



4.2 Industrial Infra

Our Industrial Infra business supports industries in their energy transition process and encompasses our Projects and Energy Solutions (P&ES), Thermax Bioenergy Solutions Private Limited (TBSPL), and Thermax Babcock & Wilcox Energy Solutions (TBWES) businesses.

Clean Energy



Projects and Energy Solutions (P&ES)

P&ES includes captive power plants, cogeneration systems, waste heat recovery plants, and independent power plants under an engineering, procurement, and construction (EPC) model. The business provides captive and independent power plants that rely on a variety of renewable fuels and energy sources.

P&ES' offerings also include sulphur recovery block installation and flue gas desulphurisation systems to capture SO_x emissions from fossil fuel-based power plants. Additionally, it provides solutions based on conventional fuels to cater to diverse energy needs and preferences.



Thermax Babcock & Wilcox Energy Solutions Limited (TBWES)

TBWES supplies steam generation solutions for both process and power requirements, along with waste heat recovery. Additionally, it specialises in retrofitting boilers and process furnaces. The service arm of TBWES offers diagnostic services, spare parts, plant optimisation services, performance enhancement solutions, and digital services like Thermax EDGE Live[®] for boilers and heaters.



Thermax Bioenergy Solutions Private Limited (TBSPL)

TBSPL manages the setting up and operation of bio-CNG plants on an EPC basis collaborating with international technology partners. It offers comprehensive solutions for producing bio-CNG from various waste sources, including biomass, agricultural waste, municipal solid waste, and food processing waste. With a vision to become a preferred partner in the industry, TBSPL aims to ensure the accessibility of clean and sustainable energy while promoting a circular economy.

MANAGEMENT DISCUSSION AND ANALYSIS

Business Highlights



A site image of our bio-CNG plant in Dhuri, Punjab

P&ES

Executed a transformative project for the Damodar Valley Corporation power plant, employing flue gas desulphurisation (FGD) technology to enhance sustainability and ensure environmental compliance

TBWES

FlexiSource™ – our multi-fuel solution selected as one of the top innovative solutions introduced in the B20 Business Compendium of the G20 summit

TBSPL

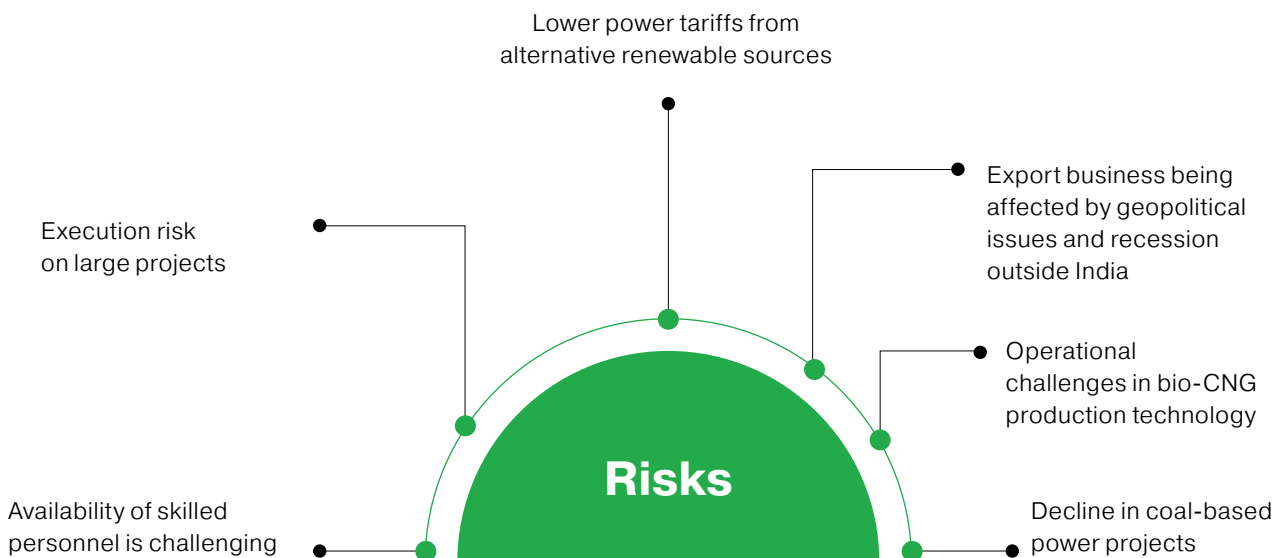
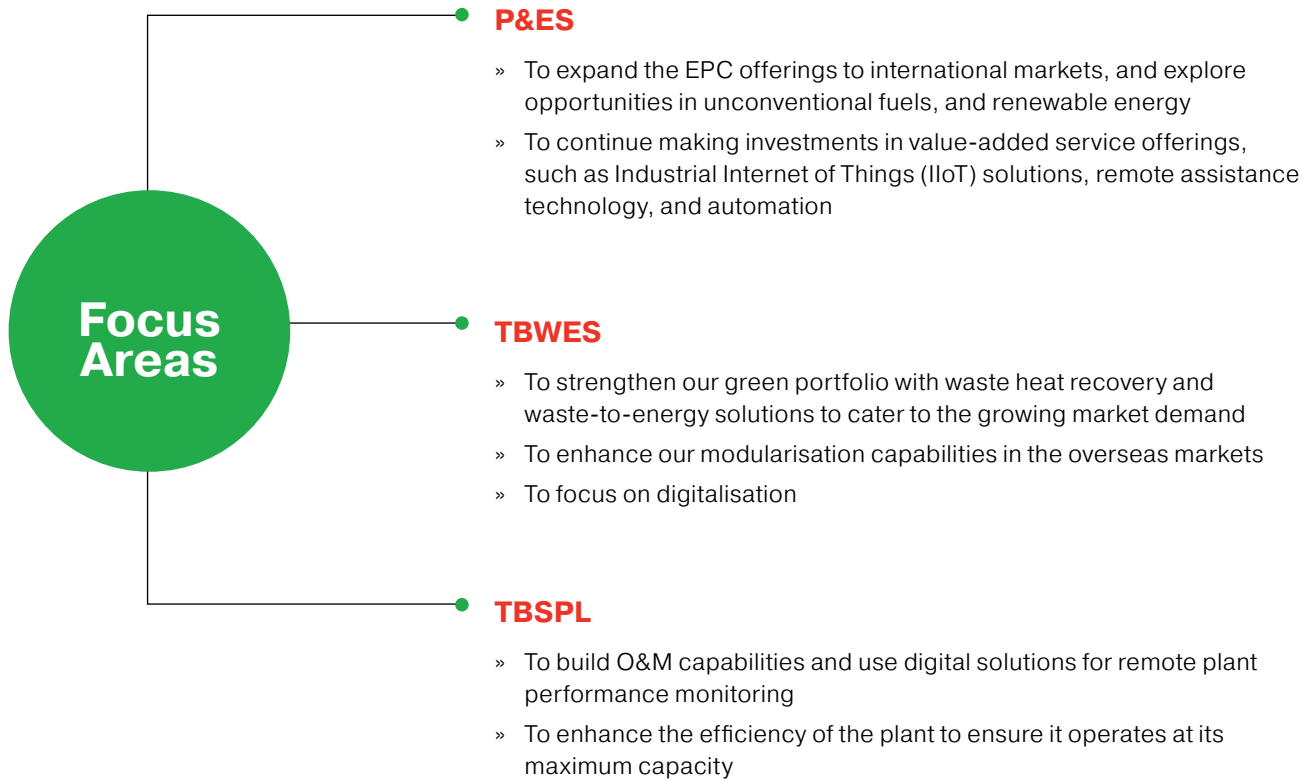
Driven by the Indian government’s efforts to decrease natural gas imports and achieve stability against oil and gas price fluctuations, TBSPL has experienced significant traction. Since its inception, it has secured 15+ orders across five states, and initiated 4+ commercial gas generation projects

Growth Drivers

- » Emphasis on clean energy driving shift in the energy mix and creating opportunities for greenfield projects and brownfield replacements
- » Increasing demand for EPC, renewable energy, waste-to-energy, waste heat recovery plants and biofuels with a focus on sustainability and energy-efficient solutions
- » Government mandate to power companies to install FGD systems within a stipulated timeframe to mitigate SOx emissions



The 20 MW captive power plant commissioned for a leading alloy steel manufacturer in South India



MANAGEMENT DISCUSSION AND ANALYSIS

New Product

FlexiSource™: Enabling Energy Input Flexibility

TBWES' ability to offer energy transition technologies and fuel flexibility is one of its growth drivers. The Company's multi-waste solution, FlexiSource™, provides energy input flexibility, effectively tackling fuel availability challenges caused by geopolitical changes, costs, and environmental factors. This waste-to-energy system enhances user capabilities by enabling them to switch energy inputs and decrease reliance on specific fuels.

Benefits of FlexiSource™

14
Different Types of Fuels

285+ kg/hour
CO₂ Reduction

10–300 TPH
Capacities Range

60–100%
Turndown Ratio

81%
Maximum Efficiency





Industrial Infra Subsidiaries

Thermax Babcock & Wilcox Energy Solutions Limited (TBWES), Pune, Maharashtra

Business Performance

TBWES achieved a 6.4% growth in revenue for FY 2023-24 (31.6% growth in FY 2022-23) and experienced a 10.6% decline in order bookings (15.7% growth in FY 2022-23) compared to the previous year. This is on account of the deferment in large order finalisations and delayed traction in waste to energy projects.

Key Solutions Provided

[Read more on page 75](#)

Sustainable Growth Plan

- » To expand its green portfolio in conjunction with the trend towards clean energy, TBWES has formed strategic partnerships and developed newer technologies focussed on waste to energy, municipal solid waste (MSW) incineration and waste heat recovery
- » To develop and deploy multiple green energy solutions which offer multifuel flexibility to achieve the most economical fuel mix
- » To continue focussing on the services portfolio including plant improvement solutions that increase capacity, reliability, emissions performance, useful life and efficiency of existing plants along with digital solutions



TBWES successfully shipped out its first consignment consisting of a fleet of 17 assembled modules for a leading waste to energy technology OEM in Europe

Geographical Footprint

- » Asia
- » Southeast Asia
- » Middle East
- » Africa
- » Latin America
- » Europe

Key Industries

- » Cement
- » Chemicals
- » Distillery
- » Fertilisers
- » Non-Ferrous Metals
- » Paper
- » Petrochemicals
- » Power
- » Refinery
- » Steel
- » Sugar
- » Textiles

Highlights

- » An EPC order for design, manufacture, supply, erection and commissioning of a 250 tonnes per hour solid fuel fired boiler for a major chemical manufacturer
- » Order for design, manufacture, and supply of four waste heat recovery boilers for a leading cement manufacturer
- » Order for design, manufacture, and supply of first MSW RDF (refuse derived fuel) waste to energy boiler with HZI Steinmüller licensed technology in India
- » Order for study and provision of BFG (blast furnace gas) firing in a PC-fired (pulverised coal) boiler for a leading steel manufacturer
- » Order for dismantling and relocation of an HRSG (heat recovery steam generator) boiler for a leading refinery and petrochemical manufacturer

MANAGEMENT DISCUSSION AND ANALYSIS

Case Study

TBWES Commissions High Capacity CFBC Boiler for a Steel Major

The TBWES team successfully commissioned a high-capacity circulating fluidised bed combustion (CFBC) boiler for a prominent steel manufacturer. This boiler was designed to meet the specific requirement of maximising the utilisation of blast furnace gas (BFG), while also being capable of operating seamlessly on 100% coal in the event of gas supply interruptions. In traditional setups, BFG is fired in radiant boilers within steel plants. However, this poses challenges during interruptions, especially when steam generation

from more costly fuels such as natural gas or oil becomes necessary.

Our design team developed eco-friendly CFB technology, in line with the Pollution Control Board emission norms with BFG being the primary fuel and coal the secondary fuel. Customised methodologies were devised to predict thermal hydraulics of CFBC performance under the BFG and coal combination.

Another challenge was placing the BFG burner in the furnace due to the positive pressure nature of CFBC furnaces and low BFG gas pressure.

To address this, our design team identified the optimal elevation for the burner location, based on the pressure profile on the flue gas side. The unit achieved full-load operation in March 2024, meeting the customer's expectations.

2,40,000
MT CO₂
Savings Per Day

Thermax Bioenergy Solutions Private Limited (TBSPL)

Business Performance

TBSPL, similar to a start-up in the bio-CNG sector, is introducing many first-of-a-kind solutions for the Indian market, including rice straw and agro-residue-based biogas, which currently have no globally recognised technologies. TBSPL continues to scale up its rice straw technology in commercial plants although it faces challenges related to digestion technology and critical equipment, particularly in the rice straw preparation system. Despite these operational challenges, TBSPL is investing significant man-hours and financial resources, confident in its ability to enhance and scale pilot projects to commercial levels, making it highly attractive to the market.

Key Solutions Provided

[Read more on page 75](#)

Key Industries

- » Oil and Gas
- » Transportation (using bio-CNG for mobility)

Sustainable Growth Plan

- » To expand manufacturing and geographical footprint by deepening the business presence in domestic markets
- » To engage in strategic partnerships and promote sustainable energy, offering a one-stop solution for bio-CNG and contributing to a circular economy
- » To generate employment opportunities for local communities
- » To invest in technology and R&D

Geographical Footprint

- » India (Punjab, Uttar Pradesh, Gujarat, Delhi-NCR)

Highlights

- » Secured orders from a leading energy conglomerate to establish five bio-CNG plants to be set up in Rajasthan, Madhya Pradesh, Maharashtra (2), and Uttar Pradesh



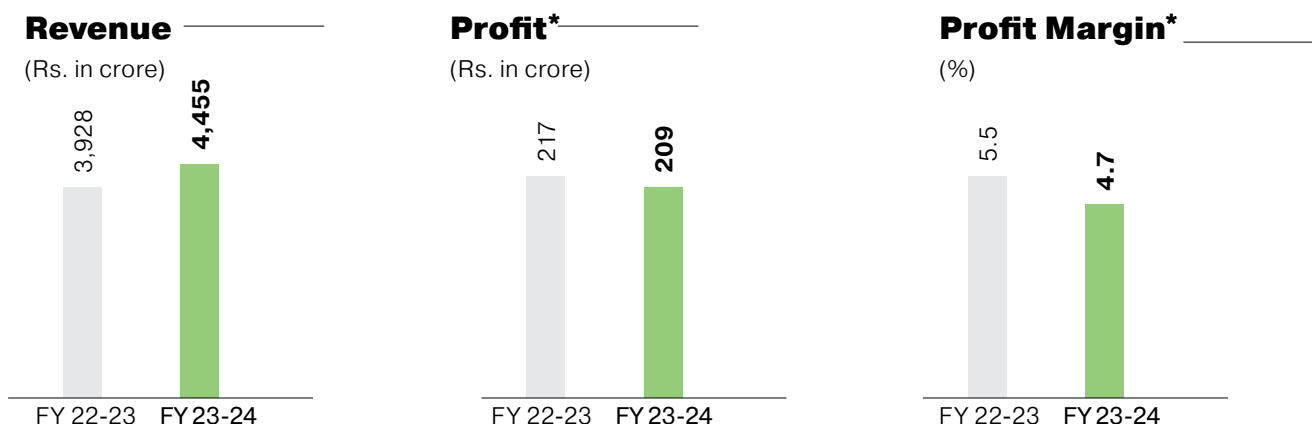
Performance of Industrial Infra Segment in FY 2024

In FY 2024, the Industrial Infra segment accounted for 46% (47.3% in FY 2023) of the Group's gross operating revenue. The operating revenue (net) stood at Rs. 4,455 crore (Rs. 3,928 crore), while segment profit was Rs. 209 crore (Rs. 217 crore) for the same period. The growth in revenue is attributable to carry-forward orders in the project business and new orders received by TBSPL. In FY 2024, order booking stood at Rs. 4,100 crore, growing from Rs. 3,779 crore in the previous year.



■ 3x80 TPH modularised plug-and-play boilers supplied to a major refinery in Iraq

Industrial Infra



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

4.3 Green Solutions Business

The Green Solutions segment includes Thermax Onsite Energy Solutions Limited (TOESL), and First Energy Private Limited (FEPL). Through these subsidiaries, the Company typically offers opex-based green utilities and renewable energy solutions through the build-own-operate model. Serving primarily industrial clients, the Company's engagements span 10 to 25 years, underscoring long-term commitment. Although capital-intensive initially, this business assures relatively secure cash flows.