

INDIAN PETROCHEMICALS CORPORATION LIMITED

(I) Company Profile:

Indian Petrochemicals Corporation Limited with management control by Reliance Petroinvest Co. and one of the Navratnas established in 1969 by Govt. of India is leading entity in corporate circles of India. IPCL's mutiprodukt portfolio includes Polymers, Synthetic Rubber, Synthetic Fibre & Fibre Intermediates, Solvents, Industrial Chemicals, Synthetic Resins, Engineering Plastics, Catalysts, Absorbents, and Wire & Cable Compounds. IPCL have manufacturing facility at three location, (a) Baroda in Gujarat, (b) Nagothane in Maharashtra, (C) Gandhar near Bharuch in Gujarat.

GANDAHR COMPLEX

The discovery of large reserves of oil and gas in the Gandhar region has given the region a fillip through a large-scale industrial development. Availability of raw materials like salt and access to a sea, besides hydrocarbon feed stock and good water sources in river Narmada offered favorable environment for growth of industries in the region.

A survey had estimated Oil and Gas reserve in the Gandhar basin at around 190 million tones out of which 73 million tones was said to be recoverable. This important discovery and abundance of salt in nearby places formed the basis for IPCL's venture to set up an integrated gas cracker and a chlor-alkali complex near Jageshwar village in Vagra taluka of Bharuch district of Gujarat.

Gandhar task force was constituted in 1989. Mr. Rajiv Gandhi, Prime Minister of India, laid the foundation stone for the complex on October 6, 1989. The final investment clearance was granted on March 26, 1992.

The special feature of this complex is that it has a fully integrated production of PVC starting from captive Chlorine and Ethylene with power drawn from a captive power plant. IPCL's entry as a producer of Caustic Soda, in synergy with fully integrated PVC plant, has provided an edge in the Caustic Soda and PVC business.

Infrastructure development was taken up in tandem with the development of the manufacturing facilities. Exploitation of waterfront for strategic advantage is a unique proposition for any commodity business that has large volumes to handle. A captive jet

to handle liquid hydrocarbons inclusive of those at cryogenic temperatures has been set up and commissioned in the estuary of Narmda at Jageshwar near Gandhar Complex. The jetty is about a quarter km long and the water channel is seven to eight meters deep. This facilitates berthing of ship upto 8,000 DWT. The jetty was commissioned on December, 2 1996, when the first ship carrying vinyl chloride arrived.

IPCL has also networked its manufacturing facilities at Dahej and Vadodara through three product pipelines. This has provided the opportunity to optimize capacity utilization at Vadodara and Gandhar and source feed stocks and other raw materials at competitive price from international sources. The major handicap of land locked locations has been overcome to a great extent in this way.

In the phase II, a gas cracker of 300,000 MTA of ethylene, 160,000 MTA of HDPE and 120,000 MTA of Ethylene Oxide/Glycol plants were built. The second phase plants have been commissioned during accounting year 1999-2000. The last set of plants of the II phase; gas cracker and C2/C3 separation unit were commissioned on February 10, 2000 (Vasant Panchmi). Flexibility to expand the cracker to 400,000 MTA of ethylene has also been built in during design stage. After addition of balancing equipment, this can also be raised further, to 500,000 MTA of ethylene.

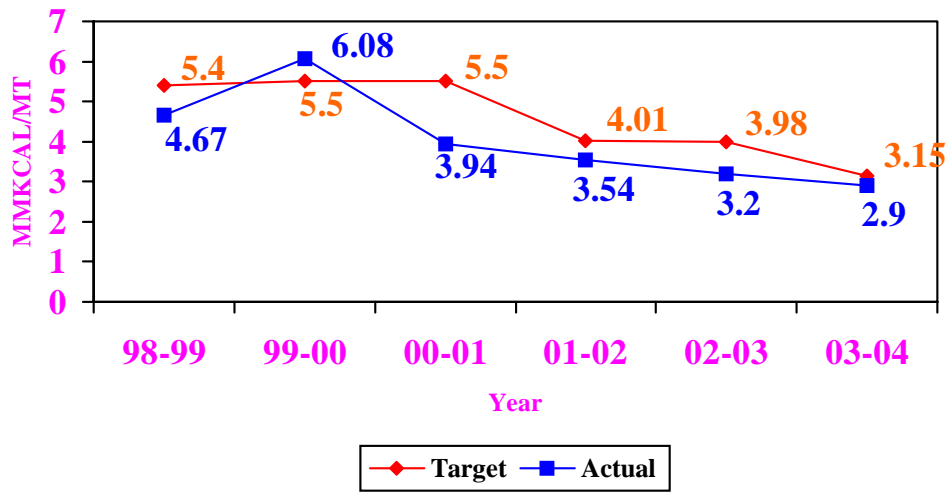
Ethylene Oxide/Glycol plant capacity has been expanded to 150,000 MTA in Nov. 03. Further capacity expansion work for CA, VCM, PVC, EO/EG and GCU plants are under progress.

(II) *Energy Consumption:*

Gandhar Complex energy consumption rate is approx. 43 Mt of Naphtha equivalent i.e.443 MMKCAL per hour.72 % of the total energy is purchased energy and balance 28 % energy is met through fuel gas and Mixed Oil generated in process internally. Please find the in the page trend of energy consumption of Gandhar complex for the period of 98 - 99 to 2003-04.

Energy Cost as a Percentage of Manufacturing cost comes to Approx. 28.63

Energy Index Trend Of IPCL Gandhar Complex



(iv) ENERGY CONSERVATION ACHIEVEMENTS

Specific energy consumption for the period under review registered a decline of

18.08 % from 3.54 MMKCAL / MT in 2001-02 to 2.9 MMKCAL / MT in 2003-04. Salient details of achievements in last three accounting years are as follows:

- * Re grouping of transformers could isolate 2 NO. of transformer.
- * Maximization of steam generation by Auxiliary firing through HRSG's which is most efficient and economical route for steam generation.
- * Reduction in voltage setting of lighting transformer from 240-205 V to 220-230 V. This reduce the power consumption by 1.7 MWH per day.
- * Installation of additional P.F. Improvement capacitors at Angareshwar pump house and SOP for operating pump during off peak period. This resulted in Annual saving of Rs. 9.0 Lakhs per Annum in GEB bill
- * Utilization of GCU Off Gas in CPP utility boilers. Commissioned in April 2001. Annual saving is Rs. 2400 Lakhs
- * Utilization of GCU Off Gas in CPP HRSG-1. Commissioned in May 2002 . Annual Saving is Rs. 2400 Lakhs
- * Utilization of Mixed Oil from GCU in CPP utility boilers. Commissioned in May 2002. Annual Saving is Rs. 806 Lakhs.
- * Utilization of Hydrogen from CA plant as Fuel. Commissioned in October 2002. Annual saving is Rs. 80 Lakhs
- * Reduction in GEB contract demand from 50 MVA to 35 MVA in year 2002. Annual saving in GEB bill is 240 Lakhs.
- * Reduction in GEB contract demand from 35 MVA to 30 MVA in year 2003. Annual saving in GEB bill is 104 Lakhs.
- * Operation guide line for steam generating equipment was implemented. a) maximize steam generation from HRSG-1 b) Maximize steam generation from CPP-1 boilers using internal fuel. Reduction in 8000 MTA of costly Naphtha consumption .
- * Scheme for Recovery of CBD/IBD and CW used for their cooling. Commissioned in Dec. 2003. Annual saving is Rs. 30 Lakhs.

- * Optimization of Cooling water flow to PVC polymer reactor. Flow reduced in each poly reactor from 500 to 350 M3/Hr. Total CW circulation reduction is 900 M3/Hr. Implemented in 2003. Annual power saving is Rs. 61 Lakhs.
- * Modification of GCU plant internal CW header and coating of CW pumps. Annual power saving is Rs. 72 Lakhs.

(v) ENERGY CONSERVATION PLANS AND TARGETS

The company has set quantitative objectives of 2.0 % overall reduction in energy usage every year during the Ninth Plan period, so as to effect reduction in purchased energy bill.

Future plans for energy conservation are as under :

- * Utilization of 3000 Nm³/Hr of hydrogen from CA plant as fuel. CAPEX is under implementation. Approx. cost is Rs.810 Lakhs. Annual saving is Rs. 735 Lakhs.
- * Utilization of 10 Mt/Hr of LMP steam from CPP-2 for PVC DBN. Scheme under implementation. Approx. cost Rs. 971 Lakhs. Annual saving is Rs.767 Lakhs.
- * Installation of low pressure CW pumps for PVC DBN requirement. Scheme under implementation. Annual saving in pumping cost is Rs. 41 Lakhs.
- * Installation of low pressure Air compressor for CA plant air requirement. Scheme under implementation. Annual saving is 43.2 Lakhs.
- * Modification to utilize Gas in LM 6K GTs and HRSGs in CPP-II. Approx. cost Rs. 3000 Lakhs. The annual saving is 16667 Lakhs.



Cooling water pump impeller with Pitting. These impellers were coated with Belzona to improve the pump efficiency. Which resulted in 20% power saving

(v) ENVIRONMENT AND SAFETY

a) Environment Conservation :

Gandhar Complex was developed incorporating also the findings of various environmental studies carried out in-and-around the site. The management of liquid effluent, air emissions, and solid wastes, etc. are integrated with operations of petrochemicals plants and various offsites & utilities. It has incinerator for hazardous wastes of VCM plant, Secured Landfill Facility for solid wastes, Centralized ETP, Effluent Disposal Pipe Line to sea, Air Pollution Control systems with stacks, Flare of 100 m height, Green Belt, Employment of Project Affected Persons, Socio-economic Upliftment Programmes for neighbouring villagers, etc. Various

modifications programmes are implemented in the complex for 'recycle / reuse / conservation / reduction' of raw materials/chemicals, natural resources (water, steam, fuel/power, etc.); and many scheme are in pipeline. The complex is going for Integrated Management System including ISO-14001 also. Environment award received during last three years are :-

- 2001–2003 :- “Good Housekeeping Award” (runner up) by Baroda Productivity Council among Petrochemicals Industries in Gujarat.
- 2002 :- The Chlor-Alkali Plant was awarded “5 leaves Award” under Green Rating Project (sponsored by UN & MoEF), and ranked 4th among 25 Chlor-alkali Industries in India.

b) Safety

IPCL's Gandhar Complex safety is well organised, established and planned for minimising losses caused by unexpected situations. Various SOPs and SMPs/rules and Safety Manuals for all plants are practised in the Company and necessary improvements/updation are also made.

Gandhar Complex is putting efforts to undergo safety audit - 5(Five) Star Rating by British Safety Council, UK and also marching to be an ISO/OHSAS certified company. Our efforts are to comply our commitment - HSE policy and quality policy to the full extent.



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ENERGY POLICY

1. MINIMISE USE OF ENERGY AND ITS PURCHASED COST BY CONTINUOUS MEASURING AND CONTROLLING THE ENERGY INDEX AND ITS COST.
2. PROMOTE ENERGY AWARENESS CULTURE IN THE ORGANISATION AND IMBIBE HABITS OF IMPROVED HOUSE KEEPING AND WASTE ELIMINATION.
3. CARRY OUT PERIODIC ENERGY AUDIT AND IMPLEMENT IDENTIFIED IMPROVEMENTS.
4. BENCHMARK CONTINUOUSLY OUR PERFORMANCE AGAINST THE BEST IN THE INDUSTRY.
5. MAKE BEST ENDEAVOUR FOR THE DEVELOPMENT AND USE OF RENEWABLE SOURCES OF ENERGY.

Ashok Chawla

ASHOK CHAWLA

CHAIRMAN & MANAGING DIRECTOR