THERMAX

Energy and Environment Solutions for Sustainable Growth



A partnership for profitable

Sustainable solutions in energy and the environment

In an integrated global market, how can business be managed competitively and sustainably? How can energy costs be optimised to maximise profits, and at the same time minimise the impact of business operations on the environment?

Everywhere, enterprises face this challenge of delivering high quality products and services while ensuring margins and, as a corporate citizen, contributing to the efforts of protecting the air we breathe and the water we drink.

Thermax's energy efficient and eco-friendly technologies offer reliable business-to-business partnerships to respond to this critical challenge. They provide the competitive edge to your enterprise to make its mark with superior offerings and community goodwill.



and responsible business

Our Vision

To be a globally respected high performance organisation offering sustainable solutions in energy and the environment

We heat, cool, power and we clean

Welcome to Thermax - an engineering company providing sustainable solutions in energy and environment. The company's vision for the future is firmly anchored in the belief that to stay competitive, companies need to adopt sustainable development practices.

The systems, products and services developed by Thermax help industry achieve better resource productivity and improve bottom lines, while maintaining a cleaner environment. Even as we convert costs to profits, we help to protect the environment in our own limited ways. A win-win for industry and the society at large.

Thermax's business portfolio includes products for 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, industrial and municipal wastewater treatment plants, waste heat recovery systems and air pollution control projects.

Systems to match wide-spectrum fuels

Operating on a wide range of fuels, including biomass and waste from industrial processes, Thermax heating systems help customers achieve higher levels of energy efficiency. Its eco-friendly vapour absorption chillers work on heat from any source and replace power guzzling cooling equipment. Thermax also integrates its expertise in diverse areas to create combined heating, power and cooling solutions.

More power for developmental initiatives

An established player in captive power plants, Thermax also builds utility power plants. It is one of the few Indian companies that has sourced supercritical technology to build boilers for mega power plants. Thermax also harnesses solar energy to support its clients in their heating, cooling and power generation requirements.

Harnessing wealth from waste

Through its water and waste management solutions, the company supports industries and civic bodies to reduce pollution, recycle resources and to generate revenue from waste. Also on offer are value added services for retrofits and rebuilds, design and implementation of optimal energy use in processes, and for managing utilities.

Through its business of energy rental services, Thermax helps industry to receive uninterrupted supply of heat, steam and chilled water and pay for them at per unit cost without having to own and operate equipment at their premises.

The Thermax presence

Thermax's solutions reach clients in 86 countries across Asia Pacific, Africa, Middle East, Europe, CIS countries, USA and South America. Its business operations are supported by 29 international offices, sales and service teams, a network of Thermax Channel Associates, a robust and innovative R&D setup, and 14 world class facilities – ten of which are in India, two in Denmark, one each in Denmark and Germany, Indonesia, Poland – that manufacture to stringent international codes.

The Thermax Group

Domestic Subsidiaries

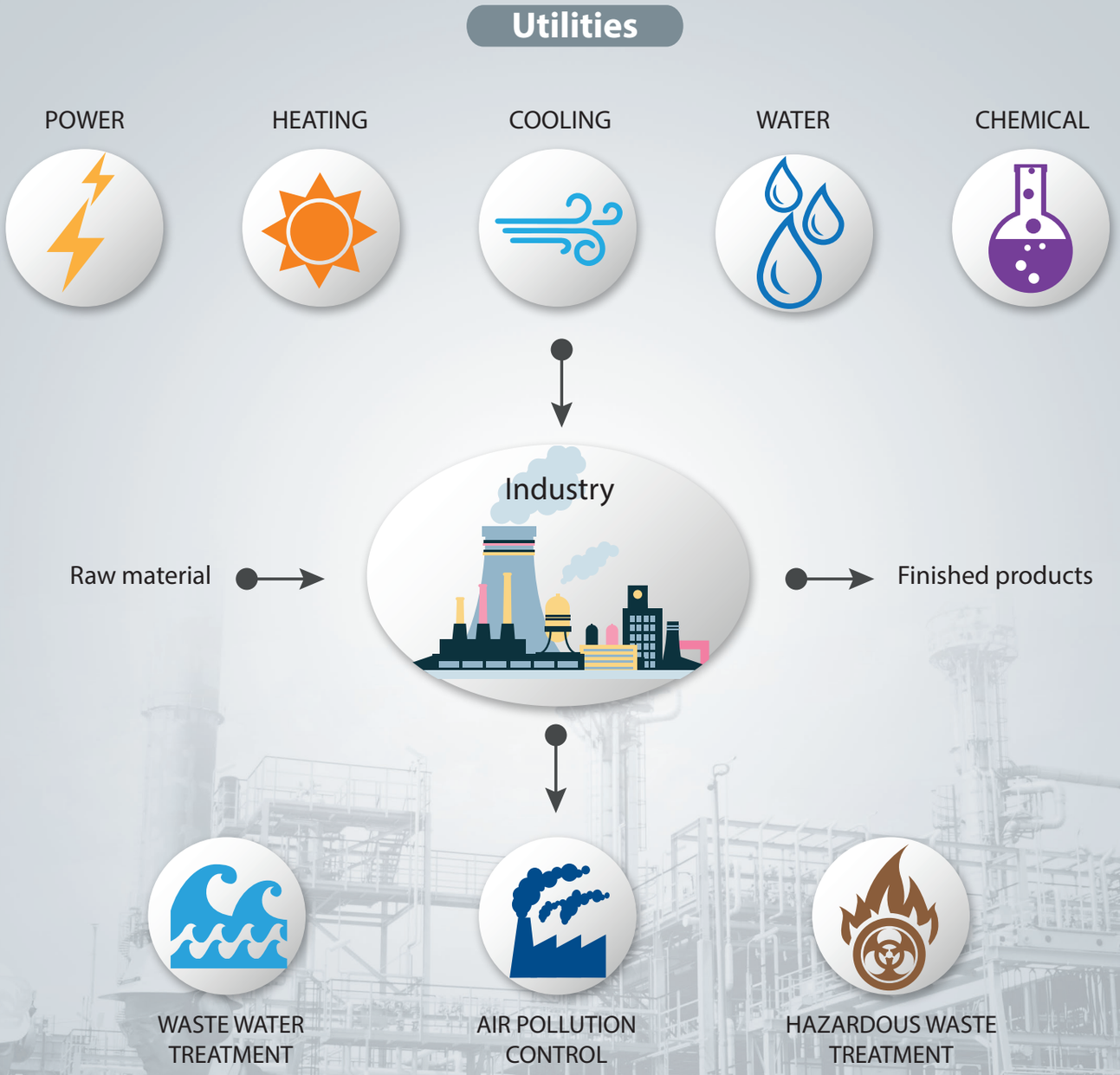
First Energy Pvt. Ltd.
Thermax Babcock & Wilcox Energy Solutions Pvt. Ltd.
Thermax Engineering Construction Company Ltd.
Thermax Instrumentation Ltd.
Thermax Onsite Energy Solutions Ltd.
Thermax Sustainable Energy Solutions Ltd.

Overseas Subsidiaries

Boilerworks A/S, Denmark
Boilerworks Properties ApS, Denmark
Danstoker A/S, Denmark
Danstoker Poland Spólka Z Ograniczona Odpowiedzialnoscia
Ejendomsanpartsselskabet Industrivej Nord 13, Denmark
PT Thermax International, Indonesia
Rifox-Hans Richter GmbH Spezialarmaturen, Germany
Thermax (Zhejiang) Cooling & Heating Engineering Co. Ltd., China
Thermax Denmark ApS
Thermax do Brasil-Energia e Equipamentoe Ltda, Brazil
Thermax Energy & Environment Lanka (Private) Limited, Sri Lanka
Thermax Energy & Environment Philippines Corporation
Thermax Engineering Construction FZE, Nigeria
Thermax Engineering Singapore Pte Ltd.
Thermax Europe Limited, Uk
Thermax Inc., USA
Thermax International Ltd., Mauritius
Thermax Netherlands B.V.
Thermax Nigeria Limited
Thermax SDN. BHD., Malaysia
Thermax Senegal S.A.R.L

Offerings

For reliable support



Installations


Eco-friendly cooling


Dairy waste management


Power generation from waste heat


FM boiler for international markets

Energy efficient and eco-friendly

World over Thermax installations provide innovative support to industrial and commercial establishments. Some of the solutions that Thermax provide in the critical areas of energy and environment include

Trigeneration – steam, power and chilling - from waste and unconventional fuels

Turnkey power plants on a wide variety of fuels

Product and metal recovery from processes

Water recycle and effluent treatment

Productivity boosting specialty chemicals

Specialised services – Energy Rentals, O&M of water and power installations, steam engineering

Heating



Large Boilers and Fired Heaters

Thermax provides steam generation solutions for process and power needs. On offer are a range of options covering combustion of various solid, liquid and gaseous fuels, heat recovery from gas turbine/ engine exhaust, waste heat recovery and fired heaters for various industrial processes and applications. For power utilities, the company offers pulverised coal-fired boilers based on subcritical and supercritical parameters.

Thermax serves industrial segments spanning steel, refineries, petrochemicals, power, cement, sugar, fertilisers, paper, chemicals, non-ferrous metals and textiles across the globe. It has developed in house expertise and self-reliance in manufacturing these boilers The company is in technical collaboration agreement with Babcock & Wilcox, USA for selected range of boilers.

Thermax HRSGs for Indonesian power plant

The heat recovery steam generators supplied by Thermax are now an integral part of the 130 MW combined cycle power plant set up by PT Bekasi Power, Jakarta. The supplementary fired HRSGs (each of 85 TPH) installed behind two gas turbines and a steam generator converts the waste heat into steam which in turn generates power.

Thermax HRSGs have also been installed in projects in several other countries including India, Algeria and the Netherlands.

Customer benefits

- Equipment designed and engineered by experts in thermal and combustion engineering
- Experienced project management and in-house construction teams
- Versatile technologies for converting waste to energy



Steam for process and power needs of industry

Technology Options	Range/ Fuel
Solid fuel, agro waste, biomass fired boiler Ranging in capacities up to 1000 TPH, 200 Kg/cm²(g), 560°C	
Circulating fluidized bed combustion (CFBC)	Coal, lignite, petcoke, sludge, oil, pitches, biomass, washery rejects, char, agro wastes, flyash, roasted chaffs, DOB, paper sludge, spent coffee grounds, bagasse, wood chips, rice husk, etc.
Atmospheric fluidized bed combustion (AFBC)	
Traveling grate/ Dumping grate/ Pinhole grate/Vibrating grate	
Waste to Energy Ranging in capacities up to 500 TPH, 120 Kg/cm²(g), 560°C	
Spentwash/ Vinesse fired boiler	Agro-wastes, spent-wash, sludge, industrial wastes, a variety of biomass
Municipal Solid Waste (MSW)/ Refuse Derived Fuel (RDF)	
Carbon burnout unit	Custom built unit to reduce carbon in flyash
BFG/Lean gas fired boiler	Blast furnace gas, coke oven gas, corex gas, LD gas & other lean gases
Waste gas fired boiler(CO/H2)	Waste gas/ tail gas from processes like carbon black, ferro alloys & caustic soda plants

Technology Options	Range/ Fuel
Oil & Gas fired boiler Ranging in capacities upto 500 TPH, 160 Kg/cm²(g), 560°C	
Bidrum FM/HCFM/PFM package/Site erected boiler	All liquid & gaseous fuels like natural gas, purge gas, heavy fuel oil, residue oil, HSD, naphtha, hydrogen gas, biogas, waste gas, tar, refinery gas, #2 oil, #6 oil, etc.
Single drum radiant boiler	
Heat recovery steam generator	
Waste heat recovery boiler	■ Used in sponge iron, coke oven, refinery & petrochemical, cement, chemical, glass, coke calcinations & gasification. ■ Sulphur recovery - WHRB downstream of reaction furnace & tail gas incinerator ■ Exhaust gas boiler up to 50 MW. Engines fired on light oil, heavy oil & gas. ■ Process gas boiler for hydrogen & ammonia plants ■ Waste heat recovery units (WHRU)- Absorbed heat duty up to 100 MW
Fired heater	Vertical, cylindrical or box type heaters up to100 MM Kcal/hr capacity for refinery, petrochemical & special applications on oil, gas, heavy oil, refinery off gas, coal, etc.



Packaged Heating Systems

As leaders in heating solutions over the last four decades, Thermax has been pioneering innovative solutions for a wide range of industrial and commercial heating applications. The company has scripted several innovations to support its clients. Fuel shift for example, allows businesses to switch to available low cost fuel - fossil (oil, gas, coal, lignite, etc.) or biomass (agriculture waste, process waste, etc.) Today, with over 35,000 installations across the world, Thermax helps small and medium firms to Fortune 500 companies to reduce energy costs.

On offer are packaged heating systems for process heating, incidental and cogeneration power requirements. Modular in construction, these are available in standard packaged configurations, custom designed for specific requirements and also offered as a turnkey solution with accessories and Balance of Plant.

In select markets, Thermax offers hybrid systems that integrate solar and thermal technologies, promoting green energy.



Heating systems in the Middle East

Thermax has installed heating systems at over 100 storage tanks for petroleum derivatives like bitumen, lube and heavy furnace oil. These products need to be heated for easy flow and reduced pumping costs. Heat is also required for product modifications for use in various applications.

VOPAK's Horizon terminal uses Thermax heaters for its requirement of 8 million kcal of heat per hour. Shell, Sharjah Oil refining, Fal Energy, Emirates Lube Oil Co. and British Petroleum are also among our esteemed clients.

Customer benefits

- High thermal efficiency heating solutions
- Innovative, compact and low installation costs
- Multi fuel fired heating solution for process and cogeneration
- Recovery of waste heat from engine, sponge iron plants
- Consultative application engineering to maximise energy utilisation and slash fuel cost
- Assured product quality through state of the art manufacturing facilities



Heating applications for wide ranging industries

- **Steam Boilers** up to 40 TPH capacity, up to 66 ata/ bar pressure and 485°C temperature. Fired on oil, gas, solid fuel (over 150 types of fossil and biomass)
- **Thermal Oil Heaters and Vapourisers** up to 25 Gcal/h capacity, up to 380°C temperature, for indirect heating with thermal oil in liquid and vapour phase as heating medium. Fired on oil, gas, solid fuel (fossil and biomass)
- **Hot Water Generators** up to 17 Gcal/h Capacity and 200°C temperature, with fuel as oil, gas, solid fuel (fossil and biomass)
- **Hot Air Generators** of up to 3 Gcal/h capacity and 200°C temperature on coal and biomass. Combustor for fixed, traveling and reciprocating grates
- **Thermosyphon** of up to 6 Gcal/h capacity and 302°C temperature with water as heating medium and using oil, gas, coal and biomass
- **High pressure Boilers** for process industry, delivering 98% dry steam upto 4 TPH capacity, pressure up to 75 bar on oil and gas firing. Higher pressures available on demand in coil construction
- **Heat Recovery System** on gas/ oil engine, capacity upto 5 MW
- **Waste Heat Recovery Boilers** on sponge iron exhaust flue gasses
- **Energy Plants** providing combined steam, hot water, thermal oil through common source using biomass/ fossil fuels
- **Solar Thermal** heating that can be integrated with existing heating system for temperature up to 210°C, with hot water or steam as heating medium

Cooling



Absorption Systems

Absorption cooling has emerged as a viable alternative to conventional cooling systems as it uses steam, hot water, exhaust gases and other fuels for cooling instead of electricity. A pioneer of this technology in India, today absorption chillers and heaters from Thermax help clients in over 86 countries with eco-friendly air conditioning and process cooling to reduce their carbon footprints.

Thermax's absorption technology solutions are based on:

- Heat recovery
- Live energy
- Specialised application

Cooling systems from Thermax are at work for clients in the pharmaceutical, chemical, fertiliser, textile and automobile industries, as well as in hotels, cinema halls, shopping complexes and office buildings. Specialised applications such as inlet air-cooling with Thermax chillers are improving output and productivity in the petrochemical and power industries. Also on offer are CHPC (Combined Heating Power and Cooling) solutions for greater energy efficiency.

Thermax chillers help customers shrink their carbon footprints, reduce green house emissions and contribute to prevent ozone depletion.

Eco-friendly chillers in Europe

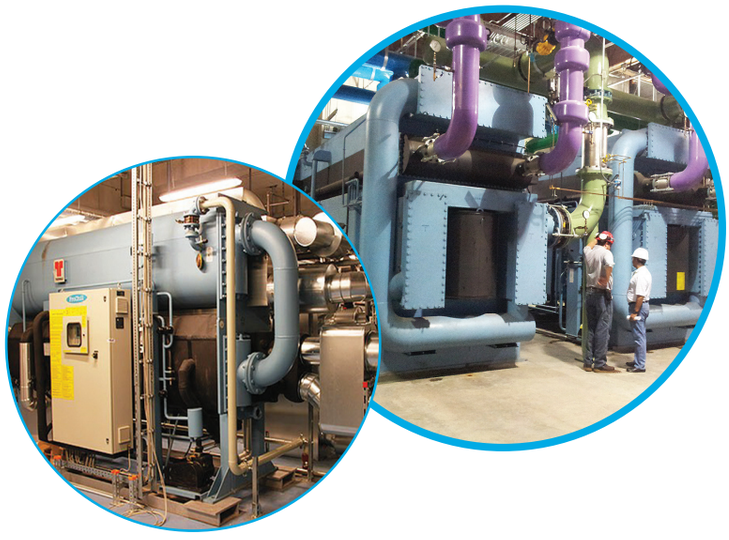
Thermax vapour absorption chiller installed by the Swiss company, IWB (Industrielle Werke Basel), air conditions shopping malls and office buildings. The 995 TR (3.6 MW) double effect chiller works on waste heat harnessed from an incineration plant and a wastewater treatment plant.

The initiative won for IWP, Switzerland's prestigious *Watt d'Or Award*, as one of the country's top sustainable energy projects.

Clients in over 86 countries have installed Thermax systems for air conditioning and process cooling.

Customer benefits

- Efficient and optimal use of heat energy from boilers/ engines/turbines or processes
- In-depth process and application knowledge of heat recovery systems
- Zero Ozone depletion potential
- Minimal carbon footprint
- Significant reduction in operational cost



Eco-friendly Cooling and Heating Solutions

Steam Fired

Range : 50 - 3,500 NTR

Steam pressure : 0 - 30 Kg/cm^{2}g

Hot Water Fired

Range : 100 - 3,500 NTR

Hot water temperature : 70 - 200°C

Also available in the 10-80 NTR range for microturbines and diesel generators.

Direct Fired

Range : 40 - 1,500 NTR

Fuel : HFO, Natural Gas, SKO, Biogas and other liquid or gaseous fuels

The above systems are ideal for any process and comfort cooling.

Multi-Energy

Range : 40 - 3,500 NTR

Heat source : Steam, hot water, exhaust or direct firing of liquid/ gaseous fuels or a combination

Application : Ideal for waste heat recovery from engine/ turbine exhaust and coolant-co-generation and tri-generation

Heat Pump

Range : 500 KW - 40 MW

Heat source : Steam/ hot water/ exhaust/ fuels/ geo-thermal or a combination

Applications : District heating, process heating and feed water application for boilers

Hybrid Chillers

Rang : 25 to 500 NTR

Heat Source : Electricity + heat in any form

Application : Negative chilling below zero degree upto – 40°C

Chiller Heater

Range : Cooling (100 to 350 TR), heating (250 KW to 9 MW)

Heat Source : Steam/hot water/ fuel and exhaust

Application : Simultaneous/ Either for cooling & heating requirements

Solar Chiller

Range : 20 TR to 200 TR

Heat Source : Solar energy

Application : Air conditioning/ process cooling

Power Generation



Turnkey Power Plants

Power Division of Thermax Limited is a leading EPC solutions provider, with over a hundred power and co-generation projects contracted in several countries. With extensive experience in building and commissioning turnkey captive power plants as well as independent power plants in the utility space, Thermax guarantees performance, overall completion schedule and fixed cost.

Thermax Power operates across a wide spectrum of industries. It has expertise in the area of combustion of over 100 different fuels and waste heat recovery solutions especially for cement and steel sectors. The company has a distinctive edge in designing, engineering and executing complete power plants with assured performance standards and fuel flexibility.

Besides its EPC capability, Thermax offers complete plant operation and maintenance services with guarantees on uptime.

The Power Division works in synergy with other Thermax divisions to offer a wide range of power plant systems and equipment - boilers and auxiliaries, ventilation and air pollution control systems, water management systems, speciality chemicals and air conditioning systems to name some. It also offers in-house construction expertise through a subsidiary company.

Captive power from biomass in the Philippines

Bataan 20:20, near Manila, is the first South East Asian power facility built and commissioned by Thermax. The co-generation plant completed on EPC basis generates 12.5 MW of power and 30TPH of process steam. It runs on biomass (rice husk) with the option of also using coal as fuel. With the boiler, Thermax also supplied the air pollution control system, the water and wastewater treatment plants and complete balance of plant.

The captive power plant, which won the *Asian Power Award*, is one of the several installations that showcases Thermax's versatility with diverse fuels including biomass.

Customer benefits

- Single point responsibility for time, cost and quality
- Effective solutions for co-generation and power generation
- Least lifetime cost option for decentralised power and co-generation solutions



Power for captive and utility requirements

Turnkey Power plants with single unit size up to 300 MW

- Based on solid fuel like coal/ lignite/ petroleum coke/ washery rejects/ biomass
- Guaranteed availability and plant performance
- O&M services

Complete BOP for power plants up to 1200 MW

- Mechanical installation and civil works for large capacity utility power plants

Extensive experience in providing turnkey solutions for gas fired power plants

- Engineering combined cycle power plants of 150 MW capacity
- Setting up Bottoming cycle plants to convert open cycle to combined cycle operations
- Setting up gas based tri-generation/ co-generation power plants for large petro-chemical complexes and textile industries, among others
- Supplying HRSG downstream of upto Frame 9FA and equivalent machines, and associated auxiliaries

Waste heat recovery based power in cement and iron & steel industries

- 4 /5 /6 stage pre-heater design for generation of power from waste heat in cement manufacturing process. The first Cement waste heat plant in India at JK Cement Nimbahera of 13.2 MW is operational since May, 2007
- Multiple power plants generating power from the waste heat of sponge iron kilns
- Blast furnace (BFG)/ Corex gas/ coke oven gas fired power plants

Integrated Sustainable Solutions for Green Power

- Possible equity participation and arrangement of finance. Ensures growth of client organisations through reduced fixed cost of operations and de-risking of business from price fluctuations and fuel availability
- Optimum configuration for power plants based on renewable energy – biomass, industrial waste, heat and solar energy

Air Pollution Control



Systems for Environment Protection

Thermax set up its air pollution control business (Enviro Division) with the conviction that pollutants are inevitable but pollution is not. Today, Thermax Enviro is a key player in abating gaseous and particulate emission. The company offers broad based, single source expertise and flange-to-flange solutions in all areas of environment protection – from products and systems for air pollution control to retrofit and rebuild services.

Extensive work with diverse industry sectors and tie-ups with technology majors enable Thermax to take up turnkey projects from concept to commissioning. Industries are aided by clean technologies that recover pollutants, thus reducing their hazardous impact on the environment and, in many cases, enabling resource recovery from processes.

The division's operations are supported by well-trained field engineering personnel. It has a full-fledged in-house R&D set up including testing, equipments, prototypes, pilot plants and shop floor plant installation to validate product performance.



Controlling industrial emissions in Oman

Thermax designed and installed five electrostatic precipitators (ESPs) for Vale Pellatisation Company LLC, in the Sultanate of Oman. The ESPs meet international emission norms and the stringent requirements of accuracy and finish.

The project involved over 3,500 tons of steel supplied through 350 containers and over 3000 cubic metres of break bulk cargo. This project is part of the supply of 10 ESPs to the 2 x 4.5 million tons per annum (MTPA) pelletisation plant in Sohar.

Customer benefits

- A wide range of particulate or gaseous emission abatement systems
- Experienced application engineering base
- Cost effective solutions
- Support from concept to commissioning phases



Clearing the air for better returns

Thermax products and turnkey solutions are helping to improve the quality of air in power generation, cement, steel, sugar, refinery & petrochemicals, paper, chemical, food, textiles, and fertiliser industries. Worldwide, it has an installation base of over 12000 bag filters, 1500 electrostatic precipitators, 150 scrubbers and 160 turnkey projects, handling over 100 types of dust.

Products

- Electrostatic precipitators – dry & wet
- Bagfilters – Pulse jet bagfilters & reverse air bag houses
- Particulate scrubbers – cyclonic, venturi type, impingement plate
- Gaseous scrubbers – Packed bed, spray/tray towers
- Combofilter
- Thermax modular gas cooler

Credentials

- Handle gases in the range of 1000 m^3/hr to 35,00,000 m^3/hr
- Performance guarantee for outlet emission <5mg/m^3
- Special focus on retrofit and revamp jobs.

Systems

- Dedusting and fume extraction systems
- Flue gas desulphurisation (FGD) Systems
- Gas cleaning plants for metallurgical applications
- Coal and pet coke preparation plants
- Coal injection and cast house de-dusting
- Systems for blast furnaces/ smelters
- Pushing emission control systems for coke ovens

Chemicals



Specialty Chemicals

Thermax's specialty chemicals enable customers across a spectrum of industries to improve efficiency and performance, conserve energy and preserve the environment.

As one of Asia's leading manufacturers and exporter of Ion exchange resins and a pioneer in chemicals for fuel and water treatment, Thermax also supplies pulp and paper chemicals, oil field chemicals and construction chemicals. Backed by technological expertise and capabilities honed over more than four decades, the chemical business supports the spectrum of Thermax's energy and environment businesses.

Thermax Chemicals manufactures its world class products in facilities equipped with automated process and instrumentation controls and with ISO 9001: 2008 and ISO 14001:2004 accreditation.

Backed by a strong distribution network, Thermax Chemical Division serves its customers in US, Europe, South East Asia and SAARC, the Middle East and the Far East.

Ion Exchange Resins for a global petrochemical complex

Thermax has developed a range of specialty ion exchange resins for deionization of Mono ethylene Glycol (MEG) cycle water in association with a leading process licensor. During MEG production, large amount of cycle water containing various types of ionic and organic impurities gets generated. Tulsion resin based treatment resulted in increased throughput of system as well as recycle and eventual saving of considerable amount of process water. These specially developed resins are successfully established at various customer locations in India, Middle East, South East Asia and Latin America.

Customer benefits

- Consistent quality
- Customised and cost effective solutions
- Products developed with technical expertise and industrial application knowledge
- Prevention of plant shutdown and reduction in production losses



Chemicals for boosting performance

Ion Exchange Resins

Tulsion brand of Ion exchange resins with product basket of more than 400 products, offers solutions in applications ranging from water and waste water treatment to highly specialized applications in the food, biotech, metal recovery, high purity water, heavy metal removal, catalysts and chemical processing and the nuclear industry segments.

Water and Fuel Treatment Chemicals

Thermax's comprehensive fuel and water treatment products and services encompass polyelectrolytes, and chemicals to treat reverse osmosis membrane, boiler water and cooling water. It also offers sugar process chemicals, fireside and fuel additives and innovative monitoring techniques for industrial and infrastructure segment.

Oil Field Chemicals

Pour point depressants, primary recovery chemicals– demulsifiers, de-oilers, on line gas line corrosion and scale inhibitors, secondary/ water injection chemicals – coagulants, flocculants, biocides, scale and corrosion inhibitors are the speciality upstream oil field chemicals for smooth crude oil production and transportation.

Pulp and Paper Chemicals

Thermax in licensing agreement with Georgia Pacific LLC, offers a spectrum of paper chemicals to enhance performance, productivity, quality and profitability in the pulp and paper industry. These products are coagulants and flocculants, sizing chemicals, strength chemicals, microbiocides and deposit control chemcials, defoamers and antifoamers, de-inking, refining and bleaching additives, paper dyes, coating chemicals.

Construction Chemicals

In technical collaboration with Tecnochem Italiana S.p.A, a leading European construction chemical company, Thermax provides an array of chemicals including concrete admixtures, grouts and anchors, surface treatments, protective coatings, repair and rehabilitation, industrial flooring, water proofing, sealants, adhesives, and cement grinding aids.

Water and Waste Water



Turnkey Installations and Standard Products

Thermax provides end-to-end solutions in water treatment, wastewater treatment, effluent recycle and zero liquid discharge solutions to global customers, consultants and OEMs. Its innovative solutions benefit industry, commercial, defence and hospitality establishments; municipal corporations, and the urban sector. The company's Water and Waste Solutions (WWS) business helps customers with turnkey solutions for large capacities and in the standardised product range.

WWS provides solutions as per international standards in water treatment, wastewater treatment, effluent treatment, effluent recycle and zero liquid discharge solutions to global customers, consultants and OEMs.

Over 400 large, and 20,000 standard plants have been designed, engineered, built and commissioned in South East Asia, Middle East, Africa and SAARC including India.

Recycling sewage and conserving water in India

Thermax commissioned a 22.5 million litre per day sewage treatment and recycle plant for a special Economic Zone at Mangalore in India. Here, Moving Bed Bio Reactor (MBBR) technology along with ultra filtration membrane is used to produce high quality treated water suitable for reuse in industrial application. Thermax has commissioned such installations for several industrial clients.

With the domain expertise gained over the last four decades, Thermax's Water business provides customized solutions to customers to recycle treated wastewater to achieve zero liquid discharge.

Customer benefits

- Space saving with low lifetime cost
- Adherence to stringent pollution norms
- Simple & low cost of operation
- Save capital Cost by enhancing of augmenting existing water and waste water



Solutions

Water Treatment Solutions

- Water softeners and de-mineralisers for removal of dissolved ions
- Tube settler/ Klari-tube settler technology to pre-treat water
- High rate solid contact clarifier to reduce silica
- Sea water desalination and reverse osmosis plants for brackish water
- High pressure condensate polishing units using ion exchange techniques

Wastewater Treatment Solutions

- Industrial effluent treatment, recycle & Zero Liquid Discharge for industry
- Membrane separation systems for recycling
- Klariturbotube settler (High Rate Clarifier) to reduce silica and to recycle
- Sequential batch reactors (SBR) for sewage/ effluent treatment
- Up flow anaerobic sludge blanket (UASB) reactor, anaerobic filters, anaerobic digester
- Fluidized aerobic bio reactor (FAB) for wastewater treatment
- Electro dialysis reversal system (EDR)
- Colour removal system for textile industry effluents
- Treatment of high COD and coke oven effluent, and reduction of heavy metals, Cyanide, Fluoride

Standard Plants/ Products

- Containerised water and wastewater treatment and recycle system
- Compact modular and standard industrial Reverse Osmosis systems
- Biofilter: Low-flow sewage treatment plant (STP)
- Terminator: Colour removal system
- BioCask: low height waste water treatment
- Bioenergen: Biodegradable waste to energy plant
- Rural water treatment plants
- USP grade water treatment
- Incinerator to dispose solid waste

Solar Energy



Solar Thermal and Photovoltaic Systems

The Solar business of Thermax handles projects in power generation, heating and cooling using photovoltaic and hybrid solar-thermal applications. Leveraging its core strengths in cooling and process heating, Thermax offers optimised, turnkey, single point, solar power based solutions. The company makes use of its extensive and varied experience with industrial processes, expertise in application R&D, and its experienced manpower.

The business has in-house expertise for analysis, system design and engineering to meet stringent time lines in executing their products..

Thermax is also pioneering the indigenous development of cost competitive solar thermal power plants using solar concentrators.

In India, Thermax is one of the solar manufacturers with the highest rating of SP 1 A for both concentrated solar thermal and solar photovoltaic. The rating indicates 'highest financial strength' and 'highest performance capability'. Thermax is the accredited Channel Partner of the Ministry of New and Renewable Energy for off-grid and decentralised solar installations.



Bringing the solar edge to auto manufacturer's energy project

Indian auto major Mahindra Automobiles required cold water at 7°C and hot water at 105°C for different processes at two of its paint shops. The challenge was to integrate renewable energy and conventional systems and to reduce overall energy intensity of fossil fuel.

Thermax provided an innovative solar energy-cum- waste heat recovery based green energy system. The combined heating and cooling system integrates 70 solar dishes and an array of equipment – waste heat recovery units, vapour absorption chiller and heat pump, heat exchanger and hot water generator. The system will help the client save 1476 tons of fossil fuel (LPG) and 184 MWhr of electrical energy annually at its paint booth.

Customer benefits

- Reliable, eco-friendly technology to reduce carbon footprints and establish green credentials. Easy integration with existing systems
- High returns with attractive payback in 3-5 year
- Operating cost savings with ensured free electricity for up to 25 years



Harnessing the power of the sun

Solar thermal hybrid systems for cooling and heating

More than 40% of the world's energy is consumed for heating (hot water, process steam, space heating), cooling (air conditioning, cold storage) and lighting (artificial, ambient) in buildings.

Thermax uses parabolic concentrators integrated with thermally driven double effect absorption chillers for cooling, which reduce power consumption significantly as compared to conventional electrically powered systems.

Use of parabolic solar concentrating technology is also used for generating steam using solar energy. The system generates hot water at temperatures as high as 140°C and saturated steam at pressures of 3 to 4 bar.

Solar concentrators - Product features

- Fixed focus with auto focus, defocus and refocus controls
- PLC based daily tracking system
- Designed for safe and easy operation & maintenance
- Concentration ratio of more than 70

Some application areas

- Boiler feed water preheating
- Washing in laundries
- Space heating
- Oil preheating
- Metal pretreatment in paint shops
- Milk pasteurisation
- Steam cooking

Solar Photovoltaic systems

- Minimum civil work for fast engineering and construction
- Low maintenance and corrosion free supports
- Improved reliability: Operations continue even if a part of the solar system falters.
- Remote performance monitoring for system output and efficiency
- Stringent quality tests and high quality material

Specialised Services



Reliable Support for Maximum Value

Thermax has dedicated service units attached to its core energy and environment businesses to take care of spares, parts, preventive and breakdown maintenance services. Thermax also supports its clients with specialized services.

The array of specialised services from Thermax offers support on critical areas–audits of energy and water followed by suitable modifications to optimise the use of resources; energy rentals of equipment and O&M of power and water installations that help clients focus on their core businesses; system retrofits and upgrades that don't need capital investments; steam engineering for improvement of plant efficiency.

Thermax service teams are at work improving efficiencies and extending longevity of critical equipment at industries from South East Asia and Middle East to Eastern Europe.

Operation & Maintenance support for an Indian cement major

Madras Cements Limited (MCL), at its captive power plant in Jayanthipuram in Andhra Pradesh enjoys higher efficiency with a little help from Thermax's Operation and Maintenance team. Thermax provided turnkey power solutions to the 60 MW project including consumables and chemical support, helping it with better plant availability, output, and extended plant life, preventive maintenance and periodic.

For MCL, Thermax has built and commissioned a cumulative 157 MW of captive power at three more locations in India. At all four locations, Thermax undertakes O&M of multi-utility process plants like boilers, chillers, water and wastewater treatment. Its customised services include annual maintenance contract, water audit and survey, training of staff, plant performance study and energy and water conservation.



Service

Specialised Products and Solutions

- Energy and water audits
- O&M of power plants, water and wastewater treatment plants
- Turnkey project execution including balance of plant
- Retrofit and revamp- boilers, heaters, water treatment plants, air pollution control equipment
- Upgrade solutions–capacity, design, efficiency improvement, fuel conversions, firing system, pressure parts
- System Improvement through automation, technology upgrades & combustion engineering solutions
- Waste heat recovery and emission control
- Condition assessment and remaining life analysis and engineering studies
- HAZOP study for equipment operation
- Steam Engineering - complete solutions in steam generation, distribution, utilisation and condensate recovery through integrated service. Includes all types of steam line accessories, etc.
- Replacement in Kind (RIK)

Operation and Maintenance

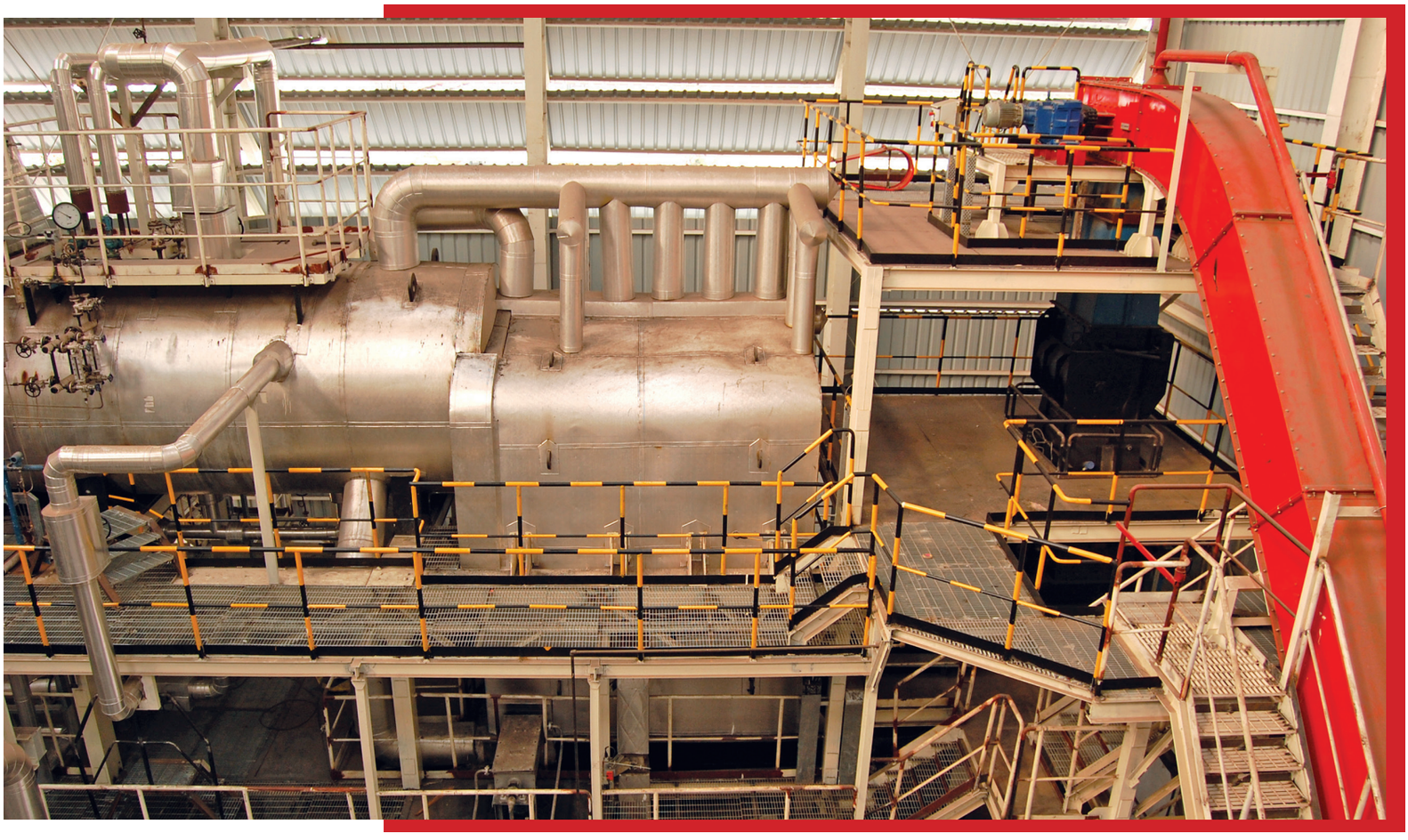
- Power plants
- Multi-utilities including boilers, chillers, water and wastewater treatment plants
- Annual maintenance contract and training of staff

Energy Audit services

In response to industry needs for cutting down wastages in energy utilization, Thermax –

- Offers energy audit services in the areas of steam, electrical and air systems
- Delivers energy savings solutions including partnering in the implementation program.
- Supports clients with piping design and utility consultancy for efficient and cost effective design of the plant utilities and distribution

High quality spares to enhance equipment uptime.



On-site Energy Rental Services

Thermax Onsite Energy Solutions Limited (TOESL), a wholly owned subsidiary, offers customers the option of outsourced utilities through the energy rental route.

TOESL provides turnkey installations through project management, fuel supply chain management, residue management, emission control as per norms, comprehensive operation and maintenance besides managing manpower and consumables.

Utilities supplied under the business models include steam, process heat (as hot water or thermic fluid), chilled water, water treatment and recycling, and combined heat and power/ cogeneration.

Thermax invests in utility equipment to ensure customers only pay for energy without additional capital investment, uncertainties related to biomass/ green fuel supply, and operation and maintenance of the plant.

Indian FMCG major opts for Thermax's energy rental service

ITC, Indian FMCG major, has been outsourcing its steam generation to TOESL at its various facilities.

After signing the first 'green steam supply' with ITC for its food division in Pune, TOESL installed a biomass briquette fired boiler of capacity 14 tons/hr @ 32 kg/cm^2(g) pressure. The contract helps ITC to avoid capital investments in their noncore area, thus paying only for the per unit cost of steam generated. TOESL ensures steady supply of fuel and system upgrades.



Hassle free, emission free and capex free

Customer Benefits

- Saves cost by harnessing green fuel and waste energy.
- No capital expenditure since TOESL selects appropriate technology and invests in utility delivery equipment and allied accessories.
- Manages biomass fuel by establishing long term contracts with farmers and vendors to ensure uninterrupted supply of fuel to the plant
- Responsible for facilitating and gaining relevant statutory clearances for boiler operations and emission control..
- Guaranteed uptime by operating and maintaining equipment as per standard engineering practices
- Installation of a state-of-the-art multi fuel boiler systems with fully automated combustors and PLC based control systems for fuel handing, bed ash handling and chemical dosing

Key Highlights

- Reduces carbon foot print
- Online remote monitoring and high automation
- Focus on safety
- Standard O& M practices and operating procedures

Client Profile

TOESL supplied steam and heat under long term contracts to

- Leading corporates
- Multinational companies
- Food, pharma, paint, chemicals, textile, tobacco, dairy

Manufacturing Excellence



India


Denmark



Poland





Germany


Indonesia

Thermax products are backed by 14 state-of-the-art manufacturing facilities, 10 of which are in India and the rest in Germany, Denmark, Pland and Indonesia.

The facilities in India are at Pune, Bhosari, Shirval, Paudh, Solapur (Maharashtra); Savli, Jhagadia, and Mundra, (Gujarat), Sri City, Dahej

Our manufacturing plants are certified to adhere to rigorous standards:

- ISO 9001: 2000 for quality management for all business operations
- ISO 14001: 2004 for environmental management
- OHSAS 18001:1999 for occupational health and safety for manufacturing operations
- Thermax manufactures to international standards - ASME, BS, DIN, GOST, API and CE, besides the IBR code in India and AQSIQ in China.

The facilities are inspected by Lloyds, Bureau Veritas, SGS and TUV.

Quality Policy

Our Quality Policy start and ends with the customer as a focal point: understanding the customer's requirements, designing optimal solutions to meet those requirements, building systems and processes in place to ensure quality at every stage, and achieving our commitments on delivery and service before and after sales.

It is our endeavour to create a culture of total quality where continuous improvement of our people, our processes and our products becomes a way of life.

Meher Pudumjee
Chairperson, Thermax Limited

Market-driven R&D



Nurturing an Innovation Ecosystem

Thermax has, over the years, introduced several products that have redefined industrial process efficiency. Its market driven R&D effort in the product development process led to the success of Thermopac, a high temperature liquid phase heater that replaces electricity with oil or coal as the heating medium; triple effect absorption chillers that are 20% more efficient than earlier generation systems; fluid bed scrubbing for gaseous as well as particulate emission; compact biomass fired boilers and heating systems with high efficiency combustion systems, new fuels and with reduced levels of pollutants like sulphur dioxide.

Thermax's focus on application oriented R&D led to the creation of Research, Technology, Innovation Centre (RTIC). The Centre supports business research teams and houses its own centres of excellence dedicated to material science, biotechnology, solar, advanced computation and combustion & heat transfer.

RTIC collaborates with leading scientific and academic institutions to bridge the gap between industry requirements and academic curriculum.

Thermax has institutionalised the N. D. Joshi Innovation awards through which it recognises and celebrates technological innovations of its employees that have resulted in significant business gains for the company.

Technology Partnerships



Tie-ups with technology champions

To make its offerings relevant for client businesses, Thermax upgrades its technology portfolio in the energy and environment space through tie-ups with global technology majors. Some of the recent partnerships:

Babcock & Wilcox, USA

For utility boiler technologies

Marsulex Environment Technologies, USA

For wet and semi dry flue gas desulphurization technologies

Lambion Energy Solutions, Germany

For grate technologies

Balcke Durr, Germany

For dry electrostatic precipitators, regenerative air gas heaters and pulse jet bag filters

A Celebration of Diversity



















Nurturing a human organisation

Thermax relies on its committed teams to make things happen. To innovate. To change things. To change themselves. To grow.

It has nurtured a human organisation that values diversity across geography, embracing a variety of profiles in education and skills.

It's vibrant work place is a reflection of the investment the company makes in learning and development opportunities for its employees all over the world. From hardcore technical subjects to softer life skills, the training calendar of Thermax is designed to upgrade knowledge and skills. Teams share their expertise with vendors and customers to offer insights into new technologies.

Built on humane values, Thermax encourages its people to speak up, to give voice to what they think and feel. Open Forum, a unique annual event brings together its employees for a focused and informal conversation about the policies and practices of the company. So are Technology Day and the N. D. Joshi Innovation awards that foster and showcase the exciting new work done by its people.

Employees make time for the community. They volunteer for CSR work in education in the Thermax Foundation-run schools and mentor students after work hours. They also spend time at old age homes and enthusiastically participate in marathons and other fund raising programmes for its NGO partners.

Thermax has won multiple awards for innovation and strategy, product design, IPR, safety and environment management, operational excellence and its human resource practices.

Partnering in Growth






Oil & Gas

- ELF Petroleum/ Petrofac, Iran
- JGC, Turkmenisthan
- ONGC, India
- Oil India, India
- MRPL, India
- Total Group
- IOCL, India
- Reliance Industries Ltd.
- Kuwait Oil Company
- PDO, Oman
- Cairn Energy
- Abu Dhabi Gas Industries Limited (GASCO)
- Abu Dhabi Gas Liquefaction Company (ADGAS)
- Takreer, UAE
- Qatar Petroleum
- HPCL
- BPCL
- CPCL

Hospitality

- J. W. Marriot, India
- Le-Meridien, India
- ITC Group, India
- Taj Group, India
- Apollo Group of Hospitals, India & Sri Lanka
- Sun 'n' Sand, India & Kenya
- Bali Nirwana Resort, Indonesia
- Marriot, USA

Petrochemicals

- Arabian Petrochemicals, Saudi Arabia
- Reliance Industries Ltd.
- IPCL, India
- Hitachi Zosen, Vietnam
- Castrol, Dubai
- Caltex, Dubai
- SABIC, Saudi Arabia
- KNPC, Kuwait

Chemicals

- Gujarat Heavy Chemicals Ltd., India
- Tata Fertilizers, India
- SPIC, India
- Colgate Palmolive, India
- Dupont, UK
- Unilever Group
- Bharat Shell, India
- Kansai Nerolac
- Al Baha Company, Jordan
- Indian Rayon, India
- Chemplast, India

Automobile

- Ford, India
- Toyota Motors, India
- Hyundai Motors, India
- Bajaj Auto, India
- Honda Cars & Scooters, India
- Maruti Suzuki, India
- Hero Motor Corp, India

Pharmaceuticals

- Ranbaxy, India
- Pfizer, India
- Glaxo Smithkline, India
- Wockhardt, India
- Square Pharma, Bangladesh
- Global Capsules, Bangladesh
- German Remedies, India
- Cheminor, India
- Cipla, India
- Dr. Reddy's Laboratories, India
- Orchid Ltd., India
- Lupin Ltd., India

Steel

- SAIL, India
- Vikram Ispat, India
- Bhushan Steels & Strips Ltd., India
- Tata Steel Limited, India
- Welspun, India
- Essar Steel, India
- Surabhaya Steel, Indonesia
- JSW group
- Jindal Steel and Power Limited (JSPL)
- Vizag Steel Plant
- Nava Bharat Ferro Alloys Ltd.
- Suryadev Alloys & Power Pvt. Ltd.
- Super Smelter Ltd.
- Topworth group

Sugar

- Vina Sugar, Vietnam
- PT Bermeese Madhusejati, Indonesia
- Oswal Sugar Mills, India
- Sakthi Sugars, India
- Mitr Phol Bio Power Co. Ltd.
- Balrampur Chini Mills Ltd
- Bannari Amman Sugars Ltd.
- Universal Robina Corp Sugar, Philippines
- Indian Cane Power Ltd.
- Sarvaraya Sugars Ltd.

Textiles

- P. T. South Pacific Viscose, Indonesia
- P. T. Texmaco, Indonesia
- Printex Enpee, Nigeria
- Apex Spinning, Bangladesh
- Reliance Industries, India
- Vinphu Textile, Vietnam
- Raymonds, India
- Beximco Textile, Bangladesh
- Arvind Mills, India
- Welspun, India
- Brandix Tectile, Sri Lanka

Tyres

- MRF, India
- Load Star, Sri Lanka
- Ceat, India
- Apollo, India
- Goodyear, India
- Bridgestone



Thermax adopts a partnering relationship with clients to address their energy and environmental challenges and enhance their performance and profits. It has the expertise to support clients at any phase of their business cycles - planning and setting up manufacturing facilities, upgrading technologies, revamping existing facilities, trouble shooting and problem solving, training technical staff on new technologies.

With integrated energy-environment expertise and a proven track record in global markets, Thermax is the preferred partner of enterprises across industrial sectors:

Space Heating
- Indian Army, India
- Dakshingangotri (Indian Expedition), Antartica
- Gaz Prom, Russia
- Heating Networks, Archangelsk & Semenov, Russia
- City Administration, Krasnayaminsk, Russia
- Thisted, Denmark
- Karstad, Sweden

Tank Farm Heating
- VOPAK, UAE
- Sharjah Oil, UAE
- Warm Seas/ Oil Serve, UAE
- VOPAK-ENOC, UAE
- IOCL, India
- BPCL, India
- HPCL, India
- Nestle Oil, Singapore

Power
- KPCL, India
- Reliance Infrastructure, India
- BHEL, India
- K C Energy, South Africa
- Neyveli Lignite, India
- NTPC, India
- Essar Power Ltd., India
- Tata Power Co. Ltd., India
- Bhushan Power & Steel, India

Food
- Cargill, Philippines
- McDonald's, India
- Coke, India
- Pepsi, India
- Nestle, India
- Kuiburi Fruit Canning, Thailand
- Dole, Philippines
- Kenya Tea Development Authority, Kenya
- Southdown Holdings, Zimbabwe
- JFT Rice Mills, Vietnam
- Cadbury's, India
- Delmonte, Philippines
- Goodrick Tea, India

Paper
- EDFU Papers, Egypt
- Phoenix Pulp & Paper, Thailand
- Union Paper, Dubai
- South India Paper Mills, India
- Indo-Afrique Paper, India
- Ballarpur Industries, India
- TNPL, India
- Basundhara Paper, Bangladesh
- ITC, India
- West Coast Paper Mills Ltd.

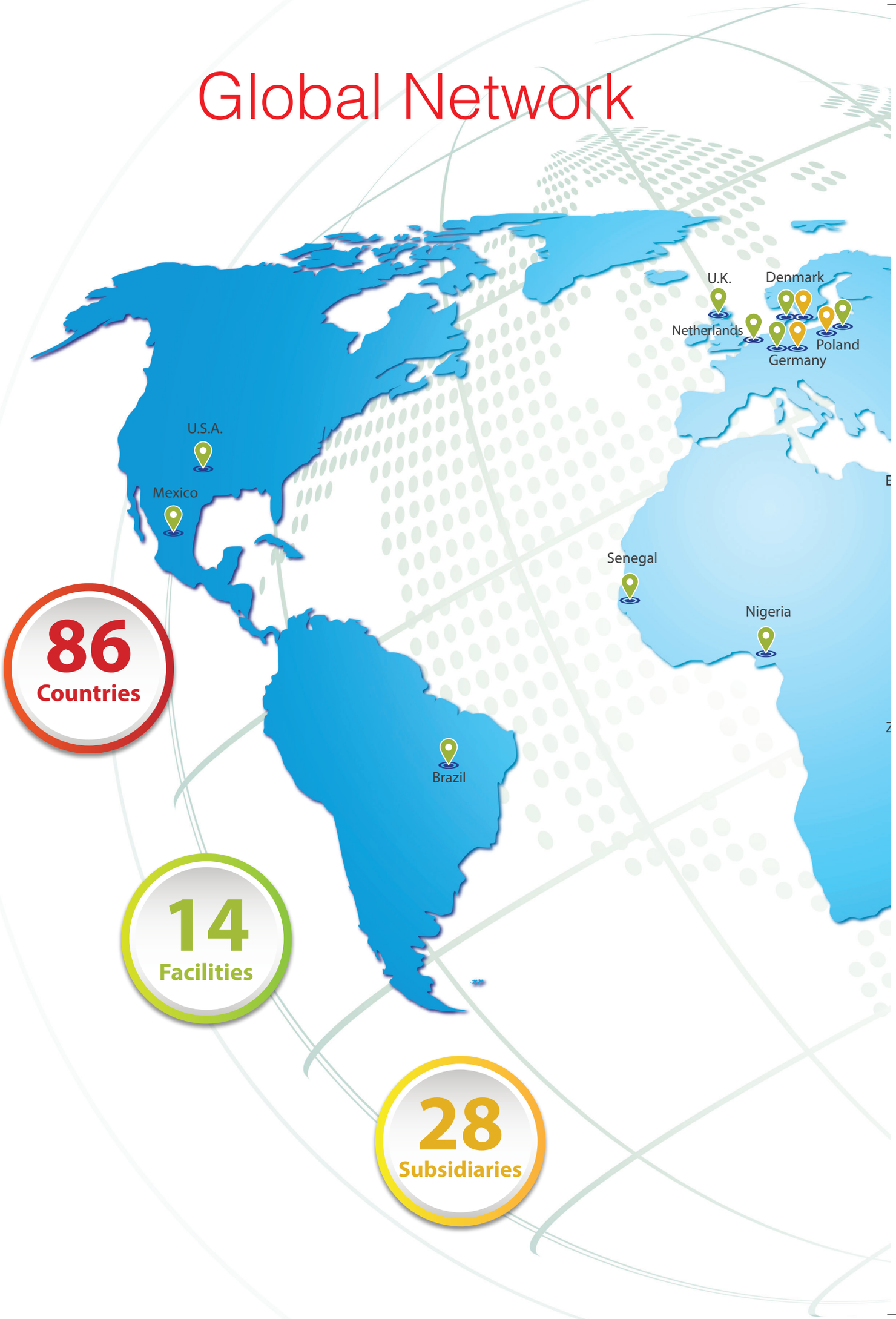
Cement
- J. K. Cements, India
- Ramco
- Madras Cement, India
- Ultratech Cements Ltd., India
- ABG Cement Ltd., India
- NCC, Yemen
- Grasim Cement, India
- Holcim
- Lafarge (Arsmeta)
- Saurashtra Cement

Edible Oil
- Golden Oil, Nigeria
- Kewalram Oils, Malaysia
- Patun Vegetable Oil, Thailand
- Oswal Agro, India
- Sulzer India, Saudi Arabia
- Desmet, India
- Agrotech, India
- Bidco, Kenya
- Adani, India
- Cargill, India

EPC Majors
- JGC, Japan
- Technip
- Bechtel, UK
- Samsung, Korea
- Mitsubishi, Japan
- MODEC
- BW Offshore
- Hyundai Engineering Co. Ltd.
- Essar Projects (India) Limited.
- Engineers India Ltd.

Consultants
- Jacobs
- Bechtel, USA
- UHDE, India
- Chemtex Engineering, India
- Aker Kvaerner
- Mecon, India
- TCL, India
- EIL, India
- DCL
- Fichtner
- Toyo Engineering

Global Network





Head Office
India

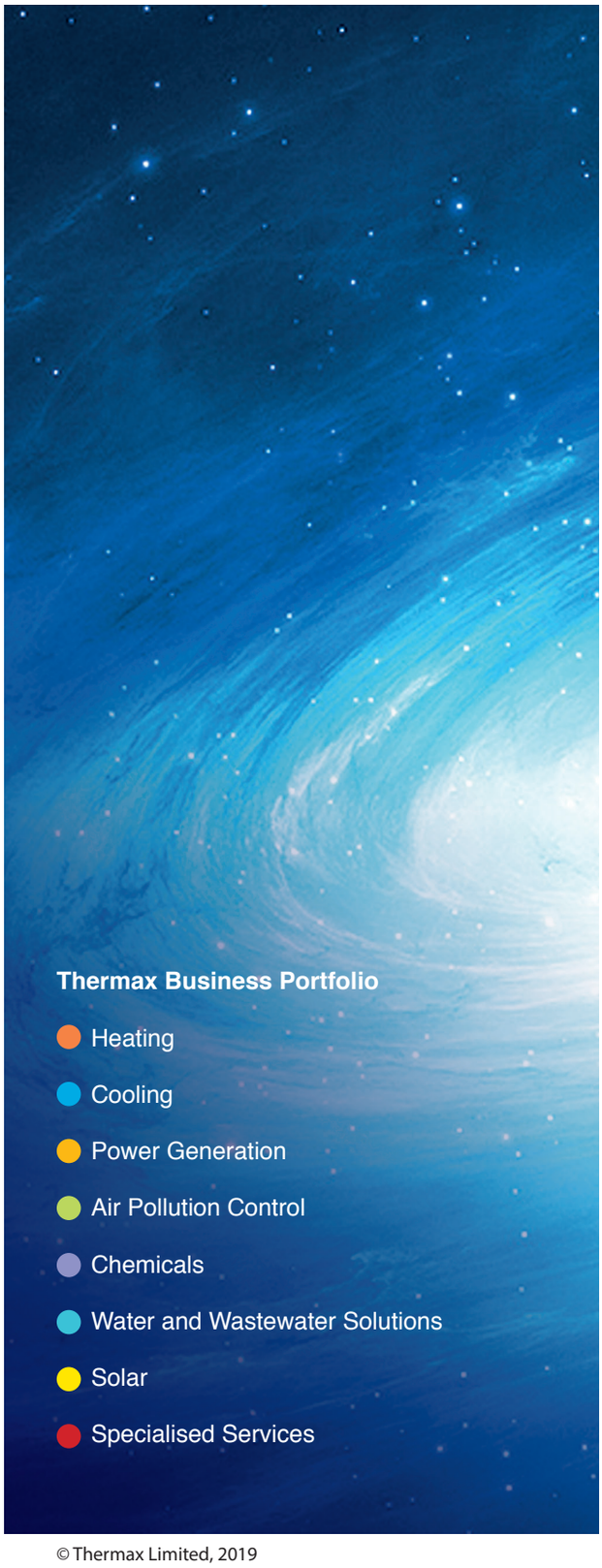
Manufacturing Units
Denmark
Germany
India
Indonesia
Poland

International Subsidiaries, Sales & Service

Bangladesh	Malaysia	Senegal
Brazil	Mauritius	Singapore
China	Mexico	Sri Lanka
Denmark	Myanmar	Thailand
Egypt	Netherlands	U.K.
Germany	Nigeria	U.S.A.
Hong Kong	Philippines	UAE
India	Poland	Vietnam
Indonesia	Russia	Zambia
Kenya	Saudi Arabia	

THERMAX

Sustainable Solutions in
Energy & Environment



www.thermaxglobal.com

Registered Office

D-13, MIDC Industrial Area,
R D Aga Road, Chinchwad,
Pune 411019, India

Tel. : +91 20 66122999 / 66155000
Fax : +91 20 27472049

enquiry@thermaxglobal.com

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