

Indian Coal to Chemicals

by

Thermax Ltd

at

Gasification India 2022

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Thermax at a Glance



Our Vision

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

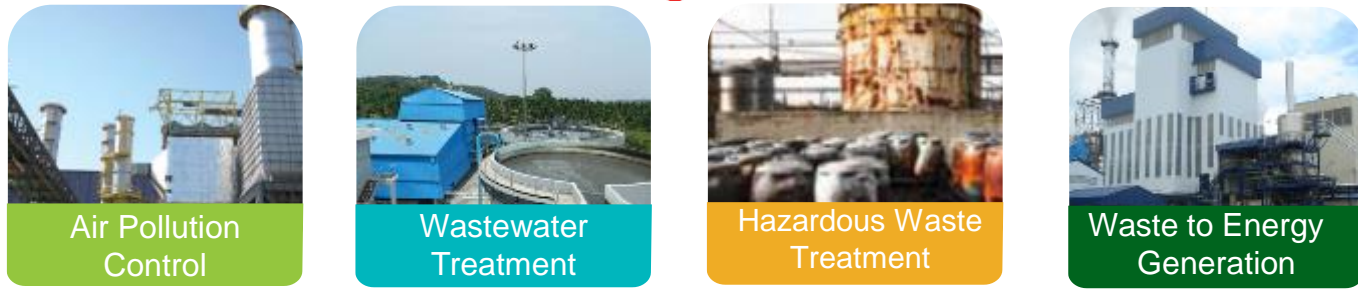
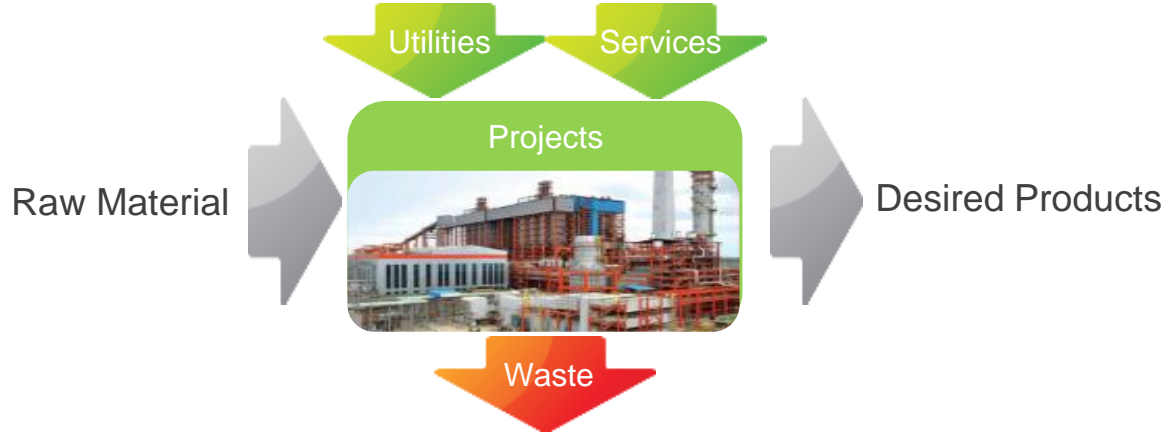


Our Corporate Philosophy

**Conserving Resources.
Preserving the Future.**



Thermax Portfolio



Projects & Energy Solutions Business Unit



- **Flagship EPC arm of Thermax** for industrial projects
- **Asset Management capabilities** for operating plants 24x7 with least lifecycle cost
- Market leader in India for medium sized EPC projects for 25 years
- Organized to deliver wide range of projects: INR 40 Cr – 1500 Cr
- World class safety standards & ISO45001: 2018 certified sites
- Technology based, digitally enabled projects and service delivery
- 150+ turnkey projects contracted across globe
- 125 sites under 24x7 care of our Asset management arm
- Track record of achieving:
 - ✓ On time delivery
 - ✓ High performance
 - ✓ Least lifecycle cost



Projects & Energy Solutions



Our EPC Offerings

Power plant EPC



Flue Gas Desulphurization systems(FGD)



Air-cooled Condenser(ACC)



Refinery Process Plants



Bio-CNG Plants



Projects & Energy Solutions



Our Asset Management Services Offerings

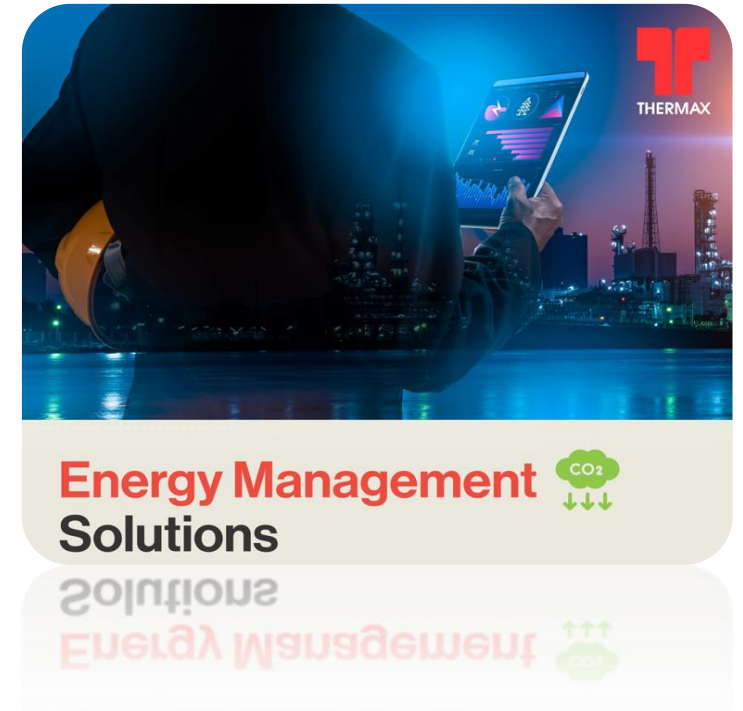
Power Plants Operation & Maintenance



Utility Operation & Maintenance



Energy Management Solutions

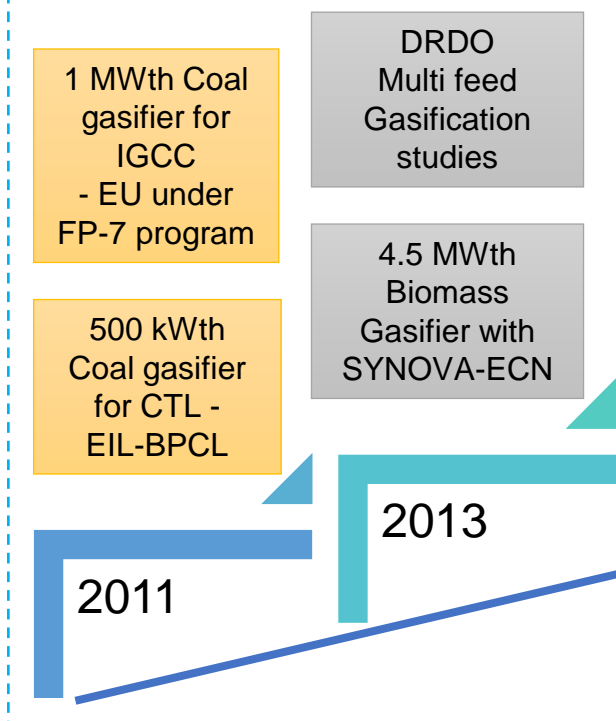


Research Technology & Innovation Center (RTIC)

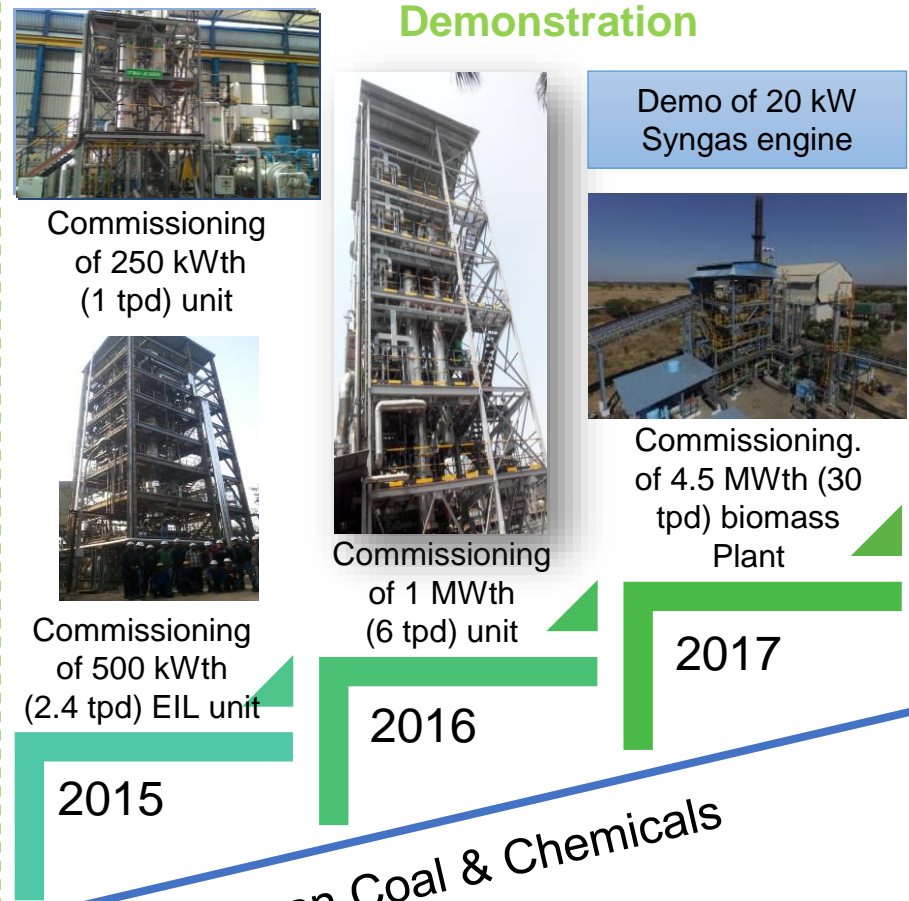


Gasification Technology Development Journey

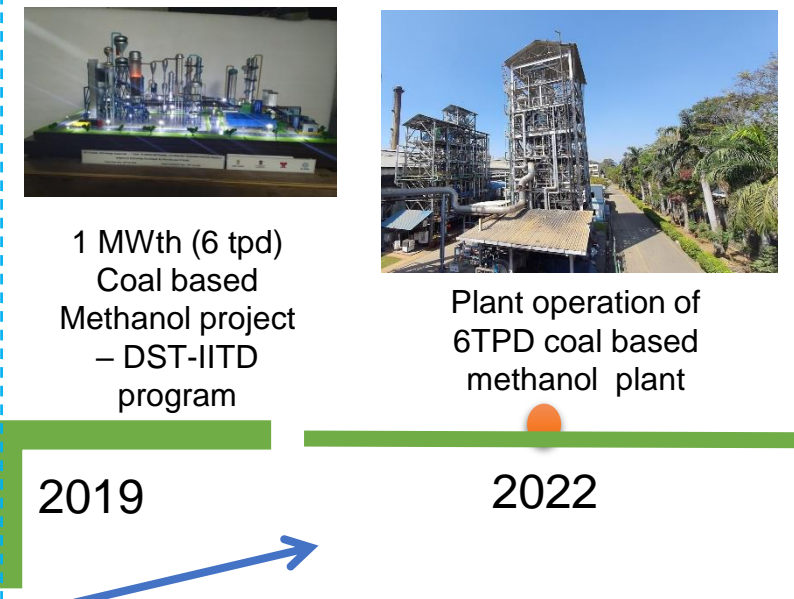
Conceptualization



Demonstration



Coal to Chemicals

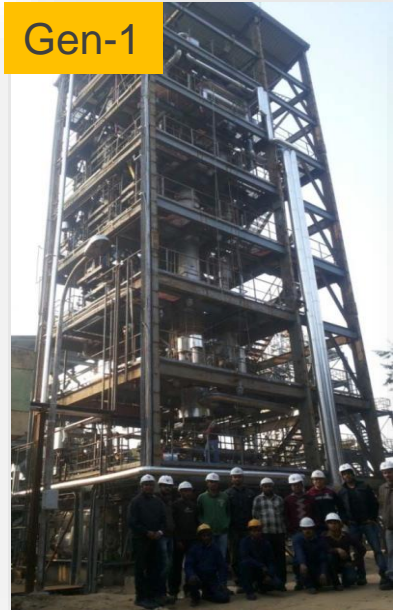


Drive for Clean Coal & Chemicals

Partners / Collaborators



Thermax Bubbling Fluidised Bed Gasifier Journey



Gen-1

Gen 1: 500 kWth (2.4 TPD) coal Gasification facility EIL Gurgaon (for CTL)



Gen-2

Gen 2: 1 MWth (6 TPD) coal Gasification facility Thermax Pune (for IGCC)



250 kWth (1 TPD) atmospheric coal Gasification facility Thermax Pune (for Fuel shift & Heat)



Biomass/Agro residue 4.5 MWth (30 TPD) dual bed FBG plant (for Heat & Power)

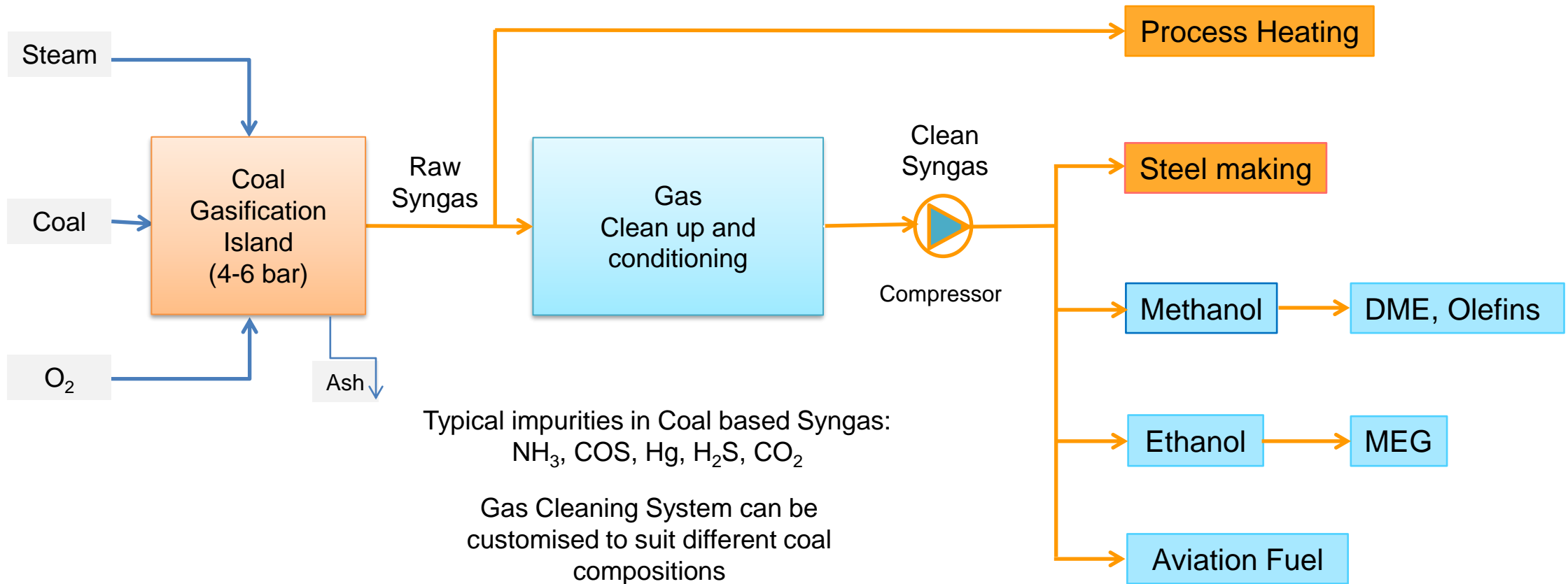


Gen-3

NEW

Gen 3: 1 MWth (6 TPD) coal Gasification and methanol facility Thermax Pune (for CTL)

Thermax Bubbling Fluidised Bed Gasifier Applications



Thermax Gasifier Features and Advantages



Key Features

- Tested with High Ash Indian coal (HAIC: 30–50 % Ash by Wt.)
- Gasifier operation till 6 bar, 1000°C (Gen-3)
- Can handle < 6mm Coal
- Also tested for imported coals (S.A / Indonesian)
- Oxy-blown process for syngas >2000 kcal/nm³ CV
- Total energy integrated solution by Thermax

Advantages

- Technology that can handle unwashed high ash coal
- Optimised oxygen consumption
- Indigenous components
- Better refractory life
- Only coal crushing required (no pulverisation)
- Simple and reliable plant operation

Indian Coal to Methanol Pilot Plant



- **Coal:** High Ash Indian Coal (30-50% ash)
- **Gasification Technology:** Oxy-blown Bubbling Fluidized Bed Gasification (medium pressure)
- **Gas clean-up :** Multiple scrubber and guard beds
- **Methanol Reactor:** Fixed bed type (80 bar)
- **Plant capacity:** 1.0 TPD methanol
- **Plant commissioned:** Feb 2022



CTM Plant Facility



Gas Compressor



Plant control room (DCS, PLC, SCADA)



Liquid O2 and N2 system



Offline Gas Chromatograph (GC)



Online Gas analyser



Boiler

Methanol Quality

Crude Methanol

- Methanol 85.8 wt.%
- Water 7.6 wt.%
- Ethanol 5.7 wt.%

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Fertilizers & Chemicals Limited
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Ph (02642)247001, 247002
Website www.gnfc.in

CENTRAL LABORATORY

Date: 07-05-2022

Analysis Report of Crude Methanol Sample

Source : Methanol 2 Process
Sample Details : Crude Methanol from M/s Thermax
Date of Receipt : 29-04-2022

Sr No.	Test	Unit	Result
1	Methanol Content	% by wt	85.8
2	Water content	% by wt	7.6
3	pH	-	6.5
4	Specific Gravity at 27°C	-	0.802
5	Ethanol	% by wt	5.78
6	Methyl format	ppm	2079
7	Aldehyde and ketone as Acetone	ppm	635
8	Acetone	ppm	65
9	Acidity as Acetic acid	ppm	810
10	Iso-propanol	ppm	56
11	N- propanol	ppm	1792
12	2 - Butanol	ppm	420
13	Iso-Butanol	ppm	1150
14	N - butanol	ppm	1124
15	Distillation range IBP	°C	66
16	Distillation range FBP	°C	98
17	Non-volatile content	mg/100 ml	<1
18	Colour	APHA	<5
19	Appearance	-	Clear free of suspended matter
20	KMnO ₄ fading time	Minutes	20
21	Carbonizable substance	APHA	>500
22	Total Sulphur	ppm	3.5
23	Hydrocarbon (Water miscibility test)	-	Fail

Pilot Plant Inauguration by Hon. Dr. V.K.Saraswat, NITI Aayog (22.11.2021)

12:52



← Tweet



Dr V K Saraswat ✓

@DrVKSaraswat49

Heartiest congratulations to THERMAX and IIT DELHI team for successful indigenous design development erection commissioning of 1 ton per day capacity high ash content coal to methanol plant .Now india can set up large capacity coal gasification plants indigenously

@Thermax @IIT D


12:16 pm · 02 Feb 22 · Twitter for iPhone

16 Retweets 24 Likes



Thermax-IITD is looking forward for opportunities to establish first Scale up plant for Indian Coal to Chemical (ICC)

THANK YOU



NITI Aayog
Ministry of Planning
Government of India

iitdelhi
Indian Institute of Technology Delhi

Department of Science and Technology
Ministry of Science and Technology
Government of India

THERMAX

Thermax coal to Methanol Demonstration plant Pune

Indian Coal

Methanol

Unbelievable Transformation
... yet possible

The image shows a demonstration of the coal-to-methanol process. On the left, there is a pile of dark, irregular pieces of Indian coal. An orange curved arrow points from the coal to a clear glass vial on the right. The vial has a blue cap and contains a clear, colorless liquid labeled 'Methanol'. The background is a plain, light-colored surface.

