

# Thermax Babcock & Wilcox Energy Solutions (TBWES)

Large Boilers & Heaters



# Conserving Resources, Preserving the Future.

Thermax provides systems and solutions in the critical domains of energy and environment. The products and services developed by thermax help industries achieve better resource productivity and improved bottom lines, while maintaining a cleaner environment. The company's vision for the future is firmly anchored in the belief that, to stay competitive, business houses need to adopt sustainable practices.

Thermax's product portfolio covers heating, cooling, water and waste management, and specialty chemicals. The company also designs, builds and commissions large boilers for steam and power generation, turnkey power plants, waste-to-energy systems and air pollution control projects.

Thermax provides its customers value added services – audits of energy and water, system modifications for optimal use of resources, annual maintenance contracts, energy rentals and O&M of power and water installations. Thermax operations are supported by innovative R&D and partnerships with global technology majors. It has an international sales & service network spread over 30 countries and state-of-the art facilities (in India, Denmark, Germany, Indonesia and Poland) that manufacture to international standards.



We Heat



We Cool



We Power



We Clean

## Thermax Babcock & Wilcox Energy Solutions (TBWES)

TBWES (wholly owned subsidiary of Thermax Limited) provides equipment and solutions for generating steam for process and power through combustion of various solid, liquid and gaseous fuels, as well as through heat recovery from turbine/engine exhaust and (waste) heat recovery from industrial processes. TBWES also offers heaters for various applications in the chemical, petrochemical and refinery segments. Its services arm offers renovation and modernization solutions for old boilers and heaters. The major industry segments served in India and across the world are steel, refinery, petrochemicals, power, cement, sugar, distillery, fertilizers, paper, chemicals, non-ferrous metals and textile.

Thermax has always kept its primary focus on customer satisfaction through constant upgradation of technologies and an in-depth understanding of market needs.





## Bagasse & Biomass Fired Boilers

### Product Features

- Continues ash discharge
- Grate driven by hydraulic / planetary gear with Variable Frequency Drive (VFD)
- Catenary design for precise grate speed control
- Overlapping grate design prevents air leakages
- Overfire air system provides turbulence and thorough mixing of volatile gases, thus assuring complete combustion
- Online maintenance of grate
- Multi-stage superheater with inter stage feed water spray attemperator
- Tall furnace for complete combustion
- Single-Drum and Bi-Drum Configurations
- Site-Assembled or Partially Modularized
- Pinhole or Pusher Grate offered for specific applications
- Can be offered as: Boiler island, Boiler-Turbine-Generator (BTG) package, Turnkey power plant (EPC)

### Operating Range

Capacity:	Up to 300 TPH
Pressure:	Up to 160 kg/cm <sup>2</sup> (g)
Temperature:	Up to 560°C
Fuels:	Bagasse, Biogas, Biomass, Cane Leaves, Coal, Coco Husk, Coconut Shells, Coffee Grounds, Corn Cob, Cotton Stalk, De-Oiled Rice Bran (DORB), Empty Fruit Bunch (EFB), Ground Nut Shell, Julia Flora Oil, King Grass, Maize Stalk, Mustard Husk, Napier Grass, Palm Fibre, Paper Sludge, Petcoke, Pith, Red Gram Stems, Rice Husk, Rice Straws, Roasted Chaffs, Saw Dust, Straw, Tapioca Stem, Wood Chips, Wood Bark, Paper Sludge, etc.



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### Major Clients

- Mitr Phol Bio-Power, Thailand
- Korach Industry Company Ltd., Thailand
- URC Sonedco Sugar Corporation, Philippines
- Incauca S.A.S, Colombia
- San Pedro Bio-energy, Dominican Republic
- Chana Green Company Ltd. (CGC), Thailand
- U-Thong Bio Power Company Ltd., Thailand
- KBS Power Company Ltd., Thailand
- Victorias Milling Company Inc., Philippines
- Zuker SA DE CV, Mexico
- Thip Kamphaengphet Bio Energy Co. Ltd., Thailand
- Cagayan Biomass Energy Corporation (CBEC), Philippines
- PT Perkebunan Nusantara XI (PTPN), Indonesia
- Lamsan Power Corporation, Philippines
- PT Rejoso Manis Indo, Indonesia
- Nakhonpathom Biomass Company Ltd., Thailand
- Isabela Biomass Energy Corporation, Philippines
- Kamuna Sugar Ltd.. India
- Ambalika Sugar Pvt Ltd., India
- India Cane Sugar Ltd, India
- Bannari Amman Sugars Ltd., India
- Dhampur Sugars Ltd. India
- Sri Chamundeshwari Sugars, India



1 unit of 140 TPH, 82 kg/cm<sup>2</sup>(g), 520°C bagasse, coal, king grass fired travelling grate boiler

# Single-Drum High Capacity Boilers

## Product Features

- Fully drainable, horizontal and convective superheater for longer life and high reliability
- Front wall firing for a variety of liquid and gaseous fuels (independently or in combination)
- Steam drum outside the flue gas path permits quick startup and load
- Low refractory, and thus reduced maintenance
- Available in full plug-&-play configurations or as partially assembled modules

## Operating Range

Capacity:	Up to 500 TPH
Pressure:	Up to 160 kg/cm <sup>2</sup> (g)
Temperature:	Up to 560°C
Fuels:	Liquid fuels such as natural gas, purge gas, coke oven gas, #2 oil, #6 oil, heavy fuel oil, residue oil, HSD, naphtha, hydrogen gas, biogas, waste gas



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1 unit of 175 TPH, 115 kg/cm<sup>2</sup>(g), 510°C natural gas, diesel fired boiler

## Major Clients

### Fertiliser

- L&T for Tata Chemicals Ltd.
- Oswal Chemicals & Fertilizers Ltd. (KRIBHCO)
- Indorama Eleme Fertilizers & Chemicals Ltd. (IEFCL), Nigeria
- PT Panca Amara Utama - Banggai Ammonia Plant, Indonesia
- Madras Fertilizers Ltd.
- Chambal Chemicals & Fertilizers Ltd.
- Hindustan Fertilizer Corporation Ltd.
- Egypt Fertilizer Co. Egypt
- Southern Petrochemicals Ind. Corp.
- Matix Fertilizers & Chemicals Ltd.
- Gujarat Narmada Valley Fertilizer Co.

### Refinery & Petrochemical

- Arabian Petrochemical Co.
- Reliance Petroleum Ltd.
- Bharat Petroleum Corporation Ltd. (BPCL)
- Gas Authority of India Ltd.

## Thermax D-Type Boilers (Thermstar)

### Product Features

- Leakproof and Fully Packaged Boilers with Modular Construction
- Bi-drum design configuration
- High-quality, fully automated membrane panel construction
- Demister pads to ensure high steam purity
- Higher turndown ratio offered for better operational flexibility
- Convenient Burner Cleaning with steam purging if applicable
- Higher thermal efficiency by incorporating bare / fin tubes
- Conservative heat release rates for reliable operation and longer life
- Convective type superheaters with complete draining provision
- Accepts a wide range of Oil and Gas fuels for operational flexibility
- Available in field-erected/ modular/ plug-&-play variants depending on site transportable limits

### Operating Range

Capacity:	Up to 500 TPH
Pressure:	Up to 110 kg/cm <sup>2</sup> (g)
Temperature:	Up to 520°C
Fuels:	Natural Gas, Hydrogen Gas, Biogas, Syngas, Blast Furnace gas, Coke Oven Gas, Purge Gas, Light Fuel Oil, Heavy Fuel Oil, Residue Oil, HSD, LDO, Naphtha, Waste Gas, Tar etc.

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### Major Clients

- Dangote Oil Refining Company, Nigeria
- JGC Corporation - for Basrah Refinery Upgrade, Iraq
- National Mineral Development Corporation (NMDC), India
- JSW Steel, India



4 units of 400 TPH, 107 kg/cm<sup>2</sup>(g), 520°C Natural Gas fired D-type boiler

## Blast Furnace Gas / Lean Gas Fired Boilers

### Product Features

- Reliable design for combustion of low calorific value
- Auto switch over to oil firing in case of interruption in BFG supply
- Safe operation of boiler under varying load conditions
- Low volumetric heat release rate with larger boiler furnace
- Specialized burner for high mixing energy of air and BFG for efficient combustion
- Safety interlocks to ensure proper burning of BFG without support fuel
- Single-drum and bi-drum configurations
- Available in field-erected/ partially modularized variants
- Boiler-Turbine-Generator (BTG) package can be offered on case-to-case basis.

### Operating Range

Capacity:	Up to 500 TPH
Pressure:	Up to 175 kg/cm <sup>2</sup> (g)
Temperature:	Up to 560°C
Fuels:	Blast Furnace Gas (BFG), Coke Oven Gas, Corex Gas, LD Gas and other Lean Gases.

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### Major Clients

- Tata Iron & Steel Co. Ltd.
- National Mineral Development Corp. Ltd. (NMDC)
- Jindal Vijaynagar Steels Ltd., Bellary
- Kalyani Steels Ltd., Hospet
- Nagpur Alloys and Castings Ltd., Raipur
- Kirloskar Ferrous Industries Ltd., Hospet
- Steel Authority of India Ltd., Rourkela
- SLR Metaliks Ltd.
- Bhushan Power & Steel Ltd.
- Rashtriya Ispat Nigam Ltd.



3 units of 220 TPH, 109 kg/cm<sup>2</sup>(g), 540°C syngas, natural gas fired BFG, COG, LDG, LDO fired blast furnace gas boilers

## Once-Through Steam Generators (OTSG)

TBWES offers once-through steam generators, a drumless boiler technology that converts feedwater into high-pressure, high-purity steam in a single pass, for enhanced oil recovery (EOR) application.

### Product Features

- In-house design and manufacturing
- Provides 80% quality-steam for optimal heat transfer and efficient reservoir sweep in EOR applications
- Capable of handling high Total Dissolved Solids (TDS) in feedwater, ensuring reliable operation in challenging water conditions.
- Modular, skid-mounted design enabling quick installation and fast setup on site.
- Compact footprint, saving valuable space without compromising performance.
- Optimized use of fins in critical areas to enhance heat transfer efficiency and overall system effectiveness.
- Gas-tight internally insulated ducting and casing for predictable performance & longer life.
- Provides operational ease & reliability.
- Built for extreme climates with enclosed piping, valves, and control panels for reliable outdoor operation.

### Operating Range

Capacity: Up to 150 MMBtu/hr  
Pressure: 1000 psi to 2500 psi stream pressure  
(80% saturated steam)  
Fuels: Fuel Oil, Fuel Gas.

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Once-Through Steam Generator Installation

## Waste Heat Recovery Units (WHRU)

WHRUs are engineered to recover waste heat from the exhaust of gas turbines or reciprocating engines. The heating media could be water, water-glycol mixture, thermal oil or regen gas depending on the application.

These units are installed on:

- Offshore platforms
- LNG tanker
- Onshore terminals and gas processing plants
- Floating Production Storage and Offloading Vessels (FPSO's)

There are over 150 installations for the upstream oil & gas segment. These units are operating successfully in very diverse locations such as Sakhalin Island, Asian Offshore Waters, North Sea, Africa Offshore, The Middle East Offshore and the Americas.

### Operating Range

Capacities: Up to 135 MW

### Product Features

- Compact, space-saving design
- Shop-modularised or site-assembled
- Integral bypass and external bypass design
- Online isolation of WHRU
- Vertical and Horizontal Gas flow options
- Single stack option
- Removable tube bundle
- Optimum gas side pressure loss
- Supplementary fired units - with FAF and - without FAF



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### Major Clients

#### FPSO

- Bumi Armada, Malaysia A/c ENI, Italy-Block 15/6 FPSO, Angola
- Nigerian National Petroleum Corporation (NNPC)- Chevron, Agbami FPSO, Nigeria
- Petrobras America Inc., P43, P48, P51 & P52, Brazil
- MODEC Inc., Singapore A/c Petrobras America Inc, MV 27 Caroica, Brazil
- BP Exploration, BP / KBR Block
- Maersk-- Husky Oil Co.
- Shell Bonga
- BW Offshore, Norway A/c Petrobras America Inc. for Chinook & Cascade, Gulf of Mexico

#### Offshore

- Unocal Thailand Ltd., Pailin Offshore, Thailand
- PTT Thailand, Offshore, Bongot, Thailand
- Essar Offshore A/c ONGC, Neelam Heera Platform, India
- B.P Exploration, Offshore UK North Sea
- Samsung A/c CTOC Cakerawala Project Offshore Thailand/ Malaysia
- NPCC Technip A/c ADMA OPCO- Umm Al Lulu Offshore Abu Dhabi

#### Onshore

- Siemens, UK A/c Burullus Gas Co. Egypt
- Petrofac A/c Hayan Petroleum Company, Jihar Onshore Syria
- Hyundai A/c Abu Dhabi Marine Operating Company (ADMA-OPCO) Satah Al Razboot (SARB), UAE



5 x 36.19 MW Waste Heat Recovery Units

## Waste Gas Fired Boilers

Waste gas fired boilers are designed to burn waste gas / tail gases to generate steam for process or power.

Typical systems include:

Carbon Black Plants (CO Gas)

Ferro Alloy Plants (CO Gas)

Caustic Soda Plants (H2 Gas)

### Product Features

- Natural circulation design
- Fire-tube or water-tube boiler options
- Special refractory-lined combustor for burning lean gas
- Adequately sized combustor for proper residence time to ensure complete burning of gas
- Membrane wall water-tube construction to minimize refractory and increase radiant heat transfer
- Advanced combustion control systems to ensure efficient burning of lean gas

### Operating Range

Capacity: Up to 250 TPH  
Pressure: Up to 100 kg/cm2(g)  
Temperature: Up to 540°C

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### Major Clients

- Hi-Tech Carbon Ltd.
- Philips Carbon Black Ltd.
- Continental Carbon
- Cabot Corporation
- Thai Carbon Black
- Birla Carbon
- BA Energy, Canada
- Himadri Chemicals & Industries Ltd.
- Goodluck Carbon Pvt. Ltd.
- Abu Dhabi Oil Refining Company (Takreer)
- Saudi Elastomers Project



1 unit of 100 TPH, 46 kg/cm2(g), 375°C CO fired waste gas boiler

## Exhaust Gas Boilers (EGB)

An exhaust gas boiler recovers heat from the flue gases of genset to produce steam, hot water or thermic fluid for various heating / cooling applications.

### Product Features

- Enhance system efficiency in genset based power plants up to 10%
- Available in configurations of water-tube and smoke-tube type to suit diverse operational needs
- Customizable to integrate with all makes of 2-stroke and 4-stroke engines.

### Applications

- Auxiliary oil heating, tank farm heating, line tracing
- Process heating
- Combined cycle
- Steam / hot water for industrial chilling
- Power generation

### Operating Range

Capacity: Up to 50 MW diesel-generating set installation  
Fuels: EGB support engines running on light oil, heavy oil, and gas



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### Major Clients

#### Steel

- Abul Khair Steel & Power
- Ispat Metallics Ltd.
- Jindal Alloy & Steel Company Ltd.
- Bhushan Steel Ltd.

#### Textile

- Alok Industries Ltd.
- Garden Silk Mills Ltd.
- Jindal Polyester Ltd.
- Indian Rayon Corp. Ltd.
- National Rayon Corporation Ltd.
- Rajasthan Spinning & Weaving Mills Ltd.
- Rajshree Polyfils td.
- Recron Synthetics Ltd.
- Indorama Synthetics Ltd.
- SRF Ltd.



21 units of 7.5 TPH, 18 kg/cm<sup>2</sup>(g), 310°C Exhaust Gas Boilers

## WHRB in Sponge Iron Plant

TBWES is a pioneer in supplying waste heat recovery boilers for sponge iron plants. The boilers are designed to handle large amounts of dust from the flue gas generated in the rotary kilns. The steam generated from these boilers is typically used for power generation.

### Operating Range

Capacity: Up to 900 TPD  
Pressure: 44 kg/cm<sup>2</sup>(g) to 115 kg/cm<sup>2</sup>(g)  
Temperature: Up to 540°C

### Product Features

- Natural circulation, water-tube design
- Optimized for dust-laden flue gases from DRI kilns
- Gas-tight side wall of water wall construction
- Horizontal design for lower kiln capacities up to 100 TPD
- Vertical design for larger kilns up to 900 TPD, for operational comfort
- Boiler-Turbine-Generator (BTG) package can be offered on case-to-case basis.



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### Major Clients

- Jindal Steel & Power Ltd.
- Bhushan Power & Steel Ltd.
- Bhushan Steel & Strips Ltd.
- Tata Sponge Iron Ltd.
- Rashmi Metallica
- Ispat Godavari Ltd.
- Shree Metallica Ltd.
- Singhal Enterprises
- Janaki Corporation Ltd.
- Tata Metallica
- Super Smelters
- Gallant Ispat
- Rungta Mines Ltd.
- BMM Ispat
- Karnikripa Power Pvt. Ltd.
- Shakambhari Ispat & Power Ltd.
- Shyam Steel Works Pvt. Ltd.



5 units x 32 TPH at 35 kg/cm<sup>2</sup>(g), 380°C WHRB in Sponge Iron Plant

## WHRB in Non-Ferrous Industry

In the non-ferrous industry, waste heat recovery boilers are provided for zinc pyrite roasters, copper smelters, and copper converters.

In these applications, the boilers typically operate at high pressure without superheating, allowing safe operation above the gas dew point and minimizing corrosion risks.

### Operating Range

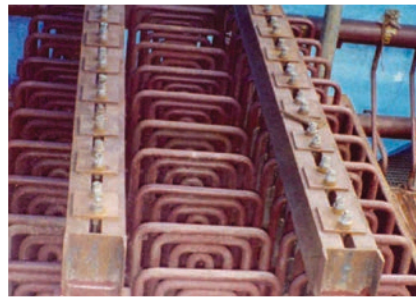
Capacity: 10 TPH to 100 TPH  
Pressure: Up to 160 kg/cm<sup>2</sup>(g)  
Temperature: Up to 540°C

### Product Features

- Forced circulation water tube design
- Gas-tight side wall with water wall design
- Wide-pitched in-line geometry to prevent choking
- On-line hammering system
- Baffles to prevent channeling of gases
- Provision of cavity followed by variable pitch convection coils



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### Major Clients

- Birla Copper
- Cominco Binani Zinc Ltd.
- Hindustan Copper Ltd.
- Pyrites Phosphates & Chemicals Ltd.



WHRB for 300 TPD Copper Converter Unit to produce 21 TPH of steam at 45 kg/cm<sup>2</sup>(g) at saturation temperature

# WHRB in Coke Oven / Coke Dry Quenching Plant

TBWES is a pioneer in supplying waste heat recovery boilers for coke oven plants.

## Product Features

- Water wall panel construction in 1st / 2nd pass
- Site / port assembly with modularized construction
- Horizontal and vertical designs, tailored to space and process requirements
- Optional blast furnace firing capability
- Natural / forced circulation design for coke dry quenching plant
- Integrated Soot Blowing System
- Gas-tight Membrane Panel Construction and Single-Shaft Design
- Boiler-Turbine-Generator (BTG) package can be offered on case-to-case basis.

## Applications

- Non-recovery coke oven plants
- Recovery type coke dry quenching (CDQ) plants

## Operating Range

Capacity: Up to 200 TPH  
Pressure: Up to 130 kg/cm<sup>2</sup>(g)  
Temperature: Up to 540°C



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## Major Clients

- Hooghly Met Coke & Iron Ltd. (Tata Power)
- Jindal Steel & Power Ltd.
- Bhushan Power & Steel Ltd.
- Konark Met coke Ltd. (Neelanchal Ispat Ltd.)
- Electrosteel Casting Ltd.
- Global Coke Ltd.
- Lanco Industries Ltd.
- Tata Steel Ltd.
- Steel Authority of India Ltd.
- National Mineral Dev. Corp. Ltd.
- Kirloskar Ferrous Industries Ltd.
- Sesa Goa Ltd.
- Global Coke Ltd.
- Electrosteel Castings Ltd. (ECL)
- Petroleum Development Oman (PDO)



12 units of 24.5 TPH, 96 kg/cm<sup>2</sup>(g), 540°C WHRB in coke oven plant

3 units of 25TPH, 66 kg/cm<sup>2</sup>(g), 500°C WHRB in coke dry quenching plant

## WHRB for Coal Gasification

TBWES is a pioneer in the field of waste heat recovery boilers for coal gasification. The steam generated from these boilers is typically used either for power generation or process needs.

### Product Features

- Horizontal configuration
- Natural circulation design
- Site / port assembly with modularised construction
- Hammering arrangement for effective cleaning of heat transfer surface
- Water wall panel construction enhances heat absorption and protects boiler structure from high temperatures

### Operating Range

Capacity: Up to 200 TPH  
Pressure: Up to 130 Kg/cm<sup>2</sup>(g)  
Temperature: Up to 540°C

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### Major Clients

- Jindal Steel & Power Ltd, Barbil



2 units of 15 TPH, 60 kg /cm<sup>2</sup>(g) 500°C WHRB in coal gasification

## WHRB for Coke Calcination

TBWES is a pioneer in supplying waste heat recovery boilers for coke calcination plants. The steam generated from these boilers is typically used either for power generation or process needs.

### Product Features

- Soot blowing arrangement to ensures clean heat transfer surfaces and efficient operation.
- Water wall panel construction in 1st / 2nd pass for effective heat absorption
- Site / port assembly with modularised construction
- Available in both horizontal and vertical configurations

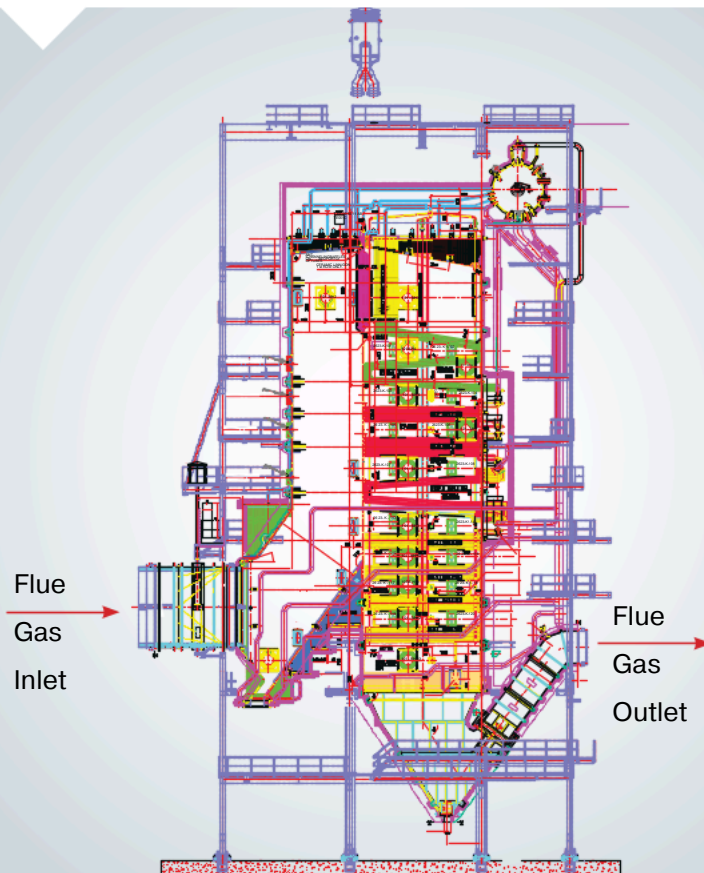
### Operating Range

Capacity: Up to 200 TPH  
Pressure: Up to 130 Kg/cm<sup>2</sup>(g)  
Temperature: Up to 540°C



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### Major Clients

One of the esteemed installations  
in UAE



2 units of 94.12 TPH, 42.1 kg/cm<sup>2</sup>(g), 381° C WHRB in coke calcination

## WHRB in Refinery & Petrochemical Plant

In refineries and petrochemical plants, the waste heat recovery boilers are provided downstream of Fluid Catalytic Cracking Units (FCCU). They capture high-temperature flue gases to generate steam, and enhance overall energy efficiency.

TBWES holds proven expertise in handling very large volumes of flue gases, such as those encountered in normal operating conditions at 515,000 Nm<sup>3</sup>/hr and 731°C with catalytic dust inclusion.

Two different technologies are available:

- Directly downstream of FCCU
- 'CO' gas boiler downstream of FCCU

### Product Features

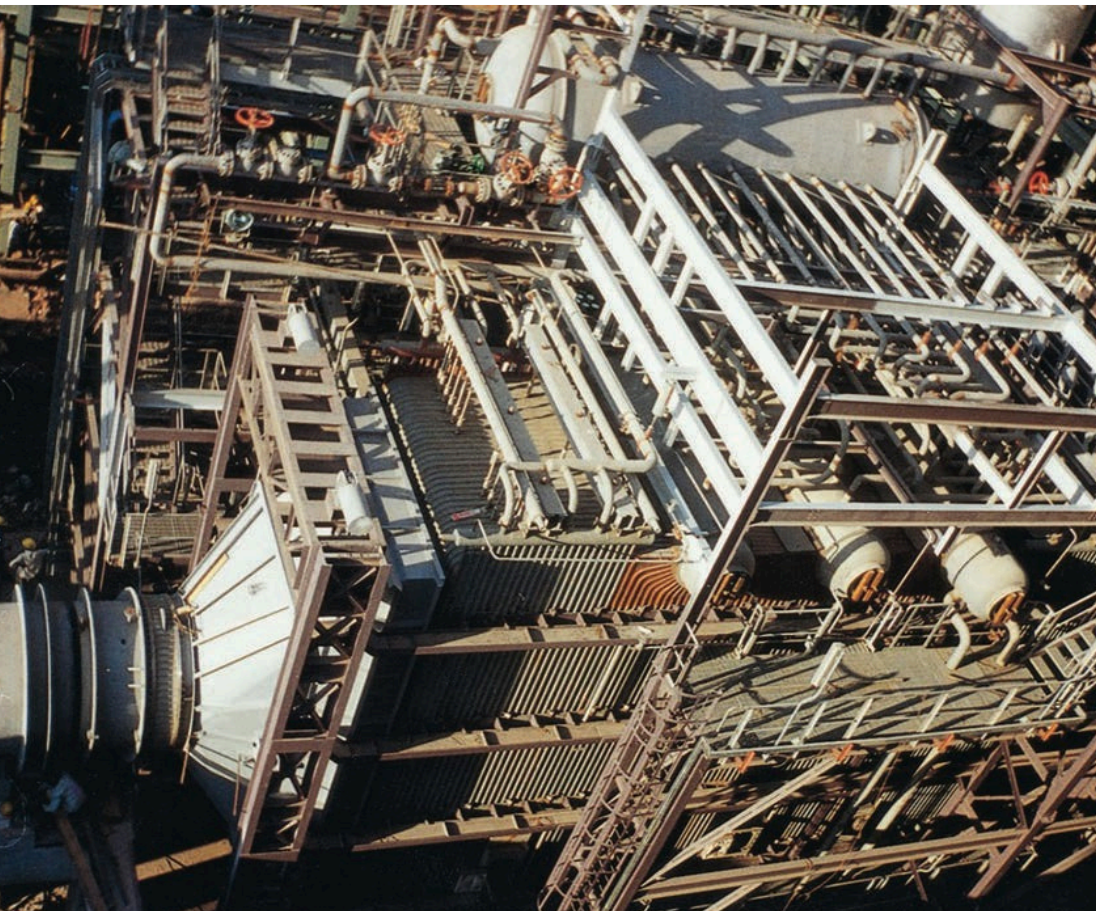
- Engineered to efficiently manage the carry-over catalytic dust
- Natural circulation design
- Fully drainable design of superheater
- Co-current, drainable economiser
- Complete membrane panel construction to ensure sulphur dew point corrosion resistance
- Strategically placed soot blowers to mitigate dust-laden gas effects

### Operating Range

Capacity: Up to 400 TPH  
Pressure: Up to 100 kg/cm<sup>2</sup> (g)  
Temperature: Up to 540°C



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### Major Clients

- Reliance Industries Ltd., India
- PEMEX - Dos Bocas Refinery, Mexico
- Dangote Oil Refining Company, Nigeria
- Indian Oil Corporation Ltd., India
- Hindustan Petroleum Corporation Ltd. (HPCL), India
- Algiers Refinery, Algeria
- Saudi Aramco Mobil Refinery Limited (SAMREF), Saudi Arabia
- Bharat Petroleum Corporation Ltd. (BPCL), India
- Mangalore Refinery & Petrochemicals Ltd., India
- HPCL-Mittal Energy Ltd. (HMEL), India

1 unit of 103 TPH, 43 kg/cm<sup>2</sup>(g), 400°C WHRB in Refinery & Petrochemical Plant



## WHRB in Cement Plant

TBWES Waste Heat Recovery Boilers in cement plants capture heat from pre-heater, calciner and clinker cooler exhaust gases to generate steam for power. This reduces the cost of highly energy-intensive cement production process, supports compliance with pollution control norms, and enhances energy security—meeting up to 35% of the plant's power needs.

### Operating Range

Capacity: 15,000 TPD of clinker production

Pressure: Up to 40 Kg/cm<sup>2</sup> (g)

Temperature: Up to 500°C

Boiler-Turbine-Generator (BTG) package can be offered on case-to-case basis.

### Product Features

#### WHRB for Pre-heater and Calciner

- Horizontal boiler with tubes located vertically for uniform dust disposal and gas distribution
- Proven technology to handle high dust-laden gases of pre-heater and calciner
- Inline / staggered heat transfer area
- Cross flow gas direction offers efficient heat transfer
- Fully field-proven de-dusting hammering mechanism
- Higher water holding capacity to cater to any steam fluctuations
- Better accessibility

#### WHRB for Clinker Cooler (with and without mid-tap off)

- Vertical boiler with horizontal tubes
- Cross flow gas direction offering efficient heat transfer
- Proven design for highly abrasive Air Quenching Clinker (AQC) gases
- Available in both forced / natural circulation designs
- Less floor space offers flexibility in layout
- Special finned design for better heat transfer



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### Major Clients

- National Cement Company (NCC), Yemen
- Dhar Cement Ltd.
- JK Cement Ltd.
- JK Lakshmi Cement Ltd.
- JSW Cement Ltd.
- Wonder Cement Ltd.
- Rain Cement Ltd. (Priya Cement)
- Gujarat Sidhee Cement Ltd. (now Saurashtra Cement Ltd.)
- UltraTech Cement Ltd.
- Dalmia Cement (Bharat) Ltd.
- Reliance Cement Company Pvt Ltd.
- Nuvoco Vistas Corp. Ltd.



Generating 72 TPH at 17 kg/cm<sup>2</sup> (g), 325°C WHRB in Cement Plant

## WHRB in Chemical Plant

In chemical industry, TBWES waste heat recovery boilers serve various applications including Sulphuric Acid Plants, Nitric Acid Plants, Dichromate Plants, Caprolactam Plants etc.

### Sulphuric Acid Plant

#### Product Features

- Available in both fire-tube and water-tube constructions
- Fire-tube boilers can be offered in both flexible and fixed tube-sheet design
- Experience in handling high gas-side operating pressures up to 6000 mmWC (special construction of economizer and superheater is provided)
- Cast iron gilled ring economiser to prevent sulphur corrosion
- Includes boiler, superheater, and economizer for a full solution
- Gas outlet temperature regulation at each equipment ensures optimal acid gas conversion

### Operating Range

Capacity: Up to 130 TPH  
Pressure: Up to 90 Kg/cm<sup>2</sup> (g)  
Temperature: Up to 520°C

### Nitric Acid / Caprolactum Plants

#### Product Features

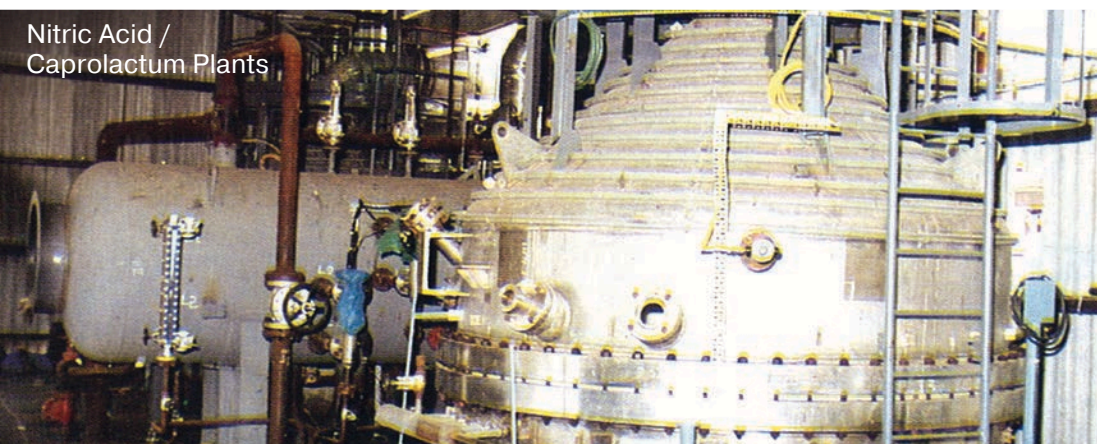
- Designed to suit both low-pressure and high-pressure systems
- Both natural circulation fire-tube and forced circulation water-tube designs available
- Gas-tight construction with stainless steel material
- Integrated NH<sub>3</sub> burner
- Heating coils to prevent dew point corrosion
- Wall cooling coils to protect the shell from thermal stress and overheating
- Lamont nozzles for uniform water distribution within the coils



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Sulphuric Acid Plant



Nitric Acid / Caprolactum Plants

### Major Clients

#### Chemical

- Hitachi Zosen for Thai Caprolactum, Thailand
- Mitsui Engg. & Shipbuilding Co.
- Sterlite Industries Ltd.
- Hindustan Heavy Chemicals
- Birla Copper Indian Explosives Ltd.
- PT. South Pacific Viscose, Indonesia
- Shree Sulphuric Acid Ltd.
- Southern Petrochemical Industries Corp. Ltd.

#### Fertiliser

- Gujarat State Fertiliser
- Bagfas Fertilizer Co., Turkey
- Shivalik Fertilisers Chemicals Ltd.
- Bharat Fertilisers Ltd.
- Fertilisers And Chemicals Travancore Ltd. (FACT)
- Gujarat State Fertiliser Corp.

#### Others

- Saudi Arabian Mining Company (Ma'aden)
- Andhra Sugars Ltd.
- Anil Starch Products Ltd.
- Metazinc Ltd.



3 units of 261 TPH, 68 kg/cm<sup>2</sup>(g), 500° C WHRB in Sulphuric Acid Plant

Ammonia burner with waste heat boiler in Nitric Acid / Caprolactum Plants

## WHRB in Sulphur Recovery Plant

In sulphur recovery plants, TBWES offers specialised boilers to recover heat from hot process gases from the reaction furnace and tail gas incinerator.

### Operating Range

Capacity: Up to 260 TPH  
Pressure: Up to 55 Kg/cm<sup>2</sup> (g)  
Temperature: Up to 510°C

### WHRB downstream of Main Reaction Furnace

- Fire-tube boiler construction; can be offered in both flexible and fixed tube-sheet design
- Proven design for high gas inlet temperatures (1300°C – 1400°C)
- Multi-pass arrangement in same shell of boiler or separate shell with common steam drum
- Steam-heated sulphur drains at outlet / intermediate gas chambers

### WHRB downstream of Tail Gas Incinerator

- Both water-tube and fire-tube design options are available
- Modularised construction
- Superheater made of high-grade (T22, T91 and Incoloy) materials

Manufactured as per Technology developed by Thermax



### Major Clients

- Reliance Petroleum Ltd.
- Cochin Refineries Ltd.
- Indian Oil Corporation Ltd.
- Hindustan Petroleum Ltd.
- Bharat Petroleum Corp. Ltd.
- Bahrain Petroleum Co.
- Dolphin Energy Ltd., Qatar
- HMEL-HPCL Mittal Energy Ltd.
- Mangalore Refinery & Petrochemicals Ltd.



3 units of 45 TPH at 38 kg/cm<sup>2</sup> (g) WHRB in Sulphur Recovery Plant

## WHRB in Hydrogen Plant

TBWES offers specialised WHRBs for hydrogen plants, designed to capture heat from reformer flue gas for steam generation and reuse.

### Reformed Gas / Process Gas Boiler

- Fire-tube boiler configuration
- Flexible tube sheet design
- Alloy steel tubes (e.g., T11, T22) are used to overcome metal dusting
- Internal bypass provided with liner to control the gas outlet temperature
- Incoloy ferrules anchored in the inlet tube sheet refractory
- Separate steam drum connected by risers and downcomers
- Heat-sensitive paint on the inlet box
- Handles high gas-side operating pressures (~30 Kg/cm<sup>2</sup>g)
- Designed to withstand gases rich in H<sub>2</sub>/CO/CH<sub>4</sub>

### Operating Range

Capacity: 30 TPD to 5000 TPD Hydrogen Production  
Pressure: Up to 40 Kg/cm<sup>2</sup> (g)

### Flue Gas Boiler / Convection Section of Hydrogen Reformer

- Available in both water-tube and fire-tube type designs
- Engineered to handle heating of diverse liquid streams
- Common steam drum for reformed gas boiler and flue gas boiler

Manufactured as per Technology developed by Thermax



### Major Clients

- Gujarat Godrej Innovative Chemicals Ltd.
- National Peroxide Ltd.
- Hindustan Petroleum Corporation Ltd.

WHRB in Hydrogen Reformer at HPCL Mumbai



## WHRB for Carbon Black Plant

TBWES WHRBs capture the intense heat from the reactor off-gas in a carbon black plant, turning a wasted byproduct into useful, high-pressure steam.

### Operating Range

Capacity: Up to 130 TPH  
Pressure: Up to 90 Kg/cm<sup>2</sup> (g)  
Temperature: Up to 520°C

### Product Features

- A combination of low NO<sub>x</sub> burners, air and fuel staging, and Flue Gas Recirculation (FGR) to minimize NO<sub>x</sub> formation
- SNCR and SCR DeNO<sub>x</sub> systems are implemented to ensure compliance with emission norms
- Externally fired combustion chamber to ensure complete combustion of tail gases
- Membrane panel side walls in convection section
- No auxiliary fuel required
- Radiant superheater design

Manufactured as per Technology developed by Thermax



1 unit of 100 TPH WHRB in Carbon Black Plant

### Major Clients

- PT. Cabot, Indonesia
- Thai Carbon, Thailand
- Philips Carbon Black Ltd.
- Balkrishna Industries Ltd.
- Epsilon Carbon Pvt. Ltd.
- Birla Carbon (Aditya Birla Group)
- Hi-Tech Carbon Ltd.

## WHRB for Other Applications

### WHRB for Glass Furnace

These boilers recover heat from hot waste gases leaving glass-melting furnaces to produce saturated / superheated steam for process heating, chilling or power generation applications. These WHRBs enhance overall energy efficiency, lower fuel consumption, and contribute to environmental sustainability in glass manufacturing.

#### Product Features

- Single-drum or bi-drum configuration
- Natural circulation design
- Optimum tube sizes and pitch to prevent choking; low gas velocities to prevent tube erosion
- Customised cleaning mechanism such as a hammering device or shot-ball cleaning effectively remove deposits and maintain peak performance.

#### Operating Range

Capacity: Up to 400 TPH  
Pressure: Up to 115 Kg/cm<sup>2</sup> (g)  
Temperature: Up to 540°C

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### WHRB for Sinter Cooler

TBWES provides a proven waste heat recovery solution specifically designed for sinter coolers, converting the high-temperature exhaust air into valuable steam for power generation.

#### Product Features

- Natural circulation, single pass, single / dual pressure vertical boiler
- Flue gas enters from the top for efficient heat exchange
- Controlled flue gas velocity to prevent erosion from dust particles
- Extended surface design can be offered for enhanced thermal performance
- Complete steel casing construction to ensure durability and structural integrity

#### Operating Range

Capacity: Up to 50 TPH  
Pressure: Up to 50 Kg/cm<sup>2</sup> (g)  
Temperature: Up to 250°C

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### WHRB for Incinerator

These boilers capture thermal energy from hot flue gases generated during the incineration of various waste gases, liquids, and solids. The boilers cool the flue gases and convert the recovered heat into steam at the required pressure and temperature for power generation or industrial use.

#### Product Features

- Water-tube or fire-tube construction to suit process requirements
- Bare tube or extended surface heat transfer area
- Natural circulation design
- Single-pass or multi-pass flue gas construction
- Membrane wall construction casing or refractory-lined construction
- Application-specific cleaning mechanism to ensure consistent performance

#### Operating Range

Capacity: Up to 15 TPH  
Pressure: Up to 25 Kg/cm<sup>2</sup> (g)

## Spent Wash Fired Boilers

TBWES spent wash-fired boilers are designed to convert distillery spent wash into valuable energy, reducing waste and operating costs effectively for both large-scale operations and micro distilleries (under 30 KLPD).

Beyond environmental compliance, these boilers offer significant commercial value; the potash-rich fly ash generated provides an additional revenue stream.

### Operating Range


Capacity:	Up to 200 TPH
Pressure:	Up to 125 kg/cm <sup>2</sup> (g)
Temperature:	Up to 540°C
Main Fuel:	Spent Wash
Support Fuels:	Coal, Bagasse, Rice husk

Can be offered as:

- Boiler island
- Boiler-Turbine-Generator (BTG) package
- Turnkey power plant (EPC)

### Product Features

- Efficient firing of low-solid spent wash (having < 48% solid concentration)
- Site-assembled and partial modularization options
- Single-drum configuration
- Combustion technology: Atmospheric Fluidized Bed / Reciprocating Grate
- Effective online cleaning system
- Continuous operation of boilers without cleaning
- Single-pass / 3-pass design (pioneered by TBWES)
- Specially designed spent wash spray system
- Compliance with Zero Liquid Discharge (ZLD) requirements
- Specially designed spent wash spray system
- Adequate residence time to ensure complete combustion, a system designed for maximum heat recovery

Manufactured as per Technology developed by Thermax 



### Major Clients

- Universal Robina Corporation, Philippines
- Bannari Amman Sugars Ltd.
- Nirani Sugars Ltd.
- Indian Sugar Manufacturing Co. Ltd.
- Nandi Sahakari Sakkare Karkhane
- EID Parry Ltd.
- Shivshakti Sugars Ltd.
- Sar Senapati Santaji Ghorpade Sugar Factory Pvt. Ltd.
- Daund Sugar Ltd.
- Shri Ambalika Sugar Pvt. Ltd.
- Godavari Biorefineries Ltd.
- Sai Priya Sugars Ltd.
- Satish Sugars Ltd.
- Athani Sugars Ltd.
- Krantiagrani Dr. G.D. Babu Lad SSK
- Kunjir Bioenergy India LLP
- Jaywant Sugars Ltd.
- Venkateshwara Power Project Ltd.
- Karmaveer Shankarrao Kale SSK Ltd.
- Loknete Sundarraoji Solanke SSK Ltd (Majalgaon SSK)

2 units of 33 TPH, 44 Kg/cm<sup>2</sup>(g), 400°C spent wash fired boilers



# Waste To Energy (WTE) Boilers - NRSW, RDF & Scheduled Waste

TBWES offers specialised boilers for transforming challenging and extremely heterogeneous waste fuels such as Non-Recyclable Solid Waste (NRSW), scheduled waste, Refuse-derived Fuels (RDF) and sludge into usable energy with low emissions and high efficiency.

With superior heat recovery, advanced emission controls, fuel flexibility and low operating costs, these boilers help industries reduce landfill load and meet stringent emissions norms — making it an ideal fit for circular economy goals.

## Operating Range

Capacity: Up to 300 TPH  
Pressure: 10 to 70 kg/cm<sup>2</sup>(g)  
Temperature: Up to 450°C  
Fuels: RDF, NRSW, Industrial Scheduled Waste, etc.

## Product Features

- Special Inclined Reciprocating Grate Technology for efficient combustion
- Vertical and horizontal model configurations
- Available in single-drum and bi-drum options
- Multi-pass design
- Specially designed combustion & feeding system to accommodate wide range of net calorific values
- Integrated flue gas cleaning system with circulating dry scrubbing and bag filter
- Modularized design for minimal on-site setup
- Automated and digitally enabled combustion control logic
- Corrosion-resistant pressure part design and specialized metallurgy, ensuring long-term operational integrity.
- The furnace is sized for complete combustion, carryovers and also to ensure proper residence time of 2 sec at >850°C for complete combustion of fuel and to decompose the Dioxin/Furans.



Manufactured as per Technology developed by Thermax

## Major Clients

- Mehali Papers Private Ltd.
- Bahl Papers Mills Ltd.
- Godrej Agrovet Ltd.
- Shalivahana (MSW) Green Energy Ltd.
- N R Agarwal Industries Ltd.
- KK Duplex & Paper Mills Pvt. Ltd.



## WTE FlexiSource™ Boilers

TBWES offers a specialised waste-to-energy boiler technology-FlexiSource™, designed for firing multiple waste fuels simultaneously. It offers unparalleled flexibility in sourcing a wide variety of waste fuels, ensuring high reliability, availability, and efficiency.

### Operating Range

Capacity: 10 to 300 TPH  
Pressure: 10 to 70 kg/cm<sup>2</sup>(g)  
Temperature: Up to 495°C depending on fuel mix  
Fuels: Non-Recyclable Solid Waste (NRSW),  
Refuse-derived Fuel (RDF), Agricultural  
Waste, Biofuels, Biomass, etc.

### Major Clients

- Bharat Spirits
- Crystal Balaji Industries Private Limited

### Product Features

- Multi-fuel compatibility
- Specially designed combustion & feeding system to accommodate wide range of net calorific values ranging from 1400-4000 kcal/kg, moisture content up to 60% with irregular fuel sizes ranging from 50 to 1000 mm
- Modularized design for minimal on-site setup
- Tall furnaces with second generation secondary air jets
- Multi-feeding locations in furnace ensure optimum heat release rates
- Integrated flue gas cleaning system with circulating dry scrubbing and bag filter
- Up to a 90% reduction in initial waste material volume
- Automated and digitally enabled combustion control logic
- Available in single-drum and bi-drum options
- Single-pass and multi-pass designs
- I-Step grate combustion technology
- Vertical and horizontal models

Manufactured as per Technology developed by Thermax



1 unit of WTE FlexiSource™ boiler in India



# Heat Recovery WTE Boilers downstream of Gasifiers, Stokers or Rotary Kilns

TBWES offers customised heat recovery WTE boilers to maximize energy recovery for integrated waste-to-energy plants and process industries with high thermal loads.

These boilers efficiently capture all types of corrosive and dust-laden flue gases coming from Municipal Solid Waste or Refuse Derived Fuel or Non-Recyclable Solid Waste Incineration in the gasifiers, rotary kilns, and stoker systems. This process converts otherwise wasted heat into usable steam or electricity, significantly boosting overall plant energy efficiency.

## Major Clients

- Jurong Engineering Ltd. - for Global Power Synergy Corporation (GPSC), Thailand
- Vital Energi Utilities Limited, UK

## Product Features

- Specially designed combustion & feeding system to accommodate wide range of net calorific values.
- Optimized for high-temperature, fouling environments
- Modularized design for minimal on-site setup
- Automated and digitally enabled combustion control logic
- Once-through or multi-pass design options
- Vertical and horizontal model configurations
- Interface engineering between stokers / gasifiers / kilns and waste heat boilers is provided

## Operating Range

Capacity: Up to 300 TPH  
Pressure: 15 to 70 kg/cm<sup>2</sup>(g)  
Temperature: Up to 480°C

Manufactured as per Technology developed by Thermax



**3 units of 26 TPH, 45 kg/cm<sup>2</sup>(g), 400° C Heat Recovery WTE Boiler**



# Fired Heaters in Chemical & Petrochemical Plants

The Fired Heaters in the Chemical and Petrochemical plants are for:

- Heating process fluid
- Thermal cracking

## Product Features

- The heaters are in complete compliance with API 530, API 560
- Modular or Semi-Modular Construction
- Serpentine / Arbor Tube Arrangement for enhanced heat transfer and durability.
- Flexible draft configurations (Natural, Forced & Balanced) for optimized combustion efficiency.
- Optimized for maximum energy recovery via integrated onboard or outboard steam generators/air pre-heaters.
- Design configurations: Vertical Cylindrical, Box-type, Cabin-type

## Operating Range

Capacity: Up to 150 MMKcal /hr (Single unit)

## Applications

### Liquid Phase Heaters for

- Mineral Oils / Synthetic Oils
- Molten Salt Heaters

### Process Industry Heaters

- Steam Superheaters
- Charge Heaters
- Start-up Heaters

### Crackers

- Ethylene Dichloride Cracker
- Acetic Acid Cracker
- Gas Cracker

### Vapour Phase Heaters for

- Synthetic Oil / Mineral Oil Vaporisers
- Hydrocarbon Vaporisers



Manufactured as per Technology developed by Thermax

THERMAX



2 units of 6.34 MMKcal/hr hot oil heaters



1 unit of 13.5 TPH, 30.5 kg/cm<sup>2</sup>g, 280°C, out board steam generator on cracking furnace

## Major Clients

### Petrochem

- Farabi Petrochemicals Company, Saudi Arabia
- Chennai Petroleum Corporation Ltd.
- Haldia Petrochemicals Ltd.
- Indian Petroleum Corporation Ltd.
- Southern Petrochemicals Industries Corp.

### Chemical

- Mangalore Chemicals & Fertilisers Ltd.
- Egyptian Propylene & Polypropylene Company (EPPC)
- Chemplast Sanmar Ltd.
- Finolex Industries Ltd.
- National Peroxide Ltd.
- Pyrites Phosphates & Chemicals Ltd.
- Sudarshan Chemicals Industries
- Tamilnadu Petroproducts Ltd.

### Textile

- India Polyfibres Ltd. (currently under Reliance Industries Ltd.)
- Gas Authority of India Ltd.
- Farabi Petrochemicals Ltd, Saudi Arabia

### Others

- Cominco Binani Zinc Ltd.
- Nirma Ltd.

# Fired Heaters for Oil & Gas Refineries

The Fired Heaters in the Oil & Gas Refineries are for:

- Heating process fluid
- Thermal cracking

Two types of designs can be offered depending on the application:

- Vertical Cylindrical
- Box-type furnace
- Cabin-type

## Operating Range

Capacity: Up to 150 MMKcal /hr (Single unit)

## Applications

- Crude Distillation Unit (CDU)
- Vacuum Distillation Unit (VDU)
- Delayed Coker Unit (DCU)
- Fluid Catalytic Cracker Unit (FCCU)
- Continuous Catalytic Reforming Unit (CCR)
- Diesel Hydro Desulfurization Treatment (DHDT)
- Naphtha Vaporisers in Hydrogen
- Motor Spirits Quality (MSQ)
- Naphtha Splitter Unit (NSU)
- Gasoline Treatment Unit
- Vacuum Gas Hydrotreater (VGO-HDT)
- Hydro Cracker
- Scanfiner Unit



Manufactured as per Technology developed by Thermax **THERMAX**



1 unit of 50 MMKcal/hr Heater for Delayed Coker Unit (DCU)

## Major Clients

### Refinery & Petrochem

- Dangote Oil Refining Company, Nigeria
- Reliance Industries Ltd.
- Indian Oil Corporation Ltd.
- Bharat Petroleum Corporation Ltd. (BPCL)
- Qatar Petroleum
- Bharat Oman Refinery Ltd.
- Shell Inc., Gabon (West Africa)
- Mangalore Refinery & Petrochemicals Ltd.
- HPCL Mittal Energy Ltd.
- PDO, Lekhwaier Project, Oman
- Hindustan Petroleum Corporation Ltd.
- Kuwait Oil Corporation
- Gas Authority of India Ltd.

# Atmospheric Fluidized Bed Combustion (AFBC) Boilers

## Product Features

- Optimum combustion with staged secondary air system
- Bed evaporator design for higher reliability
- Pin studs welded on in-bed surfaces for erosion control
- Overbed as well as underbed feed system offered
- Shop-assembled, machine-welded membrane panels
- Suspension burning of fuel for higher combustion efficiency.
- Bubbling bed ash coolers
- Two-stage steam separation
- Single drum & bi-drum configurations
- Available in field-erected / fully modularised (plug-&-play) variants
- Can be offered as: Boiler island, Boiler-Turbine-Generator (BTG) package, Turnkey power plant (EPC)

## Operating Range

Capacity:	Up to 400 TPH
Pressure:	Up to 140 kg/cm <sup>2</sup> (g)
Temperature:	Up to 560°C
Fuels:	Coal, Lignite, Char, Low Ash Coal, Petcoke, Paper Sludge, Washery Rejects, Roasted Chaffs, De-Oiled Rice Bran (DORB), Biomass, Bagasse, Rice Husk, Spent Coffee Ground, Spent Tea Waste, Pith Woodchips, Coffee Husks, Mustard Stalk, Cotton Stalk, Sawdust, De-Oiled Bleach Earth (DOBE), Rice Straw, etc.

Hopper Bottom Design \* / Fluid Bed Design is offered for specific applications:

- Absence of moving parts reduces maintenance.
- Uniform temperature distribution and optimum combustion.
- Low excess air requirement results in higher efficiency.
- Lower NO<sub>x</sub>, SO<sub>x</sub> and CO emissions.
- Low temperature operation minimises the biomass fuel ash agglomeration and fouling tendency.

\*Hopper Bottom Design is Manufactured under License from Babcock & Wilcox, USA



## Major Clients

### Chemical

DCW Chemplast

### Cement

Ambuja Cements Ltd.  
JK Cement  
Shree Cement  
Madras Cement

### Paper

Orient Paper Mills  
West Coast Paper Mills  
Ltd. Bataan 2020, Inc.  
Khanna Papers Mills Ltd.  
TNPL Naini Tissues

### Steel

Bhushan Ltd.  
Nav Bharat Ferro Alloys Ltd.  
JSW Energy Ltd  
Usha Martin, Jamshedpur  
KJS Steel Ltd.

### Others

Nestle  
Birla Tyres  
Eco Oils Sdn. Bhd.  
Ruchi Soya Oil Industries Ltd.

1 unit of 25 TPH, 45 kg/cm<sup>2</sup>(g), 480° C coal fired boiler

# Internal Recirculation Circulating Fluidised Bed Combustion (IR-CFBC) Boilers

## Product Features

- Compact, economical design and construction
- Impact separation with 'U-beam' particle separators
- Best-in-class compliance with environmental norms
- Minimum refractory with bottom-ash coolers (wet and dry)
- Automatic carbon monoxide purging logic for added safety
- Maintenance-free recycle system
- Two-stage separation for better bed inventory control
- No soot blowers are required
- Exceptional 4:1 turndown capability, eliminating auxiliary fuel needs
- Patented Reduced Diameter Zone (RDZ) tube section to eliminate interface erosion
- Can be offered as: Boiler island, Boiler-Turbine-Generator (BTG) package, Turnkey power plant (EPC)

## Operating Range

Capacity:	Up to 1000 TPH
Pressure:	Up to 200 kg/cm <sup>2</sup> (g)
Temperature:	Up to 565°C
Fuels:	Biomass, Refuse-Derived Fuel (RDF), Mill Rejects, Washery Rejects, Sludge, Oil Pitches, Agro-Wastes, Char, Fly Ash, High-Ash Coal, High-Sulphur Coal, Low-Ash Coal, High-Moisture Coal, Lignite, Petroleum Coke, etc.

Manufactured under License from Babcock & Wilcox, USA



## Major Clients

### Chemical

Kanoria Chemicals  
GHCL Ltd.  
Vinachem DAP-2 Project  
RSPL Ltd.

### Cement

Ultratech Cement Ltd.  
Saurashtra Cement  
ACC Ltd.  
Jaiprakash Associates Ltd.  
Sagar Cement  
Sharjah Cement

### Refinery

Reliance Utilities & Power Pvt. Ltd.

### Paper

Ballarpur Industries Ltd.  
ITC Ltd.

### Steel

Suryadev Alloys & Power Pvt. Ltd.  
IMFA Ltd.  
Kamachi Sponge & Power Corpn. Ltd.

### Textile

Grasim Industries Ltd.  
Indian Rayon & Inds. Ltd.  
Welspun Captive Power Generation Ltd.

### Sugar

Bajaj Infrastructure Development  
Company Ltd.

5 units of 500 TPH, 125 kg/cm<sup>2</sup>(g), 535°C Indonesian coal,  
Indian coal, petcoke fired boilers



# Bi-Drum Packaged/ Site-Erected Boilers (FM/HCFM/PFM)

## Product Features

- Package boilers are completely pre-engineered with packaged design
- 100% Skid-mounted plug-&-play design enables quick deployment and minimal on-site setup
- Special design of drum internals for high steam purity
- Membrane / studded wall water-cooled furnace construction
- Fully drainable convective superheater
- Fine combustion control and high turndown ratios

## Operating Range

Capacity:	Up to 275 TPH
Pressure:	Up to 110 kg/cm2(g)
Temperature:	Up to 520°C
Fuels:	All liquid and gaseous fuels, waste fuels, tar, hydrogen, refinery gases

Manufactured under License from Babcock & Wilcox, USA



1 unit of 273 TPH, 65 kg/cm2(g), 500° C Arabian light crude oil & natural gas fired PFM boiler

## Major Clients

### Chemical

- Qatar Vinyl Company Ltd., Qatar
- Trust Chemicals Industries LLC, Egypt
- MICCO - Thai Binh, Vietnam
- TCI Sanmar Chemicals, Egypt
- Saudi Basic Industries Corporation (SABIC)

### Fertiliser

- Galaxy Project FZCO for Burrup Fertilizers Pty. Ltd., Australia
- Indorama Eleme Fert & Chem. Ltd., Nigeria
- Gujarat Narmada Valley Fertilizers Co Ltd.

### Mining

- Saudi Arabian Mining Company (Ma'aden)

### Refinery & Petrochemical

- ADNOC Refining Company, UAE
- JG Summit Olefins Corporation, Philippines
- Saudi Aramco, Berri Gas Plant, Saudi Arabia
- Buzzichelli Maroc - Sonara Limbe Refinery Project
- Reliance Utilities & Power Pvt. Ltd.
- SABIC Petrokemya, Saudi Arabia
- Lurgi AG for PDH Alfasel Project, Saudi Arabia
- KBR for Chevron Energy, Nigeria
- Dangote Oil Refining Company
- Cairn Energy India Pvt. Ltd.
- Mangala And Rageshwari Fields, Rajasthan
- Hindustan Petroleum Corporation Ltd.
- National Petrochemical Industrial Co (NatPet)
- ONGC Mangalore Petrochemicals Ltd.

# Heat Recovery Steam Generators (HRSG)

## Product Features

- Natural circulation design for higher reliability
- Single-drum and bi-drum modular configuration
- Available in horizontal and vertical designs
- Triple pressure levels with two-stage firing with reheat option
- Fully welded construction for quicker start-ups and shutdowns
- Special drum internals which ensure high steam purity
- Gas-tight internally insulated ducting and casing
- Fully drainable superheater for higher reliability
- Strategic soot blowing for oil firing
- Firing gases and #2 oil in the duct burner
- Highest reliability despite slow burning
- Available in various modularisation philosophies including Simple Pressure Part Module, "O" Section Modules and Full Modularisation
- Firing modes: Unfired, Supplementary and Fresh Air with Automatic Changeover
- Boiler-Turbine-Generator (BTG) package can be offered on case-to-case basis.

## Operating Range

Capacity:	Gas turbine size of 320 MW
Pressure:	Up to 160 kg/cm <sup>2</sup> (g)
Temperature:	Up to 566°C
Supplementary Fuels:	#2 Oil, Natural gas / Naphtha / HSD / Kerosene / Refinery Fuel Gas / LPG etc.\

Manufactured under License from Babcock & Wilcox, USA



1 unit of 405 TPH, 83 kg/cm<sup>2</sup>(g), 310°C, natural gas, associated gas + Fresh Air Fired (FAF) boiler

## Major Clients

### Chemical

- BASF PETRONAS Chemicals Sdn. Bhd, Malaysia
- Rashtriya Chemicals and Fertilizers Ltd., (RCF)

### Fertiliser

- Oswal Chemicals & Fertilizers Ltd. (KRIBHCO)
- Chambal Fertilisers and Chemicals Ltd.

### Power

- Aban Power Ltd. Internusa A/c Bekasi Power, Indonesia
- Essar Power A/c Vadinar Power Co. Ltd., India
- Lanco Infratech Ltd, India

### Refinery & Petrochemical

- Daelim for Numaligarh Refinery
- Reliance Petrochemicals Ltd.
- Emirates National Oil Company (ENOC), UAE
- Dangote Oil Refining Company, Nigeria
- Abener for Hassi R'mel project, Algeria
- Jacobs Netherlands BV - for Schoonebeek Oilfield Development Project, Netherlands
- Petroleum Development Oman (PDO)
- Bharat Petroleum Corporation Ltd.
- ONGC Mangalore Petrochemicals Ltd.

## MSW-Fired WTE Boilers

TBWES MSW-fired boilers are ideal for industries and municipalities seeking affordable clean energy and sustainable management of Municipal Solid Waste (MSW).

TBWES has tied up with HZI Steinmüller (now Kanadevia Inova Steinmüller), Germany for addressing the low calorific value norms for municipal solid waste combustion using the advanced state-of-the-art technology. Kanadevia Inova Steinmüller's forward-acting reciprocating grate technology is globally recognized for its superior combustion of heterogeneous waste, ensuring maximum energy recovery and exceptional operational reliability. Its robust construction and intelligent controls minimize emissions and maintenance, leading to unmatched plant availability and efficiency. Kanadevia Inova Steinmüller has 660+ Waste to Energy installations globally.

### Operating Range

Capacity:	Up to 1,000 tons per day
Pressure:	15 to 70 kg/cm <sup>2</sup> (g)
Temperature:	Up to 450 °C
Fuels:	Municipal Solid Waste (MSW)

### Product Features

- The state-of-the-art Kanadevia Inova Steinmüller forward-acting reciprocating grate combustion technology
- Multi-pass design
- Vertical and horizontal models
- The air-cooled reciprocating grate offers high versatility by accommodating broad waste variations, from calorific value to size.
- Modular construction enables effortless grate bar replacement in new and existing installations.
- Integrated flue gas cleaning system with circulating dry scrubbing and bag filter
- Achieves optimal combustion of the extremely heterogeneous waste, ensuring maximum and consistent steam output.

**Kanadevia**  
**INOVA**  
**Steinmüller**

Manufactured under License from Kanadevia Inova Steinmüller GmbH



MSW-fired Waste-to-Energy plant powered by Kanadevia Inova (HZI) Steinmüller technology

## Subcritical Radiant Boilers

### Radiant Boiler - Carolina Type (RBC)

RBC features a horizontal convection pass and vertical pendant type heat transfer surfaces. It is designed to fire pulverized coal and/or fuel oil and/or natural gas or any combination thereof.

### Radiant Boiler - El Paso Type (RBE)

Compact design which includes upflow and downflow horizontal convection passes. RBC is designed to fire fuel oil and/or natural gas or any combination thereof.

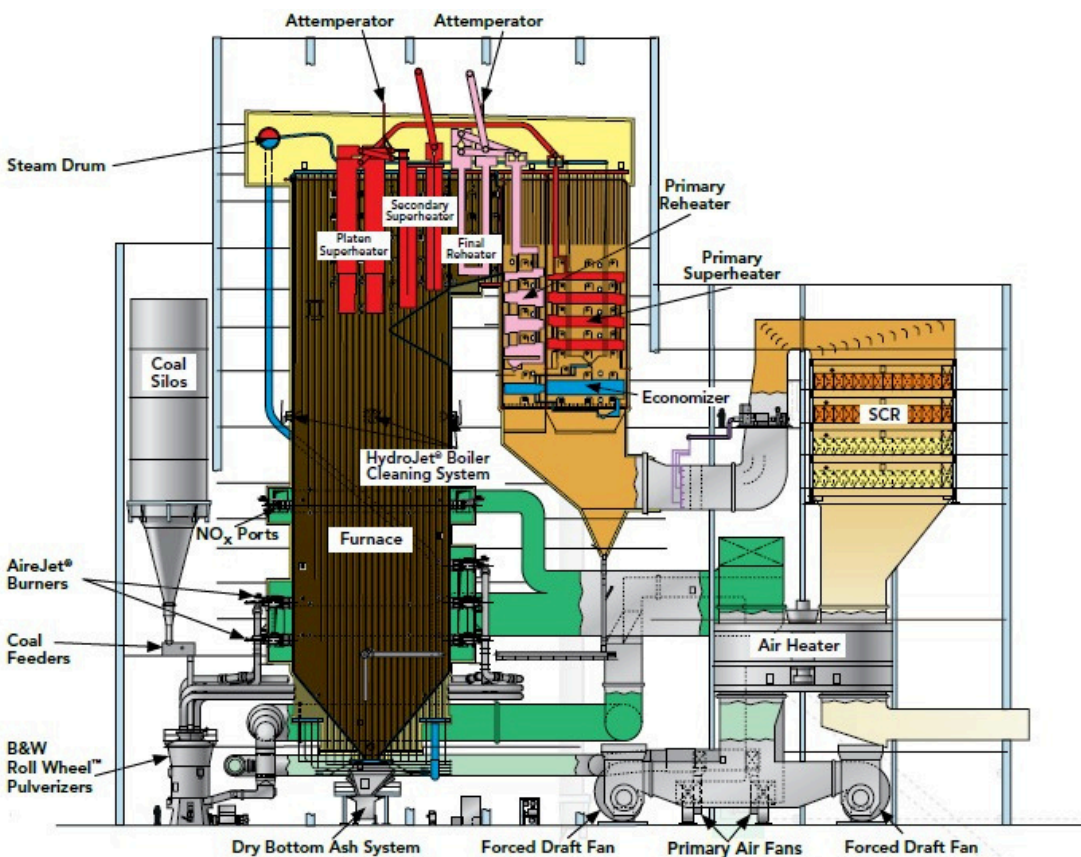
### Operating Range

Capacity : Up to 3175 TPH  
Pressure : Up to 168 kg/cm2(g)  
Temperature : Up to 585 °C

### Feature Low NOx Combustion Systems:

- Low NOx Pulverized Coal Fired Burner (DRB XCL)
- Low NOx Oil and Gas Fired Burner (XCL-S)
- Dual Air Zone NOx port - Overfire Air System
- Low NOx combustion systems offer advanced design and reliability.
- Rugged construction for proven performance and superior reliability

Manufactured under License from Babcock & Wilcox, USA



### Major Clients

JSW, India

Our licensor B&W has extensive worldwide experience in designing, manufacturing, installing and servicing 700+ Utility Radiant Boilers up to 900 MW

# Supercritical and Ultra-Supercritical Boilers

## Product Features

- Once-through boiler design for supercritical and ultra-supercritical applications
- Water cooled dry bottom furnace, superheater, reheater, economizer and air preheater.
- Designed for base load and full boiler variable pressure load cycling operation as well as on/off cycling operation.
- Spiral furnace design ensures better and uniform heat transfer and variable pressure operation.
- Split back pass design with biasing dampers to ensure zero reheater spray.
- Proven opposed wall firing for wide range of coal grades.
- Variable pressure operation, down to 125 kg/cm<sup>2</sup> (g).
- Conservative design of superheater and reheater surfaces to address operational flexibility.

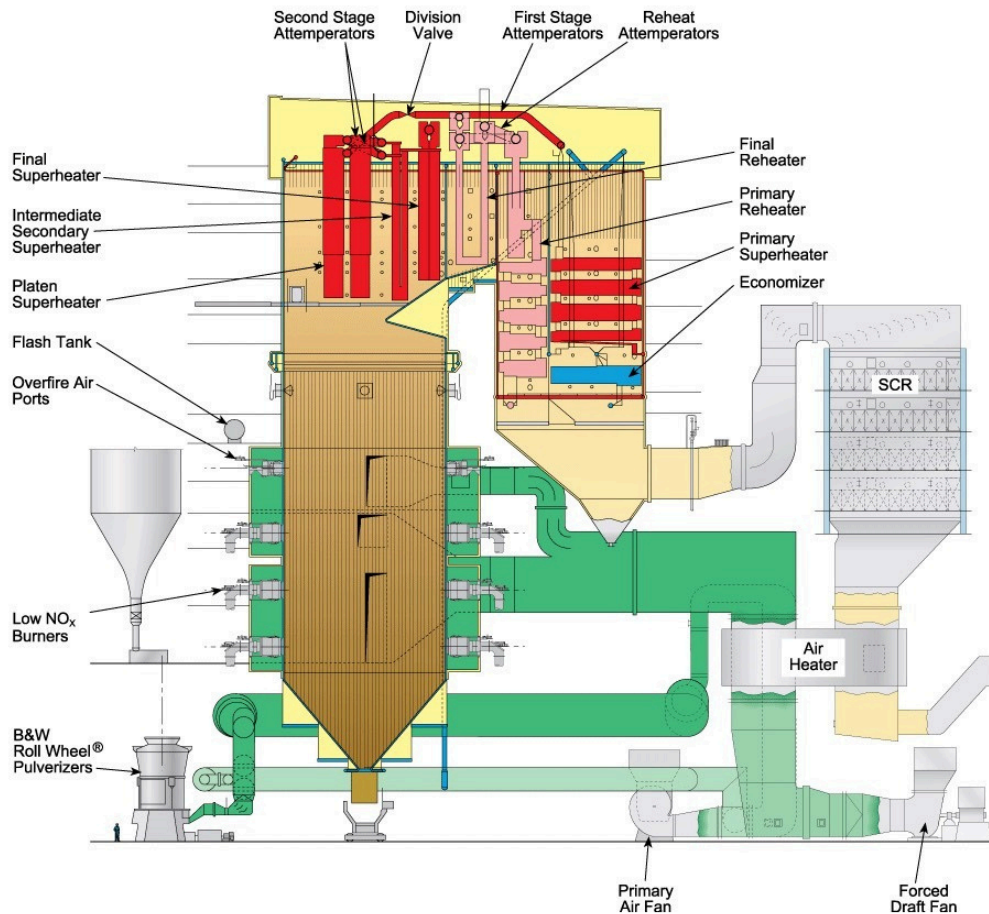
## Operating Range

Capacity: Up to 4535 TPH  
 Pressure: Up to 258 kg/cm<sup>2</sup>(g)  
 Temperature: Up to 620°C  
 Fuels: Pulverized Coal

## B&W Roll Wheel™ Pulverizer:

- Type: Vertical, air-swept, roll-&-race design
- Capacity: 15 - 104 TPH
- Maintains fineness & capacity throughput wear life of grinding elements.
- Allows independent movement of each roller while maintaining design performance with up to 40% weight of roll wheel tires.

Manufactured under License from Babcock & Wilcox, USA



**Spiral Wound Universal Pressure Boiler (SWUP)**

## Major Clients

- Babcock & Wilcox, USA for AES Masinloc, Philippines
- Babcock & Wilcox, USA for DH3, Vietnam

Our licensor B&W has extensive worldwide experience in designing, manufacturing, installing and servicing 90+ Supercritical Boilers

## Services Business

Through a dedicated services arm, TBWES specializes in delivering tailored, technology-driven, and experience-based solutions to boiler and heater users. Since the early 1990s, we have successfully supported plant Renovation and Modernisation (R&M) initiatives, offering customized services that enhance boiler performance, ensure operational safety, and extend equipment life. Our R&M approach is rooted in deep domain expertise, focusing on boiler safety, inspection, and performance optimization.

Today, our solutions are driving improved process efficiency across a wide range of industries including power utilities, petrochemicals, refineries, fertilizers, steel, cement, sugar, and paper.

Our comprehensive service portfolio includes integrity assessments, plant equipment evaluations, and reliability-based maintenance (RBM). To support ongoing safe operations, we also provide boiler health assessments through advanced Condition Assessment (CA) and Remaining Life Analysis (RLA) —ensuring fitness for service and enabling informed decision-making for long-term asset reliability.

Certain CA , RLA technologies & Utility Boiler R&M Licensed from Babcock & Wilcox, USA



## Capabilities

- We offer one-stop, end-to-end solutions for all types and makes of boilers and fired heaters
- Our specialized construction management team delivers complete turnkey solutions with a focus on safety, quality, and timely execution.
- With strategic partners across the Middle East, Southeast Asia, Africa, and select markets in Latin America and Europe, we ensure responsive, region-specific service and support.

## Plant Improvement Projects

- Fuel Conversion & Firing System Upgrades
- Performance, Reliability & Efficiency Enhancements
- Asset Re-Energization: Relocation, Revival & Retrofit
- Emission Control & Reduction Solutions
- Digitalization & Automation Upgrades
- Replacement-in-Kind & Manufacturing Services
- Engineering Design & Feasibility Studies



## Major Clients

### Chemical

- Columbia Carbon, Spain
- Alexandria Carbon Black, Egypt
- Thai Carbon, Thailand
- Egyptian Propylene & Polypropylene Co., Egypt
- Indorama, Thailand

### Fertiliser

- EDFU Project, Egypt
- Matix Fertilizers, West Bengal
- Madras Fertilizer Ltd, Chennai
- Chambal Fertilisers Ltd, Gujarat
- Narmada Valley Fertilizers, Gujarat
- IFFCO, Kalol, Phulpur
- National Fertilizer Ltd. (Panipat, Bathinda, Nangal)
- Zuari Agro, Goa
- Deepak Fertilizers & Petrochemicals Corporation
- Rashtriya Chemicals & Fertilizers (RCF)

### Others

- Maruti Udyog Ltd, Haryana
- Nestle (Thailand, Philippines, Japan and Ivory Coast)
- Air Liquide, Thailand
- PT Gunanusa, Indonesia
- Foster Wheeler, U.K
- URC, Philippines
- Ultratech Cement Ltd, Rajasthan
- Indian Navy
- National Thermal Power Corporation

## Plant Services

- Annual Maintenance & Service Contracts (AMC)
- Operation & Maintenance (O&M) Services
- Turnaround & Maintenance Support
- Plant Performance Assessment
- Automation, Boiler Safety Audit, NDT & Bundled Services
- End-to-End O&M Solutions

## Spares

TBWES provides spares for:

- Boiler Pressure Parts  
Including Furnace Tubes, Economisers, Superheaters, In-Bed Evaporator Coils, Boiler Bank Tubes, Membrane Panels, Steam and Water Drums
- Branded & Patented Fuel Firing System Components  
Including Stoker, Feeders, Mechanical Spreaders, Pneumatic Spreaders, Bubble Caps, Air Nozzles, etc.
- Fuel Feeding System Components
- Spares for Rotating Equipment
- Electrical & Instrumentation (E&I) Spares
- Heat Exchangers
- Miscellaneous Spares  
Including spares for piping and IBR fittings, control valves, process valves, safety valves, motorised valves, dampers, bellows and supports, etc.

## Testing and Reliability Services

- Asset Integrity & Reliability Services
- Condition Assessment & Remaining Life Evaluation
- Non-Destructive & Metallurgical Testing
- Corrosion Management & Pipeline Integrity
- Risk Assessment & Hazard Studies
- Structural Audits - Concrete & Metallic

## Digital Services

Thermax EDGE® Live is an innovative digital offering by Thermax Ltd., designed to enhance boiler performance through advanced cloud technology.

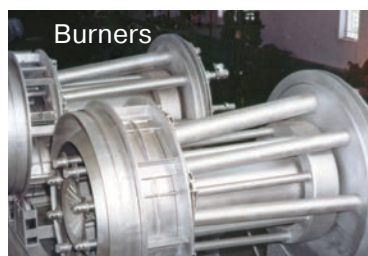
It leverages real-time boiler data, integrating AI and ML algorithms to maximize efficiency, optimize fuel consumption, enable predictive maintenance, and provide proactive alerts

Key Features:

- Real-time asset monitoring
- Diagnostics & workflows
- Predictive incident manager
- Efficiency improvement insights
- Digital logbook & reports



In-bed evaporator



Burners



Grate

## Design & Fabrication



Heat Exchangers



Combustor



Steam Drum – Process and Steam generation



Deaerators

## Major Clients

### Refinery & Petrochem

- Petronas Gas Berhad, Malaysia
- Petrokemya, Saudi Arabia
- Orpic - Sohar Refinery, Oman
- Gulf Petrochemicals Industries, Bahrain
- SAPREF, South Africa
- Reliance Industries Ltd, (Jamnagar, Dahej, Hazira)
- Reliance Industries Ltd, (Vadodara, Nagothane)
- Hindustan Petroleum Corporation Ltd, Mumbai
- Bharat Petroleum Corporation Ltd. (Mumbai & Kochi)
- Chennai Petroleum Corporation Ltd, Chennai
- Manglore Refinery & Petrochemicals Ltd, Manglore
- Indian Oil Corporation Ltd, (Vadodara, Barauni & Bongaigaon)
- Essar Oil, Vadinar
- Dolphin, Qatar
- Malaysia LNG Sdn Bhd
- Takreer Abu Dhabi Refinery

### Sugar

- Mitrphol Thailand
- Cristalla Sugar Thailand

### Steel

- Jindal Steel & Power Ltd.
- Vedanta Ltd.
- Goa Tata Steel Ltd, Jamshedpur

## Modularization - The Next Big Opportunity



The Mundra Assembly Yard is located just 2 miles from the port. The facility is 100% owned & operated by TBWES to maintain strictest control over Quality & Workmanship. The facility is ISO certified & ASME U stamp accredited.

The facility is equipped to assemble up to 10 boilers simultaneously:

- 6 Platforms that can assemble Modules weighing up to 4,000 Tons with footprint of 20 m Wide x 40 m Long
- 4 Platforms that can assemble Modules weighing up to 1,000 Tons with footprint of 14 m Wide x 38 m Long



Access to the port by wide roads with ability to handle cargo  
Coverage of the entire Yard by CCTV for remote monitoring

The port is capable of both Roll On Roll Off (RoRo) or Lift On Lift Off (LoLo) type shipments



Roll On Roll Off (RoRo)



Lift On Lift Off (LoLo)



**MODULARISATION -  
FASTER, EFFICIENT  
AND SUSTAINABLE**

Conserving Resources,  
Preserving the Future.



Absorption  
Cooling



Air Pollution  
Control



Boiler and  
Heater



Chemicals



Process  
Heating



Projects and  
Energy  
Solutions



Process  
Cooling



Renewable  
Energy



Water and Waste  
Solutions

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This brochure presents only some of our products and we reserve the right to amend any product details without notice.  
The photographs used in the brochure are indicative and may not match the actual plant.

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