

**ASIAN PAINTS LIMITED**  
**PENTA DIVISION, CUDDALORE (TAMIL NADU)**

**UNIT PROFILE**

- Asian Paints Limited is an Indian Multi-national having operations in more than 23 countries around the world. It has 5 Paint manufacturing units and 2 Chemical divisions in India. Penta Division is one of the chemical division of Asian Paints Limited located at Sipcot Industrial Complex, Cuddalore – 607 005. As a backward integration APL set up this unit in 1984 as joint venture along with Tamil Nadu Industrial Development Corporation (TIDCO). From 1994 onwards this unit has become a division of Asian Paints Limited.
- Penta Division manufactures
  - a) various grades of Pentaerythritol used in manufacture of Alkyd resin, Pentaerythritol Tetra Nitrate (PETN), PVC Stabilizers, Plasticizers etc.
  - b) Sodium Formate as by-product and is supplied to chemical manufacturers and leather tanneries.
  - c) Formaldehyde and the same is captively consumed .

**ENERGY MANAGEMENT POLICY**

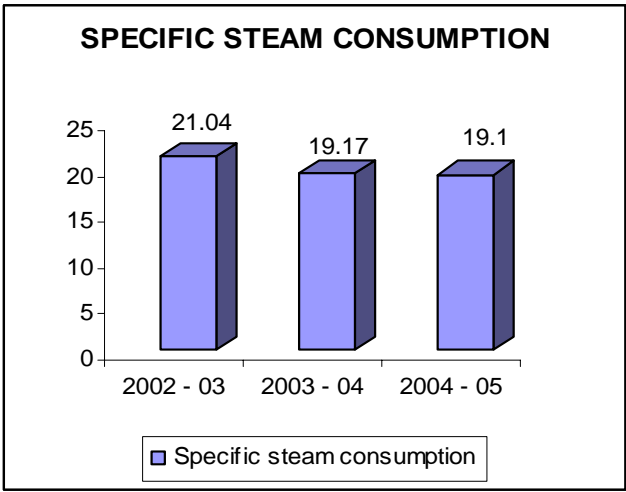
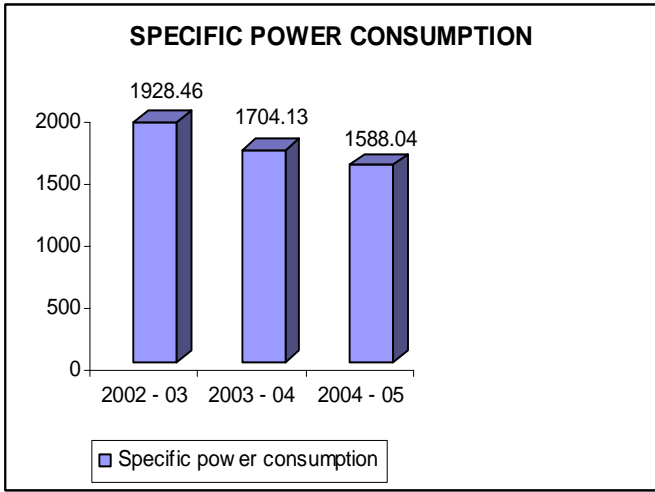
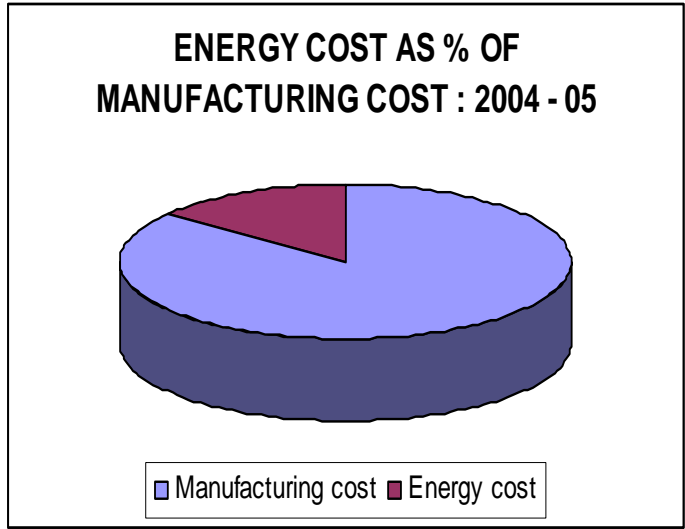
We are committed to minimize the specific energy consumption for our products on a continuous basis through

- Implementing innovative energy conservation ideas & technology up gradation.
- Maximizing capacity utilization
- Establishing, monitoring and reviewing our systems & procedures to meet the objectives and targets.
- Training and motivating all our employees & contractors by Creating Awareness on the impact of energy cost on overall cost of manufacturing.

<b>SPECIFIC ENERGY CONSUMPTION DETAILS</b>	<b>UNIT</b>	<b>2002 - 03</b>	<b>2003 - 04</b>	<b>2004 - 05</b>
Annual Production	MT	3745	4235	4430
Total Thermal Energy Consumption	M Kcal	74.83	74.55	82.50
Total Manufacturing Cost	Rs. Lacs	222.25	240.60	362.99
Energy cost as % of Manufacturing cost	%	24.21	20.57	16.79
Specific power consumption	KWH/MT	1928	1704	1588
Specific Steam Consumption	MT/PE	21.04	19.17	19.10

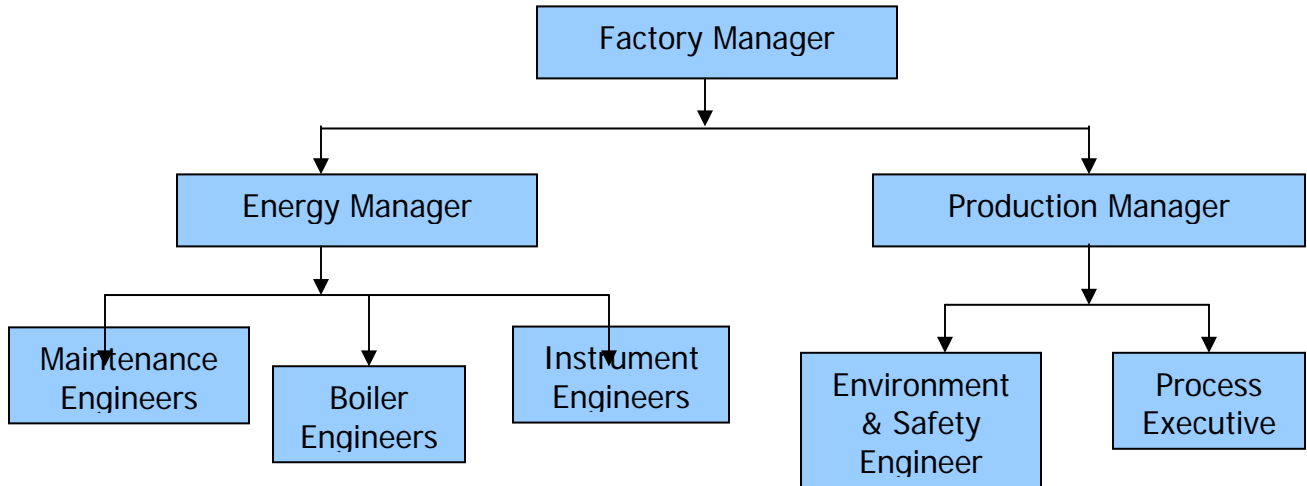
**ENERGY CONSERVATION ACHIEVEMENTS**

Penta Division has implemented various energy saving activities from the year 2000 onwards. Energy conservation activities carried out during 2004-05 is given below:



**ENERGY CONSERVATION CELL**

Penta Division has Energy Conservation Cell at Cuddalore headed by the Factory Manager, assisted by Energy Manager and supported by HODs of each department, Executives and Engineers. This team identifies energy saving potential in the respective departments, brings the proposals for finalizing action plants to implement the same. The unit gives importance in creating awareness among employees and contractors on energy conservation and thereby reducing the Specific Energy Consumption every year. Environment management system as per ISO 14001 is used as an effective tool for following up the implementation of energy conservation activities.



**ENERGY CONSERVATION PROJECTS CARRIED OUT DURING 2004 -05**

**1. Diversion of hot condensate for pre heating evaporator feed**

**Objective :**

To use the heat content available in hot condensate coming out of crystallizer tank for heating the evaporator feed material in the tank.

**Details:**

In Tech dissolver one of our process material is evaporated and crystallized and steam is used as the heating medium. The hot condensate thus formed will be transferred to the condensate tank. In another tank called T309, the feed material is stored and getting pre-heated by steam. By the new scheme the hot condensate from Tech dissolver is diverted to T309 for pre-heating and thus steam consumption is reduced.



Total Investment	:	Rs.0.65 Lacs.
Reduction in steam Consumption	:	216 MTs/year
Reduction in coal Consumption	:	33.2 MTs/year
Total cost saving	:	Rs. 0.95 lac/year.
Payback period	:	250 days



## 2. Homogenization of Double Effect Evaporator (DEE) feed

### Objective

To minimize boilouts taken in DEE and to that extent minimizing water ingress into system and thereby avoiding usage of steam.

### Details

Double Effect Evaporator is being fed with three process streams as feed. Due to variations in process parameters of three streams, the operating condition of the DEE varies with feed. This results in coating of the tubes of the evaporator with material, which is dissolved by boiling water for about 2 hrs. After boilout, the water with dissolved materials is transferred to one of the process tanks for recovering dissolved material. Thus steam is wasted both for taking boilout and for evaporating water from the dissolved material. Additionally the equipment is also not available for production.



Further there was water ingress to the tune of 3 KL/day by way of overflow of process tanks and its washings due to mismatch in the availability of DEE for concentrating three different feeds.

New scheme has been developed by mixing an three streams at a constant rate in a blend tank and feeding the evaporator with this homogenized mixture. By this steady operation of the DEE is ensured always and this has resulted in elimination of boilout to a great extent.

Total investment	:	Rs. 4 Lacs
Reduction in steam Consumption	:	1664 MTs/year
Reduction in coal Consumption in boiler	:	256 MTs/year
Toal cost saving	:	Rs.7.3 Lacs/year
Payback period	:	200 days

## 3. Waste gas firing

### Objective

Firing of waste gas containing Hydrogen and traces of methanol from Formaldehyde plant in boiler for generating steam by designing suitable Burner.

### Details

Steam is generated in a fluidized bed combustion boiler using coal as fuel. Methanol is converted into Formaldehyde which in turn used as a raw material for captive consumption in main plant. Methanol is converted into formaldehyde by dehydrogenation and partial oxidation in presence of Silver catalyst in a reactor. Reactor product gases are passed



through series of absorption columns where formaldehyde and un reacted methanol is recovered. The waste gas from the absorber was vented to atmosphere. The waste gas consists of hydrogen, carbon dioxide, Nitrogen and traces of methanol.

Hydrogen being a high calorific value substance, can be fired in the boiler as co fuel along with coal for generating steam. The waste gas from formaldehyde plant is pumped to the boiler using a twin lobe



blower. The gas is injected in to the fluidized bed combustion chamber using suitable **burners**. Burning of hydrogen along with traces of methanol resulted in additional steam generation of 750 kg/hr.

Investment	: Rs. 9 Lakhs
Additional generation of Steam with waste gas	: 750 Kgs/Hr.
	: 6300 MTs/year
Qty. of reduction in coal Consumption	: 969 MTs/year
Reduction in qty. of green House (CO <sub>2</sub> ) gas emission	: 1407 MT/year
Cost Saving	: Rs.27.6 Lacs
Payback period	: 93 days

#### **4. Turbine back pressure control by altering the speed of raw water pump using VFD**

##### **Objective**

Electrical load in the turbine to be controlled to control the back pressure which will be vented to atmosphere if not controlled.

##### **Details**

Superheated steam produced is given at 20 kg/cm<sup>2</sup> to the turbine for producing power and the steam is taken back at 4.5 kg/cm<sup>2</sup> for process heating. Steam inlet to the turbine is controlled by Governor valve and electric load in the turbine decides the steam inlet and inturn the back pressure. More the electric load more the back pressure and vice versa. The back pressure need to be controlled for smooth operation of the process and it is usually done by adjusting the electric load. Any



pressure in excess of 4.5 kg/cm<sup>2</sup> due to process disturbance will be vented out by a control valve for fine control of pressure. By this, the pressure is maintained constant but a small quantity of steam is wasted.

To avoid this, we decided to vary the electric load finely according to the pressure variations. This is done by varying the speed of a pump by a VFD and in turn the load connected to the TG. (Average running hrs of the pump is only 8 hrs and so pumps operation at reduced speed does not affect the process). By this the venting of steam is completely eliminated.

Total Investment	:	Rs. 1 lac.
Elimination of steam Venting	:	624 MT/year
Reduction in coal Consumption	:	96.1 MT/year
Cost saving	:	Rs.2.75 Lacs/year
Payback period	:	133 days

### **5. Removal of Strainers and globe valves in steam header.**

#### **Objective**

Increasing power generation of the turbine by reducing the back pressure by removing Eight inch globe valves and strainers in header.

#### **Details**

The steam coming out of the turbine is used for process heating through a Pressure Reducing Station(PRS). The high back pressure results in reduction in rpm of the turbine and so reduction in electric load. The PRS is fitted with eight inch globe valve and strainers. Since the plant



was equipped to get steam without the turbine previously and strainers were useful then. Now steam is supplied only thro turbine and strainers were of no use. Also all the distribution header points were equipped with isolation valves and one fitted in the PRS is not operated generally. Both were offering a pressure drop of 0.3 kg.cm2 and so both were removed. By doing this pressure drop of 0.3 kg/cm2 is eliminated and the back pressure at the turbine outlet is reduced. This helped in giving more electric load to the turbine.



Total Investment	:	Rs.0.25 lakhs.
Additional power Generation	:	0.7 Lac KWH/year
Cost saving	:	Rs.2.8 Lacs
Payback period	:	33 days

An approach of continuously asking why, why question on the existing facilities, simple idea of removing the unwanted, valve & strainer occurred to us. This had helped us to achieve a 10 fold saving of Rs.2.8 Lacs with an investment of Rs.0.25 lacs.

## **6. Decrease in Formaldehyde plant blower power consumption**

### **Objective**

To reduce the power consumption of Fa plant blower by rearranging the catalyst size distribution and by purging out methanol for increasing purity.



### **Details**

In Formaldehyde plant, air is supplied to the reactor for converting methanol vapour into formaldehyde vapour in presence of Silver catalyst. Air is first supplied to the Carburetor where methanol is heated and vaporised. The vapour is carried by the air from carburetor to reactor and in reactor the vapour passes through the granular silver catalyst which is spread in the reactor. Impurities in methanol deposit on top of the catalyst surface and increases pressure drop across catalyst bed. Size of the granules are distributed to have coarse sizes at the bottom and fines at the top in order to have more surface area for reaction to take place. Over a period of time the pressure drop across the reactor increases causing the blower to draw more power due to presence of foreign particles in methanol feed. Impurities in methanol deposit on top of the catalyst surface and increases pressure drop across catalyst bed.

In order to eliminate the pressure drop

- a) known amount of methanol is purged continuously to the off specification tank and this helps in maintaining the impurity level of methanol under control. Impure methanol collected is purified separately.
- b) Catalyst is re-arranged to have the bed in the order of coarse, fines, medium and coarse particles. Both the above actions helped to reduced the back pressure in the blower thereby reduction in power consumption.

Total investment	:	Rs. 0.50 Lacs	
Reduction in power Consumption	:	12 KWH :	1 Lac unit/year
Total saving	:	Rs.4 Lacs	
Payback period	:	46 days	

### **TREND SETTER**

This project is considered to be a **“Trend Setter”** in India. With an innovative idea of re-arranging the catalyst and by purging out the impurities in Methanol a whopping saving of Rs.8 Lacs has been achieved with a mega investment of Rs.5 Lacs.

**ENERGY CONSERVATION MEASURES PLANNED FOR THE FUTURE (2005-06)**

Energy Conservation Measures (Planned)	Anticipated savings		Approx. investment (Rs.lakhs)	Project Commencement & Completion year	
	Energy Value (specify units)	in - Rs. Lakhs			
Usage of MYCELIA a bio compost as co fuel in boiler	750	ton of coal	22.5	4.5	2005
Converting blades of CT fan into FRP blades.	0.8	Lakhs units	3.2	1.5	2005
Converting V belts to flat belts in Air Compressor	0.35	Lakhs units	1.4	0.75	2005
Converting one of the Cooling tower cells to Fanless cooling tower	1.26	Lakhs units	5.04	4.5	2005
Installing High Efficiency motor for motors rating higher than 75HP	1	Lakhs units	4	6	2006
Installing new inline high efficiency pump for boiler feed	0.55	Lakhs units	2.2	1.8	2006