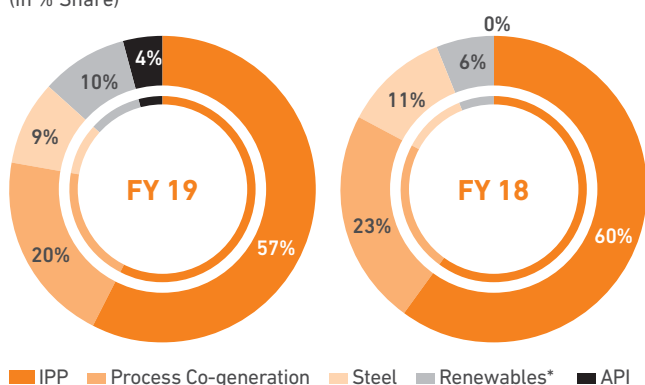
\*Includes Biomass and Sugar co-generation

## International Business

In FY 19, the global market witnessed decreasing industrial production amid growing geopolitical tensions, and several developed economies faced constraints in capital utilisation resulting in a decline of 17.6% compared to FY 18. The enquiries from international market during FY 19 declined by 19% over FY 18. The renewable-based IPP segment contributed 50% of the total exports enquiry in FY 19 while process co-generation and sugar co-generation contributed 12% and 28% respectively. The product order booking in the international market has been ₹ 3.1 billion, which is a decline of 11% when compared with the previous year. The decline in enquiry generation and order booking, due to the factors explained above, is short term and Triveni's international presence in a large number of geographies should enable the Company to address some of these regional factors in the medium term. The Company is confident of its international business potential in the medium to longer terms.

### Segment-wise Order Booking

(in % Share)



\*Includes Biomass and Sugar co-generation

## Aftermarket Business

The Aftermarket team is responsible for nurturing relationships with its customers through continued support throughout product lifecycle. The team maintains close relations with its customers to enhance product efficiencies and minimise breakdown, both for the product supplied by Triveni as well as for the turbine of different makes. Being an OEM-driven business unit, the services offered are more reliable and we ensure high level of customer satisfaction through spares and aftersales service support for the designed performance of the turbine in a timely manner.

Aftermarket business has now enhanced focus on modernisation, upgradation, refurbishment, and efficiency improvements, not only for its own turbines but also for other makes. These packages not only generate adequate Return On Investment (ROI) for the end users but also create value by strengthening Triveni's position and help retain relationships with its customer.

The Company has reinforced its customer-centric approach, which is core to its business philosophy, by strengthening its service offices in strategic locations across India to cater to the domestic market. In order to provide service back-up to its international customers, the Company has set up international offices, based on the concentration of customers and market potential for additional business opportunities. In order to extend the service network and the business reach, international offices have been established in Europe, West Asia, South East Asia and in Africa.

In FY 19, the Company undertook turnkey Refurbishment projects for other makes of turbines, showing significant growth in North Africa, in addition to its conventional markets such as Southern Africa and West Asia. In the same year, the

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Company heralded the Refurbishment business expansion into areas such as turbo-compressors for prominent entities in the global Steel industry.

As part of innovation, the Company has effectively implemented Internet of Things (IoT) by offering Triveni Touch, a subscription-based remote monitoring solution for its turbines, giving its customers visibility of key performance indicators and health of their turbines.

Buoyed by the success in the target markets with large spares order, bookings in FY 19 have grown over 13%, with exports contributing over 44% of the Aftermarket business.

### Manufacturing

The Company has two state-of-the-art and eco-friendly manufacturing facilities at Bengaluru (Peenya and Somapura) to manufacture Steam turbines up to 150 MW capacity. Both these facilities are certified for AS 9100D Rev 2016 / ISO 9001:2015 Quality Systems, ISO 14001:2015 Environmental systems and ISO 18001: 2007 Safety systems. In the year under review, the manufacturing facility at Peenya was awarded the prestigious Platinum Rating by Indian Green Building Council (IGBC) certified for Green Factory building, which is the highest green rating awarded to any factory by IGBC.

The manufacturing facilities have best-in-class multiple axis CNC machine tools, fully equipped test beds for mechanical run test of steam turbines with wireless data recording systems, IoT-enabled Industry 4.0 systems, elaborate operating processes and SOPs, trained operating staff, along with rigid quality assurance processes to ensure high quality of the product through all stages of manufacturing. The two cardinal principles in manufacturing are zero defect and do it right the first time. This ensures the highest level of quality and timely delivery of products to international and domestic customers.

The manufacturing facilities are also equipped with High Speed Balancing Vacuum Tunnel Machines of reputed make, large size Coordinate Measuring Machine (CMM), Non-destructive Testing (NDT) facilities and other advanced machinery to support new product development. This enables the Company to offer new avenues of customer services in precision balancing of rotors, not only for turbine but also for all rotary equipment such as compressors, alternators, pumps, impellers, to further augment its Refurbishing business. The Company is now in a position to offer customised high quality turbines in the range of 0.25 MW to 100 MW, completely made in India in line with the Indian Government's "Make in India" campaign, in all its stages of designing, engineering, sourcing, manufacturing and testing. The Company's agile manufacturing set-up has enabled it to successfully compete with MNCs and retain a high market share consistently.

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## Technology and R&D

The DSIR-approved advanced in-house R&D centre of the Company is engaged in development of new efficient and cost-effective turbines. This continuous product upgradation results in high-power dense, cost-competitive, robust and efficient turbines to meet the requirements of the evolving global market. The Company continuously monitors trends in the global markets and updates its product programmes to align with the latest international quality standards.

The Company is associated with premier technology development institutions such as IISc, Bangalore, IIT Madras & IIT Bombay through various research programmes, and therefore continues to be a preferred industrial partner for Indian Government-funded programmes of MNRE, DST and Ministry of Power. Extensive in-house validation of the developed technology is undertaken and the performance parameters in the field are monitored closely before commercial use to ascertain satisfactory performance. The Company has well-defined processes for development, testing, field feedback and continuous advancement of technology, through in-house processes and associations with global research and scientific institutions, including in Europe and the US.

The Company continues to develop cost-competitive models with reduced carbon footprint to provide power solutions meeting the requirements of its diverse international and domestic customers. The application segments include waste-to-energy, combined cycle, process industries, renewables, captive and co-generation, apart from others. In line with the industry trends, the Company has been diversifying into different types of steam turbines and other renewable energy products focussing on high efficiency cycles, including injection applications and distillery processes. The Company is constantly upgrading and improving its steam turbine designs for optimal performance to meet the increasing power solution requirements globally.

## Intellectual Property Rights

The Company is engaged in development of new technologies and improvements in product variants for the customers, mostly in its in-house R&D Centre. During the process of such development and improvement, several innovations and technological upgradations take place, generating valuable intellectual property. Creation and protection of the Intellectual Property (IP) portfolio therefore is of significant importance for the Company and all its stakeholders. In order to ensure that the generated Intellectual Property is adequately captured and protected, a dedicated team of specialists works closely with the Research & Development team from the planning and conceptualisation stage to the manufacturing stage.

The Company has built an extensive IP strategy for creation and protection of long-term IP assets to secure and preserve its technological advantage. Reflecting its global focus, the Company constantly undertakes patent and industrial design filings in different international jurisdictions, even as the IP portfolio is enhanced in India. The Company has filed patent applications and design registrations in India, Europe, South East Asia, and in the US, and plans to protect its IP in new international markets served by the Company. A substantial number of Intellectual Property Rights have been already awarded to the Company in various jurisdictions, including in FY 19.

## Digitalisation

The Company has procured, developed and installed a comprehensive portfolio of software and automation technologies for industrial applications covering the entire lifecycle - right from product design and production to aftersales services, as well as for commercial and financial applications. Continuous upgradation of these applications with latest available technology is reviewed and applied as per business requirements. These applications are mostly customer-centric, aiming for cost optimisation, and focus on increase in business efficiency. The future plan for further automation and upgradation is under constant evaluation. At the same time, the Company is also strengthening security measures to address possible cyber security threat.

## Supply Chain

The Company has a robust supply chain which sources all critical supplies from across India as well as from selected countries in Asia, Europe and North America. High production volumes of turbines give the Company's supply chain a unique advantage in cost due to bulk purchases and long-term contracts. The major focus area of supply chain has always been, primarily, cost efficiency, coupled with stringent quality checks, on-time deliveries, and efficient working capital management.

The philosophy of the Company is to treat all suppliers as 'partners in progress'. The Company has an elaborate suppliers' code of conduct to regulate dealings with suppliers, and follows a fully transparent approach. The Company shares annual and quarterly production and supply plans with suppliers to ensure that their production activities are streamlined with its requirements and they adhere to the deliveries. There are regular and planned interactions with suppliers at various levels, both at the Company's office in Bengaluru and at suppliers' places. Suppliers are appraised about current business requirements of the Company. Inputs and feedbacks are given to suppliers on quality, specific customer needs, technology upgradation, compliances to international standards, new



product developments, quality plans, value engineering ideas. This ensures a seamless functioning of the supply chain across diverse supply chain partners and helps the Company retain its competitive edge through optimisation of cost, quality and delivery parameters.

Despite having a wide range of product portfolio with different models and applications, the product designers adopt standardisation of product design to maximum extent. The standardisation helps the Company to improve its material procurement planning, reduce inventory carrying cost, and optimise the supply chain cost. This also enables the Company to have long-term rate contracts with suppliers, which in turn helps suppliers plan and control their operations in a cost-effective manner. The Company ensures that suppliers have subscribed to international quality standards, such as ISO 9001, ISO 14001 etc., and comply with most international regulations on health, safety and environment.

The Company also has a robust and reliable logistics system to ensure that turbines and other ancillaries are safely delivered to customers across the globe in a timely and safe manner.

### Quality Assurance

The Company has AS9100D / ISO 9001:2015 certification, with sound quality management system implemented throughout the organisation. Quality Operating System at TTL (QOS@TTL) aims for Zero Defect and Total Customer Satisfaction. This is driven through **seven focus areas** of implementing QOS@TTL.

At the foundation of the QOS is TTL's focus on competency development of its **employees**. Competent and engaged employees produce world-class quality. Employee engagement remains high and was evident with more than 40% increased participation in the Company-wide Kaizen programme during FY 19.

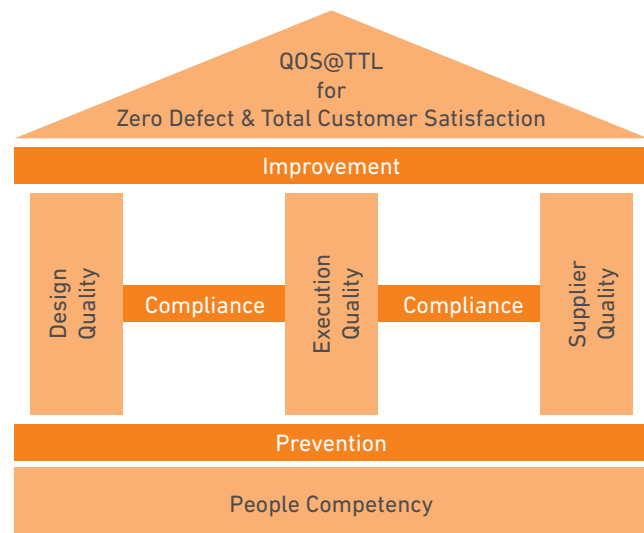
With **design** review, verification and validation process, quality in design output is ensured. This has helped TTL churn out new designs to suit customer requirements. Continuous and quick feedback from execution, through the Design Feedback process, further ensures that TTL's design remains robust, to meet the challenging cost and delivery requirements.

TTL's **manufacturing and project execution** capabilities continue to maintain benchmark level of quality and responsiveness. Execution teams (Assembly, E&C, Spares & Service, Refurbishing) act as a beacon of customer-centricity to ensure that all internal stakeholders are providing them products that would ensure customer delight.

**Supplier** ecosystem is nurtured to improve their competency level. Continuous improvement in the supplier ecosystem is ensured with three-pronged approach to supplier quality – Supplier Qualification, Supplier Evaluation/Rating and Supplier Development. A high ~95% First-Pass-Yield (FPY) is maintained across supply chain of sub-contractors and suppliers.

All of the above functional focus areas are strengthened with three process focus areas:

- **Prevention** – with risk management approach to quality and incorporating FMEA approaches in design and processes.
- **Compliance** – to international quality standards (API, ASME, AGMA, NEMA, IEC, etc.) and global customer requirements (CE, GOST, SONCAP, etc.).
- **Improvement** – in all areas of businesses with CAPA and special group activities (SGA).



### Human Resources

The Company believes that its people energise and make the organisation exceptional, and remains focussed on driving world-class performance as well as in fostering and enhancing its human capital.

The Company's HR process relies on the belief that the achievement of its growth objectives is dependent largely on the ability to innovate continuously, connect closely with the customer, and to create and deliver superior and unmatched customer value. Towards this end, the Company has assiduously

built a culture of continuous learning, innovation and collaboration across the organisation, through development of technical, commercial and business skills.

The Company, for many years, has been investing in creating in-house training infrastructure with adequate facilities in a green and environment-friendly atmosphere. Young talent recruited from the campuses undergo a structured class room and on-site training programme for about two years before being inducted in jobs. This enables them to become highly skilled engineers and technicians, contributing effectively towards business and customer satisfaction. The Company endeavours to build talent from within, which gives the advantage of long experience and strong expertise in Technology, Product, Services and Processes. In the face of rapidly changing client expectations, the Company is investing and developing programmes that equip people with futuristic skills and competencies.

The Learning Centre is equipped with multiple classrooms, Computer-Based Product Training Lab (CBT), as well as a Library with highly trained in-house and external training staff. People are encouraged to develop through e-learning modules, expert and peer learning outbound trainings, on-job learnings & mentoring. The experienced and senior employees are provided refresher programmes to keep abreast of the changes in the dynamic and challenging business environment. During the year, the Company arranged many such training programmes.

A robust performance management system is designed to achieve employee development through performance differentiation, transparency and effective evaluation, with a structured process of formally and objectively evaluating performance against defined goals and objectives. The Company continues to drive a high-performance culture, and accordingly, the performance management system is being critically reviewed periodically, to align with dynamic business needs and compliances.

The Company believes in influencing all aspects of an employee's life – including physical, mental and emotional well-being. It continues to enhance safety and security at the workplace by prescribing policies and procedures, creating awareness and imparting trainings. It has institutionalised key policies like Prevention of Sexual Harassment.

The "Supplier Quality Improvement Programme (SQIP)", as part of "Continuous Improvement" training programme for suppliers, continued in FY 19.

During the year, the Company imparted training to the extent of 6,090 plus training man hours - substantially higher than earlier years. It launched multiple training programmes in various facets, including but not limited to, upgradation of technical skills, soft skills, performance development, environmental and EHS, commercial and compliance capabilities. Employees built their capabilities through classroom trainings, e-learning modules, learning through subject experts and peers, outbound trainings, on-job learning, mentoring and orientations.



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## Environment, Health and Safety

Triveni cares for Nature. Both Peenya and Sompura facilities boast a lush green nature cover. Construction of a new factory at Sompura was oriented to ensure that existing mango grove is kept intact. Over and above the existing plantations in factory open land, hundreds of new saplings of various plant species were planted over the last two years. Entire design and construction of the new factory was aligned with principles of natural lighting and ventilation. Both the plants are eco-friendly, zero discharge plants, complying with ISO 18001 (Occupational Health and Safety Assessment series) and ISO 14001 (Environmental Management System) international standard requirements. Action plans are already drawn to migrate to ISO 45001 OH&SA series standards by the end of FY 20. The ISO 14001 EMS standards will be integrated with ISO 45001 to create robust Environmental and Occupational Health and Safety standards for overall benefit to the Company. Employees are involved in ensuring good EHS practices through various joint management committees. The entire campus is covered with electronic surveillance through CCTV and IT-enabled security systems.

Environmental Management programmes are drawn with specific Key Performance Indicators each year to improve the environmental performance of the unit. Ambient air quality is ensured through proper maintenance of DG sets and Boilers. Entire sewage water is treated in the plant, and used for landscaping and gardening purposes as secondary use. 300 KW of solar panels are installed on the rooftop of Peenya manufacturing facility, generating about 3.5 Lakh Units of non-conventional electric power catering to the energy requirements of the factory. Energy-efficient LEDs are being introduced in a phased manner, replacing the conventional CFLs / Fluorescent lights. Both units are also equipped with recreational facilities with indoor and outdoor games as well as fitness equipment for all employees.

## Business Outlook

Global economic growth remained steady at 3.1% in 2018, and is projected to sustain this momentum at 3.0% in 2019, according to an International report. The acceleration in global growth in 2018 was predominantly due to firm growth observed in several developed economies, and due to the push from the world's most dynamic regions, namely East and South Asia.

Following the Brexit, political and economic turmoil was witnessed in various economies across the globe in 2018, causing the international market for steam turbine business

to slow down in CY 18. However, the Company has been able to secure orders from Europe, Africa, SAARC and South East Asia regions, and together with the domestic market, it posted a record order booking in FY 19, owing to strong domestic demand conditions and increased focus on sustainable power development.

With the expected increase in investment activities in industries such as Steel, Pulp & Paper, Cement and Sugar, the demand for steam turbines should remain robust in the coming years.

With a strong enquiry pipeline, increasing global presence and strategic marketing activities, the Company is expected to carry out the same momentum in FY 20 as well, in both domestic and international business.

## Subsidiaries

The growth potential of foreign subsidiaries to expand in international space is encouraging. Through these foreign subsidiaries, the Company has increased its capabilities to connect with global EPC players and industries. During the year, the Company engaged with industries from various segments, such as API, Waste to Energy, Combined cycle, Process industries, of global scale through its subsidiaries. The connections have enhanced the visibility of the Triveni Turbines brand and future business potential. The Company expects that the foreign subsidiaries will further augment business growth in the near future.

## Joint Venture

GE Triveni Limited (GETL), the joint venture Company with General Electric (GE), is engaged in the design, supply and service of advanced technology steam turbine generator sets, with generating capacity in the range above 30-100 MW. GETL offers products, manufactured to international standards of quality and reliability, with best-in-class efficiencies. The flange to flange turbine is manufactured competitively at TTL's world-class facilities located at Peenya and Somapura in Bengaluru. The complete project is executed by GETL in accordance with GE's manufacturing, quality and supply chain procedures and processes, which include certification of suppliers, adherence to environment and health concerns, and other ethical standards.

The overall performance of GETL for the period under review has been significantly below the Company's expectations in terms of order intake. During the year, GETL earned profit before tax of ₹ 128.0 million as against a loss of ₹ 104.7 million in the previous year.