

ROHM AND HAAS (INDIA) PRIVATE LIMITED

Taloja, Distt. Raigarh (Maharashtra)

Unit profile

Rohm And Haas Company was established in 1907 in Esslingen, US by two young German entrepreneurs, chemist Otto Rohm and Business man Otto Haas to manufacture and sell technologically superior and unique chemical product for leather industries. Rohm And Haas Company pairs creativity with sound knowledge for making it possible to meet ever changing market demands. More than 16500 Rohm And Haas Company professionals develop specialty and performance materials for customers in more than 100 facilities with operations in 27 countries. Rohm And Haas Company products are sold around the world and used in may industrial and consumer products applications worldwide including Building and construction, Electronics, Food and Retails, Household and personal Care, Industrial Process, Packaging, Pare, Transportation and Water.

Rohm And Haas Company was a 9.6 billion USD specialty chemical company headquartered in Philadelphia, USA until April-2009 when is was acquired by DOW Chemical Company.

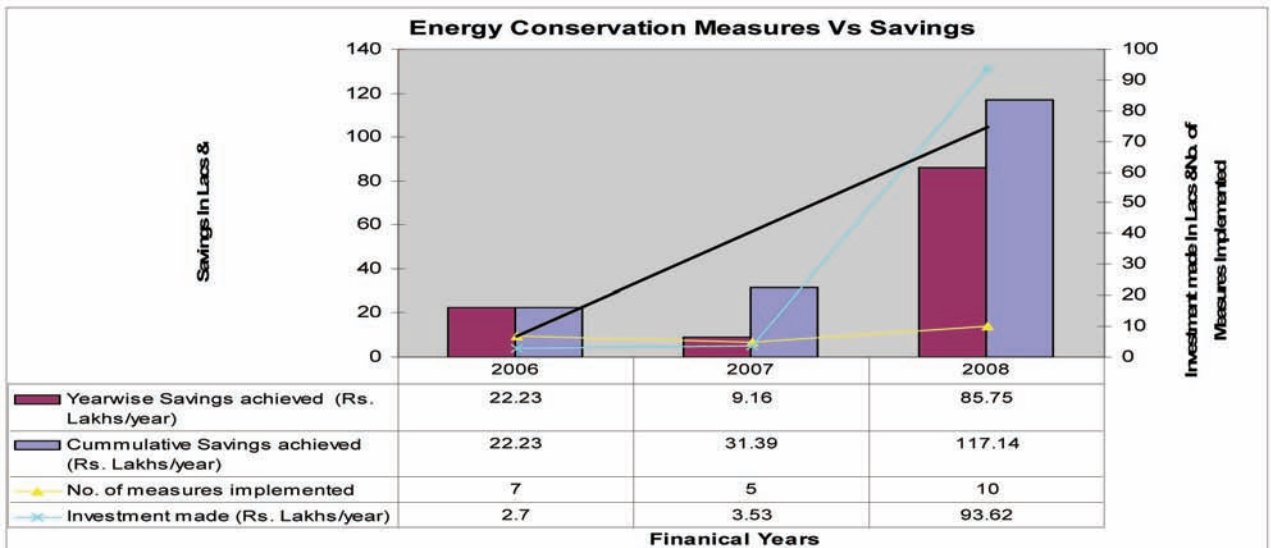
Rohm And Haas Company started its operation in India since 1995 and thereafter established its manufacturing unit in Taloja, India - Rohm And Haas (India) Pvt. Ltd. In August-2003 to manufacture Paint and Coating materials (Emulsion) and Packaging and Building Materials (Adhesives & Sealant). This plant is on 70,000 sq. mtrs. Plot and the design incorporates the most advanced automation and process control.

The Rohm And Haas (India) Pvt. Ltd, Taloja Plant is a IMS certified company for ISO: 9001: 2000, ISO: 14001:2004, ISO: 18001: 2007 and has 5S certification.

Energy Consumption

Rohm And Haas (India) Private Limited, Taloja Plant considers the Energy Saving as a multi disciplinary approach. Even smallest reduction in Energy cost adds directly to its profit and above all contribution to the nation in preservation of precious resource of energy. Rohm And Haas India Private Limited, Taloja Plant has identified various energy conservation projects and formed cross-functional Project Team. The energy conservation projects have resulted in both tangible and intangible savings and above all contribution to the nation in preservation of precious resources of energy. With implementation of various energy conservation measure there is steady decline in specific energy consumption per tonne of product manufactured, which depict continual reduction in Specific energy consumption over last three years. **The Energy Conservation projects spearheaded by absolute internal resources has brought in an accrued financial saving of Rs. 85.95 Lakhs in 2008.**

Synopsis of the Tangible Savings By way of Energy Conservation



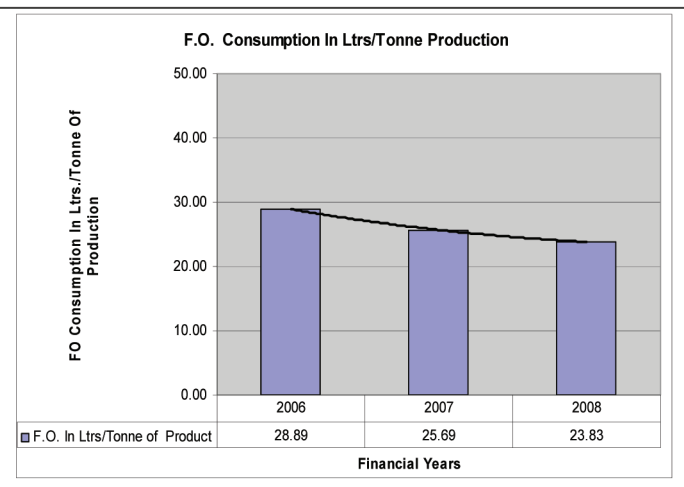
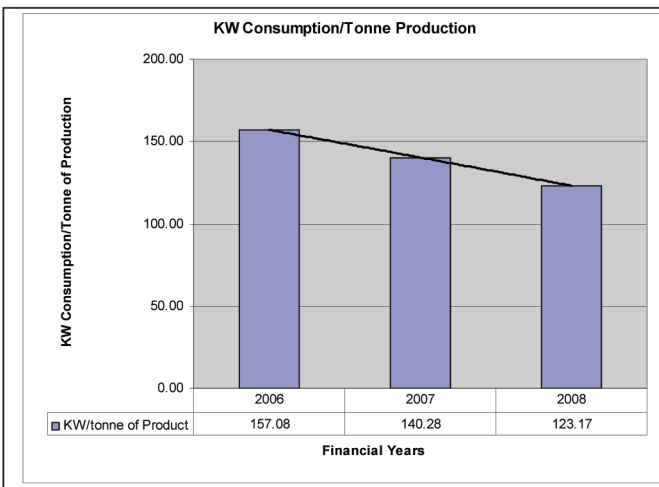
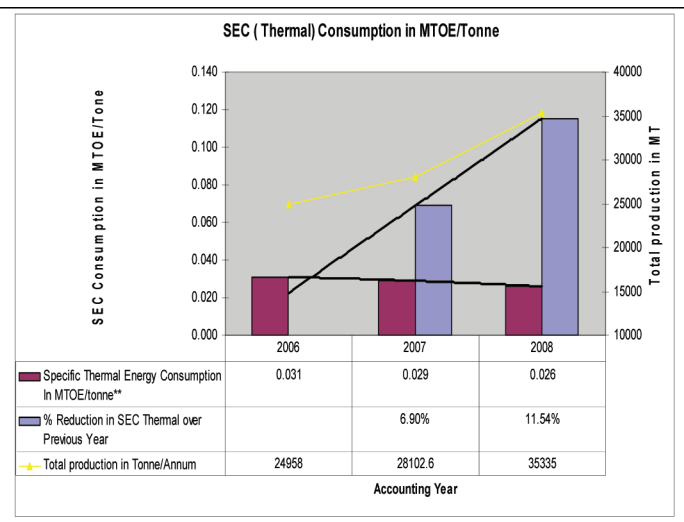
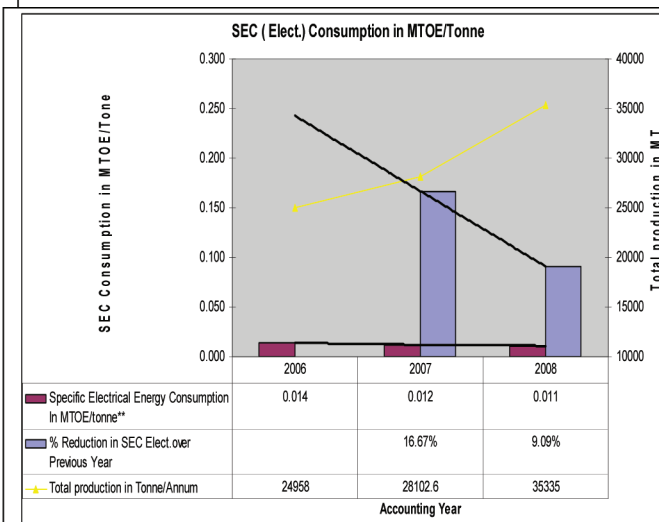
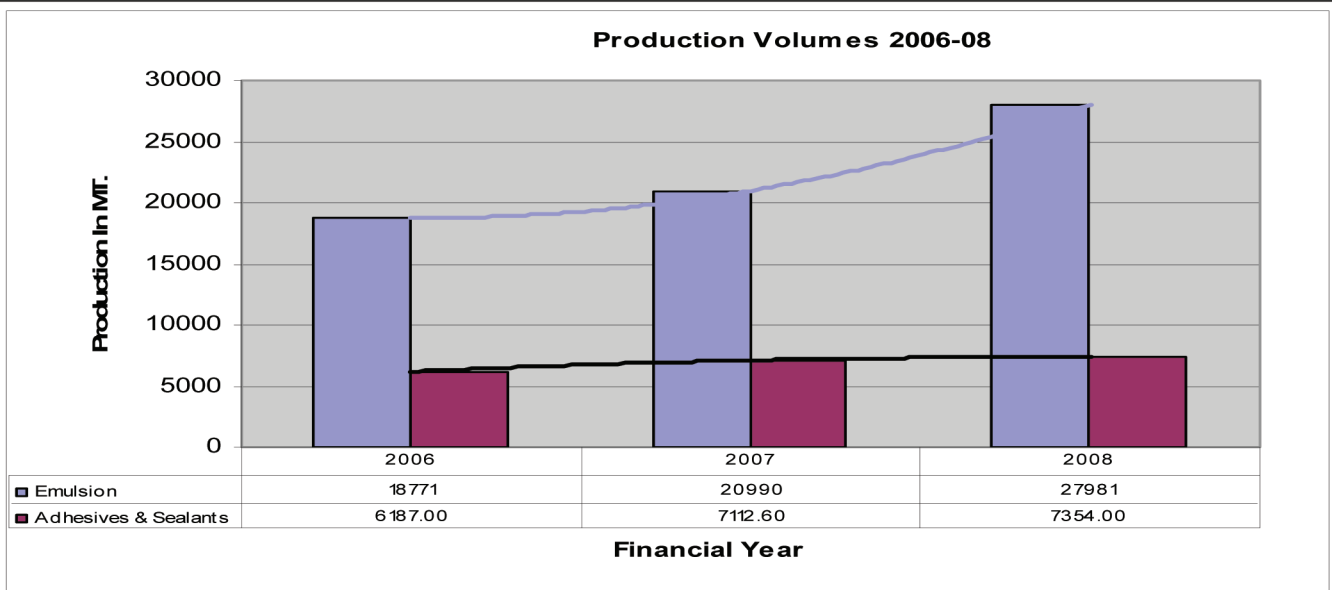
Specific Energy Reduction (in MTOE / Ton)

With all above initiatives taken in 2006-08 resulted both in Electrical and Thermal Energy savings as compared to 2006, and Utility Cost/Tonne of Product Manufactured reduced, The Energy Conservation Impact on Product is as follows:

Description	2006	2007	2008
Year wise Savings achieved (Rs. Lakhs/year)	22.23	9.16	85.95
Cumulative Savings achieved (Rs. Lakhs/year)	22.23	31.39	117.34
No. of measures implemented	7	5	11
Investment made (Rs. Lakhs/year)	2.7	3.53	95.37

Description	Unit	2006	2007	2008
Total Electrical Energy Consumption	Lakhs KWH	39.20	39.42	43.52
Total Thermal (Furnace Oil) Energy Consumption	KL	721	722	842
Total Production (Emulsion+Adhives & Sealant)	Tonne	24958	28102.6	35335
Specific Electrical Energy Consumption	kWh/Tonne	157.08	140.28	123.17
Specific Electrical Energy Consumption in MTOE/tonne**	MTOE/tonne	0.014	0.012	0.011
% Reduction in SEC Elect. over 2006	%		16.67%	9.09%
Specific Thermal Energy Consumption	Ltrs/Tonne	28.89	25.69	23.83
Specific Thermal Energy Consumption in MTOE/tonne**	MTOE/tonne	0.031	0.029	0.026
% Reduction SEC Thermal over 2005-2006	%		6.90%	11.54%

Energy Conservation Overall Savings Realized viz. Quantitatively & Qualitatively: 2006-2008



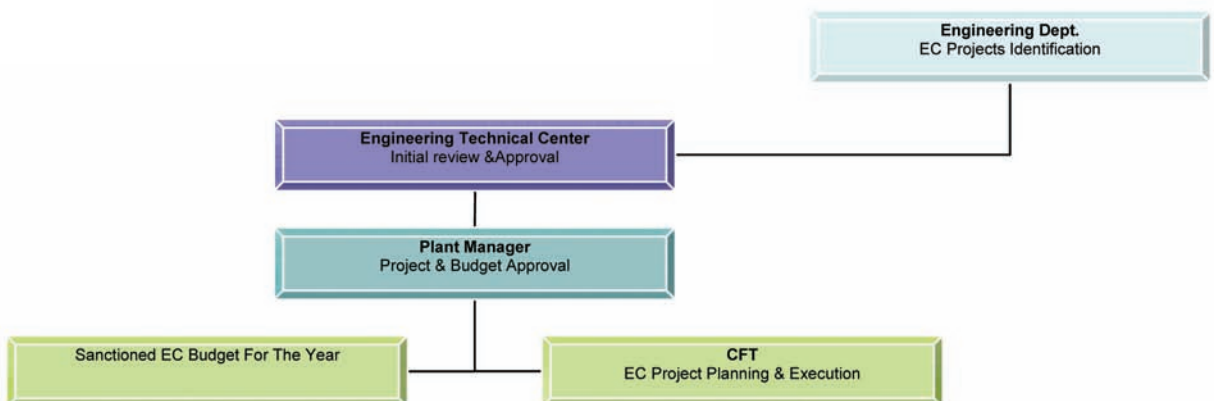
Energy Conservation Commitment and Policy Set Up

Rohm And Haas (India) Private Limited, Taloja Plant considers the Energy Saving as a multi disciplinary approach. Even smallest reduction in Energy cost add directly to its profit and above all contribution to the nation in preservation of precious resource of energy. Units energy profile consists of electricity, furnace oil, diesel and water. Even though Rohm And Haas (India) Private Limited do not have separate "Energy Management Policy" the company has committed itself for energy conservation and the same is reflected in its Quality, Environment, Occupational Health & Safety Policy and Objectives under IMS.

Company has arranged both internal and external training programmers on energy conservation for its employees also Energy saving slogans, posters are displayed at various locations in the unit of employees awareness. The company's senior management has provided all required tools and help to drive the energy conservation. Apart from sharing the best practices and success stories for energy conservation within organization as well as from other similar industries. unit has dedicated website (EEMatrix) for this purpose where energy conservation activities are tracked/ Monitored and shared among group companies.

The company has formed cross-functional teams for energy conservation projects, the senior management closely monitors the progress of the projects and provide all necessary budgetary and moral help. The team members of successful projects are appreciated by Company's Leadership by way of recognition letter and cash award to motivate them further.

Energy Management Structural Flow Diagram



Major Energy Conservation Initiatives Implemented During 2008

Replacement of Cooling Tower Fan Blades

Till 2007 cooling towers used for process and refrigeration cooling application were having GI fan blades as per the original OEM supply design. These were replaced with FRP fan blades which being better in term of efficiency, lighter in weight and thus draws lesser current resulting in less consumption of power. First Year saving Period from Date of Commissioning: **Rs.0.81 Lakhs** (Savings from 6 Months).

Savings On Year Basis...

Electrical Energy Savings : 0.36 Lakhs KWH/Annum

Savings : Rs. 1.62 Lakhs/Annum

Investment : Rs 0.25 Lakhs

Highlights : Reduced load on process cooling tower for better cooling, increased cooling tower efficiency, reduced power consumption, cost effective and maintenance free.



▲ New FRP Fan Blades Of Cooling Tower

Optimization of Cooling tower Pumps- Separate Pump for Utility-Air compressor

As per the original design of the plant, a common cooling tower pumps was installed for the main plant and utilities. Since the cooling tower load in the utility is constant requiring lower head of the pump, it was decided to cater the utility with a separate small, energy efficient pump. Before the conversion, two pumps of 250 m³/hr, 48m head, 45 Kw were used for catering the loads of the plant and utility. Post the change, one 45 KW pump is being used to cater the fluctuating load of the plant and a small 3 Kw pump is being used to cater the constant utility load. This has brought in tremendous savings to the tune of 500 – 600 Kw/day. First Year saving Period from Date of Commissioning: : **Rs.4.10 Lakhs** (Savings from 5 Months).

Savings On Year Basis...

Electrical Energy Savings : 2.30 Lakhs KWH/Annum

Savings : Rs. 10.35 Lakhs/Annum

Investment : Rs 0.50 Lakhs

Highlights : Reduced load on process cooling tower for better cooling and flow rate, increased air compressor efficiency due to enhanced/ effective cooling, reduced power consumption.



▲ New Small EE Grundfos Pump For Air Compressor

Installation of High Efficient Pump for Cooling Tower of AFC-2 Plant

Installed High Efficient Pump from Grundfos's for Cooling tower with capacity of 300m³/hr at 38m head coupled with 45Kw motor instead of Matter-Platte – Low efficient pump of 300m³/hr coupled with 75Kw motor .This energy reduction measures taken up after confirmation by measuring actual performance of Existing pump. Now there is saving of :900-1000Kwh /day. constant utility load. This has brought in tremendous savings to the tune of 500 – 600 Kw/day.First Year saving Period from Date of Commissioning: : **Rs.3.50 Lakhs** (Savings from 3 Months).



▲ **New EE Grundfos Pump For AFC-2 Plant**

Savings On Year Basis...

Electrical Energy Savings : 3.42 Lakhs KWH/Annum

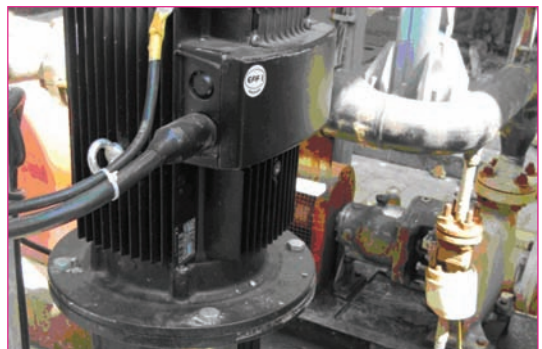
Savings : Rs. 15.39 Lakhs/Annum

Investment : Rs 2.50 Lakhs

Highlights : Enhanced & effective cooling for process application, reduced power consumption without effecting the process cooling tower water flow rate and pressure requirement of plant, easy to operate and maintained, Low maintenance cost, highly energy efficient.

Installation of High Efficient Pump for Cold DI Water

Installed High Efficient Pump from Grundfos for Cold DI water of capacity 16m³/hr, 80M head coupled with 5.5kw motor at 90% efficiency instead of 34m³/hr ,80m head coupled with 22kw motor with 27% efficiency . This measure has been taken after actual calculation of efficiency during Energy audit of Utility Equipments. Now there is saving of 140-150kwh/day..First Year saving Period from Date of Commissioning: : **Rs.0.18 Lakhs** (Savings from 1 Months).



▲ **New EE Grundfos Pump For Cold DI Water With 5.5. KW Motor**

Savings On Year Basis...

Electrical Energy Savings : 0.48 Lakhs KWH/ Annum

Savings : Rs. 2.16 Lakhs/Annum

Investment : Rs 1.25 Lakhs

Highlights : No change in cold DI water required of flow rate and pressure, reduced power consumption, easy to operate and maintained, Low maintenance cost, highly energy efficient.

Installation Of Air Compressor With VFD Control

Installed Atlas Copsco make 600CFM capacity Air compressor configured with VFD for auto loading and unloading to maintain Discharge air pressure of Compressor, instead of old non VFD Air compressor of -600CFM capacity. This has substantially reduced power consumption. First Year saving Period from Date of Commissioning: : **Rs.6.08 Lakhs** (Savings from 9 Months)

Savings On Year Basis...

Electrical Energy Savings : 1.80 Lakhs KWH/Annum

Savings : Rs. 8.03 Lakhs/Annum

Investment : Rs 30.0 Lakhs

Highlights : No change in required discharge air flow rate and pressure, reduced power consumption, easy to operate and maintained, Low maintenance cost, highly energy efficient.



▲ New Air Compressor With VFD

Installation Of IBR Boilers Instead Of Non-IBR Baby Boiler

Till 2007 plant was using 3 nos. non-IBR baby boilers of 850 Kg capacity for steam generation for process application, these boiler were producing wet steam and were not energy efficient so replaced them with more energy efficient single IBR boiler with capacity of 5Ton, which also help to incorporate increase in demand because of increase in capacity of Plant, as this new single IBR boiler is more fuel efficient than earlier combined 850Kg X 3 nos non IBR baby boilers. Overall saving of Furnace Oil achieved - 6KL per month. Also quality of steam Improves which in turn provides additional benefits of improvement in heat exchange. First Year saving Period from Date of Commissioning: **Rs.14.68 Lakhs** (Savings from 10 Months).

Savings On Year Basis...

Electrical Energy Savings : 0.83 Lakhs KWH/Annum

Thermal Energy Savings : 34.85 MTOE/ Tonne

Savings : Rs. 17.62 Lakhs/Annum

Investment : Rs 37.0 Lakhs

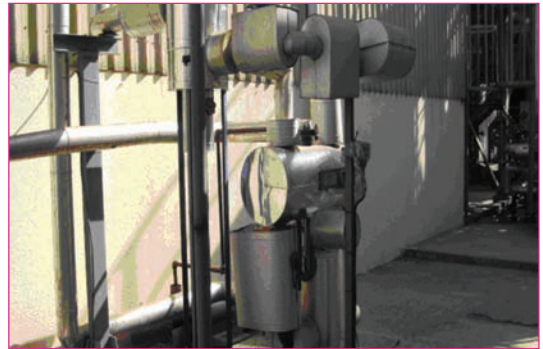
Highlights : Reduced power/Furnace oil consumption, easy to operate and maintained single boiler than three different non-IBR boiler, Low operating cost, highly energy efficient, Automated operation, Improved quality of steam, Enhanced safety features.



▲ New 5 - Ton IBR Boiler

Condensate Recovery System

Installed Condensate recovery system from Forbes Marshall along with New Hot DI Plate Heat Exchanger . As almost 80% of steam generated is used to heat DI water for process and , hence condensate recovered in this location is maximum which was earlier not recovered. But with installation of new steam condensate recovery system, external heating requirement of Feed water is eliminated and hence saving on Fuel achieved. First Year saving Period from Date of Commissioning : **Rs.2.89 Lakhs** (Savings from 10 Months).



▲ Steam Condensate Recovery System

Savings On Year Basis...

Thermal Energy Savings : 8.72 MTOE/Tonne
Savings : Rs. 3.47 Lakhs/Annum
Investment : Rs 4.50 Lakhs

Highlights : Reduced Furnace oil consumption as recovered heat used for boiler feed water pre-heating, Reduced boiler feed water consumption, Reduced ETP load, easy to operate & maintained, cost effective and efficient.

Replacement of Thermic Fluid-Degraded with new Thermic Fluid with High Heat Capacity

In Taloja Plant , unit has two Furnace oil fired thermic fluid heaters of total 8 Lakhs kcal Capacity ,in which Marlotherm SH- was used as a thermic fluid for process heating application. But due to Oil quality degradation of this thermic fluid the heat carrying capacity of Thermic fluid reduced , which resulted in turn increased furnace oil consumption as thermic fluid heater would run under full load most of the time to maintained the desired temperature required for process heating application. by replacing the de- graded Marlotherm SH thermic fluid with new thermic fluid –Thermia B which has better heat carrying capacity , which in turn reduces F.O. consumption .100-150L/Day. First Year saving Period from Date of Commissioning: : **Rs.11.4 Lakhs** (Savings from 5 Months).



▲ Thermic Fluid Heater

Savings On Year Basis...

Thermal Energy Savings : 68.74 MTOE/Tonne
Savings : Rs. 24.48 Lakhs/Annum
Investment : Rs 12.0 Lakhs

Highlights : Reduced Furnace oil consumption , Reduced load of thermic fluid heater reduced heater power consumption, Reduced batch heating time cycle, Better heat carrying capacity.

Installation of CFL Lamp of 65W Instead of 125W MH Lamp

The plant was conventional 125W mercury vapor lamps with ballast plant lighting system used. Plant had around 100 Nos such plant lighting lamps in factory premises. So the management has procured and replaced 100 nos. conventional 125W mercury vapor lamps with 65W energy efficient CFL lamps. Thus with out effecting illumination system required lux level the plant has able to reduce the power consumption.

First Year saving Period from Date of Commissioning : **Rs. 0.16 Lakhs** (One and Half Months Savings).

Savings On Year Basis...

Electrical Energy Savings : 0.28 Lakh KWH/ Annum

Savings : Rs. 1.28 Lakhs/Annum

Investment : Rs 0.87 Lakhs

Highlights : Reduced power consumption by Street lighting system, No change in illumination lux level.



▲ New 65 W Energy efficient CFL Lamps

Filter Water Pump Installation (Hydro-Booster system) for Raw/ Filter Water Plant

Installed High Efficient Pump from Grundfoss for Filter raw water application of capacity 30m³/hr, 59.1M head coupled with 7.5kw motor of 90% efficiency, instead of 50m³/hr, 66m head coupled with 22kw motor with 27% efficiency. This measure has been taken after actual calculation of efficiency during Energy audit of Utility Equipments. Now there is saving of 80 -85 kwh/day First Year saving Period from Date of Commissioning : **Rs.0.12 Lakhs** (Savings from 1 Months).

Savings On Year Basis...

Electrical Energy Savings : 0.30 Lakh KWH/ Annum

Savings : Rs. 1.20 Lakhs/Annum

Investment : Rs 4.75 Lakhs

Highlights : No change in filter raw water required of flow rate and pressure, reduced power consumption, easy to operate and maintained, Low maintenance cost, highly energy efficient.



▲ Hydro-Booster system for filter water plant

Project Description	Capital Cost (Rs.)	Anticipated Annual Savings Rs./yr)	Status
Boiler De-rating for Efficiency Improvement	65,000	720,000	Completed
Improve Steam Metering			
IBR boiler in place of Baby boiler	2,500,000	1,500,000	In progress
Two Parallel pump for Hot DI with PLC and VFD and	650,000	350,000	In progress
Two Parallel pump for Cold DI with PLC and VFD			Completed
Hot Oil Energy Improvement	15,000	-	Completed
Compressed Air Leakage Audit	50,000	300,000	In progress
Electrical Motors Audit	150,000	150,000	In progress
Cooling Tower Fill Replacement	150,000	100,000	In progress
Insulation Efficiency Checking	100,000	200,000	Completed
Pump/Motor Audit, Checking potential for Replacement	500,000	500,000	In progress
AOD pump Audit, Replacement potential with electrical Pump	300,000	600,000	In progress
Lighting Load reduction by using Energy Efficient Lighting	300,000	300,000	In progress
Motion sensor control on HVAC and Lighting	75,000	75,000	In progress
Spot vent system Audit	50,000	50,000	In progress
Use of Roto Pumps for Blend Transfer instead of AODD Pumps	250,000	250,000	In progress

Environment and Safety

To bring in awareness among employees **Rohm And Haas (India) Private Limited**, Taloja Plant has taken various initiatives including safety audits, risk analysis, On-site emergency response plan, responsible care, HAZOP study, monitoring and measurement, health check-up for all employees including contract employees, Safety slogan / Posters suggestion & safety quiz competition etc are arranged during Safety Week. Also the EHS policy is displayed at various locations in the factory in both English and local languages.

Safety

“Safety First” is the slogan of the company and so the unit and the same is reflected in the EHS policy. EHS audits are carried out periodically both by internal and certified agencies and corrective actions are taken as per the outcome of the audits to minimize the potential risks in the factory. For enhancing the health and safety performance we have adopted OHSAS 18001: 2007 along with EMS ISO

14001:2004 standards for ensuring good environment, health and safety management standard. The Hazards Identification and Risk Assessment (HIRA) for each and every activity done in plant is carried out, which has resulted in identifying potential risk to its employees, equipments and environment in better way. This has in turn resulted in providing better control systems like safety interlocks to the potential risks involving equipment or activity. In-line with our EHS policy for continual enhancement of safety standards, the unit has taken various initiatives to avoid fire hazards like installation of new diesel generator operated fire hydrant system with sprinkler, gas leakage detector, Smoke detectors etc.

Environment

In-line with our EHS policy, **Rohm And Haas (India) Private Limited**, Taloja Plant is committed for preserving precious energy resource, social responsibility and protecting environment. For achieving the same, unit has adopted EMS ISO : 14001:2004 system. External environment audits through certifying agencies are conducted and various environment initiatives including environmental monitoring are implemented to maintain the ecological balance in and around company premises .All requirements relating to various environment protection and EHS legislation are being duly complied with by the company. Also all other statutory requirements under Factory Act are being complied by the company.

GHARDA CHEMICALS LIMITED
Tal-khed, Distt. Ratnagiri (Maharashtra)

Unit profile

Gharda Chemicals Limited established in 1967, is a research-based private limited company. The company has won several National Awards for Technical Innovation in the Chemical Industry and has many firsts in the field of dyestuffs, pesticides, veterinary drugs and polymers.

With world-class products and sales of Rs. 900 crores in the year 2008-09 Gharda today is among the top-ranking chemical companies in India.

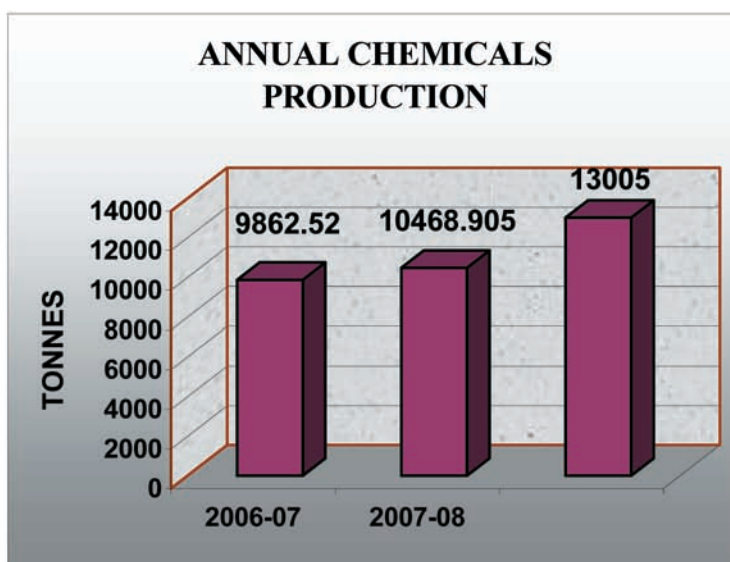
Company has four manufacturing units one each at Dombivili and Lote in Maharashtra & other two are at Panoli and Ankaleshwar in Gujarat.

Both manufacturing units of Gharda in Maharashtra viz. Dombivili & Lote have received ISO 9001 certification. Lote Parashuram unit has received ISO 14001 (Environment Management System) Certification in Yr. 2003. Plant has received OSHAS 18001 (Safety & Occupational Health) certification in November 2004.

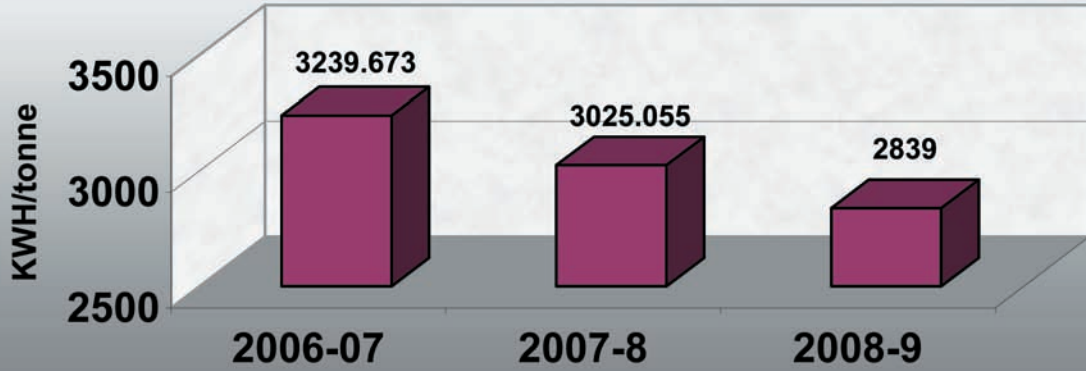
Energy Consumption Trend

There is a steady decline of specific energy consumption due to implementation of various energy conservation measures. The Energy scenario of GCL in the past three years is given below.

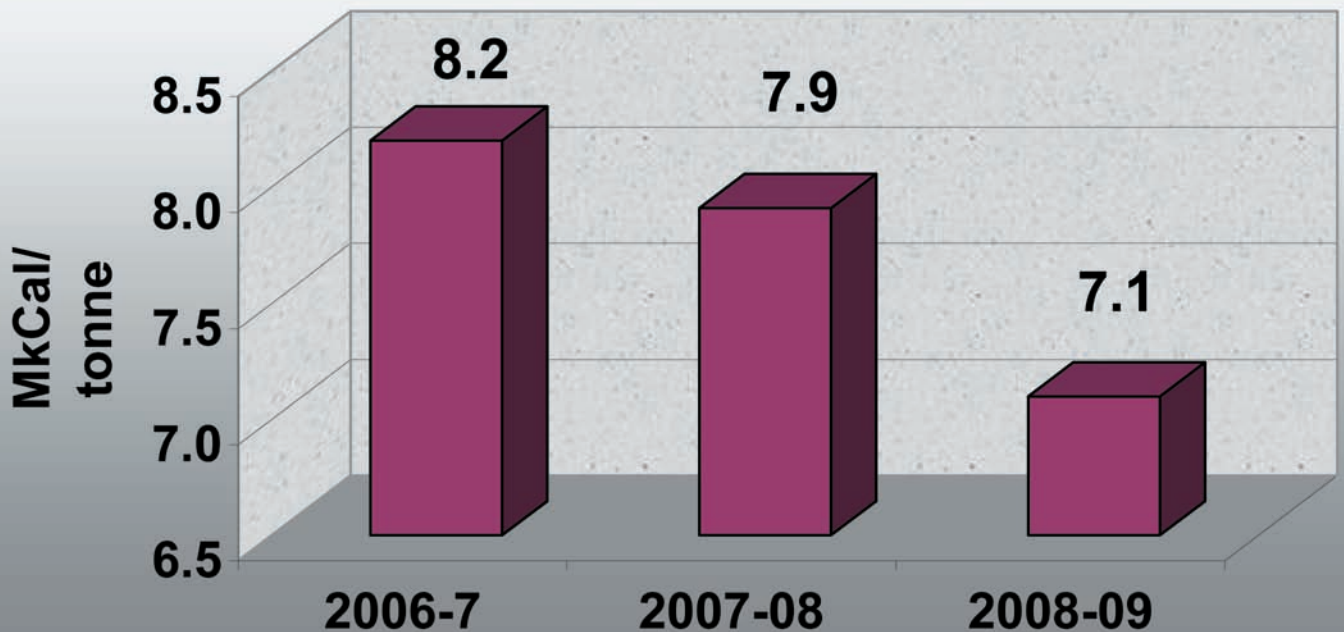
S. No.	Description	Unit	2007-08	2008-09
1	Annual Chemicals	Tonnes	10468	13005
2	Total Electrical Energy Consumption/yr	Lakhs KWH	316.69	369.26
3	Specific Electrical Energy Consumption/yr (All Products)	KWH/tonne	3025	2839
4	Total Thermal Energy Consumption/yr	MkCal	8279	92318
5	Specific Thermal Energy Consumption/yr (All Products)	Mkcal/tonne	7.9	7.09
6	Total Manufacturing Cost	Rs Lakhs	68830	32783
7	Total Energy Cost	Rs Lakhs	5463.72	2364
8	Energy Cost as %age of Total Manufacturing Cost	%	7.9%	7.21%



SPECIFIC ELECTRICAL ENERGY CONSUMPTION/yr (CHEMICALS)



SPECIFIC THERMAL ENERGY CONSUMPTION/yr (CHEMICALS)



Energy Conservation Achievements (2008-2009)

The major projects implemented during 2008-2009 are given below.

(1) Replacing the cooling tower fans from Aluminum to FRP.

Background:

1. For induced draft cooling tower exhaust fan is available.

Observations:

1. Power consumption due to metallic blades of fan is more.
2. By installing fan with FRP blades instead of Aluminum alloy, power consumption may be reduced.

Action taken:

1. Aluminum alloy Fan blades were replaced by to FRP blades.
2. FRP fan blade were installed and commissioned.

Payback period:

Annual saving : 148000 per annum
 Annual saving : 7.5 lakhs per annum
 Investment : 2 Lacs
 Payback : 3 months

(2) Providing Dry vacuum pump for Corrosive solvent.

Background:

1. Conventional water circulation and Steam Ejector used for solvent recovery.

Observations:

1. Power consumption reduced due to low HP motor requirement for dry vacuum pump.
2. Steam stage ejector is removed. Vacuum from dry vacuum pump was sufficient for the system.

Action taken:

1. Dry vacuum pump is installed for R5102 system for distillation.

Pay back period:

Annual saving : 49000 KWH per annum
 Annual saving : 3.49 lakhs per annum
 Investment : 14 lakhs
 Payback : 1 month.

(3) Distributing the heat load to Cooling tower from chilled water

Back ground:

1. Chilled water is used for condensing the solvents. Chilled water power requirement is high compared to cooling tower water.

Observations:

1. Heat transfer area is increased and cooling tower water is provided to condense the solvents.

Action taken:

1. Additional condenser is provided and Load is distributed.

Pay back period:

Annual saving : 320000 KWH per annum

Annual saving : 16 lakhs per annum

Investment : 2 Lacs

Payback : Immediate.

(4) Vapor absorption machine installed for Chilled water production

Back ground:

1. Conventional compressors used for the chilling of water for utility purpose

Observations:

1. Compressors is a energy consuming equipment .VAM is working with excess steam coming from cogeneration plant.

Action taken:

1. Provision is made to collect the gas as it is to be utilized in the boiler.
2. By doing so Company can save fuel consumption in the boiler.

Pay back period:

Annual saving : 4340000 Kwh per annum

Annual saving : 221.3 lakhs per annum

Investment : 100 Lacs

Payback : With in One month

(5) Modifying the logic of Circulation pumps for Energy conservation

Back ground:

- a. Two circulation pumps were used for cooling tower circulation.

Observations :

1. Two pumps were running only for circulation of cooling tower .and one big pumps used for plant circulation.

Action taken:

1. Two lower HP pumps removed and existing pump flow is diverted for cooling tower circulation.

Pay back period:

Annual saving : 260000 KWH per annum

Annual saving : 13 lakhs per annum

Investment : Rs 0.2 Lacs

Payback : 1 Months.

Energy Conservation Plans and Targets (2009-2010)

List of energy conservation measures planned for the future, investment planned & expected savings include the following.

Energy Conservation Measures (Planned)	Anticipated savings in		Approx. investment (Rs.lakhs)	Project Commencement & Completion year
	Energy Value (specify units)	Rs. Lakhs		
Vapor ammonia absorption system	18.8 lakhs KWh	85.00	100.00	Dec-08
Co-generation plant	112 Lakhs KWh	900.00	1000.00	Mar-09
Agro waste based boiler	7720 million Kcal	120.00	30.00	May-09
Cooling tower Fans modification	1 lakh KWh	4.50	0.70	Mar-09
Reciprocating compressor replacement	16.00 Lakh Kwh	72.00	50.00	Aug-09
Lithium bromide base compressor unit	3.4 lakh kWh	15.30	35.00	Aug-09
Ammonia absorption for chilled water	3.4 lakhs KWh	15.00	35.00	Mar'09
Distribution of utility load to CT water	5 lakhs KWh	22.50	10.00	March'09
Total	-----	514.72	2565.9	-----

IOL CHEMICALS AND PHARMACEUTICALS LIMITED

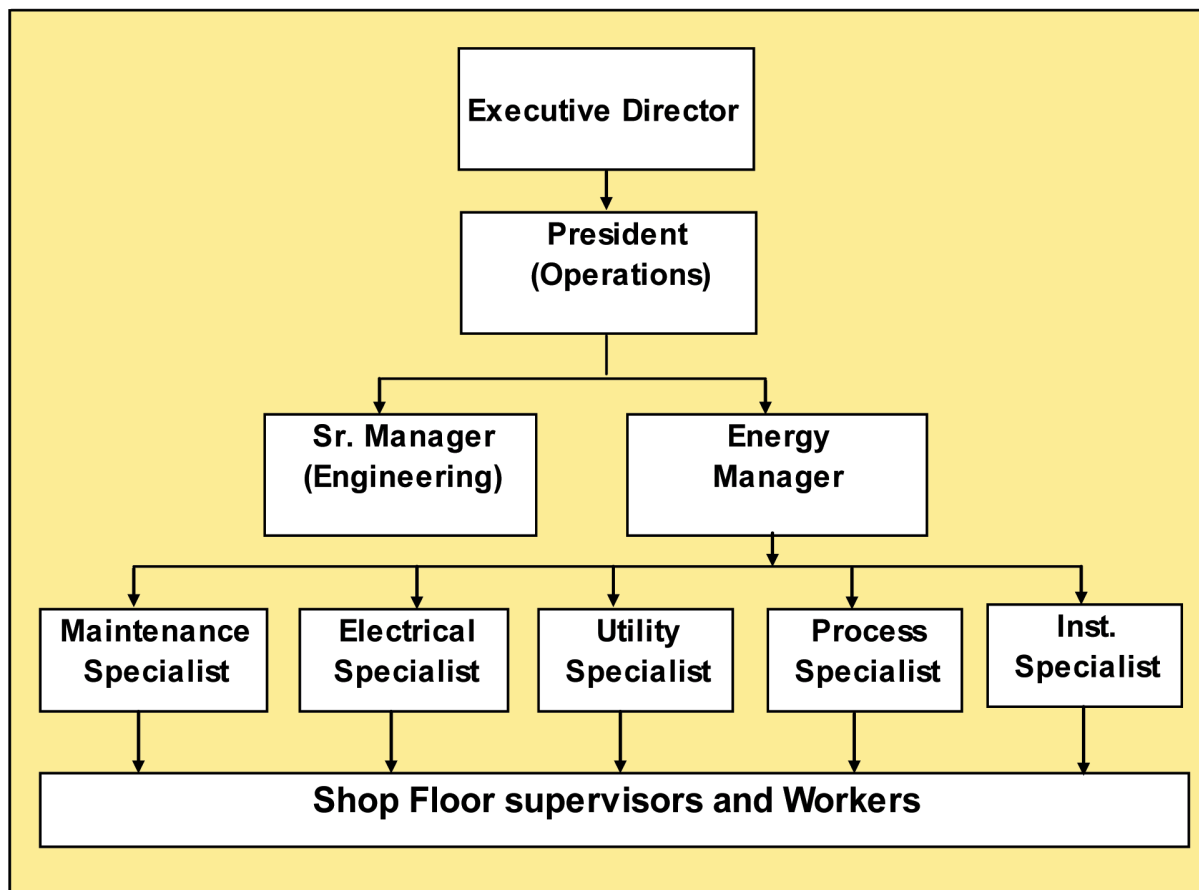
(Chemical Division) Barnala (Punjab)

Unit profile

IOL Chemicals and Pharmaceuticals Limited is a chemical manufacturing industry located in Barnala in Punjab. IOLCP began with a small project of Rs. 65 million to manufacture 4500 TPA of Acetic Acid and has now diversified into a multi product company to manufacture the 50000 TPA of **Acetic acid**, 33000 TPA **Ethyl Acetate**, 12000 TPA **Acetic Anhydride**, IOLCP is **National Energy Conservation Award Winner (2nd prize) in 2005, 2006, 2007,2008** and certified with ISO: 9001, 14001, Halal And Kosher certification and Strong market presence in 47 countries.



Energy Conservation Cell Structure



Major Energy Conservation Project (2008-09)

1. Installation of Multi Pressure Distillation System in Ethyl Acetate Plant for reducing the consumption of thermal energy.

Installation of Multi Pressure effect distillation Instead of simple distillation in Ethyl Acetate plant to create the Cascading in Process streams to recover the energy from each other.

Steam saving = 23000 MT/annum

Description:

Total investment = 405 Lakhs
Steam saving @ Rs 991/MT = 228 Lakhs
Payback period = 1.88Years



2. Low Pressure Oxidation in acetic acid reaction (Acetaldehyde to acetic acid) for reducing the pumping cost for circulation process material.

Installation of Low Pressure oxidation reaction, instead of reaction under high pressure Also we have creating the siphon on basis of difference in Sp. Gravity for removing the exothermic reaction heat instead of using forced Circulation pumps

Electrical Energy saving = 29.7 Lakhs Kwh/Annum

Description:

Total investment = 450 lakhs
Power saving @ Rs 3.6/kwh = 106 Lakhs/Annum
Pay back period = 4.2 Years



3. Complete Heat Exchangers networking system in Chemical Plant for using the waste process heat.

We have done heat exchanger networking; so that process stream's energy transfer can take place such a way that ultimate load on steam and power gets reduced.

Electrical Energy saving = 0.10 Lakhs Kwh/Annum

Steam saving = 300 MT/Annum



Description:

Total HE installed for networking = 5 nos.
 Piping = 100 meters
 Total investment = 18 lakhs
 Power saving @ Rs 3.6/kwh = 0.36 Lakhs/Annum
 Steam saving @ Rs 991/MT = 3.0 Lakhs/Annum
 Total saving = 3.36 Lakhs/Annum
 Pay back period = 5.3Years

4. Replacement of shell & Tube heat exchangers with corrugated Heat exchangers in Acetic Acid & Acetic anhydride plant for better transfer coefficient and save energy.

We have replaced the Shell & Tube heat Exchangers with Corrugated Heat Exchangers for increasing the rate of heat transfer and save lot of amount of thermal energy in Acetic Acid & Acetic anhydride Plant.



Steam saving = 500 MT/Annum

Description:

Total HE Replaced = 4 nos.
 Piping = 75 meters
 Total investment = 25 lakhs
 Steam saving @ Rs 991/MT = 5 Lakhs/Annum
 Pay back period = 5 Years

5. Installation of VFD(Variable frequency drive) .

By Installing the variable Frequency drives on motors in chemical plant we have reduced the electrical energy. With the uses of VFD's motors RPM can be reduced according to the requirements and reduced the load for power saving.



Electrical Energy saving = 0.6 Lakhs Kwh/Annum

Description:

Total VFD Installed = 4 nos.
 Total investment = 12 lakhs
 Power saving @ Rs 3.6/kwh = 2.16 Lakhs/Annum
 Pay back period = 5.5 Years

6. Substitution of cow dung with coal & Husk in boiler.

We are using the cow dung with coal in boiler in optimum ratio. By using this method we are saving lot of amount of thermal energy for the nation.

Thermal energy saving = 1320 million
K cal/Annum

Description:

Total investment = 0 lakhs
Total saving = 6.6 Lakhs/Annum



7. Installation of Central AC system.

We have installed the central AC system in place of separate AC system in IBB & MCA Control rooms & offices. By using the central Air conditioning system, we have reduced the total load which was more in separate air conditioning system.

Electrical Energy saving = 0.5 Lakhs
Kwh/Annum

Description:

Total no. of AC installed = 1 no.
Ducting = 100 meters
Total investment = 7.5 lakhs
Power saving @ Rs 3.6/kwh = 1.8 Lakhs /Annum
Pay back period = 4.1 Years



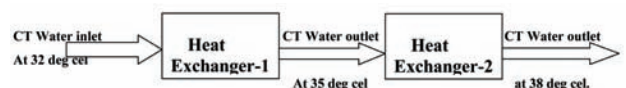
8. Cascading of Heat Exchangers doing in chemical process plant.

By installing the cascading system, we have reduced the pumping cost by reducing the circulation of 400 m³ per day cooling water. In cascading system, the outlet CT water from one heat exchanger is used as an inlet for other heat exchanger in process for obtaining the optimum delta of cooling water.

Electrical energy saving = 1 Lakhs
kWh/Annum

Description:

Piping used (MS) = 150 Meters
Butter fly valve (6") used = 4 in nos.
Butter fly valve (4") used = 8 in nos.
Total investment = 5 Lakhs
Power savings @ Rs 3.6 / kWh = 3.6 lakhs
Pay back period = 1.4 Years



9. Decreasing the elevation of coolers and condensers of column no. 16 in acetic acid plant for reducing the pumping cost of cooling water.

We have changed the position of condenser and cooler of column no. 16 from 17 meter to 10 meter for reducing the pumping cost of cooling water pump.

Electrical Energy saving = 0.22 Lakhs Kwh/Annum

Description:

Total investment = 5 lakhs

Power saving @ Rs 3.6/kwh = 0.8 Lakhs/Annum

Pay back period = 6 Years



10. Replacement of old acetaldehyde reactor with newly designed reactor.

Of newly designed Acetaldehyde reactor in place of Old reactor. It is more efficient than old reactor. In this Installation reactor we had increased the no. of fins from 24500 nos to 28500 nos and multiple feed points from one to two points which increased the conversion in the reactor and saved the thermal energy.

Steam saving = 2500 MT/Annum

Description:

Nos. of reactors installed = 1

Total investment = 50 Lakhs

Saving @ Rs 991/MT = 24.7 Lakhs/Annum

Pay back period = 2 Years



11. Installation of cooling tower aluminium fan blades with light weight FRP(Fiber Reinforced plastic) blades in Chemical Plant.

We have replaced the aluminium fan blades of cooling tower with FRP (Fiber reinforced plastic), because FRP are lighter than Aluminium blades. Due to this torque on motor and running load of blades on motor gets reduced.

Electrical Energy savings = 1 Lakhs Kwh/Annum

Description:

Total Fan blades installed = 4 Nos.

Total investment = 4 Lakhs

Power savings @ Rs 3.6/Kwh = 3.6 Lakhs

Pay back period = 1.17 Years



12. PPFRP transparent Sheets are provide in IBB & MCA Plant for better lighting in building.

We have replaced ordinary metal sheets with PPFRP transparent sheets for better lighting in IBB & MCA Plant Packing shed area, Utility section shed area. By placing these sheets. There is no need of electrical lighting in day time and we have saved the power.

Electrical Energy saving = 0.2 Lakhs Kwh/Annum

Description:

Nos. of sheets Installed size 6mX1m = 50 nos.

Total investment = 3 Lakhs

Power saving @ Rs 3.6/kwh = 0.72 Lakhs/Annum

Pay back period = 4 Years



13. Installation of metal halides light inplace of high pressure sodium vapour lamps.

We have improved the illumination system and reduced the power consumption by replacing the High pressure sodium vapour lamps with MH (Metal Halide) lights.

Electrical Energy saving = 0.9 Lakhs Kwh/Annum

Description:

Nos. of MH-70 watt installed = 150 nos.

Nos. of MH-150 watt installed = 60 nos.

Nos. of MH-250 watt installed = 70 nos.

Total nos. of lights changed = 280 nos.

Total investment = 8 Lakhs

Power saving @ Rs 3.6/Kwh = 3.2 Lakhs/Annum

Pay back period = 2.5Years

