

MANAGEMENT DISCUSSION AND ANALYSIS

4.1 Industrial Products

Industries today face three prominent challenges: combatting climate change, securing clean energy, and managing water scarcity. Our products, engineered to provide solutions for clean air, clean energy, and clean water, along with our digital service EDGE Live empower industries to adopt environmentally sustainable practices, guiding them towards a cleaner tomorrow.



Clean Air Solutions

Thermax provides air pollution control (APC) systems for both particulate and gaseous exhaust.

We offer broad-based, single-source expertise and flange-to-flange solutions in all areas of environmental protection – from products and systems for air pollution control to retrofit and rebuild services.

We undertake turnkey environmental projects from concept to commissioning through tie-ups with technology majors and diverse industry sectors.



Clean Energy Solutions

This segment delivers a comprehensive range of heating solutions, including packaged boilers, fired heaters, and turnkey process heating solutions using steam, thermic fluid, hot water, and hot air.

Our solutions extend to biomass-fired equipment and heat recovery solutions for clean energy production.

We also offer energy-efficient vapour absorption machines and process cooling equipment for environment-friendly cooling and heating solutions in industrial and commercial settings.

Furthermore, we offer comprehensive operation and maintenance services to ensure the continued optimal performance of our solutions.



Clean Water Solutions

Our Company's Water and Waste Solutions (WWS) business assists industrial, commercial and residential establishments with products and services to purify, reuse and recycle water and treat sewage and effluents.

We also provide seawater desalination solutions, that reduce freshwater consumption and play a significant role in water conservation efforts.

Additionally, we provide operation and maintenance services, ensuring the sustained efficiency of our solutions throughout their lifecycle.



Business Highlights



Clean Air

Our Air Pollution Control business ventured into biogas purification and upgraded technology solutions to enhance gas processing quality and efficiency.

- » Thermax introduced hybrid heat pumps that combine the benefits of both electrical and absorption technologies in one product.

the globe, including manufacturing facilities in western India that cater to major companies in pharma and personal care.

Clean Energy

Heating

- » We introduced a range of new and upgraded products to cater to the market's changing requirements and offer strong value propositions to industrial customers. Some of these included Dynatherm – a multi-combustor, compatible, solid fuel-fired thermic fluid heater; Shellmax Global Ultra – an upgraded version of a packaged oil and gas-fired steam boiler; the advanced Thermopac Global and UPRG (Ultrapac) – a compact and reliable biomass boiler for extremely fouling fuel.

Cooling

- » We launched a dedicated growth unit under our Cooling business to offer products that enhance energy efficiency and water savings, reduce fossil fuel dependency, and support industrial process improvements.

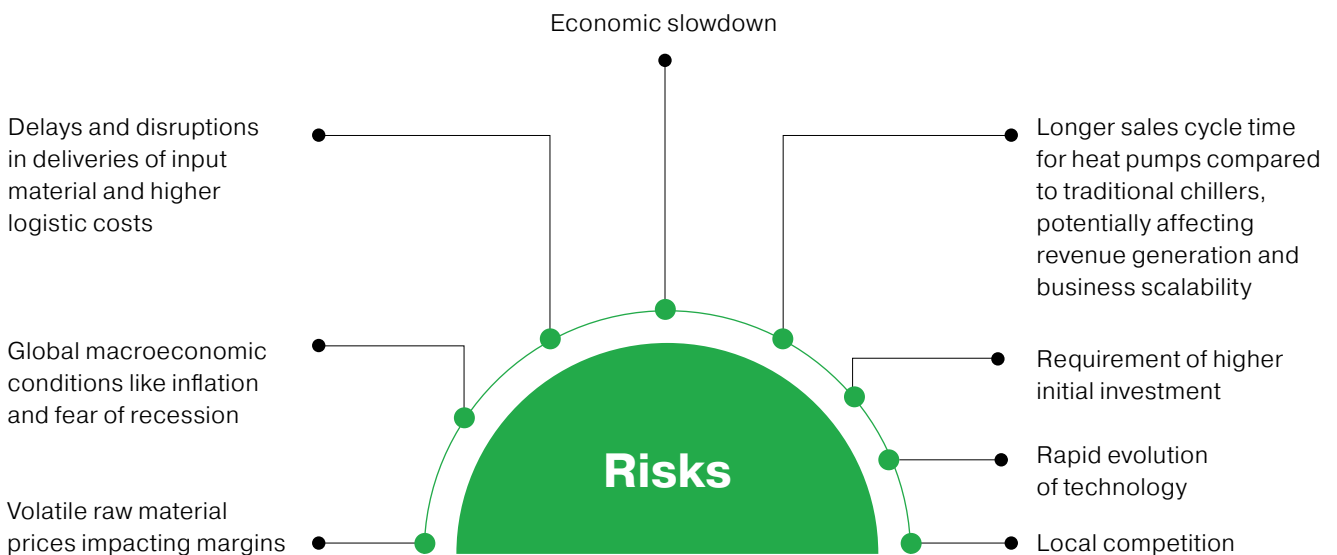
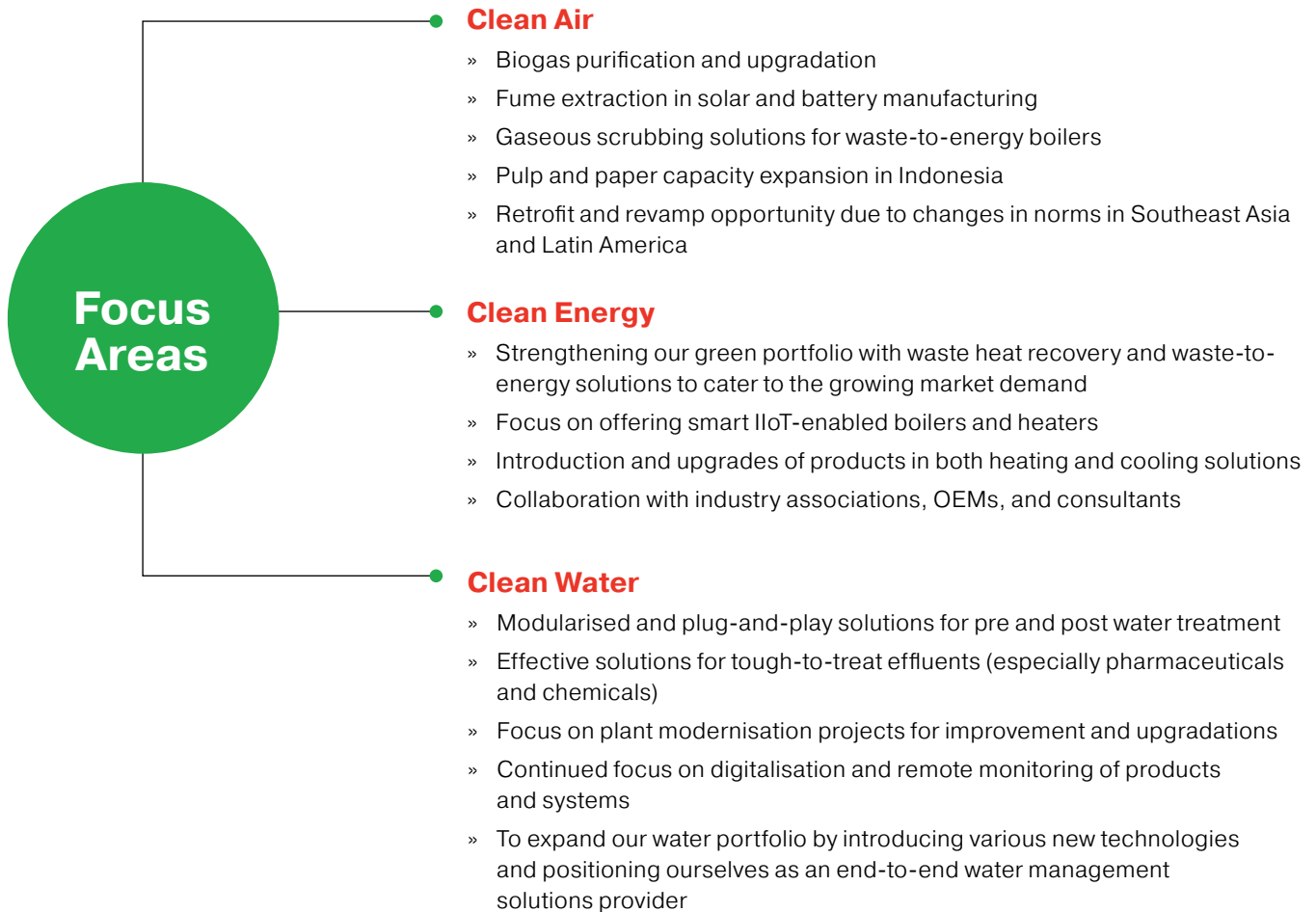
Clean Water

- » Thermax's Water and Waste Solutions business inaugurated a new high-tech facility in Pune, Maharashtra, equipped with advanced machinery such as plasma plate cutting and robotic welding systems. The plant prioritises environmental sustainability by utilising solar power and rainwater harvesting, while its scalable design allows for future expansion. It incorporates efficient and eco-friendly practices, such as nanotechnology-based painting, to ensure swift delivery and top-notch quality.
- » With Thermax's acquisition of TSA Process Equipments on April 19, 2024, WWS now offers complete solutions to meet pure water requirements across industries including pharmaceuticals, biopharma, personal care, and food and beverages. Founded in 2004, TSA Process Equipments Pvt. Ltd. is headquartered in Mumbai, Maharashtra. It has over 500 installations across

Growth Drivers

- » Enforcement of emission norms globally
- » Fuel shift from coal to biomass or agro-based fuels
- » Energy security concerns and global policies supporting energy transition
- » Market demand for pre-fabricated/plug-and-play water and waste treatment products
- » Increased government push for water recycling and reuse for industries
- » Stringent regulatory discharge norms for wastewater to prevent the pollution of water bodies
- » Traction in ethanol and high-purity water segments
- » Traction in predictive analytics and energy utility optimisation
- » Customers seeking organised single-point service providers for products, projects, and services for better reliability and uptime
- » Adoption of AI across the industry
- » Manufacturing growth in India

MANAGEMENT DISCUSSION AND ANALYSIS



**New Product****Hybrid Heat Pump: A Sustainable Green Solution**

Heating and cooling are essential operational needs for any industry. To optimise energy usage and reduce carbon emissions, Thermax has introduced an innovative hybrid heat pump that combines electrical and absorption technologies to meet both cooling and heating demands singlehandedly. This dual-capacity solution is capable of generating high-temperature water at 120°C and providing a cooling capacity of up to 30%.

Benefits of the Heat Pump**120°C**

High Temperature Efficiency

Up to 30%Simultaneous Cooling
Generation Capacity**40%**

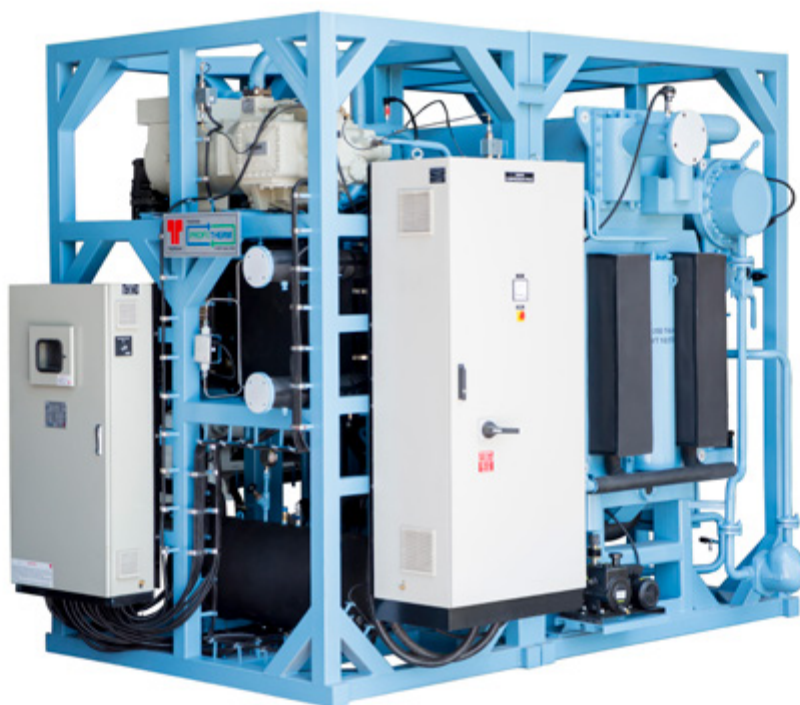
Fuel Consumption Savings

30%

Water Savings

400 kw

Capacity (Heating) Onwards



MANAGEMENT DISCUSSION AND ANALYSIS

The MDA covers significant subsidiaries impacting segmental performance. Please refer to AOC-1 on page 298 for detailed information on each subsidiary.

Industrial Products Overseas Subsidiaries

Danstoker Group, Herning, Denmark

Business Performance

The subsidiary's revenue grew by 38.9% in FY 2023-24 (FY 2022-23 saw a growth of 25.1%) while the order booking increased by 2.1% (in FY 2022-23 the order booking grew by 52.7%). This subsidiary has turned around in the last two years after registering negative growth for a prolonged period. This improvement is primarily driven by positive developments in the biomass segment, spurred by the non-availability of fossil fuels due to geopolitical circumstances, resulting in an increased demand for biomass-fired boilers.



The 26 TPH boiler supplied and installed by Danstoker for a dairy company in France

Key Solutions Provided

- » Solid fuel-fired (biofuel) boilers
- » Electric boilers
- » Waste heat recovery boilers
- » Oil/gas-fired boilers

Sustainable Growth Plan

- » To expand the business with waste biomass as a fuel that is likely to experience massive demand in Europe in the years ahead. The growing market is a consequence of Europe's plan to be independent of Russian gas supply
- » To leverage Europe's growing demand for biomass and electric boilers

Geographical Footprint

- » Denmark
- » Poland
- » Nordic countries (Norway, Sweden and Finland)
- » Baltic countries
- » Western Europe (France, Germany, the Netherlands, and Belgium)

Key Industries

- » Automotive
- » Breweries
- » Crematoriums
- » Dairies
- » District Heating
- » Food and Beverages
- » Pharmaceuticals
- » Wood

Highlights

- » Received its biggest-ever order from a packager in France for a biomass-fired boiler with a capacity of 25 tonnes per hour, operating at 45 bar pressure and 450 degrees Celsius temperature
- » Supplied the first-ever RDF (refuse derived fuel) fired hot water boiler with a capacity of 9.6 MW, operating at 16 bar pressure, for a project in Senja, Norway
- » Delivered another RDF fired hot water boiler of 17.5 MW capacity, operating at 10 bar pressure for a project in Kvitebjorn, Norway



PT Thermax International, Indonesia (PT TII), Jakarta, Indonesia

Business Performance

The subsidiary registered a 29.3% decline in revenue in FY 2023-24 (a growth of 83.3% in FY 2022-23). Order bookings decreased by 41.7% this year (61.7% increase in FY 2022-23). PTII has been incurring losses since its inception. This year, we are bringing in management as well as operational changes, which will help to gradually turnaround its performance going ahead.

Key Solutions Provided

- » Process heating equipment such as steam boilers, hot water and hot air generators, thermic fluid heaters and steam accessories
- » Services such as steam audits, along with value-added services like retrofitting and revamping existing assets within customer premises are also offered, complementing the product portfolio

Key Industries

- » Agriculture and Allied
- » Chemicals
- » Food and Beverages
- » Palm Oil
- » Paper and Packaging
- » Petrochemicals
- » Pharmaceuticals
- » Rubber
- » Textiles
- » Tobacco



Sustainable Growth Plan

- » To streamline local manufacturing facilities and increase the capacity utilisation
- » To penetrate the market with competitive products and pricing along with aggressive sales and marketing activities
- » To strengthen the services business by providing services such as revamping and retrofitting for boilers, heaters, and air pollution control equipment
- » To remain focussed on customer service and retention
- » To develop a network of channel partners and dealers and increase customer reach and visibility
- » As part of the expansion, the subsidiary is in the process of setting up a chemical blending unit
- » To reduce the overall cost
- » Closer coordination with India

Geographical Footprint

- » Indonesia
- » Southeast Asia

Highlights

- » Secured an order from one of the largest multinational corporations in the food and beverages sector for three boilers equipped with a reciprocating grate combustor. These boilers feature multi-fuel capability, including the ability to incinerate in-house process waste. This project represents a noteworthy fuel shift in the process industry and will serve as a flagship project for PT Thermax International Indonesia.
- » Secured a first-of-its-kind order for the supply of bag filters from an EPC partner for a government power plant project

MANAGEMENT DISCUSSION AND ANALYSIS

Thermax Europe, Bletchley, United Kingdom

Business Performance

During FY 2023-24, the order booking was down by 9% (23.8% down in FY 2022-23). However, the revenue increased by 1% (9.4% up in FY 2022-23). The business did not perform due to the destabilisation caused by the Russia-Ukraine war, resulting in the project uncertainties and diminished orders. Also, with electrification getting cheaper, the demand for both steam and gas fired chillers has reduced considerably.

| | | |
|---|---|---|
| <p>Key Solutions Provided</p> <ul style="list-style-type: none"> » Absorption chillers and heat pumps with a capacity of 35 kW to 12,000 kW, driven by hot water, steam, oil & gas and waste heat | <p>Sustainable Growth Plan</p> <ul style="list-style-type: none"> » With the change in the market and high energy costs in Europe, our focus is on heat pumps and absorption refrigeration applications of waste heat recovery through hot water chillers | <ul style="list-style-type: none"> » 2 MW hot water-driven chiller delivering chilled water at 2 degrees Celsius supplied to a lettuce grower in the UK » Supplied a 1 MW chiller with a special design for hazardous areas for one of the world's leading suppliers of chemicals, plastics, synthetic fibres, and agricultural products in the Netherlands » Delivered a 3.6 MW steam-driven chiller custom-made for a large refinery in Saudi Arabia |
| <p>Key Industries</p> <ul style="list-style-type: none"> » District Heating » Commercial Establishments | <p>Highlights</p> <ul style="list-style-type: none"> » Supplied a 6 MW steam-driven heat pump to Fyn district heating plant in Denmark | |
| <p>Geographical Footprint</p> <p>Eastern and Western Europe</p> | | |

Thermax Inc., Houston, Texas, USA

Business Performance

In FY 2023-24, order booking related to absorption cooling and heating products by the subsidiary was 14% lower (6% higher in FY 2022-23) owing to challenges emanating from fiscal policies and ongoing geopolitical turmoil. The revenue also decreased by 31.6 % (144% higher in FY 2022-23).

| | | |
|---|---|--|
| <p>Key Solutions Provided</p> <ul style="list-style-type: none"> » Sale and service of cooling and heating equipment based on absorption technology | <p>Geographical Footprint</p> <ul style="list-style-type: none"> » Americas (North, South, Central and the Caribbeans) | <p>Highlights</p> <ul style="list-style-type: none"> » A leading university opted for a multi-energy absorption chiller to ensure comfort cooling through recovery of waste heat from exhaust gases » A major Latin American beverage manufacturer chose Thermax's multi-energy absorption chiller. This chiller recovers waste heat from its processes and utilises it for process cooling. » A renowned chemical manufacturer opted for a Thermax steam fired chiller for its critical processes utilising waste heat recovery across different operations |
| <p>Key Industries</p> <ul style="list-style-type: none"> » Chemicals » Commercial Establishments » Data Centres and Information Technology » Food and Beverages » Hotels, Resorts and Hospitals » Oil and Gas » Pharmaceuticals » Universities, Schools and Colleges | <p>Sustainable Growth Plan</p> <ul style="list-style-type: none"> » To focus on promoting decarbonisation efforts all over the Americas (namely North, South Central and the Caribbeans) with cutting-edge absorption technology that can be deployed together with on-site power generation, solar energy technologies, district heating and cooling segment, and above all, for process integrated and discrete industrial heating and cooling applications | |



Case Study

Air Pollution Control Secures a Rs. 100 Crore Order from Solar Industry

In a first-of-its-kind order in India, the Air Pollution Control (APC) business secured a Rs. 100 crore order for a process exhaust system for solar PV cell and modules production lines of 4 GW capacity on a turnkey basis for a leading power company in Tamil Nadu, India.

Traditionally, solar panel manufacturers turn to international markets for gaseous abatement

scrubbers. However, our team successfully leveraged our division's expertise in addressing similar challenges and tailored solutions to meet the unique requirements of solar cell and module manufacturing. By optimising layouts and providing plug-and-play solutions, they met stringent deadlines, ensuring seamless execution of the project.

The team successfully concluded the initial phase of the project, delivering 2 GW of the process exhaust system.



Case Study

Water and Waste Solutions Pioneers Indigenous Mechanical Vapour Recompression (MVR) Technology

A leading pump manufacturer, renowned for its expertise in micro-precision parts with chrome/nickel plating sought an effluent treatment plant (ETP) based zero liquid discharge (ZLD) system to reduce freshwater usage and adhere to government discharge standards. However, the project faced challenges concerning limited space and steam availability.

Thermax introduced an innovative solution – a 10 KLD mechanical vapour recompression (MVR) unit, incorporating a plug-and-play modular skid design that required no steam for start-up and included an agitated thin film dryer (ATFD). This approach also integrated an advanced two-phase closed-loop system to boost efficiency.

Advantages

45 Days to 7 Days
Man-Days at Site Reduced as Most of the Assembly Work Was Done in the Factory

45%
Space Savings Due to Skid-Mounted Design Versus Conventional Systems

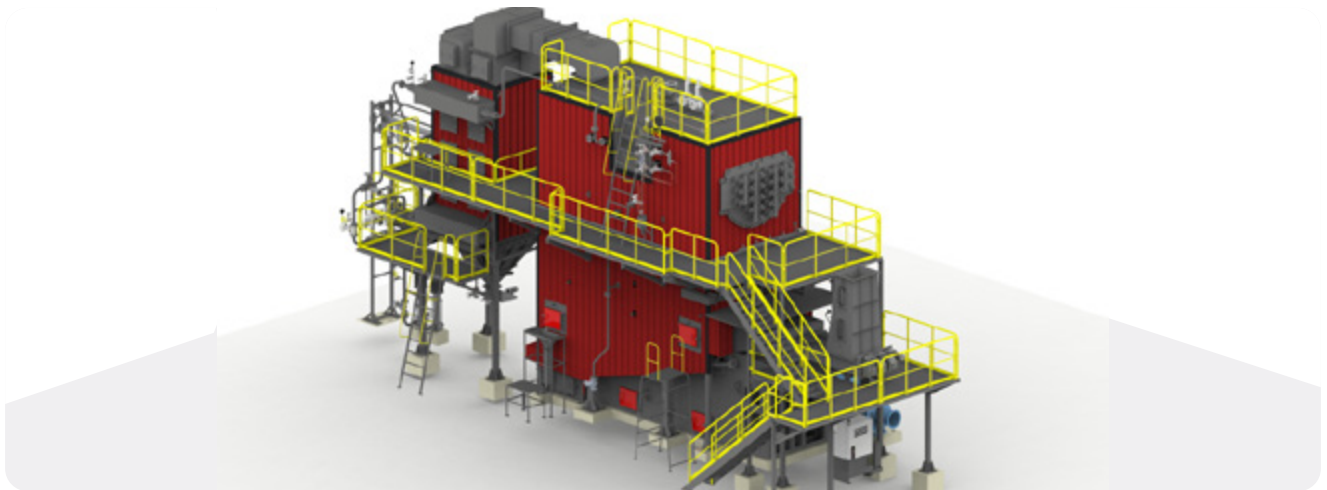
95%
Water Recycled for Reuse



MANAGEMENT DISCUSSION AND ANALYSIS

Performance of Industrial Products Segment in FY 2023-24

In FY 2023-24, the Industrial Products segment accounted for 41.9% (40.2% in FY 2023) of the Group's gross operating revenue. The operating revenue (net) stood at Rs. 4,055 crore (Rs. 3,338 crore), while segment profit* was Rs. 397 crore (Rs. 274 crore) for the same period. In FY 2023-24, the order booking was Rs. 4,329 crore, up from Rs. 4,172 crore in the previous year. The higher revenue can be attributed to strong growth in the metal, cement and food & beverage sectors.

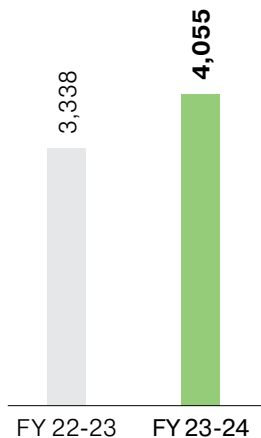


Ultrapac is a compact and packaged biomass boiler designed for low-grade biomasses with extremely fouling characteristics. It offers fuel flexibility and requires minimal cleaning frequency, addressing the demand for CO₂-reducing solutions in the smaller boiler market.

Industrial Products

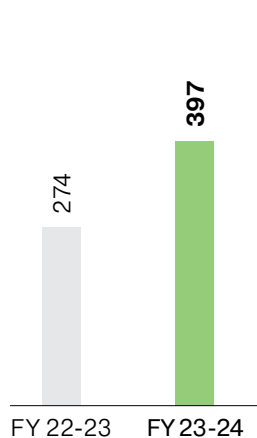
Revenue

(Rs. in crore)



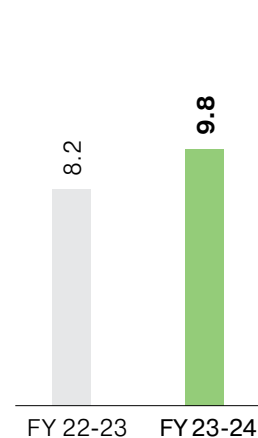
Profit*

(Rs. in crore)



Profit Margin*

(%)



Profit* and Profit Margin* – Segment PBIT before exceptional and unallocated overheads