

Indian Petrochemicals Corporation Limited (Baroda Complex)

Company Profile:

Indian Petrochemicals Corporation Limited with management control by Reliance Petroinvest Co. and one of the Navaratans established in 1969 by Govt. of India is a leading entity in Corporate circles of India. IPCL has formulated ambitious expansion plans and is currently considering upgrading and expansion of existing facilities. IPCL's multi-product portfolio includes Polymers, Synthetic Rubber, Synthetic Fibre & Fibre Intermediates, Solvents, Industrial Chemicals, Synthetic Resins, Engineering Plastics, Catalysts, Absorbents, Wire and Cable Compounds. Along with Baroda other two operating complexes are at Nagothane in Maharashtra and Gandhar near Bharuch.

Baroda Complex has several distinctions to its credit. Accredited for Best performance award among petrochemicals companies worldwide (CI London), FICCI Awards, ICMA Awards, National Energy Awards and several awards from National Safety Council, USA and British Safety Council, UK. Also ISO-9002 and ISO-14001 Certification for most of the plants of the Complex.

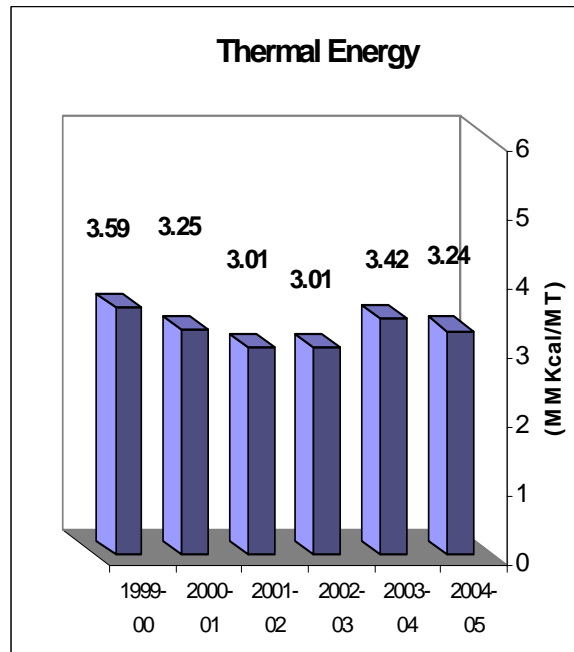
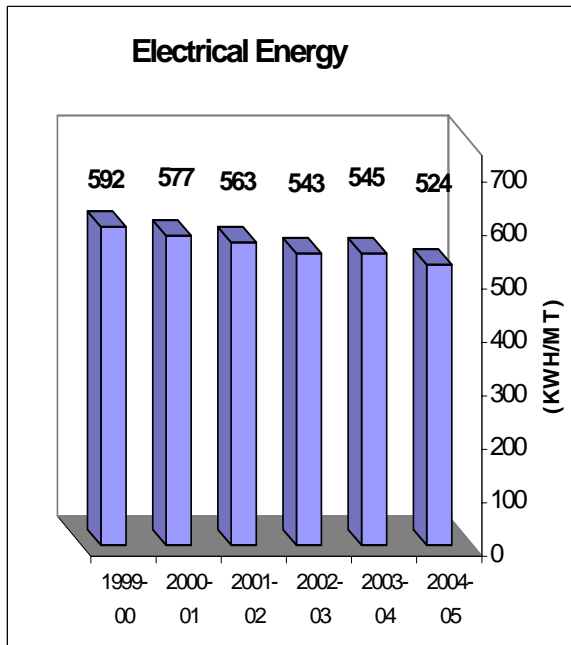
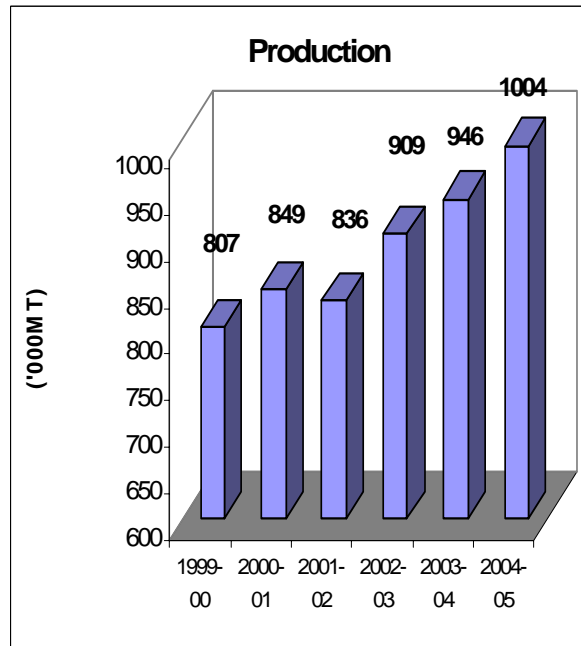
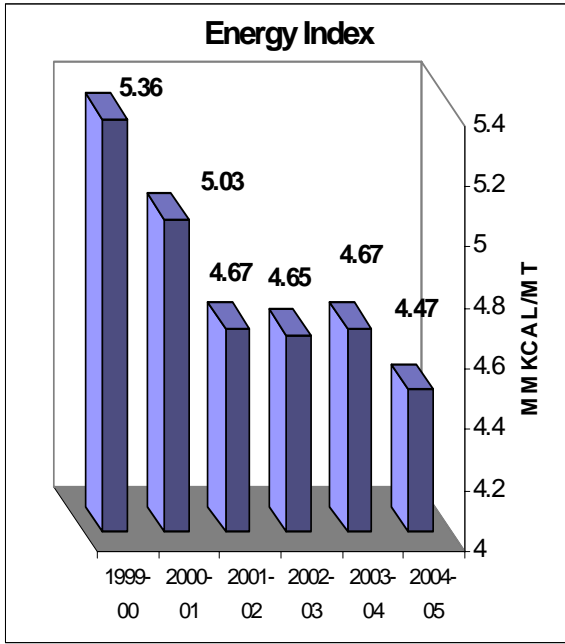
Energy Consumption:

Baroda Complex energy consumption rate is around 50 MT of fuel oil equivalent i.e. 500 Million KCal per hour. 70 % of total energy consumed is purchased energy and balance 30 % energy is met through fuel gas, CBFS and Mixed oil generated in the process internally and through various waste heat recovery and energy saving schemes implemented.

Specific Consumption Details :

Parameter	Unit	2002-03	2003-04	2004-05
Annual Production	MT	909024	946152	1004059
Overall Specific Energy Consumption	MMKcal/MT	4.65	4.67	4.47
Thermal Energy	MMKcal/MT	3.01	3.42	3.24
Electrical Energy	KWH / MT	543	545	524
Energy Cost as % of Mfg. Cost	%	16.34	15.21	13.84

Graphical Representation of Specific Energy Consumption:

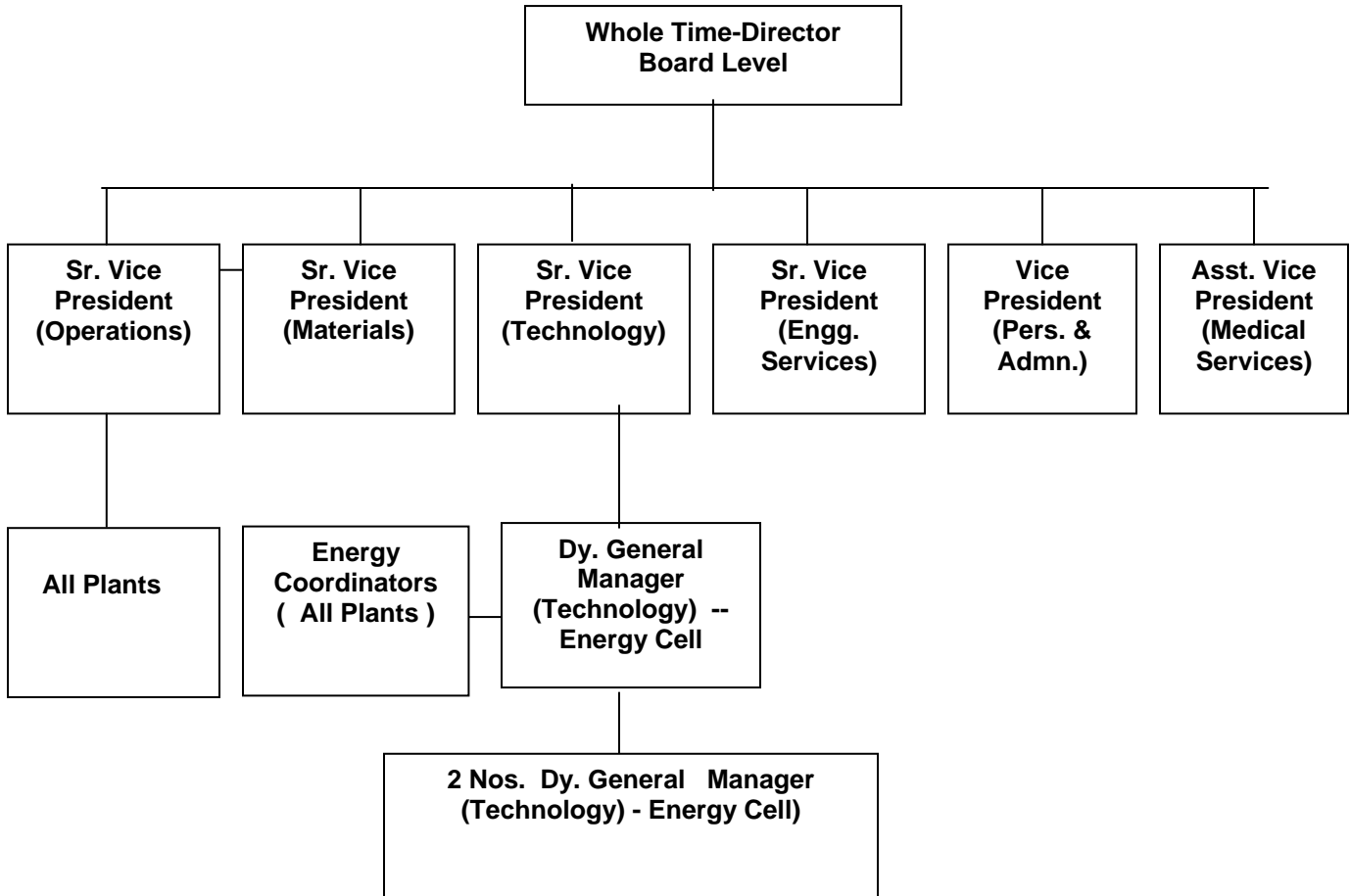


Energy Conservation Commitment, Policy and Setup:

Energy Conservation Cell set up at IPCL, Baroda was initiated quite early after commissioning and stabilisation of the Cracker and few downstream plants way back in 1982. Since, then the Cell has been playing a very vital role for the organization. The Cell is headed by Sr. Vice President (Technology) and assisted a team comprising of Dy. Gen. Mgr.(Techonogy) and two full time a Dy. Gen. Mgrs. for carrying out various activites of the Cell. The group works in tandem

with all the nominated Energy Coordinator of all the plants for Monitoring, Motivating and Implementation of the various schemes in the Complex. It is Committed to saving Energy every year to the tune of 2% every year through de-bottlenecking, technology upgradation, detailed audit studies by Experts and in-house, Optimising of Energy inputs by consuming plants and Utilities Generators and upkeep through better and proactive Maintenance practices. The Organogram of our Complex w.r.t Energy Conservation Cell is as under :

Organisation Structure:



Energy Conservation Achievements:

IPCL, Baroda has implemented various schemes big and small, some of them quite innovative and thereby had been successful every year in reducing the Specific Energy Consumption. The year 2004-05 had been quite successful on Energy front. Revenue Saving due to various measures carried out during the year is Rs. 2090 Lakhs. Major Energy Conservation Projects implemented during the 2004-05 are as under :

1. Installation of Low Pressure Fuel Gas system :

In Butadiene plant non-condensable with 100 ppm O₂ from a column was being diverted to flare for controlling the O₂ level. Modification was carried by diverting directly from the column the non-condensable stream at 2 MT/day in to the Pyrolysis gasoline plant fired heater burners directly. The scheme savings are :



Investment : **Rs. 0.40 Lakhs**
+Internal spares
Annual Saving : **7474 MMKCAL**
Estimated
Annual Saving : **Rs. 85 Lakhs**

2. Compressors Seal gas recovery :

The Seal oil contaminated with process gas known as 'Sour Oil' is drained to sour oil trap from where the gas is separated and vented to atmosphere at a safe height. Team of experts in-house from Technology and Operation Groups worked out an elaborate scheme of recycling the vent gas in to the compressor system. The scheme savings are :



Gas Recovery : **1360 MTA**
Investment : **Few Lakhs +**
Internal Spares
Annual Saving: **17149 MMKCAL**
Estimated
Annual Saving : **Rs. 254 Lakhs**

3. SRT Heaters Convection zone cleaning :

IPCL has developed Innovative method of cleaning of SRT heaters convection zone. On top of the convection zone there are 2 nos. of manholes which are opened and through each man hole a duct is laid connected to a separate vacuum blower. On the sides of the convection zone peeping openings are there. From here air lancers are introduced. Air at a pressure of 10 kg/cm² pressure is injected through air lancers and the dust is removed from top due to vacuum provided at the manhole. The scheme savings are :



Investment : **Rs. 0.40 Lakhs**
Annual Saving : **8186 MMKCAL**
Estimated Annual
Saving : **Rs. 65 Lakhs**

4. **Heat recovery from MP Condensate**

MP condensate having temp of about 180 °C is generated from DSG system. MP condensate at temp of 180 °C flows to shell side and cools down to 85 °C which is then sent to Utilities plant. On the other hand CPU outlet water gets preheated in the tube side from 45 °C to 84 °C. The Scheme savings are :



Investment : **Spares Exchanger + Internal Spares**

Annual Saving: **12846 MMKCAL**

Estimated Annual Saving : **Rs. 102 Lakhs**

5. **Reducing of Energy losses in Yard piping region :**

As part of the drive for improving the House keeping by reducing the Energy losses in Yard Piping Area, detailed survey was carried out in stages. The objective of the Survey was not only to identify but also to get all the leakages attended. The mission had been quite successful and Enormous Energy and Revenue Saving for the Complex was achieved. The scheme savings are :



Investment : **Rs. 55 Lakhs**

Annual Saving: **59698 MMKCal**

Estimated Annual Saving : **Rs. 474 Lakhs**

6. **Reduction of De-aerator steam pressure :**

This is an innovative scheme of IPCL and initiative taken based on careful monitoring. BHEL boilers in Utilities plant are designed to operate at 81 MT per hour capacity. They were designed to be operated with high flue gas temperature of 180 Deg. C at start of the run. This temperature goes upto as high as to around 210 oC at EOR conditions. The De-aerator drum pr. was decreased in steps to 1.5 Kg/cm² g by taking care of

1. Dissolved oxygen in the feed water
1. Sulphur Dew point condensation.

After taking care of the above considerations, the De-aerator drum pr. has been decreased to 1.5 Kg/cm²g & has resulted in the drop of feed water temperature to 120 Deg. C thereby resulting into drop of Flue gas temp of Boiler # 3 to 162 Deg. C, a drop of 18 Deg. C. The drop for the Boiler # 2, is from 210 to 190 Deg. C, drop of 20 Deg. C. Also, there is saving in De-aerator steam due to lower Boiler feed water temperature. The scheme savings are :



Investment : Nil
 Annual Saving: 20529 MMKCal
 Estimated Annual Saving : Rs. 163 Lakhs

7. Usage of Fuels - Waste streams and Cheaper alternative in Utility Boilers

In the last one year following new fuels & waste streams have been tried in Utility boilers by considering their merits and demerits :

Carbon Black Feed Stock- CBFS, Slop Oil- Waste stream from EQ, Jamnagar Fuel oil - JN_FO. Oritis - waste oil from LDPE plant

Successful trial of burning these fuels in BHEL Boilers were carried out alongwith the Operation group without jeopardizing any of the operation of the complex. The Scheme Savings are :

Estimated Annual Saving : **Rs. 907 Lakhs.**
 Investment : **NIL. Existing Pumps were used. Piping material for hook-up in the boiler area were arranged internally.**

Other Projects implemented during 2004-05 :

- 1) Reduction of Excess Air in EDC Cracker furnace of VCM plant
- 2) Epoxy coating of Cooling water pumps
- 3) Reduction in Refrigeration load of a Polybutadiene Rubber Plant.
- 4) Installation of Intelligent street lighting system.
- 5) Installation of Auto Lighting Transformers
- 6) Installation of High Lumen tube lights with louvertec reflector.
- 7) Various Steam related Savings

Energy Conservation Plan and Target

Planned Specific Energy Consumption Target for the year 2005-06 & 2006-07 are :

Year	Electrical*	Thermal*	Reduction over the year 2004-05	
	Kwh/MT	MMKCAL/MT	Electrical%	Thermal%
2004-05 (Base year)	524	3.24	-	-
2005-06	519	3.21	1	1
2006-07	514	3.18	2	2

The company has set quantitative objectives of 2.0 % overall reduction in energy usage every year. Major future plans for energy conservation are as under :

- a) Modification of SRT Heaters for installation of WHRB.
- b) Online water washing of Gas Turbine Machines.
- c) Automatic blowdown system for Aux. Boilers.

- d) Re-engineering of Steam and Condensate systems of a Polypropylene Co-polymer Plant.
- e) Revamp of Burner System of an Aux. Boiler.