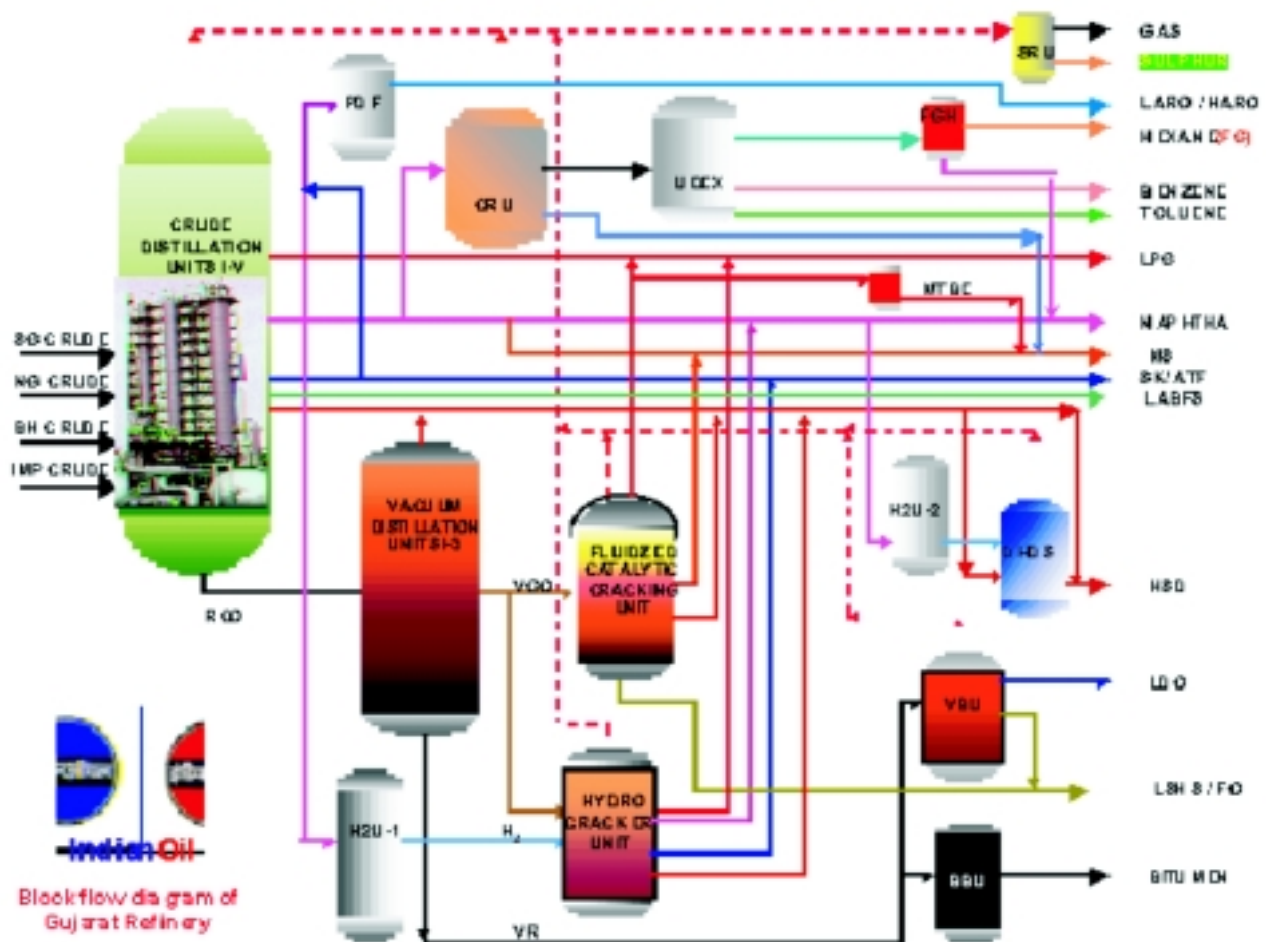


## GUJARAT REFINERY - INDIAN OIL CORPORATION LIMITED Vadodara (Gujarat)

### Unit Profile

The largest Public Sector Refinery of the country, located at Vadodara, Gujarat, is the biggest and most energy efficient Refinery of Indian Oil Corporation Limited. The first Prime Minister of India, Pandit Jawaharlal Nehru laid the foundation stone of this Refinery on 10<sup>th</sup> May, 1963.

The present installed capacity of the refinery is 13.7 MMTPA and process both indigenous as well as Imported crude oil. In the year 2003-04, the Refinery achieved highest ever crude throughput of 12.7million tonnes. The typical block flow diagram indicating various process units & the products is given below :



## Energy Consumption

The energy consumption at Gujarat Refinery is monitored on daily basis and optimization of consumption is an ongoing activity. Energy consumption is always focused as a key parameter of its overall strategy for remaining globally competitive by maintaining lower energy cost.

These helped Gujarat Refinery to bring down the energy consumption level from 110.4 MBTU/BBL/NRGF in 1999-00 to **101.4 MBTU/BBL/NRGF in the year 2003-04.**

Reduction in energy consumption for last 3 years is given below.

Year	Crude Throughput, MMTPA	Sp. Energy MBN	Fuel consumption % on Crude	Thermal Energy consumed per unit production Million Kcal / tonne of product
2001-02	11.7	105.6	6.54	0.4823
2002-03	12.4	104	6.51	0.4786
2003-04	12.7	101.4	6.27	0.4563



Country's largest LAB (petrochemical) plant with biggest HOT OIL furnace commissioned successfully in record times.



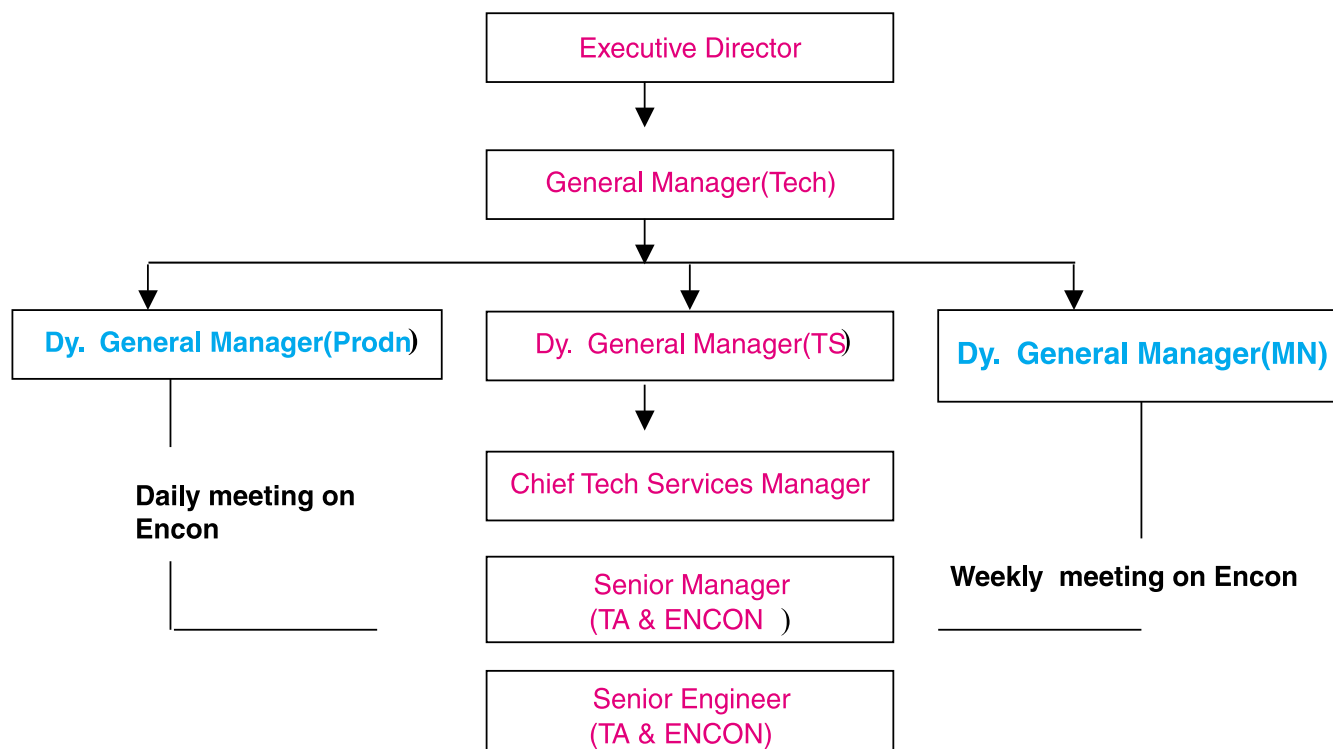
VAM (VAPOUR ABSORBTION MACHINE) INSTALLED AS AN ENERGY CONSERVATION MEASURE ,  
POWER SAVED : 940 KW /YEAR



HIGH EMISSIVE CERAMIC COATING APPLIED ON THE REFRACTORY OF  
AU1 FURNACE FOR REDUCTION OF ENERGY CONSUMPTION

## Energy Conservation Commitment, Policy and Set Up

Gujarat Refinery is concerned about Energy conservation at design and operating stages. Right from the beginning a dedicated Technical Audit Cell was formed in 1971 to over-view the energy consumption activities and control of the same. Besides the above, Energy Conservation Cell under Senior Manager was constituted in 1990 to act as a focal point for energy conservation activities.



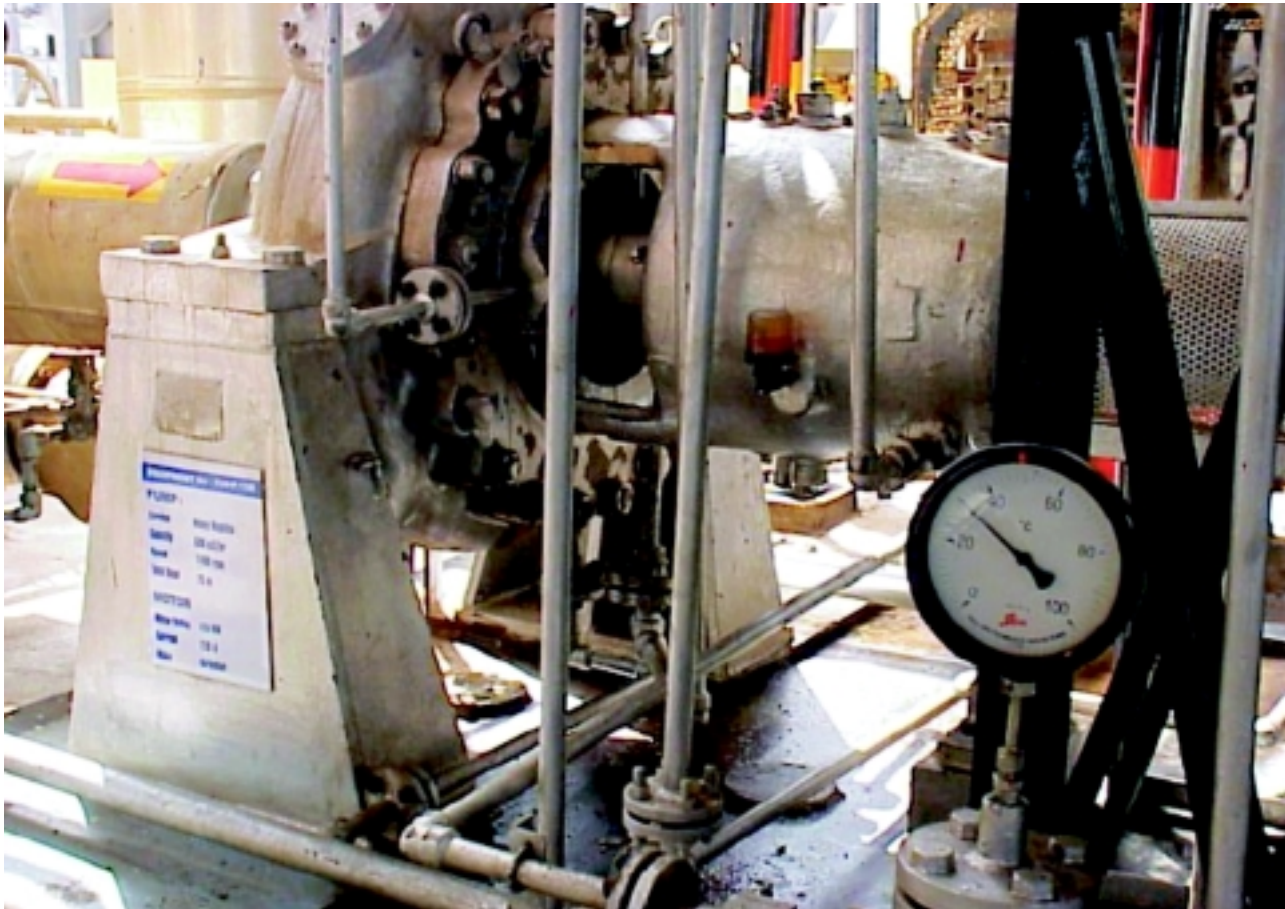
There is total involvement and commitment of top management with regards to energy conservation and formal monthly reviews of Energy performance are done where the Executive Director chairs the meeting and the same is attended by all Head of Departments, Deputy General Managers and General Managers.

Groups of Operating, Maintenance and Process contact personnel of various processing units work in cohesion under the leadership of respective managers for optimising the energy consumption in day to day operation. Energy conservation group of Technical services department monitors the energy consumption and in turn work with the co-ordinator of operating group. In addition to this, Weekly meetings are held in Refinery Shift Manager's (RSM) Office, wherein the areas that needs optimisation and loss control is reviewed and action plan drawn for immediate rectification. General Manager(T) of Refinery participates in these weekly RSM meetings and ensures acceleration in the ENCON efforts put in by every individual department.



Solar light installed at Guest House  
To promote renewable source of energy.

TPM (Total productive maintenance ) system is one of the new concept in today's competitive scenario for optimisation of cost and increasing productivity. Gujarat refinery had launched this new system in Nov2003.



FCC, a critical plant was selected as model for TPM activities.

### **Energy Conservation Achievements**

The refinery has invested more than Rs.200 crores since mid eighties for its various energy conservation projects, which has paid rich dividends. The specific energy consumption figures in terms of MBTU/BBL/NRGF reduced from 128 in 1995-96 and the same to an all time low of 101.4 in 03-04. In recognition of its efforts towards energy conservation, the Ministry of Petroleum & Natural Gas had awarded the Trophy for Best performance in energy consumption award : special prize for consecutive two times (2003 & 2002) after receiving 1st Prize consecutively from 2000 onwards.

New innovative / technology up gradation in insulation system by using ceramic coating on refractory surface of furnace and achieved 3.7% of fuel saving.

VAM (Vapour absorption machine ) a new technology towards electrical power saving, was installed in 2003-04.

### **Energy Conservation Plans and Targets**

To improve the energy performance further, the following projects are under implementation/active consideration of the company.

- VDU furnace efficiency improvement by installing air preheater.
- Flare Gas recovery
- H2 recovery from off gas of CRU and CLPS off gas of HCU
- Fuel additive trial in TPS
- Refractory coating in other furnaces .
- On-line cleaning of Furnace to improve efficiency
- Installation of additional Coalescer in product line to reduce loss

With the implementation of above major and other miscellaneous projects, specific energy consumption of the refinery will be less than 100 MBTU/BBL/NRGFinn 2004-05.

### **Environment and Safety**

Gujarat Refinery is committed towards minimisation of consumption of resources ,minimisation of the waste production, creation of an environment conducive to increase efficiency and productivity.

Its commitment towards the environment is reflected in the fact that it has been complying with and excelling the statutory limits and norms of Pollution prevention and control.

Use of latest technology so as to conserve the natural resources and production of quality products with minimum adverse effect on ambient cover has been part of its vision & mission.

#### **WATER POLLUTION PREVENTION & CONTROL:**

Entire treated effluent is being recycled back for firewater and Cooling water make-up.

#### **AIR POLLUTION PREVENTION & CONTROL:**

Total SO2 emission from Gujarat Refinery always remains below the stipulated limit.

#### **SOLID WASTE MANAGEMENT(Bioremediation of oily sludge)**

The Energy and Resources Institute (TERI), New Delhi and IOCL, R&D Centre , Faridabad has developed

an entirely new method, using bioremediation technique for degradation of oily sludge. After extensive research work, TERi and IOCL, R&D center have developed a bacterial system known as "Oilivorous-S" to biodegrade oily sludge and sulfur containing hydrocarbons. leaving behind no harmful effects. The GR has successfully treated 1750 MT of oily sludge using bioremediation technique for degradation of oily sludge. Treatment of second lot of 1700 MT oily sludge is in progress



**OCCUPATIONAL HEALTH MONITORING:**

A full-fledged Occupational Health Centre has been set up in the refinery hospital.

**ISO - 14001 ACCREDITATION:**

Environmental Management `System at Gujarat Refinery is at par with international best. Gujarat Refinery became the first organization in the state of Gujarat to get the coveted ISO-14001 certification for Environmental Management.