

HPCL - MITTAL ENERGY LIMITED (HMEL) **Bathinda (Punjab)**

Unit Profile

HPCL Mittal Energy Ltd. (HMEL) owns and operates the Guru Gobind Singh Refinery (GGSR) of 9 MMTPA capacity at Bathinda, Punjab. It was established on July 25th, 2007 as a joint venture between Fortune 500 Company, Hindustan Petroleum Corporation Limited - a Government of India Enterprise engaged in the business of oil refining and marketing and Mittal Energy Investments Pte. Ltd - a Lakshmi N Mittal Group Company and a 100% subsidiary of Mittal Investments SARL (Société à responsabilité limitée), Luxembourg as a unique Public Private Partnership (PPP). Completed in record time of four years, the refinery became operational in February, 2012 and on April 28, 2012 .

HMEL's wholly owned subsidiary, HPCL-Mittal Pipelines Limited (HMPL), owns and operates a Single Point Mooring (SPM) for receipt of Crude Oil, Crude Oil Terminal (COT) for storage of Crude Oil and 1017 km cross country pipeline for transportation of the crude from Mundra, Gujarat to the refinery at Bathinda.



The refinery produces eight liquid product and three solid products of EURO-IV specifications using world-class environment-friendly technologies such as Sulphur Recovery Units, Hydro-Treaters, State-of-the-art Effluent Treatment Plant, Vapour Recovery Systems and Low NOX Burners in the furnaces, Tertiary and fourth stage separators to remove catalysts fines from flue gases in FCCU, Secured Land Fill for toxic solids etc. GGSR holds the unique distinction of being a 'Zero Bottoms Green Refinery' with no liquid or solid wastage. In addition, a vast green belt, covering 410 acres with approximately 230,000 plants has been developed inside the refinery complex.

Energy Consumption

Description	UOM	FY 2014-15	FY 2015-16
Total Electrical energy consumption per annum	Lac. kWh	7474	9629
Specific electrical energy consumption	kWh/ Tonne	101.7	89.4
Total thermal(Fuel) consumption per annum	MKcal	6366348	8709159
Specific thermal (Fuel) energy consumption per annum	MKcal / Tonne	0.87	0.81

Specific Energy Consumption Reduction

Year	Specific Energy Consumption (kWh/Tonne)	% Reduction over 2014-15	Specific Thermal Energy Consumption (MKcal/Tonne)	% Reduction over 2014-15
FY 2014-15	101.7	--	0.87	--
FY 2015-16	89.4	12.0	0.81	6.6

Specific Energy Consumption details MMBTU/BBL/NRGF (MBN) -

Attributes	MBN
FY 2014 - 15	66.01
FY 2015 - 16	62.10

Energy Conservation Achievements

1. Reduction in Feed reactor riser steam in FCC

MP steam consumption in the reactor-riser system of FCC unit was 25 wt. % of feed which was as per design. As an initiative to reduce steam consumption in the unit, MP steam was reduced in reactor riser system in steps by monitoring the yield and quality of products. Finally MP steam was reduced from 25 wt. % to 21 wt. % of feed.

Savings	UOM	FY 15 - 16
Fuel Saved	MT	5718.1
Monetary benefit	INR Lakh	1570.6

2. C3 stripper side reboiler commissioning / Utilization of Hot water belt heat

LP steam was consumed for reboiling in C3 stripper column of PRU unit. Another reboiler of the same column using heat from hot water belt was kept redundant as heat recovery from hot water belt was not possible at running design conditions. But in view of optimization of energy, the heat recovery through hot water belt was optimized and that additional heat was used in redundant reboiler which resulted in saving of LP steam by 14.7 TPH.

Savings	UOM	FY 15 - 16
Fuel Saved	MT	1759.9
Monetary benefit	INR Lakh	389.1

3. Reduction of VDU heater COT and HVGO IR optimization

VDU heater COT was previously maintained at 398oC. To reduce the COT further, HVGO internal reflux to VDU column was reduced in steps by close monitoring of the product quality and delta pressure across the column. This resulted in 4oC reduction of VDU heater COT by reducing HVGO internal reflux by 40 m³/hr.

The fuel saving achieved by reducing overall heater duty by reducing heater COT was -

Savings	UOM	FY 15 - 16
Fuel Saved	MT	554.9
Monetary benefit	INR Lakh	159.7

4. Reduction of VGO-HDT main Fractionator pressure & stripping steam

The fractionator column of VGO unit was operated at a pressure of 1.2 Kg/cm²g. However, in view of energy optimization, pressure was reduced in steps to 0.85 Kg/cm²g by reducing the reboiler steam consumption from 17.0 TPH to 14.1 TPH maintaining the desired product quality which resulted in saving of reboiler steam.

Savings	UOM	FY 15 - 16
Fuel Saved	MT	847.0
Monetary benefit	INR Lakh	239.2

HINDUSTAN PETROLEUM CORPORATION LIMITED

Mumbai Refinery (Maharashtra)

Unit Profile

Standard Vacuum Refining Company of India Limited was incorporated on July 5, 1952. Then on 31st March, 1962 the name was changed to ESSO Standard Refining Company of India Limited.

Hindustan Petroleum Corporation Limited came into being after the takeover and merger of erstwhile ESSO Standard and Lube India Limited in 1974 by Government of India. Caltex Oil Refining (India) Ltd. was taken over by the Government of India and merged with HPCL in 1978. Kosan Gas Company, the concessionaries of HPCL in the domestic LPG market, are taken over and with HPCL.

HPCL operates 2 major refineries producing a wide variety of petroleum fuels & specialties, one in Mumbai (West Coast) of 6.5 Million Metric Tonnes Per Annum (MMTPA) capacity and the other in Vishakapatnam, (East Coast) with a capacity of 8.3 MMTPA.

HPCL also owns and operates the largest Lube Refinery in the country producing Lube Base Oils of international standards, with a capacity of 335 TMT and group - II lubes of 227 TMT. This Lube Refinery accounts for over 40% of the India's total Lube Base Oil production.



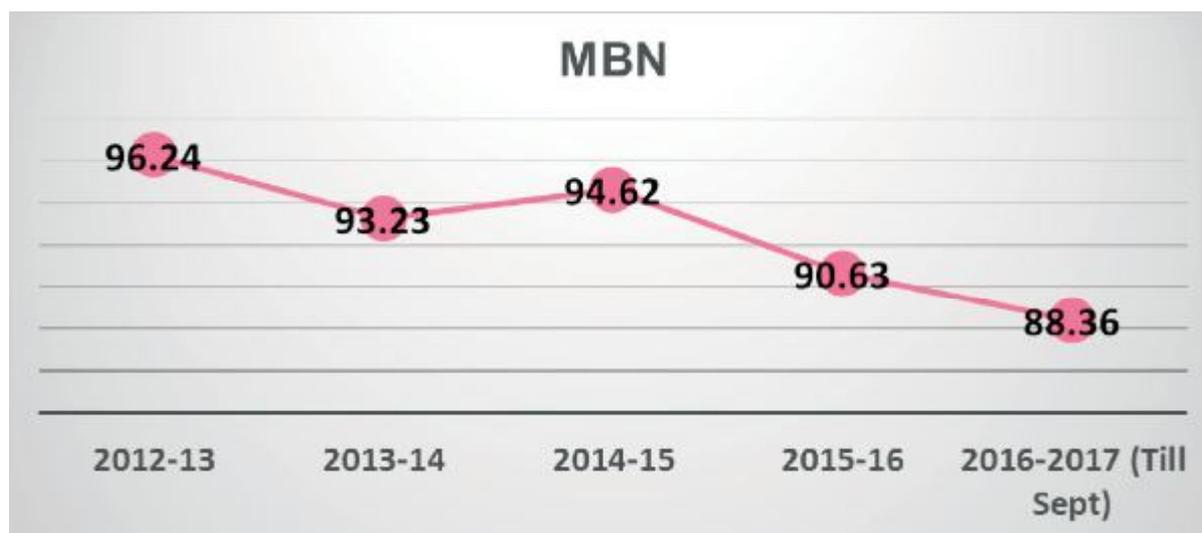
Energy Conservation Activities

A large variety of opportunities exist within the Refinery to reduce energy consumption while maintaining or enhancing the productivity of the plant. Study conducted by M/s Solomon Associates in 2010, 2012 and 2014 demonstrated the existence of a substantial potential for energy efficiency improvement.

Basis the gap analysis, areas for energy efficiency improvement were identified ,such as utilities, fired heaters, process optimization, shaft energy, steam from waste heat and others. Various initiatives are implemented by Technical and other sections of the refinery for conserving energy in these areas which have resulted in lesser fuel consumption.

Following is the trend of the specific fuel consumption of HPCL - MR for the past 4 years which clearly indicates the improvement with respect to energy consumption.

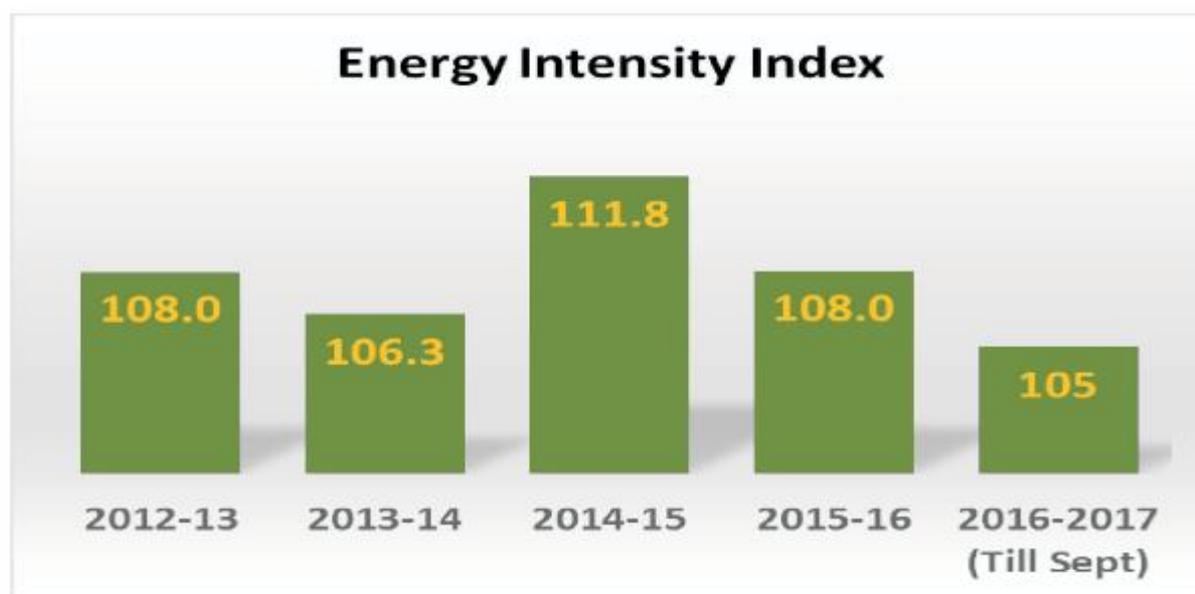
MBN: MMBTU/BBL/NRGF (Million British Thermal Units/Barrel/Energy Factor)



Mumbai Refinery accords highest priority to energy conservation as it is the most economical solution for energy production and is a more environmentally friendly alternative to increased energy production. HPCL Mumbai refinery has taken proactive role in the area of energy conservation and MR has achieved significant improvement in the area of energy conservation by continuously practicing the energy conservation techniques and implementing energy conservation projects.

Energy Index:

The trend of energy intensity index (Solomon Associates) for last 4 years is indicated below:



Projects Implemented:

Sr. No.	ENCON Projects/Scheme implemented in FY 2015-2016
a.	Offline furnace cleaning of FRE APS/VPS was carried out during T/A in May and online chemical cleaning of FR-VPS/ FRE-VPS/LR VPS / SEU-II / SEU-III in December.
b.	Moisture separators were installed in FRE-APS stripper (3 nos.) to improve quality the of steam.
c.	Under steam trap management 3420 traps out of 12069 traps were rectified. Steam trap survey was carried out along with M/s Forbes Marshall under steam trap management program -Phase - I. The opportunity of annual shutdown was used to rectify certain traps which needed outage for its repairs and the progress of the activities was monitored in Phase -II (Rectification).
d.	Drain pockets (3nos) were installed in steam headers.
e.	All PSV and Control valve and bypass connected to flare were surveyed on a regular basis and passing valves were identified and rectified (about 105 number of PSV passing/ leaking). 9 cycles of leak survey for H2 rich network has also being carried out wherein about 63 leaks had been identified and rectified in the period.
f.	Air ingress survey in furnaces and air leak survey of air headers in the refinery was carried out . Identified power loss due to air leak which was informed to Operations/ Maint for arresting the leaks
g.	Insulation survey of steam headers in HGU, OFCCU (HP steam header), FR VPS MP steam header, DHT SRU and DHT LP steam header was carried out.

Sr. No.	ENCON Projects/Scheme implemented in FY 2015-2016
h.	Energy efficient TLV free float steam traps (2 nos) were installed in PDU unit of E-307 in area no 19.
i.	Better insulation material was identified and the same was taken up by Inspection department for changing the insulation (from conventional to Perlite) of steam lines (to start with) where insulations need improvement.
j.	The baseline MBN (for Perform, Achieve and Trade -PAT) was calculated on the basis of the refinery's historical performance. For this purpose, data for the most recent three years was collected from the refinery. Close Coordination with CHT and BEE for stream lining of the New MBN methodology in for the refinery.
k.	Thermography Insulation survey carried out for HGU unit
l.	Maximization of CCR in NFCCU feed
m.	Commissioning of Diesel Isotherming Unit which is energy efficient in operation as compared to DHT in terms of fuel , power and steam usage.