

Reliance Industries Limited Patalganga

UNIT PROFILE

Patalganga (PG) division of Reliance Industries Limited is a leading manufacturer of petrochemicals and fiber intermediates. It is located on the banks of river Patalganga. The complex is well connected in terms of modes of transport i.e. by road (7 kms off the Mumbai-Pune highway), by sea (Near JNPT) and air (78 kms from Mumbai Airport).

This complex was conceived in 1980. Spreading over 200 acres, it forms half the entire industrial area of Patalganga. Various products manufactured at RIL-PG include PTA, PFY, PSF and LAB. The company exports large quantities of polyester fiber and AB.

The technologies for all the plants are provided by World's leading technology providers such as DuPont and UOP. The plants are efficient in specific consumptions and energy utilisation right from design stage.

The complex is self sufficient in terms of power and all other utilities. Patalganga complex has the following utilities section :

1. Two No of Gas Turbines with HRSG (Heat Recovery Steam Generator)
2. One Steam Turbo Generator.
3. Four No of Diesel Generator sets.
4. Three No of Auxiliary Boilers
5. Three No of Dow Heaters
6. Compressed Air System.
7. DM Water, Cooling water and Chilled Water System.
8. Integrated Effluent Treatment Plant with Effluent Recycle Unit.

Central library and Learning centre at the site help the employees to remain well informed about the latest developments and also help in enhancement of knowledge and skills. Other facilities at the site include well-equipped and well organised Fire and Safety departments, Information Technology department, an advanced telecommunication and full fledged medical facilities.

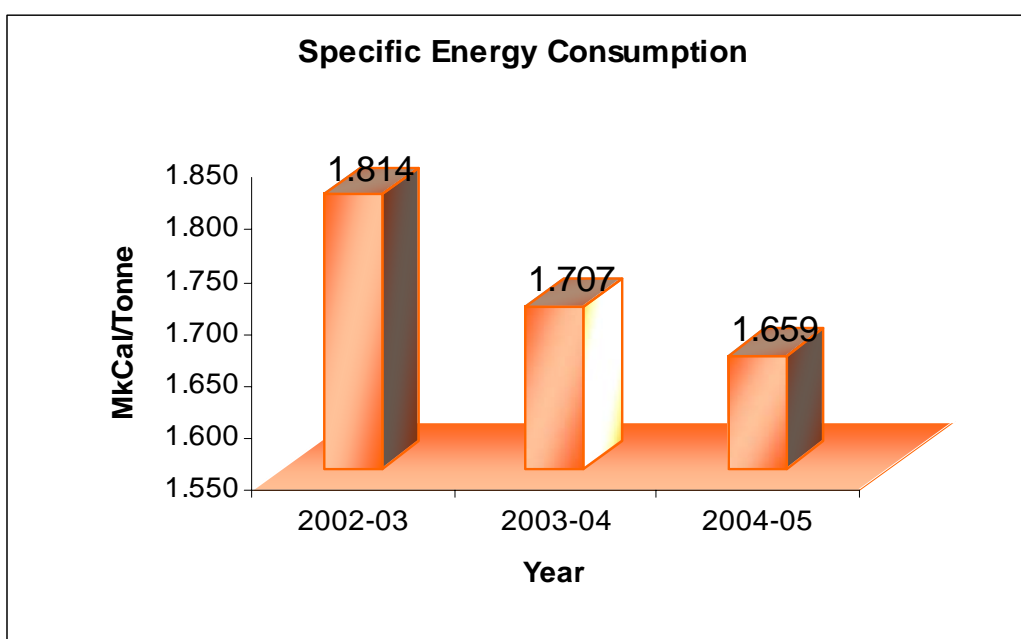
We are ISO-9001:2000, ISO-14001 and ISO-18000 certified.

ENERGY CONSUMPTION

The energy consumption at RIL Patalganga is monitored on regular basis and optimisation of consumption is an ongoing activity. The annual electrical and fuel energy consumption at Patalganga complex as given below shows a steadily decreasing trend owing to the efforts put in for energy conservation.

Year	Electrical energy consumed (In lakh kWh)	Thermal energy (In Mkal)	KWh/T product	Mkal/T product	Overall energy consumed Mkal/T of product
2002-03	4669	1226057	520.41	1.37	1.814
2003-04	4645	1140895	514.72	1.26	1.707
2004-05	4840	1165260	507.79	1.22	1.659

The reduction in specific energy consumption per MT of product over the last few years is evident from the chart below.



ENERGY CONSERVATION COMMITMENT, POLICY AND ORGANIZATIONAL SET UP

Reliance Industries Limited, Patalganga, is committed to Energy Conservation. Our energy conservation policy (given later in the text) defines our mission to be the lowest specific energy consumer in the industry we operate and to maximize the use of renewable and low energy fuels. Energy Conservation is always a key component in our overall strategy to remain globally competitive by maintaining lower energy costs.

RIL, Patalganga, concentrates on energy conservation both at design and operating stages. The plants at Patalganga are installed with technical collaboration with the world's most competitive technology providers. Energy conservation by heat integration and superior equipment design are achieved right at the stage of designing of these plants. In spite of best possible designs, we find opportunities for improvement in view of availability of new technology innovations. We are always conscious about energy consumption and at every stage of operation and while implementing a new project, energy conservation is given the

top most priority. For any new project, cost of energy is weighed against the cost of additional hardware. Based on our experience of the last decade, it is our firm belief that opportunities never cease to exist.

In order to put the message across to the employees even at the shopfloor level, we have an "Employee Suggestion Scheme" which encourages every employee to come forward with suggestions for improvement in a structured manner. A "Six Sigma" approach is employed to identify potential energy saving opportunities and implement them. A recent project where the operation of the Effluent Treatment Plant was improved and the Biogas generated was used in a fired heater is a good example of the Six Sigma approach. Over the years, the consumption of power, steam and fuel has been steadily brought down to below benchmark norms by dedicated continuous efforts towards implementation of effective energy conservation measures.



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ENERGY MANAGEMENT POLICY

Reliance plays a lead role in the national economy by providing quality goods and services in the materials and energy value chains and in infrastructure.

Our mission is

- ◆ **To be the lowest specific energy consumer in the industry we operate.**
- ◆ **To maximize the use of renewable fuels and low energy level fuels in our operations**

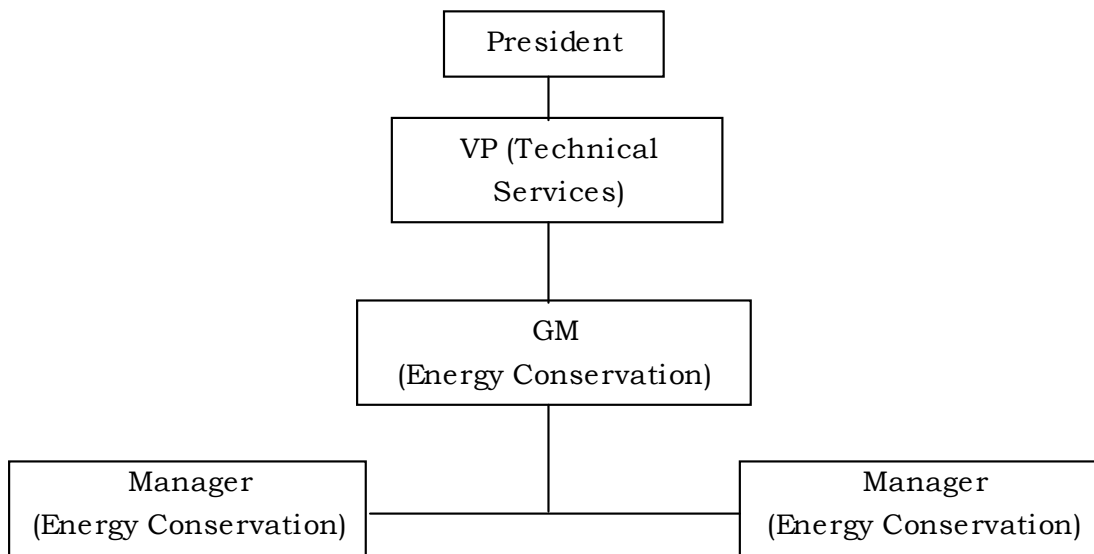
This we plan to achieve by the following:

- ◆ **Manage efficiently the utilization of energy resources, upgrade hardware and employ cleaner and more efficient technologies**
- ◆ **Train employees to make Reliance the pace setter in the area of energy conservation**
- ◆ **Carry out regular internal and external audits to identify areas for improvement**
- ◆ **Benchmark continuously our performance against the best in the world.**
- ◆ **Enrich our experience on energy conservation by exchange of ideas with other organizations.**
- ◆ **Promote awareness among all members of the large Reliance family.**


(Mukesh D. Ambani)

The Energy Conservation Cell consists of a Technical General Manager and two Technical Managers (organogram given below). Apart from the Energy Conservation Cell, we have

energy coordinators from each plant as well as representatives from the engineering and technical services who work in close coordination with core team.



The team monitors energy consumption of each plant on a daily basis. A consolidated monthly report is prepared by the Energy Conservation Cell which contains the energy consumption per ton of each product (Energy Index), energy consumption in terms of fuel, steam and power by each plant and the list of energy conservation projects. The team also carries out energy audits of plants at specified frequencies. The team is also responsible for converting energy conservation opportunities into proposals, and follow the proposals through the approval and implementation stages.

ENERGY CONSERVATION ACHIEVEMENTS

1. Upgradation of Effluent treatment system and use of biogas in PX heater.

Performance of Effluent Treatment Plant (Expanded Granular Sludge Blanket) was drastically improved using Six Sigma methodology and the Methane rich gas generated was used as fuel in the Paraxylene plant in the heater D-5001, for which a compressor along with accessories and moisture removal facility were installed. This resulted in reduction in consumption of black fuel in the heater. The investment incurred for the project is Rs.89 Lakhs and the savings achieved are Rs.161 Lakhs, resulting into Pay-back period of 8.3 months. Apart from the savings achieved, the reduction in consumption of black fuel in heater helps in cleaner environment.

2. Installation of variable speed screw compressor for LP air and optimization of LP air pressure.

Since the LP air demand varies considerably and to meet shortfalls, an additional compressor, consuming about 1050 kW was required to be run continuously, a variable output compressor, running in parallel with the existing compressors, was installed delivering to the same common header. This led to reduction in total power consumption of the compressors. The investment incurred for the project is Rs.161 Lakhs with the Pay-back period of 11.7 months. The actual savings achieved by this project - Rs.165 Lakhs/yr.

3. Inverter on two Cooling Tower fans at EC.

There are five fans in Energy Center Cooling Tower. All the fans were operated with fixed drive. As a result the loads on CT fans could not be varied based on seasonal

requirements. It was observed that the cooling demand was equivalent to load of 4.5 or 3.5 fans in winter. But as it was not practically possible to operate a fan at its half load in fixed drive the power consumption did not drop proportionately with cooling tower load. Variable Frequency Drive was implemented in three fans in Nov 2004 to overcome this problem. The speed of VFD controlled fans are varied based on cooling water outlet temperature. The investment in this project is Rs.6 Lakhs with the Pay-back period of just 7.2 months. The savings achieved by the project are Rs.10 Lakhs/yr.

4. Installation of VFD on FD fan of CP-6 dow heater 1.

Combustion air fan was fitted with inverter (speed control of motor) to control excess air. Power savings was achieved because of speed reduction of FD fan and fuel oil savings were also there on account of smooth control (in place of mechanical dampers) of O₂% in flue gas. The investment incurred in this project is Rs.4 Lakhs with the savings Rs.4.9 Lakhs/yr. resulting in a Pay-back period of 9.8 months.

5. Cooling water optimization in LAB plant resulting in stopping one of the two parallel running pumps.

Two cooling water pumps having 55 KW motor each, were running in parallel, consuming 110 KW. One motor was replaced from 55 KW to 90 KW, which resulted in running of only one pump instead of both. This is a zero investment project (since an existing spare motor was used) with the savings achieved Rs.3.85 Lakhs/yr.

6. Power cost optimization with import of MSEB power.

With revised MSEB tariff, there was a scope of reducing power cost with more power import during night (non-peak hours) at concessional rates. The same was implemented which resulted in substantial saving in power cost. This is a zero investment project with the savings achieved Rs. 230 Lakhs/yr.

7. Use of HRSG flue gases for ETP sludge dewatering and drying.

Presently the Effluent Treatment Process is generating biological sludge with 2% solids. A Belt Filter Press dries the sludge to about 15-17% solids and the sludge used to go for further drying. A Spin Flash Dryer, using waste gas from HRSG, was installed which led to increase in solids percentage to 96%. This saved the heat energy required for drying and also reduced the quantity of sludge to be handled. This project comes under waste heat recovery. The investment incurred in this project is Rs.146 Lakhs with the Pay-back of period of 72 months and the savings achieved are Rs.24 Lakhs/yr.

ENERGY CONSERVATION PLANS AND TARGETS

Energy Conservation Measures (Planned)	Anticipated savings in		Approx. investment (Rs.lakhs)	Project Commencement & Completion year
	Energy Value MkCal/yr	Rs. Lakhs (per year)		
Use of Natural Gas in place of Liquid Fuels at PG	1761219	19500	4330	2006-07
Gas Turbine Inlet Air Chilling.	99441	1101	991	2006-07
Installation of Helixchanger for Platformer Unit.	58978	653	650	2006-07
Installation of APC in LAB plant	34141	378	--	2005-06
LAB Front End APH Redesign	4064	45	56	2006-07
Upgradation of Kerosene feed pump	181	2	5	2005-06
Installation of Front End light end stripper feed bottoms exchanger	90	1	1	2005-06
Power recovery from 100 Bar to 44 Bar steam	TBE	TBE	TBE	2005-06
Reduction in power consumption in liquid Dow heater system.	TBE	TBE	TBE	2005-06
Solar water heating for PG and Lodhivali	TBE	TBE	TBE	2005-06

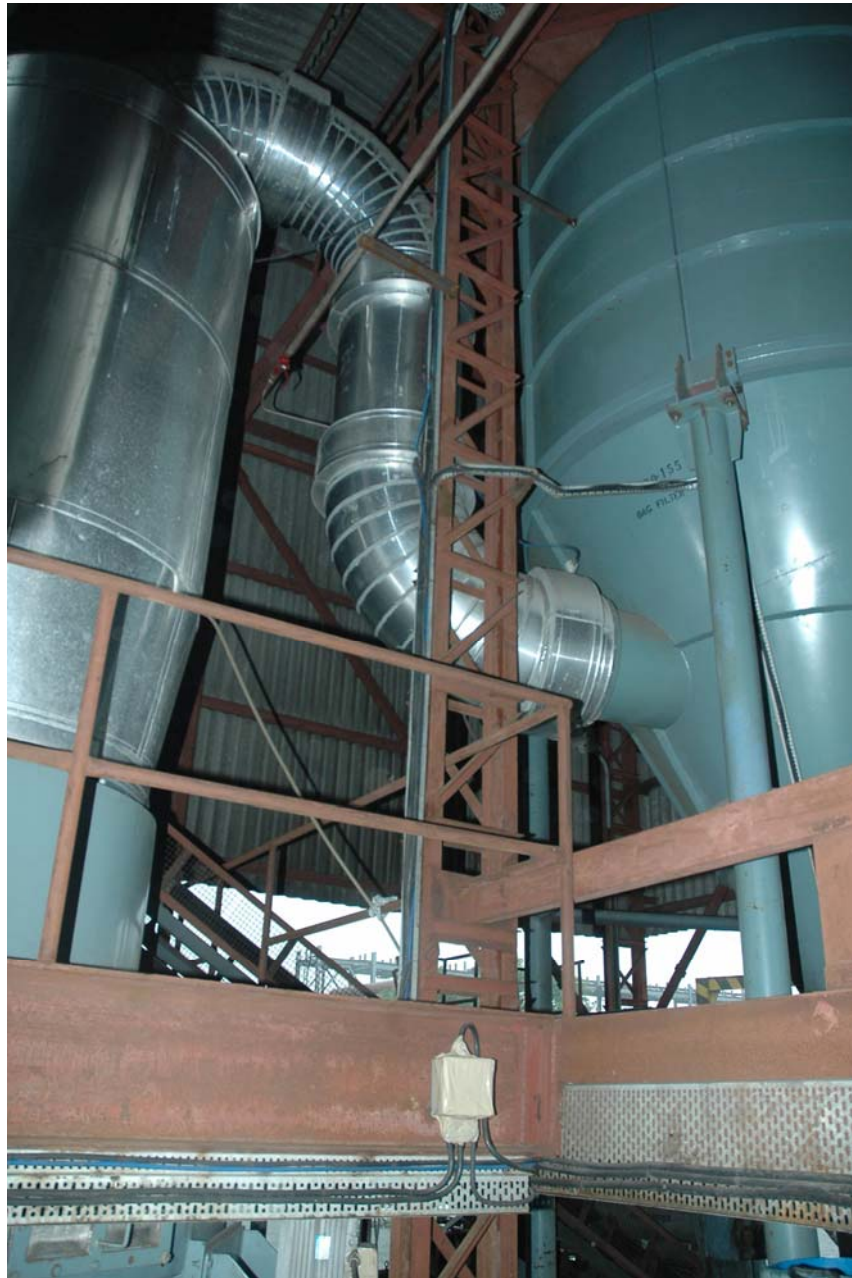
TBE – To be estimated.

PHOTOGRAPHS

- BioGas Compressor used in PX Plant Heaters.
- Variable Speed Screw Compressor for LP Air.
- VFD for FD Fan in CP-6 Dow Heater.
- Using HRSG Flue Gases for ETP Dewatering and Drying.



BioGas Compressor used in PX Plant Heaters



Using HRSG Flue Gases for ETP Sludge Dewatering and Drying



Variable speed Screw Compressor for LP Air



VFD for FD Fan in CP – 6 dow Heater