

HINDUSTAN PETROLEUM CORPORATION LIMITED

i) Company Profile

Hindustan Petroleum Corporation Limited (HPCL) was formed after Government of India took over the ESSO group of companies in Bombay in 1974. Caltex operations in India including its Refinery at Visakhapatnam was also taken over by Government of India and amalgamated with HPCL in 1978.

The Refinery at Visakhapatnam was commissioned in 1957 with a capacity of 0.675 million TPA. The old crude unit was modernized and revamped to increase its capacity to 1.5 million TPA. In 1984-85, Refinery's crude processing capacity was increased to 4.5 MMTPA by adding 3 MMTPA crude unit along with matching secondary processing capacity. In the second phase of expansion additional 3 MMTPA refining capacity was added, bringing the total refining capacity to 7.5 MMTPA. It is planned to upgrade product quality to EURO II & III standards. "Clean Fuel Project" is already under implementation.

Along with increase in refining capacity, Visakh Refinery implemented various environmental projects to minimize its impact on environment. For example, Sulfur recovery unit for the desulfurisation of fuel gas were installed both to treat FG & off gases during Diesel hydrodesulfurisation to reduce SO₂ emission. A DHDS unit is installed for HSD desulfurisation, to meet the new reduced Sulphur specification of the HSD and will help in reducing SO₂ emission pollution. Refinery has got the ISO 14001 certification in May 2002 by implementing the Environmental Management System in the Refinery.

Visakh Refinery is manufacturing petroleum fuel products like LPG, Propylene, Naphtha, Motor Spirit (MS), Superior Kerosene Oil (SKO), Aviation Turbine Fuel (ATF), High Speed Diesel (HSD), Light Diesel Oil (LDO), Jute Batching Oil (JBO), Wash Oil (WO), Furnace Oil (FO), Low Sulfur Heavy Stock (LSHS) and Bitumen.

High capacity utilization with optimum yield and efficient energy uses is the operating philosophy of Visakh Refinery and to be Environment friendly is one of our main priorities.

Over the years, Visakh Refinery has improved its product slate to meet the demand for different fuel products viz. LPG, SKO and MS in the country. The production of these high value products though more energy intensive, yields higher netbacks and increases returns on energy consumed. Value addition per ton of crude has been continuously going up year after year.

SO₂ emission at VR has dropped from 23-24 tons per day in early eighties to 9 to 11.5 tons/day after the commissioning of sulfur recovery unit & management control.

ii) Energy consumption

The refinery consumes fuels viz. LSHS and Refinery gas in steam boilers and furnaces, Naphtha for captive power generation. In addition to captive power generation, the Refinery imports electricity from APSEB to meet their power requirements in case of emergency

iii) Energy conservation commitment, policy and set up

Owing to the steep rise in oil prices from the 1970's onwards oil industry took a hard look at their energy performance and stepped up their energy conservation efforts. Visakh Refinery while implementing energy conservation schemes was not guided only by economic compulsion but adopted energy conservation as part of its operating philosophy. As a result, energy conservation projects which were implemented were incorporating state of the art technologies. For example, while designing new units for the refinery expansion which was commissioned in 1985, the latest energy conservation strategies were adopted. Visakh Refinery was the **FIRST IN INDIA** to install glass tube Air Preheater in their furnaces while replacing crude unit furnaces in the old unit. Gradually the design efficiency of the fired equipment at Visakh Refinery has increased from 80% in early eighties to 90% by the end of eighties. In the second phase of expansion furnaces of 91% efficiency are being incorporated.

All the Furnaces in Refinery are provided with Air Preheater for better efficiency. Following are the photographs of typical furnace with APH:



Hydrogen Unit Reformer: (provided with Air Pre heater and steam drum which recovers heat from flue gases for air pre-heating and generation of High Pressure Steam.)



Crude Distillation Unit-II Vacuum Furnace with Air Pre-Heater:

Visakh Refinery has a Energy Conservation department headed by Sr. Manger-Technical. This Group is directly responsible to monitor and ensure efficient energy utilization in the refinery in coordination with Operations, Maintenance, Technical & Project departments.

iv) Energy conservation achievements

Visakh Refinery has implemented various energy conservation projects during 2006-2007:

- Improvement in furnace efficiencies subsequent to online chemical cleaning of furnaces. On line cleaning of total seven number of furnaces were carried out in Crude & Vacuum Distillation Units.
- Reduction in % opening of Steam Pressure Reducing Stations.

- Improved Specific Fuel consumption in Captive Power plant. The specific fuel consumption was reduced from 0.39 during 2005-2006 to 0.37 during 2006-2007.
- Improved service factor of New CO boiler on CO mode, thereby reducing fuel consumption in the boiler.
- Reduction in steam leaks by installation of MST 21 steam traps on Cu tracing lines Total steam leak was reduced from 7T/Hr during 2005-2006 to 4.6 T/Hr during 2006-2007.
- Reduction in compressed air leaks. Subsequent to identification of compressed air leaks by survey, arresting of leak was carried out.
- Increasing PFD vapourisation in CDU-II from ~14 % to ~19% by reducing the operating pressure. Increased vapourisation of crude in preflash drum has resulted in lower fuel firing in Atmospheric Furnace to heat the crude.

Visakh Refinery has been given a second prize in best improvement category of specific energy consumption by Centre of Higher Technology for the year 2006-2007.

Specific Energy Consumption of Refinery for 2006-07 was 87.9 MBTU/BBL/NRGF which is lowest ever achieved in the history of the Refinery.

v) Energy conservation plans and targets

To improve the energy performance further and to conserve energy, the following work is undertaken :

- ♦ A feasibility study to recover complete condensate from the Refinery and to improve the steam distribution management is in progress. It is planned to implement the recommendations of the feasibility study to recover the complete condensate in phases. Already a part of the facility in one unit is commissioned and job is in progress for three other units.
- ♦ Compressed air system audit carried out in the Refinery in order to identify the areas of energy consumption in the Refinery. New order for carrying out a fresh round of surveys is already placed.
- ♦ Periodic steam survey is carried out with internal and external expertise and recommendations implemented.
- ♦ A comprehensive utility Energy audit was conducted by M/s TUV South Asia Pvt Limited to identify areas of Energy Conservation in the system. Implementation of recommendation is in progress.
- ♦ A Hydrocarbon loss survey was conducted by M/s KBC Advanced Technologies UK, to identify areas to improve on the HC loss of Refinery. Implementation of the recommendation is in progress.

vi) Environment and Safety :

The company's commitment for Environment improvement and safety is of equal importance along with energy conservation. Visakh Refinery has always been committed to improvement of environment and has implemented various environmental improvement projects to minimize the effects of pollutants on the environment. It has also taken a keen interest in tree plantation activity.

Commitment to safety is another prime aspect of Visakh Refinery. Regular safety audits, monitoring and implementation of safe working practices are carried out in the Refinery. The Refinery is ISRS level 8 company.

Following table indicates various investments made for Environment Protection including abatement of pollution taken by Visakh Refinery:

Project	Approx. Project Cost (Rs. Lakhs)
Conversion of Turbines to Motors in phases	1,100
On-line Stack Monitors	300
Treatment of Tank bottom sludge	27
Water Recycle	336
Flare System	1,741
SRU-I & II	5,078
Cooling Water System	3,859
SWSU Augmentation	260
ETP's Revamp	615
Circulating Cooling Water System	3,859
Ex-situ Processing of accumulated sludge	1,230
Integrated Hazardous Solid Waste Management Plan	30
Vermicomposting of canteen food waste	8
Bioremediation Farm	22
Mecon Study and implementation for modification of surface drains	620
EIL Study on excessive oil ingress into ETPs.	3
Continuous Ambient Air Monitoring Stations	220
Agar probe in Desalter	68
DHDS/DHDS SRU to reduce fuel S	79,400
Auto samplers for ETP effluents	8.7
Clean Fuels Project for Euro-III/ BIS-II	216,000
Empty Drum Washing Facility	4
ISO14001 Certification	3
Oil Spill Response Plan	10
Routing of CDU- II Hot Well Off Gases to Furnace	35.5
Condensate Recovery System for CDU-I	20

Project	Approx. Project Cost (Rs. Lakhs)
Excess Oil Ingress	720
CAAMS	75.2
Online SPM Analyser	271.4

Under the refinery expansion project all major pollution control facilities have been augmented to take care of the extra load generated by the new units. Cooling tower and air fin coolers have been provided to reduce the net consumption of cooling water. The new units utilize the latest state-of-art technologies to minimize energy consumption and pollution generation.

To reduce sulphur content in diesel as stipulated by Ministry of Environment & Forest, Diesel Hydro De-Sulphurisation (DHDS) plant (installed at a cost of Rs. 794 crores) is operational.

Refinery is in the process of implementing Oil Spill Response Plan. National Institute of Oceanography, Goa has been engaged as the consultant for preparation of the Plan. The risk analysis part is completed. Refinery also entered into agreement with VPT for oil spill management. Oil catchers are installed in wharf area. Garlanding during ship loading/ unloading at wharf is in practice.

The refinery is also implementing clean fuels project, along with installation of FGDs in the FCCUs, with an expenditure of about Rs. 1635 Crores to meet Euro-III norms for MS and Diesel.

The fourth surveillance external audit was completed after ISO 14001 certification.

Refinery allocates a high revenue expenditure to the tune of Rs. 20 crore as cost towards chemicals and other operating consumables/ study/ testing expenditure over and above maintenance/ energy expenditure of environmental facilities.

Empty drum washing facility has been developed with in-house expertise and all the accumulated 200 lit. capacity empty chemical and oil drums (about 6000) were washed. A system is put in place for labelling, collection, washing and dispatching the empty drums. About 800 empty washed drums were sold to APPCB authorised recycler in the year 2005-06. Action has been initiated for disposal of other washed empty drums.

The Refinery has formed a separate Instrumentations group for maintaining of online stack analysers.

DeSOx additive is being used in the Refinery to bring down SOx emission from Regenerator flue gases in Fluidised Catalytic Cracking Units.