

UNIT PROFILE

Haldia Refinery is the fourth in the chain of eleven refineries owned and operated by Indian Oil Corporation Limited, the largest commercial enterprise in the country and the leading Indian company in the “Fortune Global 500” listing of the world’s largest corporations.

Haldia Refinery was commissioned in January 1975 with an initial crude processing capacity of 2.5 Million Tonnes per Annum (MMTPA); the capacity was progressively increased to a level of 3.6 MMTPA through low-cost debottlenecking and innovative technology. A new crude distillation unit with a capacity of 1.0 MMTPA was installed and commissioned in March, 1997 for processing of low Sulphur imported crude to generate low sulphur internal fuel oil for burning in process furnaces/ TPS boilers for reducing SO₂ emission; capacity of New Crude Distillation Unit was also progressively increased to a level of 2.4 MM TPA through low-cost debottlenecking. Thus, the total installed capacity of the refinery is currently 6.0 MMTPA. Apart from normal fuel distillates like, LPG, MS, ATF, SKO, HSD etc. Haldia Refinery also produces the high valued Russian Turbine fuel (RTF) for use in fighter plane (MIG) & Lube oil base stock (LOBS).

The Year 2007-08 was a noteworthy year in the Haldia Refinery’s journey to excellence. Despite the M&I Shutdown, Haldia Refinery achieved crude throughput of 5.715 MMT against the stretch target of 5.7 MMT, In a collective effort to improve energy efficiency, a new milestone was set by achieving the lowest ever energy consumption of 69.9 MBN (against stretched target of 70) surpassing the previous best of 72.1 MBN.

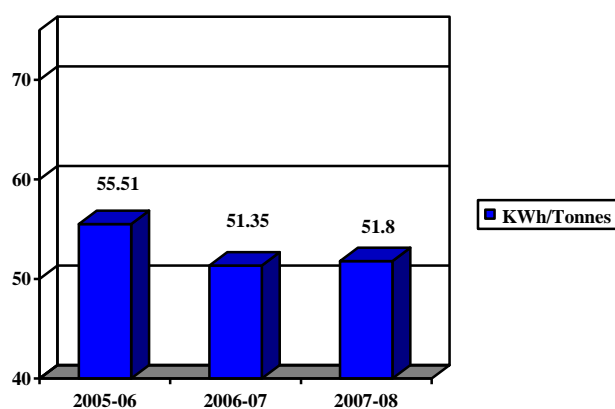


Energy Consumption.

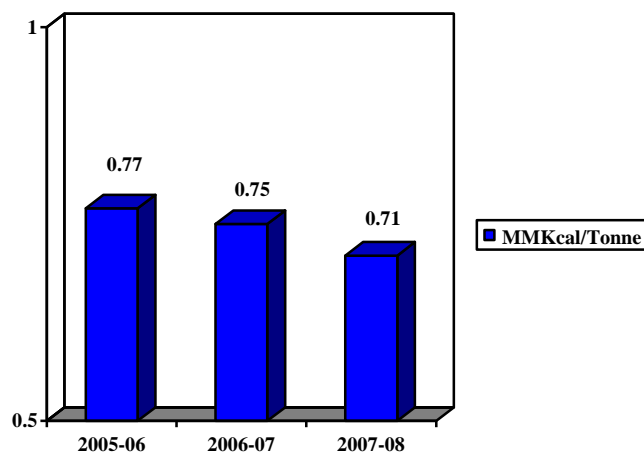
The Energy Scenario of Haldia Refinery in the past three years is given below:

DESCRIPTION	UNIT	2005 - 06	2006 - 07	2007-08
Annual Product Processing Rate	MMTPA	5.5	5.84	5.71
Total Electrical Energy Consumption / annum	Lakhs KWh	2767	2722	2690
Specific Energy Consumption - Electrical	KWh/Tonne	55.51	51.35	51.80
Total Thermal Energy Consumption/ annum	MMKcal	3863000	3968618	3701876
Specific Energy Consumption – Thermal	MMKcal/ Tonne	0.77	0.75	0.71
Total Manufacturing Cost	Rs. in Lakhs	1088019	1343816	1420145
Total Energy Cost	Rs. in Lakhs	65374	73508	79138
Energy Cost as %age of Total Manufacturing Cost.	%	6.01	5.47	5.57

Electrical



Thermal



Specific Energy Consumption Over 2005-2006

Energy Conservation Commitment, Policy and Setup

Haldia Refinery has always accorded top-most priority for energy conservation and a dedicated Energy Conservation and Technical Audit Cell has been set up in the Refinery right from the time of commissioning of the Refinery. This cell is headed by a Chief Technical Services Manager and includes Energy Manager and experienced chemical engineer for monitoring, reviewing the refinery operations and implementing energy conservation measures in the refinery.

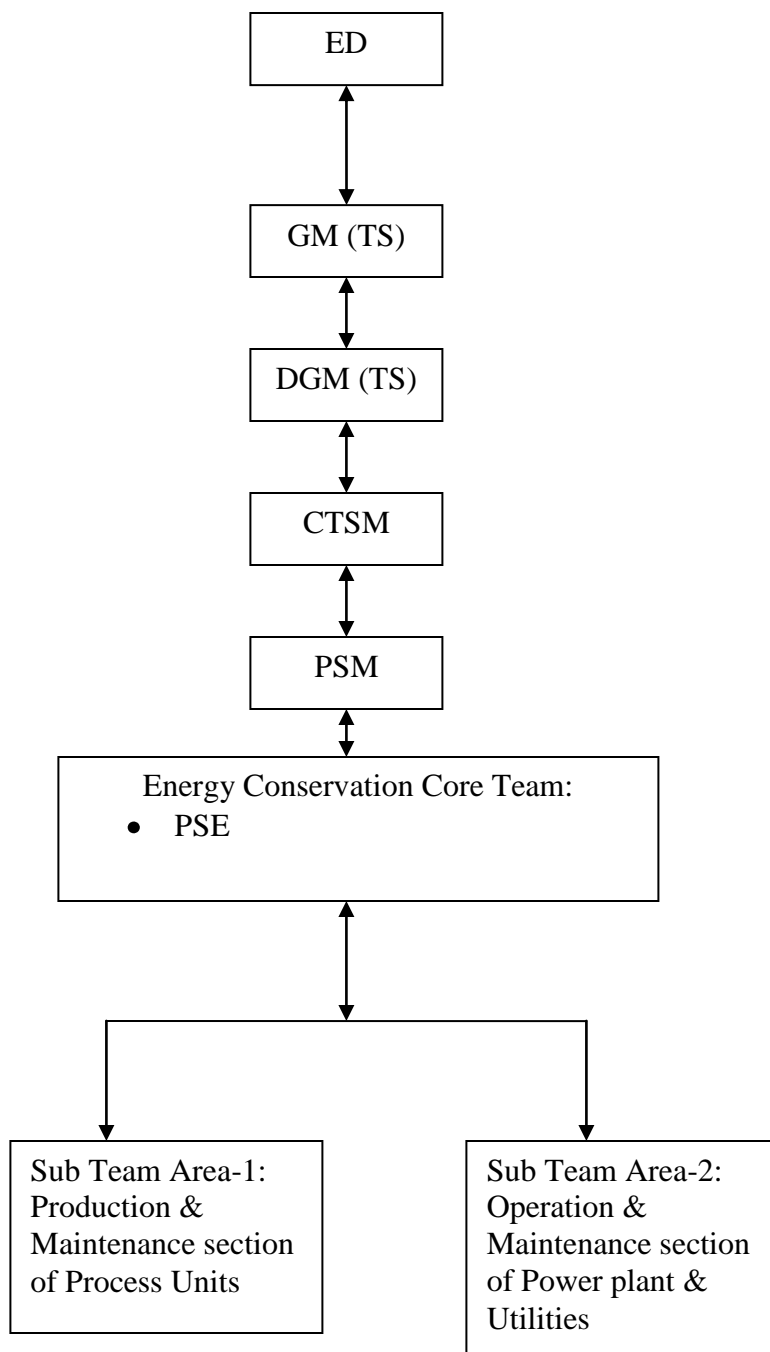
The engineers from Encon/TA cell review the energy consumption on a monthly basis. These are discussed monthly review meeting under the chairmanship of Executive Director.

Based on regular monitoring and periodical survey of the energy performance of the various process units, Thermal Power Station (TPS), heaters, heat exchangers etc., areas for further improvement in the energy efficiency are identified and are studied in details either through in-house efforts or external consultants. The outcome of these studies are discussed and reviewed with all the concerned departments before actually implementing the scheme.

Regular survey are carried out with regard to steam leaks, insulation effectiveness, HC loss survey (with Physical Acoustic Leak Detector, Fugitive Emission by GMI surveyors, product loading / despatch operations, energy balance etc. to identify potential areas of improvement.

Specialized studies are carried out through reputed process/energy consultants to compare the energy performance with the best practices adopted worldwide and new opportunities for energy conservation are explored/ identified. The outcome of these studies are reviewed and analyzed in details at various levels and energy conservation measures that are practicable / feasible are implemented at the earliest opportunity. Monthly energy performance of the Refinery vis-à-vis the targets are discussed in details in the Monthly Refinery Performance Review Meeting.

Energy Conservation Team Structure



Energy Conservation Achievements

Haldia Refinery has incorporated and implemented number of major energy conservation measures based on in house studies and studies by reputed external consultants. Some of major energy conservation schemes implemented during the recent past by the refinery are given below:

- o Installation of 20 MW Co-generation Gas Turbine along with Heat Recovery Steam Generator (HRSG) with additional auxiliary gas firing facility.
- o Reduction in Steam consumption of Main Air Blower in FCCU.
- o Calcium Silicate Insulation in MP/LP steam header - Phase-II.
- o Installation of high efficiency furnace in Lube Hydro-finishing unit.
- o MP Steam condensate recovery in FCCU (Naphtha Splitter Reboiler).
- o Condensate recovery from TG Condensate pumps seal flushing line.
- o Installation of Balance Pressure Thermostatic Traps (BPT) in copper tube steam tracing line.
- o Control valves related to flare upgraded to higher-class valves.
- o Provision of fuel gas firing facility in Furfural Extraction unit furnace.
- o Improvement of VDU-II furnace efficiency through in-house modification.
- o Sick wagon unloading facility.
- o Replacement of Motor driven pump with Turbo-driven.
- o Provision of Insulation for tanks in 700 tank farms.
- o Provision of High Efficiency and High Capacity Centrifugal Air Compressor.
- o Reduction of HRSG Stack temperature through Optimization of HRSG Deareator Operation.
- o Single FD fan operation in VDU-II.
- o Calcium Silicate insulation in MP & LP steam header - Phase – III.
- o Ceramic Fibre Insulation in VDU-I Furnace – 31-F-01.
- o Installation of Mechanical trap (Float type) in steam outlet line of Boiler IV Steam coil Air preheater.
- o Installation of Flash Vessel in 11E111 (CDU-I Add. Naphtha Stabilizer reboiler) condensate line to recover MP steam condensate (1.5 MT/hr).
- o Upgrading FG control valve from Type IV to Type V.
- o Pre-heat improvement in CDU-I & CDU-II.
- o Installation of high efficiency Centrifugal Air Compressor at TPS.
- o Ceramic Fibre Insulation in FEU Furnace.
- o Installation of Packinox Heat Exchanger in CRU.
- o Optimization of VDU-I ejector steam.
- o Pre-heat improvement in KHDS.
- o Heat Recovery from VDU-II Tempered Water
- o GT-1 IGV with Temperature Control
- o BFW Injection in MSQ hot condensate to minimize generation & venting of Flash Steam
- o Replacement of Boiler-4 APH & VBU Economizer coil
- o Ceramic insulation in VBU Heater
- o Ceramic insulation in PDA Heater
- o Installation of low excess air burner in PDA heater.
- o Installation of low excess air burner in VBU heater.

MAJOR ENCOM SCHEME Implemented in Haldia Refinery During 2007-08.

1. Efficiency Improvement of PDA Heater by installing low excess air burners.

Replacement of Eight (8) Oil Burners (40% Excess Air) with Low NOx Low Excess Air (With Oil: 20%) Burners were carried out during M&I shutdown in Oct'07 as a part of PDA heater efficiency improvement project.

Benefits Realized:

Savings in F.O : 240 SRFT/yr.
Financial Benefit : Rs. 53 Lakhs/annum.



New Low Excess Air Burners installed in PDA

2. Efficiency Improvement of VBU Heater by installing low excess air burners

Replacement of existing Sixteen (16) Combined Firing Oil & Gas Burners (40% Excess Air) with Low NOx Low Excess Air (With Oil: 20% & With Gas: 15%) Burners were carried out during M&I shutdown in Oct'07 to improve VBU heater efficiency from a level of **84.0% to 85.9%**.

Benefits Realized:

Savings of F.O. equivalent	:	320 SRFT/yr.
Financial Benefit	:	Rs. 70 Lakhs/annum.



New Low Excess Air Burners installed in VBU

3. Ceramic insulation in PDA Heater

Old castable refractory of PDA was replaced with Ceramic fibre insulation in Oct'07. This modification reduced the furnace wall temperature from average 105°C to 42°C. Due to reduction in furnace wall temperature, the radiation heat loss of the furnace reduced from the level of 0.28 MMKcal/hr to 0.02 MMKcal/hr.

Benefit Realized:

Reduction in Heat Loss	:	0.26 MMKcal/hr
Savings in IFO consumption	:	208 MT/annum
Financial Benefit	:	Rs. 46 Lakhs/annum



Ceramic Insulation inside PDA Furnace

Energy conservation Plan & Target

Refinery has time bound action plans to further bring down energy consumption and hydrocarbon loss from present level of operation. Some of the major schemes under implementation / planned are as under:

Sl. No	Description	Saving in SRFT/Yr	Savings (Rs. In Lakh)	Investment (Rs. In Lakhs)
1	Installation of GT-II & HRSG.	12000	2158	14000
2	Installation of Flare Gas Recovery System.	3240	583	934
3	RECYCLE GAS vs. Separator off-gas exchg. In lube HFU	350	63	13.2
4	Hot RCO to VDU-I & VDU –II	600	108	-
5	Preheat Improvement in VBU	150	27	20
6	Installation of GT-III with HRSG	5000	899	-
7	2nd Exchanger for further recover heat from tempered water of VDU-2	1687	303	-
8	Waste Heat recovery from KHDS furnace (23-F-01).	1113	200	374
9	Calcium Silicate Insulation in MP & LP Steam header of Offsite Area (Phase-IV).	559	101	363
10	Recovery of Vent Gas from VDU-II.	2400	432	162
11	Recycling of VDU-II overhead vapor to reduce stripping steam	2089	376	51.2
12	Recovery of hydrogen from bleed-gases by membrane separator.	-	49.29	30
13	Heat integration of VDU-I & PDA by heating asphalt mix stream with sr	-	45.5	30

Total investment planned vis-à-vis energy saving targets are given as under:

ENCON Projects	Investment in (Lakhs)	Energy Savings in FO mm KCal
Under implementation & future Projection	15952.20	274646

Environment and Safety

Haldia Refinery has always taken the lead to undertake environmental improvement programmed with respect to the liquid effluent, air emission and solid waste management. Haldia Refinery has well-established Environmental Management System certified under ISO-14001. An investment of around Rs. 750 Crore has been made by Haldia Refinery towards environmental improvement. Haldia Refinery received Golden Peacock Environment Management Award given by World Environment Foundation, New Delhi during the year 1999 & 2000 (runners-up) and Indo-German Greentech Award for 2001 for outstanding achievement in the field of Environment management. Haldia Refinery also received the prestigious "Millennium Business Award (2000) for Environmental Achievement" from International Chamber of Commerce, Paris.

Measures taken by Haldia Refinery to control Pollution

WWTP (Effluent Treatment Plant) – Augmented Capacity up to 790 M³/hr and modernized. Treated water reused as Make up in Cooling tower, Process area and as Fire Water make up. 5 nos. ambient air-monitoring stations and one continuous ambient air monitoring station are installed. HDPE lined pit for storing of residual sludge to prevent water & soil pollution. In addition to that an Incinerator has been installed.

Development of Green belt in and around refinery and Township.

Green Belt development has been a continual endeavour of Haldia Refinery. Year round plantation of tree had been carried out and saplings were distributed to township residents as well as surrounding locality. Haldia Refinery has scored an impressive Level 7 rating under the International Safety Rating System during the assessment audit conducted by M/S DNV during April 2005.

Haldia Refinery has also adopted the international standard on Occupational Health and Safety Assessment Series (OHSAS) in accordance with OHSAS-18001 and received the certification from M/s Det Norske Veritas, Netherland.

ENERGY MANAGEMENT POLICY

To be a World Class performer in energy management

By

- Adopting energy efficient and environment friendly technologies.
- Benchmarking our performance with the best in the world and endeavoring to be ahead.
- Promoting use of renewable sources of energy.
- Fostering a culture of participation and innovation amongst stakeholders for continual improvement in energy conservation.
- Propagating the message of avoiding wastage of energy to the community.



Indian Oil Corporation Limited.