Sustainable Solutions in Energy and Environment

Disclaimer: Information in this presentation does not form of any offer and can be changed without prior notice. Thermax does not assume any obligation or liability arising from the use of this data in any form apart from its intended use of dissemination of preliminary information only.
Thermax Group

Corporate Office: Thermax House, 14-Mumbai Pune Road, Wakdewadi, Pune 411003, Maharashtra, India

Registered Office: D-13, MIDC, Industrial Area, R.D. Aga Road, Chinchwad, Pune 411019, Maharashtra, India
Our Vision
To be a globally respected high performance organization offering sustainable solutions in energy and environment.

Our Belief: “Profit is not only a set of figures, but of values”

Late Rohinton D. Aga
1935 – 1996
Founder, Thermax
Our Business Profile

Boiler & Heater
- Packaged boilers
- Large capacity power boilers
- Thermal oil/water heaters
- Energy recovery systems

Cooling & Heating
- Exhaust & multi-energy fired chillers
- Steam fired chillers
- Hot water fired chillers
- Direct fired chillers
- Steam boilers for power generation (upto 30 TPH)
- Packaged boilers, thermal oil heaters & hot water generators suitable for solid/oil/gaseous fuel
- Engine exhaust waste heat recovery boilers

Power Generation
- Turnkey power plants
- Solid fuel based
- Gas based combined cycle
- Waste heat recovery based
- Renewable energy based (biomass, waste heat, solar)
- Power plant management services

Chemicals
- Ion exchange resins
- Cooling water chemicals
- Fineside chemicals
- Polyelectrolyte
- Environmental
- ESP & bag filters
- Scrubbers
- Air purification
- Retrofit & revamp

Air Pollution Control
- Heating
- Cooling
- Combining solar and thermal energy for client applications

Renewable Energy
- Water and wastewater
- Wastewater & effluent water treatment systems
- Water recycling
- Waste management
Technology Partnerships

**Babcock & Wilcox, USA**
- More than 180 years of Combustion Experience
- Technical tie-up for solid fuel and Waste Heat Recovery
- Joint Venture Partners for super-critical Boilers

**Balcke Dürr, Germany**
- Brand under SPX Corporation
- SPX Established in 1912
- Technical tie-up for Pollution abatement equipments
- Joint Venture Partners for Large ESP’s, Air Cooled Condensers and RAPH.

**Taiheiyo, Japan**
- TEC Group Company
- More than 180 years of Combustion Experience
- Technical tie-up for Cement Waste Heat Recovery
- Commissioned the First Cement Waste Heat Recovery Plant in India under this technology tie-up

**Graver Water System LLC, USA**
- World’s leading water treatment company
- Over 50 years of experience
- Technical tie-up for Condensate Polishing Units
- Serving the Supercritical Thermal and Nuclear Power Projects.
Certifications & Associations -

Conforms to International Codes:
- ASME, BS, DIN, API, GOST, CE, JIS

Associated with Consultants:
- Black & Veatch
- BECHTEL
- Toyo Engineering India Limited
- Mott Macdonald
- Development Consultants Private Limited
- DAELIM
- Fichtner
- Sargent & Lundy
- Tata Consulting Engineers Limited
Our Global Presence

Index
- Manufacturing Unit

Thermax Limited - Corporate Presentation
Thermax Group

Subsidiaries
- Thermax Instrumentation Ltd., (India)
- Thermax Onsite Energy Solutions Ltd., (India)
- Thermax Sustainable Energy Solutions Ltd., (India)
- Thermax Engineering Construction Co. Ltd., (India)
- Thermax Inc. (U.S.A.)
- Danstoker A/S, (Denmark)
- Thermax Europe Ltd. (U.K.)
- Thermax Denmark ApS, (Denmark)
- Thermax Hong Kong Ltd (Hong Kong)
- Rifox Hans Richter GmbH, (Germany)
- Thermax International Ltd. (Mauritius)
- Thermax Netherlands B.V. (Netherlands)
- Omnical Kessel und Apparatebau GmbH, (Germany)
- Thermax do Brasil-Energiae Equipamentos Ltd (Brazil)
- Ejendomsanpartsselskabel Industrivej Nord 13, (Denmark)
- Thermax (Zhejiang) Cooling & Heating Engineering Co. Ltd. (China)

Joint Ventures
- Thermax Babcock & Wilcox, India
- Thermax SPX Energy Technologies Ltd., India
**Global Footprints**

- Presence in 13 + countries
- Close to 25 Business Associates across the Globe
- Global Presence with a customer base of over 25,000

**Global Footprints**

- South East Asia
- Middle East
- North America
- Europe
- Africa

---

Our international installations consists of the following:

- **Chillers**: 300+ installations
- **Air Pollution Control**: 200+ installations
- **Power Boilers**: 40+ installations
- **Process Boilers**: 50+ installations
- **Water Treatment Plants**: 40+ installations
Our offerings

1. Turnkey/EPC (Engineer–Procure–Construct) solutions

- **Procurement**
  - Engineering
  - Construction
  - Commissioning

**Turnkey EPC of Power Projects**

<table>
<thead>
<tr>
<th>Fossil Fuel fired</th>
<th>Waste Heat recovered from</th>
<th>Biomass</th>
<th>Open cycle to close cycle</th>
<th>Solar</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Solid Fuel</td>
<td>• Sponge Iron kiln</td>
<td>• Using grate -</td>
<td>• Through heat recovering steam generator</td>
<td>• Photovoltaic</td>
</tr>
<tr>
<td>• Liquid / Gas</td>
<td>• Cement mfg. process</td>
<td>• Travelling Grate</td>
<td>• Dumping grate</td>
<td>• Concentrated Photo voltaic</td>
</tr>
<tr>
<td></td>
<td>• Coke oven</td>
<td>• Pin Hole Grate</td>
<td>• Fixed Grate</td>
<td>• Concentrated Solar Power</td>
</tr>
<tr>
<td></td>
<td>• Blast furnace</td>
<td>• Chain Grate</td>
<td>• Pulsating Grate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Smelters</td>
<td>• Reciprocating Grate</td>
<td>• Offering full bottoming cycle solution</td>
<td></td>
</tr>
</tbody>
</table>

- **Open cycle to close cycle**
  - Through heat recovering steam generator
  - Offering full bottoming cycle solution

- **Solar**
  - Photovoltaic
  - Concentrated Photo voltaic
  - Concentrated Solar Power
Our offerings

2. FEED (Front End Engineering & Design) for power plants in

- Cogeneration Plants
- IPPs
- Captive Power Plants

3. Operation & Maintenance (O&M) for Power Plants

- IPP
- Cement
- Steel
- Chemical
- Ferrous / Non Ferrous
- Paper
- Sugar

4. Power projects on BOOT (Build–Own–Operate–Transfer) basis for

- Biomass
- Waste heat recovery
- Distillery spent wash
Preferred EPC Player

1. Leader in captive EPC power generation market in India
2. In-house Manufacturing of key Project Equipment's viz. Boiler, ESP, ACC & Water Solutions
3. Experienced Professionals from Power majors like Development Consultants, Black & Veatch
4. Contracted more than 85 power projects in 15 years
5. Latest Technology deployed for Engineering and Project Management
In-house expertise of Basic & Detailed Engineering

Demonstrated experience In Sub Critical, Reheat, For Coal and Gas Plants

With O&M Feedback we Design user Friendly Plants

Team – 171 Engineers
Power and Energy Experts for Separate Systems

- 3D Smart Plant
- ETAP
- GT & ST Pro
- STAAD Pro
- AFT
- Auto CAD 3D
Our IT Enablers

✓ State of the art software such as Smart Plant 3D Modeling, GT Pro, Steam Pro etc to simulate data.

✓ Software such as CEASAR II & STAAD are used for piping stress & structural analysis

✓ Software such as ETAP for Electrical Load Flow Studies

✓ Advanced project management tools such as Primavera, MS Projects

✓ Software such as Smart Plant are utilized to simulate real time conditions
Project Management

PROVEN RECORD OF SUCCESSFUL COMPLETION

- Ability to handle over 16 Projects simultaneously
- Use of Project Management Tools viz. Primavera
- Demonstrated experience of Working With Onshore Contractors
- Over 40 IPMA Certified Professionals
- Over 100,000 Man-hours of Project Management Experience
Procurement

• 75,000 + sourcing man-hours per annum
• Dedicated Team for Vendor Quality & Assessment
• Global Sourcing Capability

Gas / Steam Turbine & Generators
GE, Siemens, Skoda, Fuji, Toshiba, Hitachi, Shin Nippon

Booster Gas Compressors
Atlas Copco, Mann-Turbo, Camaroon. Hitachi

Electrical Systems (HT & LT)
ABB, Areva, Siemens, Schneider Electric

DCS & Control Systems
ABB, Emerson, Honeywell, Yokogawa
Construction & Supervision

**Sea Water Intake**

**Executed:**
- Civil >200000m³/annum
- 80,000 MT of Mechanical
- Managed in excess of 2000 labor force at site
- Dedicated construction team for site activities

**Piling Rigs in Action**

**Mechanical Erection**

**Well Point Dewatering**
Health Safety & Environment

Certified for OHSAS:18001 (Occupational Health Safety Assessment Series) and ISO:14001 (Environment Management System) International Standard for continuous improvement in Health, Safety and Environment
**Organization Structure of Power Division**

- **Small Power Plants**
  - Commissioned over 10 Projects
  - Over 10 Projects under Execution

- **Medium Power Plants**
  - Commissioned over 34 Projects
  - Over 8 Projects under Execution

- **Large Power Plants**
  - 2 Project Commissioned
  - 2 Projects under Execution

- **O&M**
  - Operating more than 30 Plants
Gas Based Projects

- Consultant: Black & Veatch
- Gas Turbine: GE (PGT-10)
- 2 No. of Thermax HRSG & 1x6.5 Mw steam turbine; 2-2-1 combination per unit
- Tri-generation plant with full fledged inlet air cooling system (IAC) & ZLD
- Plant executed on EPC basis and operational since 1996
Consultant: MECON

Part of crude steel expansion project at SAIL

3 x 100 TPH BF gas fired boilers, 2 x 18 MW STG, 1 x 6.5 MW BPTG and associated balance of plant

Thermax awarded certificate for three million accident free man hours during execution of this project

Project execution on EPC basis
Other Breakthrough Projects

15 MW JK Nimbahera

- **Tata Sponge Iron Limited** – One of the first plants in India to earn benefits from carbon credits

- **Kalpataru Power Transmission Limited** – First biomass project in the world and the first project from India to be registered for CDM benefits

- **JK Cement Works, Nimbahera** – Amongst the first projects in India to utilize the low temperature cement waste flue gas for power generation and eligible for CDM benefits

- **National Cement Company, Yemen** – First solid fuel based plant in Yemen for the cement industry
Awards & Key Achievements

Asian Power Awards 2012
Thermax Limited awarded gold prize for 1 x 12.5 MW Bataan 2020 Philippines, in the best biomass cogeneration plant of the year category by Asian Power Awards in Oct 2012

Multiple bonus recipient –
• Rs. 6 Crores from DCW for Power plant performance
• Rs 1 Crore bonus from Madras Cement Limited for early completion of 2x18 MW coal based power project
• Rs 1.5 Crore bonus from JK Lakshmi Cement Limited for on time completion of 2x18 MW coal based power project
• Rs. 1 Crores from Shree Cement Limited for 2x18 MW project
• Rs. 27.22 Lacs for Efficiently Operating the Power Plant of ACC

Repeated orders from customers –
• Long Gulf (Yemen)
• Madras Cement (India)
• JK Cement (India)
• DCW Limited (India)
• Aditya Birla (India)
• Shree Metallic (India)
Manufacturing & Assembly Facilities

- World Class facilities for Hot rolling (Max 200 mm thk), Cold Rolling (Max 130 mm thk) & Coil Strip welding
- Dedicated manufacturing plants for Air Cooled Condensers, HRSG & Coil bending
- State-of-the-art facility for Supercritical boilers in advance stages
Advantage Thermax

- IPMA (QPMP) Certified Project Managers to ensure timely completion of Projects
- Capability to handle more than 18 projects concurrently
- Projects designed to meet international standards like ISO, ASME, DIN, IBR, TEMA, ASTM, AWS, BS, HEI, etc
- O&M Experience helps us Design Maintenance Friendly Power Plants
- Subsidiary construction company to ensure timely completion of Project
- Mechanical erection in excess of 120,000 MT and civil erection in excess of 300,000 m³ in last 2 years
- Quality Policy with the Customer at its focal point

- Guaranteed Power Plant Availability & Performance
- Projects designed to meet international standards like ISO, ASME, DIN, IBR, TEMA, ASTM, AWS, BS, HEI, etc
- International sourcing Capability
- Excellent Relation with Logistic Service Providers
- World Class Vendor Management System
- Experience of working with all major Power Project Consultants in India

- Engineering Management
- Operation & Maintenance
- Project Management
- Supply Chain Management
- Quality Management
- Construction Management
Thermax advantage

- Over 85 Projects on EPC
- Recipient of many bullet bonuses
- Wrap Around Guarantees
- Fixed Cost & Schedule
- 35% Equipments manufactured In house
- Alliance with reputed vendors
- Ability To attract and mobilize resources
Thank you