



FY 17 total order booking from International market is ₹ 3 billion. During the year, the Company's enquiry book grew by 5% at 5 GW and also expanded its market reach by entering new geographies.

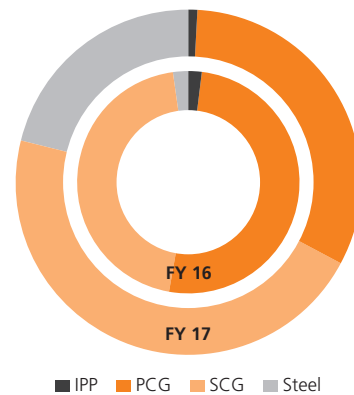
is not available and when cost is the constraint. India has an installed captive power capacity of 47,200 MW as of March 2016. The Government of India allowed the captive power producers to participate in coal auctions last year to address the problem of coal shortages. Though limited fuel shortages still exist in the captive power sector, the situation is expected to improve the long-term growth in the steel and cement industries.

## BUSINESS REVIEW

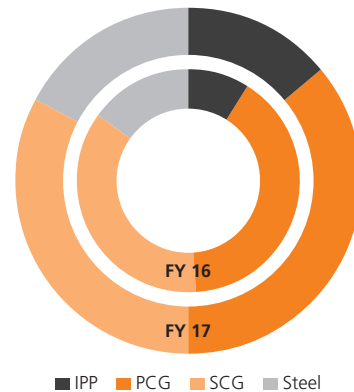
### Domestic Market

The Indian Steam Turbine market for under 30 MW size showed a growth of 7% in FY 17 as compared to FY 16. Demonetisation impacted many end-user segments resulting in deferment of some orders. Though enquiry generation was good, order finalisation did not gain momentum as many enquiries remained in the budgetary stages on account of the slow pace of economic activity. The total domestic order booking for the Company in terms of value stood at ₹ 4.11 billion in FY 17, a growth of 29%.

The segment wise orders booked during the current financial year are:



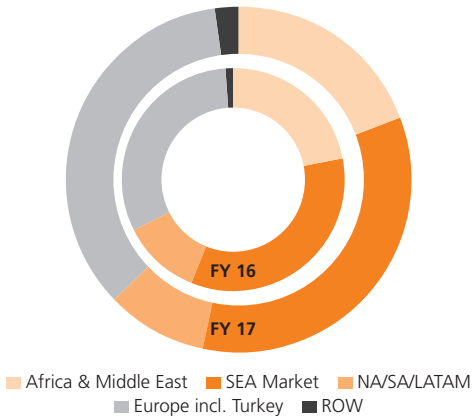
The segment wise enquiry pipeline is given below:



### Exports Market

The export order booking for FY 17 was lower in comparison to FY 16. This was primarily due to geo-political uncertainties in many of TTL's focus markets especially key regions of Europe, Turkey, parts of Africa and parts of Asia witnessed a slowdown in order booking. The total order booking from International market during the year stood at ₹ 3.00 billion. During the year, the Company's enquiry book grew by 5% at 5 GW and also expanded its market reach by entering new geographies.

The region-wise enquiry generation for FY 17 vis a vis FY 16 is as under:



In the exports order book, Sugar co-generation segment contributed 44% of the total order booking, process co-generation industries contributed 38% and the rest was IPP and metals. While the major contributor in South East Asia market is the sugar industry, the orders from the other regions are a mix of segments such as IPP, Steel, and process industries among others. The increased focus and penetration in new markets like Middle East and North Africa, Australia, Vietnam has yielded positive results that are expected to strengthen the Company's growth in the export market. Similarly, the Company's foray into

the Oil & Gas segment in Middle East has been successful with good order booking. The Company, going forward intends to leverage on its presence in this segment in other regions of the global market.

### Aftermarket Services

The Aftermarket team, an integral and vital part of the organisation, is responsible for maintaining a continuous relationship and support the customers throughout the complete lifecycle of the turbine starting from the time of dispatch of turbine. This has now been further strengthened with aggressively pursuing repairs, refurbishing and efficiency improvements of its own turbines and those of other makes.

In order to serve the customer better, the Company has established strategically located service offices across India to cater to the domestic market. In view of major expansion in International market in recent times, it has also opened offices in Europe, West Asia, South East Asia - a move that is expected to bring the Company closer to customers and earn their confidence by providing them with timely and efficient technical support. The philosophy of the Company is to provide 24/7 service for these far away overseas location and accordingly, the necessary infrastructure with mobile service units and trained manpower are positioned at strategic locations. As a collateral benefit, this provides confidence to the customers to entrust not only the Company's products but also the installed fleets





of other makes. This should help in improving business growth especially in the refurbishment segment.

During FY 17, the Company completed few critical export projects successfully and these will act as reference for further business.

The Company has entered in the Internet of Things (IoT) and digital space with a concrete plan for remote monitoring of its products across the globe. This will give the Company instant access to its products, and help monitor their performance and live support to customers wherever and whenever required.

Despite stiff competition, the growth rate of order booking in FY 17 is 8% and sales growth stood at 13%. The Company is confident that in coming years, the aftermarket segment will provide a major boost to its overall growth. The Company's foray into the export market for the aftermarket business has also started gaining momentum with exports



4 Advanced reaction technology based turbines developed for European applications.

contributing 40% of the order booking and 35% revenues for FY 17 respectively.

## MANUFACTURING FACILITY

The Company has an existing 11 acre eco-friendly manufacturing facility located at Peenya, Bengaluru with state-of-the-art machinery and best in class manufacturing processes. The facility has capacity to produce around 150 turbines annually.

During the year, the Company successfully commissioned the second production facility at Sompura Industrial Area near Bengaluru with an area almost double of the current facility. Phase 1 of the new facility has been completed within the scheduled time and production has started successfully. The campus is green, eco-friendly, energy efficient and equipped with best in class production facility built to modern aesthetic design.

The second plant is designed and equipped to manufacture turbines up to 100 MW. The facility has larger and taller bays to accommodate and handle turbines weighing up to 300 tonnes. The plant has been equipped with CNC machines for manufacturing of critical components. A High Speed Balancing Machine capable of balancing rotors up to 55 tonnes in weight, 4 meter diameter and 8 meter long is under construction. The factory is also one of the few in the world which will

have capability of carrying out live mechanical run test of up to 100 MW turbines with a boiler having capacity to produce steam of 380 degree celcius at 42 ata. The Company is now in a position to provide faster deliveries of the widest range (from 1 MW to 100 MW) of high quality industrial turbines to the global markets. The Company takes pride in participating in the Indian Government's "Make in India" campaign with designing, engineering, manufacturing and supplying cost efficient high quality steam turbines, while successfully competing with large MNCs. The products are shipped from these two facilities to global customers.

## TECHNOLOGY AND R&D

The Company has a DSIR approved advanced in-house well equipped R&D centre, which is engaged in the development of new models and continuous product upgradation resulting in high-power dense, cost-effective, robust and efficient turbines to cater to the requirements of the ever-changing global market. The Company continuously monitors global trends and accordingly updates and prioritise its R&D plans to keep its product offerings aligned to the latest international standards and requirements.

The R&D centre is equipped with trained manpower working on advanced design software and equipments. Further, the R&D centre is closely associated with IISc, Bengaluru & IIT, Bombay on research programs and continues to be a preferred industrial partner for Indian Government-funded programs by MNRE, DST and Ministry of Power. The technology developed is extensively validated before commercial use, and the performance parameters in the field are closely monitored to make modifications, as may be considered necessary. The Company has well defined processes for development, testing, field feedback and continuous advancement of technology through in-house processes and association with global design houses.

The Company continues to develop cost competitive models, with much reduced carbon footprint as its offerings towards power solutions needed by its diverse global customers. The application segments include waste to heat, combined cycle, industrial process, renewables, captive and co-generation among others. In line with the industry trends, the Company has plans to diversify into different types of steam turbines and



New direct drive application LP module developed and tested.



25 MW Axial exhaust turbine with containerised design for sugar co-generation developed and successfully tested.

other renewable energy products focusing on high efficiency cycles. Even as such products become a reality in the near future, 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

As mentioned, constant technological upgradations, development of new models and product diversification are some of the major ingredients of the R&D programme of the Company. These R&D efforts demand adequate safeguard of the invaluable in-house generated Intellectual Property. A dedicated team of specialists works along with the R&D team from the planning and initiation stage to the final product stage to ensure that the generated Intellectual Property is captured and protected.

Over the past few years, the Company has implemented a broad IP strategy for creation and protection of long-term IP assets to secure its technological advantage and know-how. Since the Company has a significant footprint in the International market and growing year on year, it constantly undertakes patent and industrial design filings in various international markets. The Company has already filed patent applications and design registrations in India, Europe, South East Asia, and the U.S. In the future, it also plans to cover other international markets where the Company has sold its products.

During the year, the Company made 31 IP filings, thereby increasing the IP filings in India to 172 and in other countries to 29. A substantial number of Intellectual Property Rights have already been awarded to the Company in various jurisdictions. These efforts will continue to protect the Company's IPs.

## SUPPLY CHAIN

The Company has an effective and robust supply chain management system starting from procurement process to delivery system. A structured purchase policy, revisited from time to time, provides guidelines for the Company's procurement function, encompassing all its key aspects. The emphasis is on cost control, quality, timely delivery, working capital management, consistency and transparency. The Company believes in the development and nurturance of long



Developed modular blocks with fast start-up capability for combined cycle applications.

term partnership in its supply value chain system, which ensures achievement of its objectives. Annual/monthly plan, new product design, international best practices and improvement in value engineering are shared with the supply chain partners thus enabling them to align their businesses with the Company's vision and requirements. With a growing focus on exports, the supply chain partners' capabilities to meet international standards of production and supplies and competitive price have been enhanced in a planned manner to meet competition and customers' expectations. This has been possible through regular interaction with suppliers/vendors/contractors, backed by regular exchange of information, training, planned reduction of cost, reduction of rejections, building up of sustainable trust and confidence and various other business development parameters generally followed in good business practices.

There is a strong realisation and acceptance of 'Zero Defect' and 'Do it right the first time, every time' concepts by the supply chain partners and, to ensure strict adherence to these concepts, supplier upgradation programmes are regularly conducted and suppliers are evaluated using structured parameters and tools. The existing supplier partners are periodically reassessed through a third party agency in order to ensure that the prescribed quality standards are maintained and technology

is upgraded in line with the evolving requirements. For new suppliers, a well-defined qualification process is in place along with EHS requirements. All the supplier partners are governed by a strict code of conduct and non-disclosure agreements.

The Company has successfully controlled the input costs by means of value engineering in design and materials, development of cost-effective supplier partners and sourcing of raw materials and components from some of the most cost-effective suppliers in India and around the globe. The Company's supply chain always strives to be a value creator through implementation of strategic initiatives year on year. In the similar manner, TTL has an effective logistic system for safe and timely deliveries of its products, in India and in the International markets at a competitive cost.

### QUALITY ASSURANCE

The Company has implemented a process-based management structure, where the processes are continuously evolved and owned by process owners and focused on customer. The Company is AS9100C/ ISO 9001:2008 certified, with a sound quality management system integrated throughout the organisation.

TTL ensures that its network of suppliers and dedicated sub-contractors also comply with these standards through supplier

qualification, QAPs and Standard Operating procedures (SOPs) to maintain comprehensive quality control of turbine and its auxiliary systems.

Products are designed, manufactured and commissioned in accordance with the International quality norms, such as APL, ASME, AGMA, NEMA and IEC, among others. Systems are developed to address country-specific product requirements. These systems have helped TTL to meet the stringent requirements of export customers, such as CE/PED and GOST certification.

TTL has adopted the 'Zero Defect' concept with respect to quality, which is supported by tools and techniques like visual management system, root cause analysis, followed by CAPA, DWM, DMAIC, Kaizen, SQIP (Supplier Quality Improvement Programme), SQDCM, Quality Circles, and a rigorous automated Customer Complaint Resolution System.

"Kaizen" movement was started in the Company in 2010 to inculcate a culture of continuous innovation and improvements throughout the organisation, involving people at all levels. The movement continues to provide significant benefits in productivity, quality, cost and EHS. TTL regularly participates in All India Kaizen events organised by CII-TPM Club of India, and has bagged several awards.

## HUMAN RESOURCES

The Company's investment in building its organisational capability on a continuous basis has strengthened its ability to sustain competitiveness in the global market. To sustain the competitiveness, it has been building a robust talent pipeline by inducting fresh engineers through a structured selection and training programme, which, has yielded good results in nurturing talent specific to our line of business. The Young Engineer's Programme (YEP) has equipped engineers to grow with the Company and position themselves to occupy key roles.

The focus of the Company remains in developing innovative training and improvement programmes across the functions. This initiative has resulted in building and enhancing technical capabilities and generation of overall development of human resources, contributing in achieving the set business goals. Further, platforms like, Cross Functional Teams have also been formed as part of Employee Engagement and Involvement through ongoing/ special projects which has created learning opportunities for the employees. Also, initiatives to foster employee engagement like "Skill enhancement programme", "Capability building" and "Creating future leadership programme" are also being conducted, on a regular basis.

The Learning Centre continues to be the nodal point for employees and customers, undertaking training on regular and continuous basis, about the Company's product and operation



The presence of its wholly owned subsidiary, Triveni Turbines Europe Pvt Ltd, UK and step down subsidiary Triveni Turbines DMCC, Dubai has started yielding economic benefit to the Group

and maintenance of steam turbines. In FY 17, Regional Managers from South Africa & Thailand underwent a six weeks specific training programme at our Learning Centre.

The Company continued with the "Advance Product Knowledge Upgradation" programme for its Customer Care Engineers, improvising the technological advancement in the life cycle of the product, followed by behavioural aspects which include outbound experiential learning and certification for project management. The "Supplier Quality Improvement Programme (SQIP)", as part of "Continuous Improvement" training programme for suppliers also continued in FY 17.

Computer Based Product Training Lab (CBT), a unique platform developed by the Learning Center is a comprehensive self-learning aide on turbine product. This platform is being upgraded on a continuous basis in order to cover the technological changes/ advancements. This also includes innovative processes being introduced / adopted.

The Company dedicated a total of 3112 plus man days in training employees during the year. This is 14% higher in comparison to FY 16. Similarly 5535 man-days of training were provided to the Graduate Engineer Trainees before being formally inducted into departments. In FY 17 a batch of Diploma Engineers were inducted and trained at our Learning Center to strengthen the assembling of higher range of turbines.

## ENVIRONMENT, HEALTH AND SAFETY (EHS)

The Company has commissioned a modern new plant (Phase 1) at Sompura, near Bengaluru. The Company has strictly adhered to applicable EHS norms throughout the duration of construction, erection and commissioning of the civil work thereby achieving 1.7 million safe man-hours.

This objective was achieved through training, coaching and providing greater accountability to supervisors, along with broader employee engagement through peer-to-peer feedback and by changing "at-risk behaviour" to "safe behaviour" and by fostering a more collaborative working environment and providing necessary safety equipment. EHS practice in Peenya facility continues during the year in the same spirit. The Company's safety practices have contributed to zero reportable accidents during the previous six years.

### **Occupational Health and Safety**

Certification audits of all departments and processes of TTL at Peenya Industrial Area and Sompura Industrial Area were carried out by a leading global service provider in line with OHSAS 18001:2007 standards. Both the units are found conforming to the standards requirement and certified for Occupational Health and Safety Management systems valid through March 2020.

### **Environmental Management System and Compliance Audits**

The Company's Environmental Management System (EMS) is a comprehensive approach to environmental management and continual improvement that measures the performance against regulatory and management standards. Certification renewal audit of Peenya Industrial Area plant and Fresh Certification Audit for Sompura Industrial Area plant have been carried out in line with ISO 14001:2015 standards and both the plants have been certified for the upgraded Environmental Management System standards. The certification is valid through March 2020. Ambient air monitoring study for particulates and gases, ambient noise monitoring study and drinking water analysis are being conducted on regular basis as per norms specified by the Karnataka State Pollution Control Board. Results were below regulatory limits.

### **BUSINESS OUTLOOK**

After a sluggish 2016, economic activity is projected to pick up pace in 2017 and 2018, especially in emerging markets and developing economies. Although the outlook appears better, uncertainty about policy direction in major economies casts a shadow over the prospects of recovery. According to the latest projections by the World Bank, world economic growth is projected to increase to 2.7% in 2017 from a sluggish rate of 2.3% last year. Advanced-economy growth is expected to recover moderately to 1.8% in 2017. In emerging and developing economies, growth is projected to accelerate to 4.2% in 2017 from 3.4% in 2016. This outlook reflects soft external demand, heightened uncertainty about global trade, and slower private investment. The Company's focus in the international market is in the renewable segment and it believes that the growth should be supported by various Govt. initiatives, for improving environment.

After witnessing a slowdown across major international markets, the Company believes that some of the focus markets may witness growth which would lead to increased order booking in FY 18. With a strong carry forward enquiry pipeline for both the domestic and international segment, the Company is expecting robust order booking in FY 18, thereby ensuring growth in the performance. Similarly, the aftermarket segment is also expected to witness growth with

its contribution from the regional offices at all major markets where TTL has a presence. The overall market is also expected to grow and the indicative signs reflected in the enquiry pipeline.

### **SUBSIDIARIES**

The presence of its wholly owned subsidiary, Triveni Turbines Europe Pvt Ltd, UK and step down subsidiary Triveni Turbines DMCC, Dubai has started yielding economic benefit to the Group with respect to expansion in the international market and growth in customer confidence. These companies are well equipped with trained sales and service personnel to augment order booking and providing aftermarket services. The subsidiary in Dubai, in order to achieve further business penetration, has opened regional offices in Indonesia, Vietnam and in final stages of setting up offices at other potential geographical locations. The subsidiaries are profitable and the Company expects further growth of these subsidiaries (including its regional offices) in coming years, which will add economic value and growth to the group in the long term.

### **GE TRIVENI LIMITED (GETL)**

GE Triveni Limited, joint venture Company with General Electric (GE), is engaged in the design, supply and service of advanced technology steam turbines 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 Bengaluru, and the complete project is executed by GETL in accordance with GE's procedures and processes, which include certification of suppliers, adherence to environment and other standards.

The financial health of the joint venture has improved vastly with higher number of export orders executed during the year. The enquiry and order pipeline from international market is encouraging and the outlook is positive, despite stiff competition in this segment. However, the Indian market is still continuing to remain sluggish, as in previous year, and is expected to revive in coming quarters.

FY 17 witnessed a strong order booking from the international market for GETL and similarly, the turnover for FY 17 was also primarily led by exports. The JV achieved a turnover of ₹ 1.21 billion with a net profit of ₹ 102 million. Similarly, the order intake for the JV for FY 17 has been ₹ 1.66 billion.

The pipeline of enquiries for both exports and domestic brings visibility for a good year of order booking in FY 18 while having a healthy turnover and profitability for the JV.