



## EXCEL INDUSTRIES LIMITED ROHA, RAIGAD (MAHARASHTRA)

### UNIT PROFILE



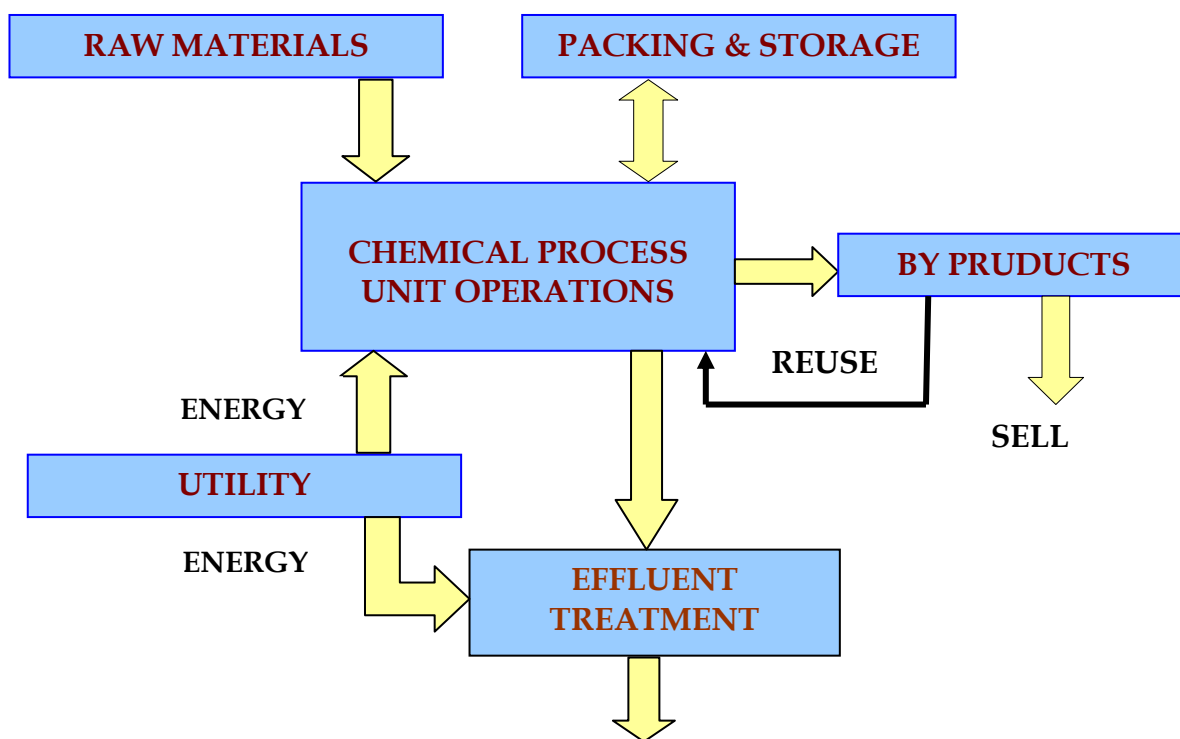
Excel Industries Limited, Roha is a pioneer in the field of manufacturing industrial chemicals, intermediates, specialty chemicals and agricultural chemicals and leading global manufacturer of Di-ethyl Thiophosphoryl Chloride, Phosphorous Pentasulphide and Glypophosphate . Although Excel has a much diversified range in chemicals manufacturing, our main strength lies in chlorine & phosphorous based chemicals.

Excel Industries Limited, Roha unit was started in 1975 with the production of Phosphorous Trichloride. Since then several additions were carried out with increase in the product range. Presently twelve industrial & agrochemicals are being manufactured at Roha unit. With this utility installations also underwent major expansions.

Presently, Roha unit is IS/ISO 9001: 2000; IS/ISO 14001 since January 2003 and IS 18000 certified unit since February 2006.

We are also a signatory of Indian Chemical Council's ' RESPONSIBLE CARE' and are prepared for audit in 2008-09 to get qualified.

**There is absolutely no excuse to ignore the energy challenges that lie ahead.**



CETP AS PER PRESCRIBED NORMS

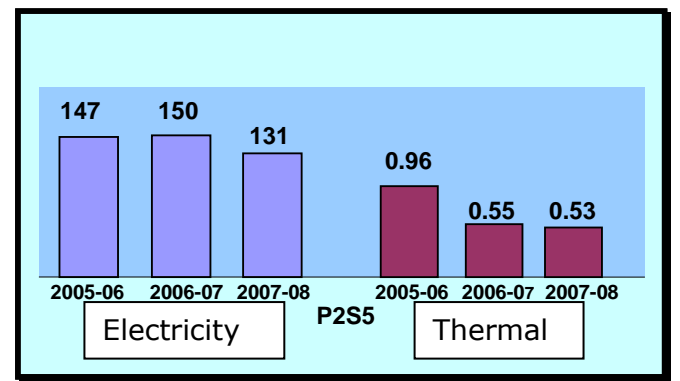
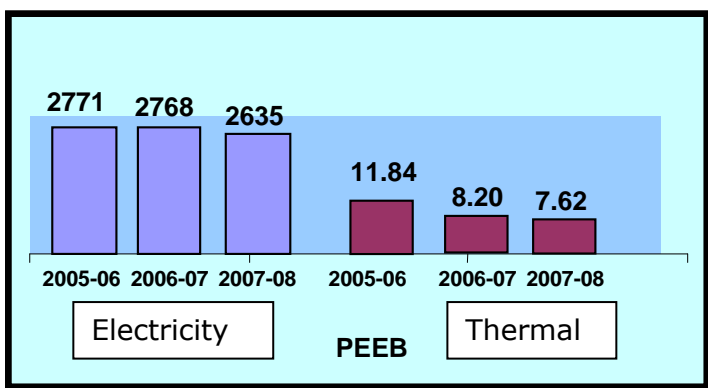
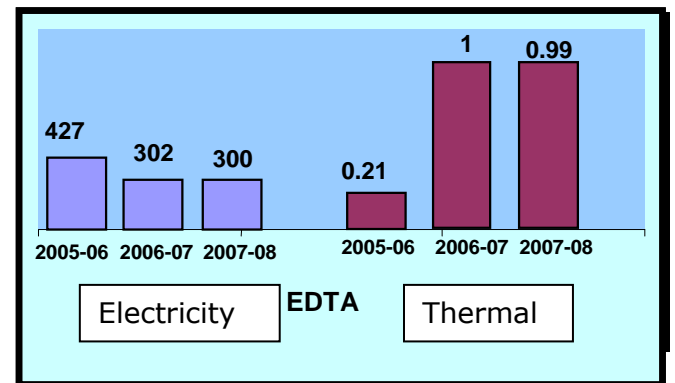
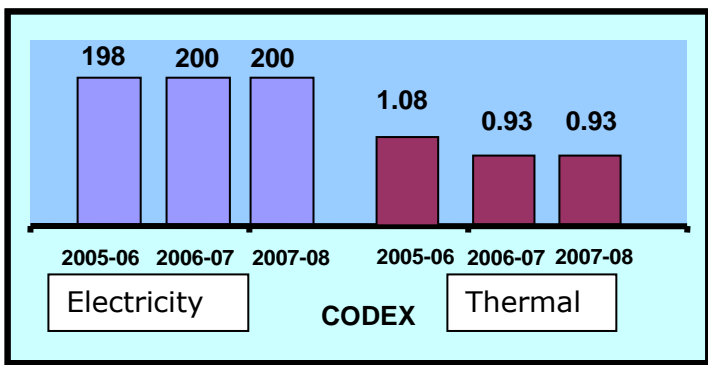
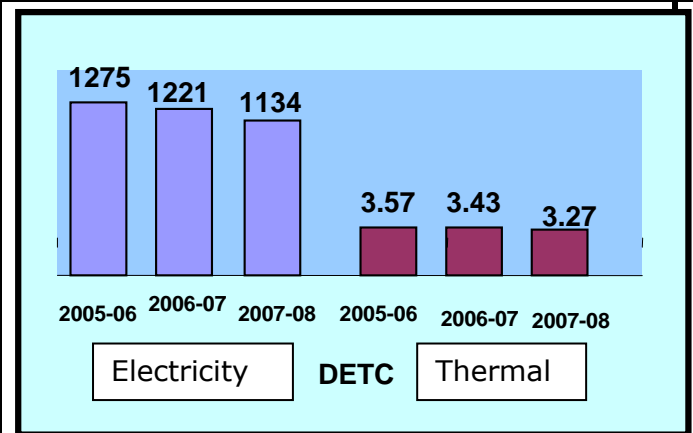
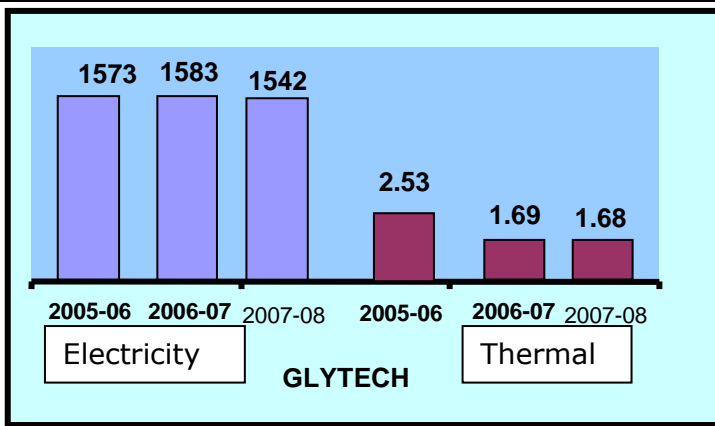
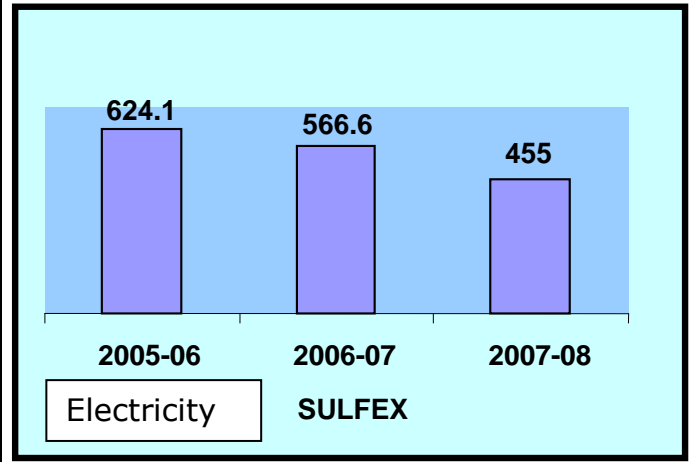
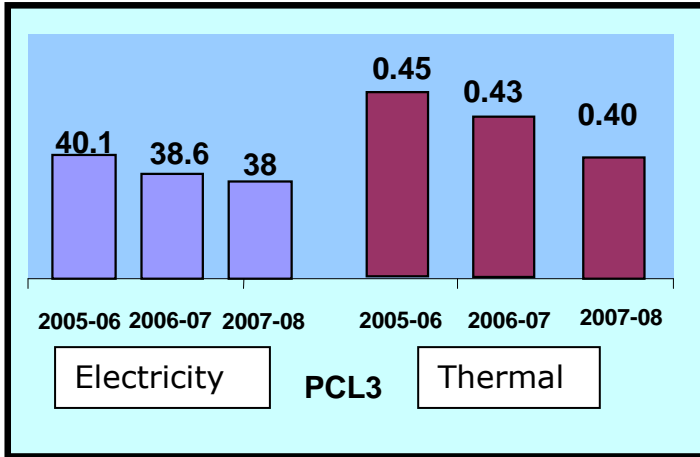
## (ii) ENERGY CONSUMPTION

Excel, as its tradition goes, believes in in-house development & indigenous technology. Energy conservation is not an exception to that. Our energy conservation efforts have shown us fruitful results. This was achieved in spite of upward revision of energy rates, raw material & other manufacturing costs, keeping the product prices almost stable.

With the implementation of various energy conservation measures as ongoing practice, there is steady decline of specific energy consumption. Last three years specific energy consumption figures are shown below, which depicts continual reduction in energy consumption over last two years due to our sustained efforts to conserve it with the implementation of various energy conservation measures.

DESCRIPTION	UNIT	2005-06	2006-07	2007-08
Electrical Energy	Lakhs kWh	137.86	124.62	143.55
Thermal Energy	Millions of kCal	45567.43	38317.74	55650
Total Value of Production	Rs. Lakhs	18044.00	19668.00	21716.00
Total Energy Bill	Rs. Lakhs	1164.04	1151.81	1216
Energy as % of total Value of Production	%	6.45%	5.85%	5.66
Reduction in Energy Expenses w.r.t. previous year	Rs. Lakhs		+12.23	-65
Electrical Rate	Rs/KWh	3.50	4.13	4.28
FO Rate	Rs/Liter	14.14	15.82	18.12
Diesel Rate	Rs/Liter	33.83	36.09	34.17

## REDUCTION IN SEC ELECTRICAL / THERMAL IN 07-08





## **20 (iii) ENERGY CONSERVATION COMMITMENT,POLICY,SET UP**

ENCON is an integral part of Excel's policy. It is reflected from our Mission Statement for 50 years, as stated in 1990 and the recent Policy Statement for Energy. Energy conservation has been given high due importance in every activity, on site, such as production, projects, expansions and modifications. Managers, Department heads and engineers are involved in ENCON activities through ENCON action planning, periodic energy consumption reviews and various training programmes conducted through internal and external faculties.

ENCON Cells at Corporate & site levels are formed and regular meeting conducted to plan, share & review Energy Conservation activities. Energy Policy has been constituted to reduce Specific Energy Consumption.

ENCON cells of all sites, along with Corporate representative meet quarterly to review & plan energy conservation activities. Specific energy consumption targets for each product are fixed at the beginning of the financial year and monthly energy report, indicating any deviations from standard specific consumption fixed are presented & discussed in Operations Planning Group which comprises of Chairman of the Board, and Managing Director, Executive Director, Vice-presidents of all divisions and all site in-charges. Annual operating plan is prepared for ENCON activities for every financial year with budget requirement.

Excel's continual improvement policy has been embedded in its Manufacturing Excellence Programme since August 2003. Energy conservation is an important part of our Manufacturing Excellence Programme. Under this programme, cross functional teams are formed to take specific projects aimed at Energy Conservation.

Excel is committed to Total Energy and Natural Resource Management and Prevention of Wastage. Because of this commitment, various Energy and Natural Resources Conservation features have been incorporated in the design stage itself.

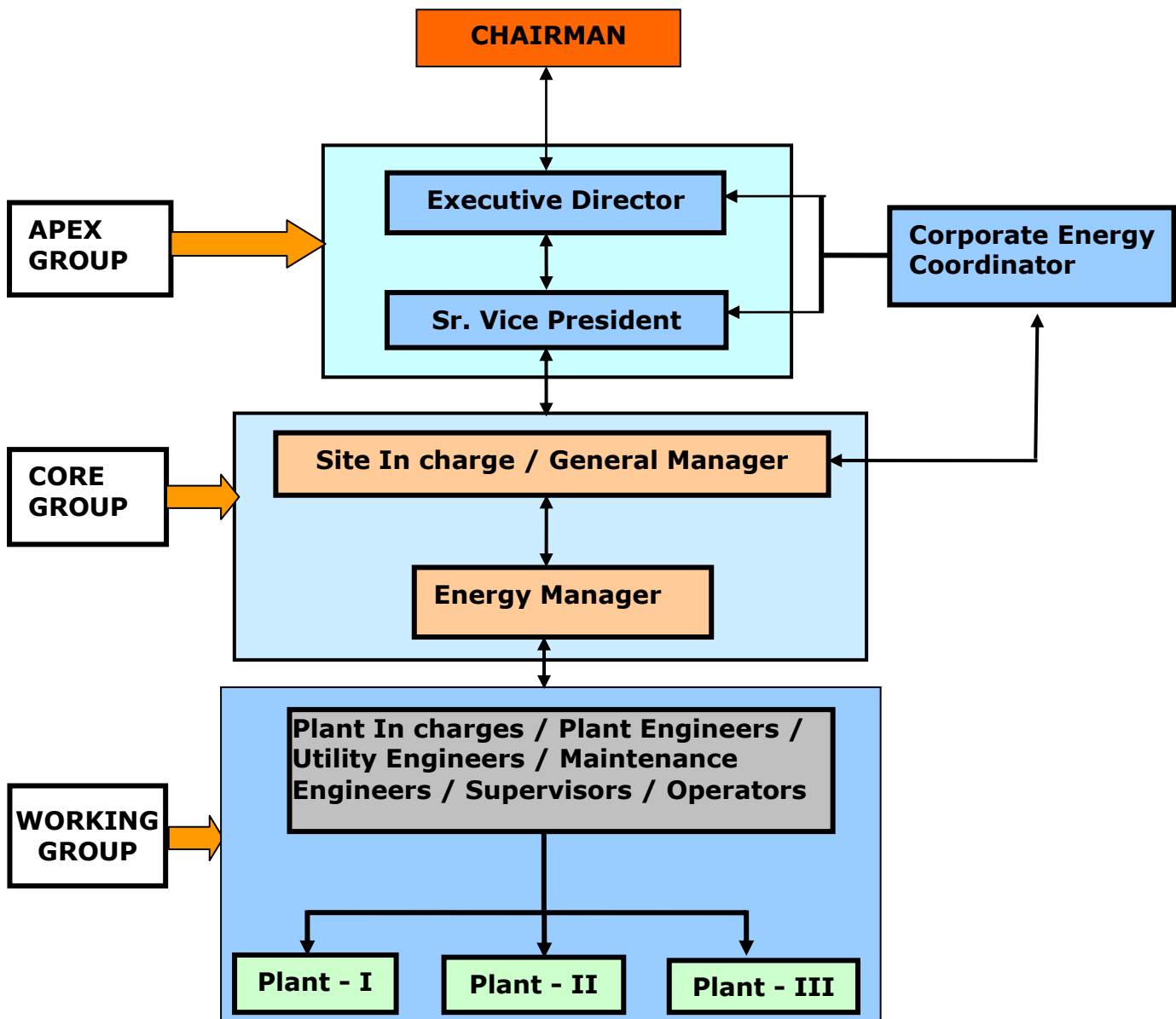
The ENERGY MANAGEMENT SYSTEM (EMS) comprises of three groups –  
APEX Group, CORE Group and WORKING Group.

The Energy Performance is monitored continuously, and reported to Top Management every month.

### iii) ORGANIZATIONAL STRUCTURE FOR ENERGY MANAGEMENT

The **ENERGY MANAGEMENT SYSTEM (EMS)** comprises of three groups

Group	Responsibility	Responsibility Function
<b>APEX Group</b>	• <b>TO SHOW THE PATH</b>	<ul style="list-style-type: none"> <li>• Commitment for Energy Conservation.</li> <li>• Guidance &amp; Support.</li> <li>• Motivation.</li> <li>• Making funds available for Energy Conservation projects &amp; Annual Plans.</li> </ul>
<b>CORE Group</b>	• <b>TO MAKE PATH</b>	<ul style="list-style-type: none"> <li>• Monitoring, Targeting Energy Consumptions &amp; Performance.</li> <li>• Preparing Annual Operation Plan for ENCON projects.</li> <li>• Conducting &amp; arranging Energy Audits.</li> <li>• Creating Awareness among working group members.</li> <li>• Technology Up gradation.</li> <li>• Training to Working &amp; ENCON Group</li> </ul>
<b>WORKING Group</b>	• <b>KEEP THE PATH CLEAN AND WALK SPEEDILY.</b>	<ul style="list-style-type: none"> <li>• Implementation of ENCON projects.</li> <li>• Measuring Energy Consumptions.</li> <li>• Generating ideas at work place.</li> <li>• Maintaining plant ENCON Equipment performance.</li> </ul>





## 20 (iii) ENERGY POLICY of EXCEL INDUSTRIES LIMITED, ROHA



### EXCEL INDUSTRIES LIMITED

#### ENERGY MANAGEMENT POLICY

We, at Excel Industries Limited, are committed to conserving energy and natural resources in all our processes and activities:

We shall accomplish it through:

- Enhancing awareness of all members of Excel family towards energy and resource conservation and building competence to conserve through appropriate training.
- Maintaining Energy Conservation Cell to coordinate Encon activities:
  - Through review of monitoring and reporting systems and modifications.
  - Providing common platform for information sharing, comparing energy consumption norms within the organization, with neighbors and with international norms.
  - Considering substitution with renewable energy sources where appropriate.
  - Ensuring management participation and budgetary support to energy management activities.
- Setting targets for reduction in specific energy consumption and developing action plans to achieve them.
- Seeking and exploring energy conservation opportunities through activities like energy balance studies, monitoring of utility equipments, evaluation of specific energy consumption of processes and experimental changes in energy sources.

04 September 2004

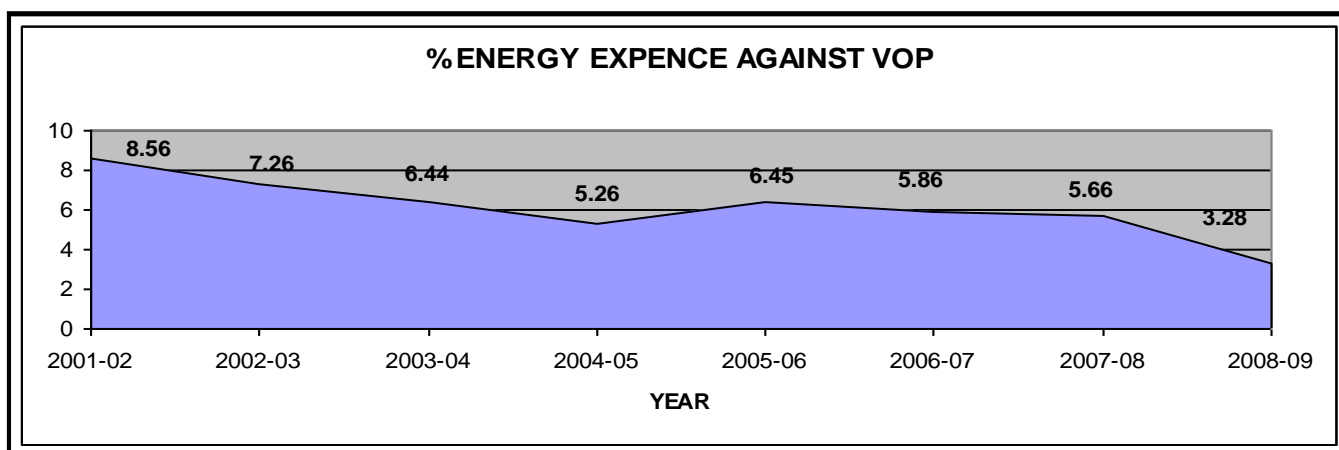
**S. R. POTDAR**

**EXECUTIVE DIRECTOR**

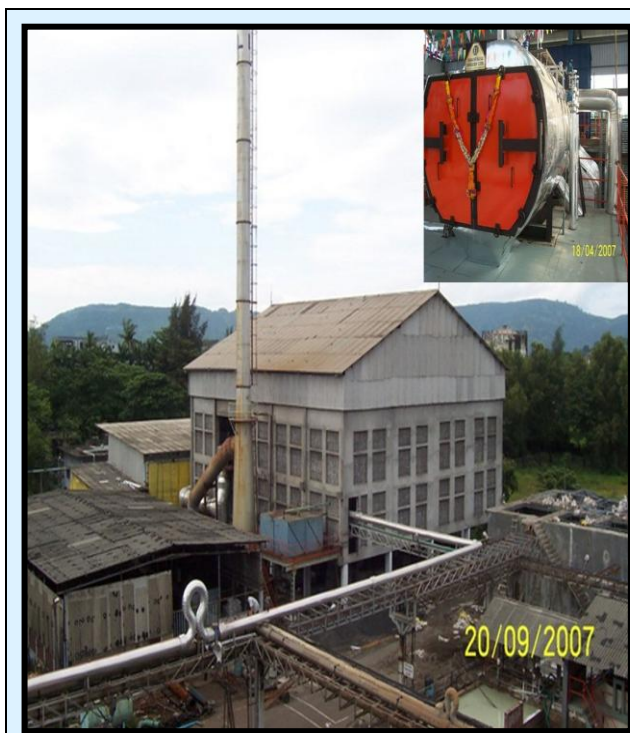
## 20 (iv) ENERGY CONSERVATION ACHIEVEMENTS

### Write-up on major energy conservation project implemented during the year 2007-2008 only

During the period 2007 - 2008, EXCEL have implemented 13 major energy saving ideas generated through periodic brain storming sessions. Annual savings of Rs.583.2 lakhs was achieved with an investment of Rs. 486.95 lakhs. These continuous work in energy efficiency and conservation as resulted into reduction in energy cost.Lakh of VOP (Value of Production) in spite of upward price hike of Energy cost.



#### Project-1: Installation of Coal Fired Boiler (Purchasing Energy at Low Cost)



As the cost of Furnace oil as fuel for steam generation was going as high as 18.12 Rs per liter; the cost of steam generation went up to Rs.1.33 per kg. So to reduce the cost of steam, Coal fired boiler of 12 TPH capacity was installed in April-2007. Steam generation was started on imported coal which is costing Rs.3.84 per kg; resulting in low coat of steam production at Rs.0.54 per kg with 7.10 kg/kg Evaporation ratio. During the year 2007-08, 45304 MT of Steam was generated from Coal.This resulted in saving of 3413 KL equivalent of Furnace oil with 13.27 kg/ Liter Evaporation ratio in 2007-08.

**Investment : Rs.400 Lakhs**

**Saving: Rs.436.74 Lakhs**

**Payback Period: 11 Month**

## Project-2: Electricity Load side Management (Technology Upgradation ;Teamwork)



Load side management is the Co-Operative action between the user & internal supplier of energy to use of energy without affecting the quantity & quality of product. The objective of power supply utilities behind introducing incentives in tariff structure is to promote efficient utilization as well as avoiding surges in demand in peak hours. We reduced the effective rate of electricity purchased from public utility by implementing some load side management measures and continuously monitoring the results. So, the reduction and controlling in Maximum Demand to a pre determined level resulted in yearly saving in M.D. charges to Rs. 4.80 Lakhs and net effect of reduction in purchased electricity bill of Rs. 28.80 Lakhs as compared to neighboring chemical industries in Roha industrial area.

Results of Load side Management:-

- 1)Load factor Improved
- 2)Reduction in Consumption.
- 3)Saving
- 4)Unity Power factor throughout year

**Investment : ZERO**

**Saving: Rs.4.80 Lakhs per year**

### Project-3: Installation of Vapor Absorption Chilling Machine – 250 TR (Technology Upgradation)



As the cost of steam generated by our Coal fired Boiler was reduced to 0.53 Rs per kg; Chilled Water Unit on Vapor Absorption with steam as heating source was commissioned in October – 2007. This VAM uses hot steam for chilled water generation. Till then, the effective cost of Chilled Water generation was Rs.4.60 per TR @ Rs.4.38 per kWh in 2007-08 with ammonia vapor compression systems. After commissioning LiBr-H<sub>2</sub>O based 250 TR Vapor Absorption Machine; the cost of chilled water generation is Rs.4.30 per TR. This also resulted in reduction Maximum Demand of electricity supplied by public utility causing reduction in effective rate of electricity Rs.0.53 per unit. Net reduction in power consumption by 14.45 Lakhs units is achieved. Improvement in operational stability having minimum drives, along with drastically reduced noise levels.

**Investment : Rs.45 Lakhs**

**Saving: Rs.37.44 Lakhs**

**Payback Period: 14.5 Month**

### Project-4: Installation of Mono – Belt Filter Press in place of Decanter for Gypsum drying process. (Technology Development)



We were using Alpha Laval Centrifuge for drying Gypsum in ETP Dept. Encon Team found that now same activity can be done by energy efficient Monobelt Filter. The proposal was sanctioned by management. The results are as follows:-

	Unit	Decanter	Mono-Belt
Output/Hr	M3/hr	3	5
Load	Kw	44	17
Running Hours/Day		18	11
Output /Day	M3/hr	54	55
Consumption/Day	KWH	792	187
Saving/Day	KWH		605
Saving /Annum	KWH		220825
Cost of Electricity	Rs		4.23
Net saving	Rs in Lakhs		9.34
Noise Level	db	100	35

**Investment : Rs.25 Lakhs**

**Saving: Rs.9.34 Lakhs**

**Payback Period: 32 Month**

## Project-5: Installation of Variable Frequency Drives for Reactor stirrer motors. (Technology Development)



Variable Frequency Drives were installed for Motors of 5 of Process Reactor stirrers in DETC plant, where variable stirring speeds were required by process during people at different phases of reaction. VFD will provide much controlled speed of reactor stirrer as required, which resulted in energy savings. For one Reactor, the total batch time is 10 Hours. Previously, the reactor stirrer was to run at 98 rpm for the entire batch time. After installation of VFD, the stirrer RPM was reduced to 75 RPM for 7.25 hours out of 10 hours. Earlier, One reactor was to consume  $11.9 \text{ KW} \times 10 \text{ Hours} = 119 \text{ kWh}$ . After installation of VFD, one reactor was started to consume  $11.9 \text{ KW} \times 2.58 \text{ Hrs} + 9.1 \text{ KW} \times 7.42 \text{ Hrs} = 98 \text{ kWh}$

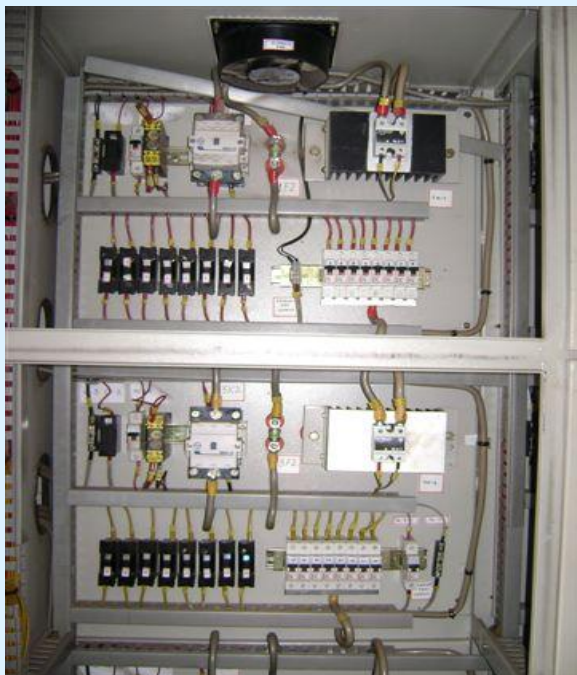
This resulted in saving of 21 kWh for 10 hours of operation per batch per reactor.  
Total Energy saving =  $21 \text{ kWh} \times 2692 \text{ no of batches in } 2007-08 = 56532 \text{ kWh}$   
Agency that executed the project: In House

**Investment : Rs. 2 Lakhs**

**saving: Rs. 2.47 Lakhs**

**Payback Period: 10 Months**

## Project-6: Thyristor based Temperature Control System for Electric Heaters (Technology Upgradation)



In our P2S5 plant, process requirement compels us to use electrical heaters to maintain temperature of process pipelines & certain equipment between 400 to 500 °C. Earlier practice of controlling the temperature by ON/OFF method using electronic timers was inefficient, as some heaters use to remain ON even if specified temperature is reached. With the use of thyristor controllers, which take temperature as a feedback and regulate power supply to heaters, it was possible to save energy as well as achieve accurate control of process temperature.

- ⊕ Production of Undistilled Product: 5300 MT
  - ⊕ Plant Running Hours in 2007-08:20 Hrs/Day x25 Days/Month x11 Months: 5500 Hrs.
  - ⊕ Installed Heaters Capacity:80 KW
  - ⊕ Electrical consumption on heaters with timer control:366640 KWh  
(Based on 50 sec ON /10 sec OFF per minute = 4583 Hours/ per year)
  - ⊕ Electrical cons with thyristor Controller :308000 KWh
  - ⊕ Power Savings for 2007-08 per year :58640 KWh
  - ⊕ Total saving: Rs.256843
- Agency that executed the project: In House

**Investment : Rs.0.90 Lakhs**

**Saving: Rs.2.56 Lakhs**

**Payback Period: 4.5 Months**

## Project-7: Improvement in Boiler Steam Condensate Recovery from 65 % to 70 %.(Waste Heat Recovery)



It is always advised to collect and use steam condensate wherever possible. Ideally, the Recovery of steam condensate should be 100%. But due to contamination, it is not possible to recover total condensate in a chemical plant. To maximize the recovery of condensate, a scheme of collecting and transferring steam condensate water was commissioned. Thereby Steam condensate recovery was increased from 65% to 70% by laying suitable pipelines of 1.5" NB – 200 meter long from plant & chilled water unit and a steam pressure operated condensate transfer pumps. This steam condensate at 85°C is being utilized as feed water to boiler to minimize the steam pre-heating of boiler feed water. During 2007-08, total steam used by plants for heating purpose was 62490 MT. Total condensate collected: 43743 MT Total Thermal Energy in terms of steam saved by eliminating boiler feed water pre-heating from 30°C to 85°C: 43743 MT x 55°C x 1000: 3645 MT of Steam This saved 71.42 KL of FO and 421.48 MT of Coal in 2007-08

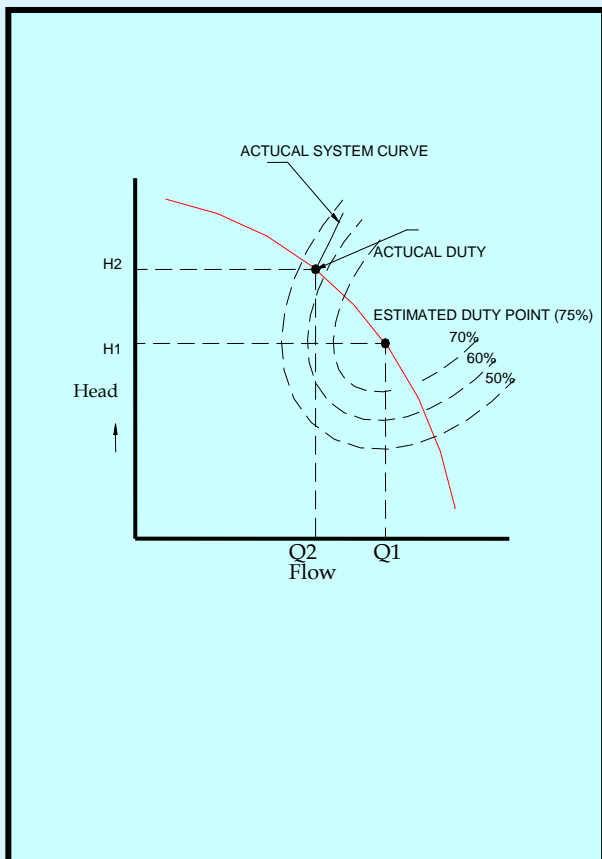
Agency that executed the project: Elixir Engineering Pvt. Ltd. Mumbai.

**Investment : Rs. 3 Lakhs**

**Saving: Rs. 29.12 Lakhs**

**Payback Period: 1.2 Month**

## Project-8: Installation of 3 no of Energy Efficient Centrifugal pumps. (Efficiency Improvement)



After careful study & audit of our cooling water systems, it was observed that 3 no of centrifugal utility pumps were not operating at the desired efficiency levels as Actual pumping circuit is altered from desired values which were at the time of system curve calculations.

This was due to addition / deletion of equipment in the circuit or throttling of valves for process requirement. To optimize our pumping system, actual duty point was determined by measurement of flow & head to calculate the present pump efficiency. We procured & installed the pump having highest possible efficiency for the given duty point.

Total 3 pumps replaced. The 30 HP/22.38 KW Reduction was achieved. These pumps operate for 24 hours x 12 months.

So, total power reduction:

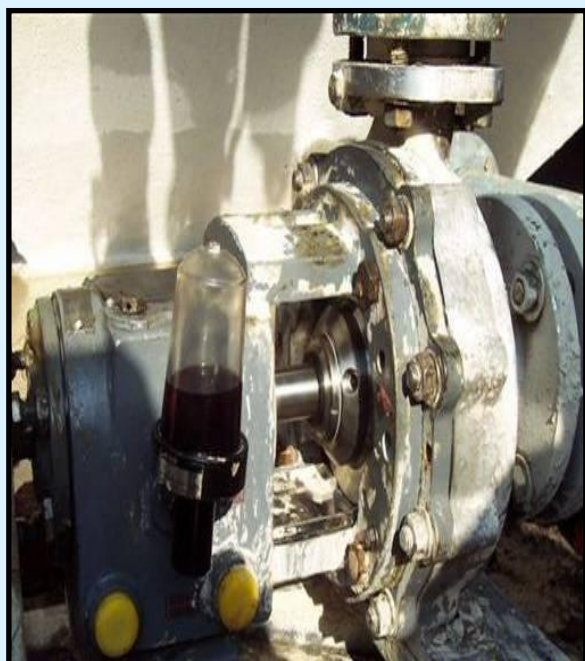
$22.38 \times 24 \text{ Hours} \times 360 \text{ Days} = 193363 \text{ kWh}$   
i.e. Rs. 8.47 Lakhs @ Rs.4.38 per unit

**Investment : Rs.2.5 Lakhs**

**Saving: Rs.8.47 Lakhs**

**Payback Period: 3.5 Month**

## Project-9: Installation of Mechanical Seals in place of gland packing to reduce frictional losses & material wastage.(Waste Elimination)



By replacing conventional gland packing in stuffing box, which causes frictional resistance to the pump shaft, with mechanical seals, has helped us in reduction in current drawn by pump motor; in addition to elimination of Asbestos Gland Packing.

The current drawn by motors was reduced by average 1.5 to 3 amps.

No. of mech. seals fitted = 5 No.s

Total reduction: 10 Amps = 6.9 KW

Annual Reduction @ 5280 hours operation = 36432 KWh

Agency that executed the project: In House & Orbit Engineers, Mumbai

**Investment : Rs.1.25 Lakhs**

**Saving: Rs.1.59 Lakhs**

**Payback Period: 4.5 Months**

## Project-10: Use of Energy efficient Lighting(Efficiency improvement)



Most of the production plants were fitted with conventional 80W/160W HPMV lamps in the Flameproof fixture. With little modifications, we were used 23W CFL lamps without compromising on Lux levels or hampering illuminance level significantly. At required places where luminaries height was also reduced to get sufficient illumination. Tube light fixtures in offices were replaced by CFL Bulbs of 18 Watt / 36 Watt.

No of 80 W HPMV Lamps replaced:80  
 No of 160W HPMV Lamps replaced:35  
 No of 32W FTL replaced:60  
 Electrical saving achieved:  
 $11.39 \text{ KW} \times 12 \text{ Hrs} \times 360 \text{ Days} = 49226 \text{ kWh}$   
 Agency that executed the project: In House

**Investment : Rs. 0.5 Lakhs**

**Saving: Rs. 2.15 Lakhs**

**Payback Period: 3 Months**

## Project-11: Use of Natural Day Light instead of Artificial Lighting (Renewable Energy)



In several departments such as engineering stores, refrigeration units, godowns, Air Compressors unit; there was common practice to have lights 'ON' during day time. We decided to take advantage of natural sun light during day time to illuminate the space and to switch off lighting load. The total saving was Rs. 0.285 Lakhs per year was achieved.

**Investment : Rs.8400**

**Saving: Rs.28500 per year**

**Payback Period : 10.5 Months**

## Project-12: Installation Natural Draft Cooling tower in place of Induced draft Cooling tower.(Technology Development)



We had already replaced 6 nos of Induced draft cooling towers by natural draft cooling towers. Even if the natural draft cooling towers require more space than induced draft cooling tower, it eliminates the requirement of fan for cross flow of air in cooling tower.

In 2007-08, Induced draft Cooling Towers at two locations were replaced by Natural Draft Cooling Towers. This resulted in elimination of cooling fan & motor for following locations:

1. DETC-I plant: Elimination of 10 HP motor
2. P2S5 plant: Elimination of 7.5 HP motor

The total reduction is 13 KW.

i.e.  $13 \text{ KW} \times 24 \text{ Hours} \times 330 \text{ Days} = 93056 \text{ kWh per year @ } 0.9 \text{ load factor}$

Agency that executed the project: In House

**Investment : Rs.4.50 Lakhs**

**Saving: Rs.4.07 Lakhs**

**Payback Period: 13 Months**



## 20 (v) ENERGY CONSERVATION PLANS AND TARGETS

Our achievements and results of Energy Conservation projects are measured by the reduction in Specific Energy consumptions of our following products.

We Believe that Energy Efficiency improvement is not a one time activity but a continual activity. Our performance in last 5 years had shown and more over made us confident to work more energetically and set.

### **Our target for next three years to reduce the Specific Energy consumptions by at least 5 % of present levels by –**

- ▶ Daily monitoring of electricity consumption, Maximum demand reached, Power Factor and Load Factor achieved in electricity distribution network through computer aided Load Management System.
- ▶ Continuous monitoring of KW per TR, COEFFICIENT OF PERFORMANCE & Energy Efficiency Ratio in Refrigeration units and Evaporation Ratio, Blow down quantity, Steam generation, feed water quality, Boiler overall efficiency and combustion efficiency in Boiler through SCADA operating consol.
- ▶ **FINE TUNING** Daily department wise Energy Meter readings & Steam Meter readings to know energy consumptions, comparing with Standard Energy Consumptions and taking corrective actions in case of negative deviations.
- ▶ Operating our production plants at 95% capacity utilization when operated.
- ▶ Eliminating Energy waste by eliminating "Non-Value-Adding" activities.
- ▶ Installing energy efficient equipments.
- ▶ Adopting new energy efficient technology for supplying utilities to plants and for plant production processes.
- ▶ Increasing & maintaining awareness about energy conservation among workmen, staff and to encourage them to share their ideas.
- ▶ Inviting outside firms to carry out Energy Audit at EXCEL.
- ▶ Analyzing equipment performance with respect to energy efficiency.
- ▶ Preparing Annual Operation Plan for Energy Conservation projects.
- ▶ Sharing knowledge about Energy Conservation with Energy Managers from neighboring chemical industries in Roha industrial area through Roha Industrial Association.
- ▶ Implementing life cycle concept, replacing old & in efficient equipments by energy efficient equipments.
- ▶ Optimizing the capacities of plant equipments to enhance production capacity by 10%.

### **ENERGY TARGETS**

Product	Specific Energy Consumption	
	Electrical kWh/ Ton of prodn.	Steam MkCal per Ton of prodn.
PCI3	37 .00	0.38
Sulfex	450 .00	Not Applicable
DETC	1135 .00	2.90
Glytech	1480 .00	1.52
PEEB	2200 .00	6.60
P2S5	125 .00	0.495
CODEX	155.00	0.89
EDTA	280 .00	0.92

**Limit excess air to Less than 10 % on clean fuels**

Excel is known for its commitment towards environmental excellence and safety. The company has built well equipped Effluent Treatment Plant along with Bio-reactors and incinerators.

The company has successfully implemented Environment Management System and certified for ISO-18001 since FEBRUARY 2006.

Company has created facilities for effluent treatment in terms of primary & secondary treatment. Extended aeration with activated sludge is carried out and outgoing effluent is aerated in polishing aerator to meet disposal below the norms of consent given by Maharashtra Pollution Control Board.

Adequate scrubbing systems have been provided for scrubbing all exhaust gases. In fact, by-products like NaHS, HCl & Ortho-phosphoric acid generated by scrubbing of waste gases are being sold or utilized on site.


Stack monitoring and work area monitoring data proves that our scrubbing efficiencies to be better than stipulated norms. The company meets all the requirements of existing consent for air, water and hazardous waste.

An incinerator has been installed for hazardous waste incineration. We are members of Mumbai Waste Management for disposal of wastes which can not be handled on our site.

**OUR ACHEIVEMENTS IN ENVIRONMENTAL DEPARTMENT**

<b><u>EFFLUENT DISPOSAL</u></b>				<b><u>AIR QUALITY MONITORING</u></b>			
Parameters	Unit	MPCB	Actual	Parameters	Unit	MPCB norms	Actual
pH		5.5 to 9.0	7.2	SPM	mg/Nm3	< 150	106
Suspended Solids	mg/lit	< 100	14	SO 2( Boiler )	T /Day	< 1.9	0.231
BOD 3 day @ 27 ° C	mg/lit	< 100	64	SO2( Process)	ppm	< 50	33.6
COD	mg/lit	< 250	176	HCl	mg/Nm3	< 35	14.05
Oil & Grease	mg/lit	< 10	BDL	H2S	mg/Nm3	< 10	0.75
Phenol	mg/lit	< 1	BDL	Chlorine	ppm	< 3	0.05
Pesticides	mg/lit	< NIL	BDL				
BDL - Below Detectable Limit							

<b><u>REDUCTION IN WATER CONSUMPTION</u></b>				<b><u>KEEPING FACTORY GREEN</u></b>
Year	Water Consumption M3	Total MT Production	Water M3 / MT Prod.	
2003-04	217625	12548	17	
2004-05	232425	14508	16	
2005-06	260646	22789	11	
2006-07	260332	23262	11	
2007-08	304522	27385	11	



CO2 emissions from fuel combustion increased 13% between 1990 and 2001.

Agency that executed the project: In house					
Total investment, Rs.: 2 lakhs			Year of implementation: 2007-08		
First year energy cost savings, Rs.: 49 Lacs					
First year other savings, :-					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before	-	-	-	-	-
Energy consumption after	-	-	-	-	-
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...	-	-	-	-	
Company complete address: EXCEL INDUSTRIES LIMITED Plot No.112, 20/1- OS-2, M.I.D.C.Area At-Po: Dhatav, Tal: ROHA, Dist: RAIGAD, MAHARASHTRA PIN:402116				We authorise Bureau to use this information for dissemination	
Contact person who could be contacted for more information: Mr. P.P. Dhamangaonkar, General Manager - Roha Site				Signature  Date	

**Note: Please submit this sheet separately for each Energy Conservation Measure implemented in 2007-2008 and a CD containing the above information may be please be enclosed**

## Energy Conservation Measure implemented in 2007-2008

(To be filled up separately for each Energy Conservation Measure)



	Title of the measure	Sector :- Chemical
	<u>Installation of Vapor Absorption Chilling Machine 250 TR</u>	Technology:- Process Monitoring and Controls
<p>Description of the energy conservation measure:          Earlier, chilled water was generated by conventional chilling plants using shell &amp; tube heat exchangers and ammonia for compression.          As the cost of steam generated by our Coal fired Boiler was reduced to 0.53 Rs per kg; Chilled Water Unit on Vapor Absorption with steam as heating source was commissioned in October – 2007.          This VAM uses hot steam for chilled water generation.          Till then, the effective cost of Chilled Water generation was Rs.4.60 per TR @ Rs.4.38 per kWh in 2007-08 with ammonia vapor compression systems.          After commissioning LiBr-H<sub>2</sub>O based 250 TR Vapor Absorption Machine; the cost of chilled water generation is Rs.4.30 per TR.          This also resulted in reduction Maximum Demand of electricity supplied by public utility causing reduction in effective rate of electricity Rs.0.53 per unit.          Other Benefits are:</p> <ul style="list-style-type: none"> <li>➤ Phasing out Ammonia as refrigerant to reduce hazards.</li> <li>➤ Net reduction in power consumption by 14.45 Lakhs units.</li> </ul> <p>Improvement in operational stability having minimum drives, along with drastically reduced noise levels</p>		
First year energy cost savings, Rs.: 37 Lacs		
Picture/ sketch/ drawing before modification	Picture/ sketch/ drawing after modification	
254TR VCR Installation	225TR VCR Installation	
		

Agency that executed the project (with complete address and email): Excel Industries Ltd. (In House)					
Total investment, Rs.: 45 Lacs			Year of implementation: 2007-08		
First year other savings, Rs:-- Improvement in productivity & manpower efficiency.					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before		-	-		-
Energy consumption after		-	-		-
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...					
Company complete address: EXCEL INDUSTRIES LIMITED Plot No.112, 20/1- OS-2, M.I.D.C.Area At-Po: Dhatav, Tal: ROHA, Dist: RAIGAD, MAHARASHTRA PIN:402116				We authorise Bureau to use this information for dissemination	
Contact person who could be contacted for more information: Mr. P.P. Dhamangaonkar, General Manager - Roha Site				Signature  Date	

**Note: Please submit this sheet separately for each Energy Conservation Measure implemented in 2007-2008 and a CD containing the above information may be please be enclosed**

## Energy Conservation Measure implemented in 2007-2008

(To be filled up separately for each Energy Conservation Measure)



	<b>Title of the measure</b>	Sector :- Chemical	
	<b><u>Installation of Mono – Belt Filter Press for Gypsum drying process</u></b>	Technology:- Replacement/Installation / Modernization of old and inefficient existing equipment and systems	
<b>Description of the energy conservation measure:</b>			
<p>Previously Decanter machine was being used for Gypsum drying process in our E.T.P. Decanter was having total 44 KW connected load &amp; was giving 3 m3/hour output. Total units consumed in a year with 18 hours operation per day were 2.85 Lakhs kWh. The Decanter was replaced by a Mono-Belt Press Filter having an innovative technology. The new machine is having 17.15 KW connected load &amp; gives 5 m3/hour output. Total units consumed by Mono-Belt Filter in a year with 12 hours operation per day are 0.74 Lakhs kWh. This resulted in reduction of 2.11 Lakhs kWh per year. Reduction in Noise Pollution was also observed from 100 d B to 35 d B .</p>			
	Unit	Decanter	Mono-Belt
Output/Hr	M3/hr	3	5
Load	Kw	44	17
Running Hours/Day		18	11
Output/Day	M3/hr	54	55
Consumption/Day	KWH	792	187
Saving/Day	KWH		605
Saving/Annum	KWH		220825
Cost of Electricity	Rs		4.23
Net saving	Rs in Lakhs		9.34
Noise Level	db	100	35
<b>Picture/ sketch/ drawing before modification</b>		<b>Picture/ sketch/ drawing after modification</b>	
<b>Old alfa laval Centrifuge - 45KW</b>		<b>Mono-BELT Filter press - 17KW.</b>	
			

Agency that executed the project: Techno-Fughi, Italy					
Total investment, Rs.: <b>Rs.25 Lakhs</b>			Year of implementation: 2007-08		
First year energy cost savings, Rs.: <b>Rs.9.25 Lakhs</b>					
First year other savings, :-					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before	-	-	-	-	-
Energy consumption after	-	-	-	-	-
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...	-	-	-	-	
Company complete address: EXCEL INDUSTRIES LIMITED Plot No.112, 20/1- OS-2, M.I.D.C.Area At-Po: Dhatav, Tal: ROHA, Dist: RAIGAD, MAHARASHTRA PIN:402116				We authorise Bureau to use this information for dissemination	
Contact person who could be contacted for more information: Mr. P.P. Dhamangaonkar, General Manager - Roha Site				Signature  Date	

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## Energy Conservation Measure implemented in 2007-2008

(To be filled up separately for each Energy Conservation Measure)

	Title of the measure <b style="color: red; text-decoration: underline;">Installation of VFD for stirrer Motors</b>	Sector :- Chemical			
		Technology:- Process Monitoring and Controls			
Description of the energy conservation measure: Variable Frequency Drives were installed for Motors of 5 no of Process Reactor stirrers in DETC plant, where variable stirring speeds were required as required by process people at different phases of reaction. VFD will provide as much controlled speed of reactor stirrer as required, which resulted in energy savings. For one Reactor, the total batch time is 10 Hours. Previously, the reactor stirrer was to run at 98 rpm for the entire batch time. After installation of VFD, the stirrer RPM was reduced to 75 RPM for 7.25 hours out of 10 hours. Earlier, One reactor was to consume 11.9 KW x 10 Hours = 119 kWh. After installation of VFD, one reactor was started to consume 11.9 KW x 2.58 Hrs + 9.1 KW x 7.42 Hrs = 98 kWh This resulted in saving of 21 kWh for 10 hours of operation per batch per reactor. Total Energy saving = 21 kWh x 2692 no of batches in 2007-08 = 56532 kWh					
<b>Picture/ sketch/ drawing before modification</b>		<b>Picture/ sketch/ drawing after modification</b>			
M.C.C. w/o VFD		VFD Installation			
					
Agency that executed the project In House					
Total investment, Rs.: <b>2 Lakhs</b>			Year of implementation: 2007-08		
First year energy cost savings, Rs.: <b>2.47 Lakhs</b>					
First year other savings, Rs:-					
On annual basis	kWh 000'	Coal (Tons )	Gas Nm <sup>3</sup>	Oil (kL)	Other Raw Material for process
Energy consumption before	-	-	-	-	-
Energy consumption after	-	-	-	-	-
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...				-	

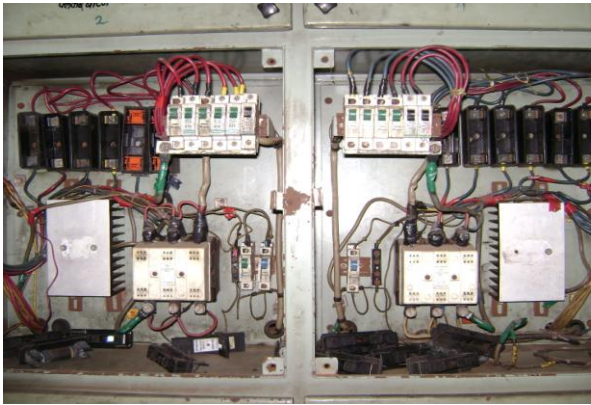
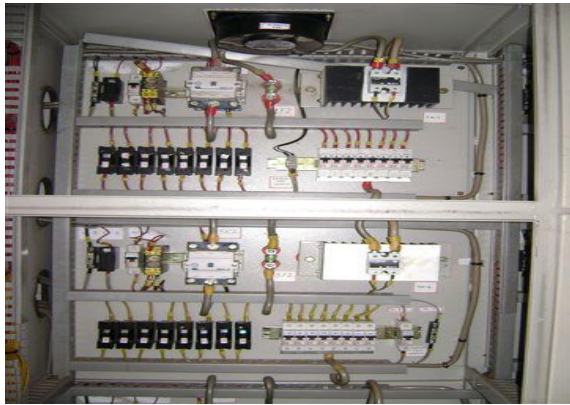


<p>Company complete address: EXCEL INDUSTRIES LIMITED Plot No.112, 20/1- OS-2, M.I.D.C.Area At-Po: Dhatav, Tal: ROHA, Dist: RAIGAD, MAHARASHTRA PIN:402116</p> <p>Contact person who could be contacted for more information: Mr. P.P. Dhamangaonkar, General Manager - Roha Site</p>	<p>We authorise Bureau to use this information for dissemination</p> <p>Signature</p> <p>Date</p>
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## Energy Conservation Measure implemented in 2007-2008

(To be filled up separately for each Energy Conservation Measure)



	Title of the measure	Sector :- Chemical			
	<u>Thyristor based Temperature Control System for Electric Heaters</u>	Technology:- Energy substitution/switching measures			
Description of the energy conservation measure:					
<p>In our P2S5 plant, process requirement compels us to use electrical heaters to maintain temperature of process pipelines &amp; certain equipment between 400 to 500 °C. Earlier practice of controlling the temperature by ON/OFF method using electronic timers was inefficient, as some heaters use to remain ON even if specified temperature is reached. With the use of thyristor controllers, which take temperature as a feedback and regulate power supply to heaters, it was possible to save energy as well as accurate control of process temperature was made possible .</p>					
<b>Picture/ sketch/ drawing before modification</b>	<b>Picture/ sketch/ drawing after modification</b>				
Thermal Relay Controlled panel.	Thyristor Controlled Panel				
					
Agency that executed the project (with complete address and email): Excel Industries Ltd.(In house)					
Total investment, Rs.: 0.90 Lacs			Year of implementation: 2007-08		
First year energy cost savings, Rs.: 2.56 Lacs					
First year other savings, Rs:-- NIL					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before		-	-	-	-
Energy consumption after		-	-	-	-
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...				-	



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## Energy Conservation Measure implemented in 2007-2008

	Title of the measure  <b style="color: red; text-decoration: underline;">Improvement in Boiler Steam Condensate Recovery from 65 % to 70 %</b>	Sector :- Chemical  Technology:- Energy substitution/switching measures
Description of the energy conservation measure: It is always advised to collect and use steam condensate wherever possible. Ideally, the Recovery of steam condensate should be 100%. But due to contamination, it is not possible to recover total condensate in a chemical plant. To maximize the recovery of condensate, a scheme of collecting and transferring steam condensate water was commissioned. Thereby Steam condensate recovery was increased from 65% to 70% by laying suitable pipelines of 1.5" NB – 200 meter long from plant & chilled water unit and a steam pressure operated condensate transfer pumps. This steam condensate at 85°C is being utilized as feed water to boiler to minimize the steam pre-heating of boiler feed water. During 2007-08, total steam used by plants for heating purpose was 62490 MT. Total condensate collected: 43743 MT. Total Thermal Energy in terms of steam saved by eliminating boiler feed water pre-heating from 30°C to 85°C: 43743 MT x 55°C x 1000: 3645 MT of Steam. This saved 71.42 KL of FO and 421.48 MT of Coal in 2007-08		
<b>Picture/ sketch/ drawing before modification</b> Condensate drained to ETP.	<b>Picture/ sketch/ drawing after modification</b> Condensate Recovery Pump.	
		
Agency that executed the project (with complete address and email Elixir Engineering Pvt. Ltd. Mumbai.		
Total investment, Rs.: 3 Lacs		Year of implementation: 2007-08
First year energy cost savings, Rs.: 29.12 Lacs		
First year other savings, Rs:-- NIL		
On annual basis	kWh 000'	Coal (Tons)
Energy consumption before	-	-
Energy consumption after	-	-
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...		-





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## Energy Conservation Measure implemented in 2007-2008

(To be filled up separately for each Energy Conservation Measure)

	Title of the measure	Sector :- Chemical																																					
	<u>Installation of 3 no of Energy Efficient Centrifugal pumps.</u>	Technology:- Energy substitution/switching measures																																					
<p>Description of the energy conservation measure:</p> <p>After careful study &amp; audit of our cooling water systems, it was observed that 3 no of centrifugal utility pumps were not operating at the desired efficiency levels as Actual pumping circuit is altered from desired values which were at the time of system curve calculations.</p> <p>This was due to addition / deletion of equipment in the circuit or throttling of valves for process requirement.</p> <p>To optimize our pumping system, actual duty point was acquired by measurement of flow &amp; head to calculate the present pump efficiency.</p> <p>We procured &amp; installed the pump having highest possible efficiency for the given duty point.</p> <p>Total 3 no of pumps replaced. The 30 HP/22.38 KW Reduction was achieved. These pumps operate for 24 hours x 12 months.</p> <p>So, total power reduction:  <math>22.38 \times 24 \text{ Hours} \times 360 \text{ Days} = 193363 \text{ kWh}</math>          i.e. Rs. 8.47 Lakhs @ Rs.4.38 per unit.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 40%;">Pump Description</th> <th style="width: 15%;">KW before pump replacement</th> <th style="width: 15%;">KW after pump replacement</th> <th style="width: 30%;">Saving in KW</th> </tr> </thead> <tbody> <tr> <td>CW Pump for 160 TR Ref. Unit</td> <td style="text-align: center;">33.75</td> <td style="text-align: center;">30.26</td> <td style="text-align: center;">3.49</td> </tr> <tr> <td>CW Pump for VAR Unit</td> <td style="text-align: center;">34.90</td> <td style="text-align: center;">34.90</td> <td style="text-align: center;">0</td> </tr> <tr> <td>CW Pump for OPA Unit</td> <td style="text-align: center;">31.00</td> <td style="text-align: center;">11.60</td> <td style="text-align: center;">19.40</td> </tr> <tr> <td>CW Pump for Aqueous Reboiler</td> <td style="text-align: center;">47.68</td> <td style="text-align: center;">27.35</td> <td style="text-align: center;">20.33</td> </tr> <tr> <td>CW Pump for Codex plant</td> <td style="text-align: center;">11.05</td> <td style="text-align: center;">4.94</td> <td style="text-align: center;">6.11</td> </tr> <tr> <td>CW Pump for HCL Scrubber</td> <td style="text-align: center;">18.16</td> <td style="text-align: center;">10.99</td> <td style="text-align: center;">7.17</td> </tr> <tr> <td>CW Circ. Pump for DETC-I</td> <td style="text-align: center;">24.40</td> <td style="text-align: center;">21.50</td> <td style="text-align: center;">2.90</td> </tr> <tr> <td><b>Total</b></td> <td style="text-align: center;"><b>200.94</b></td> <td style="text-align: center;"><b>141.54</b></td> <td style="text-align: center;"><b>59.40</b></td> </tr> </tbody> </table>				Pump Description	KW before pump replacement	KW after pump replacement	Saving in KW	CW Pump for 160 TR Ref. Unit	33.75	30.26	3.49	CW Pump for VAR Unit	34.90	34.90	0	CW Pump for OPA Unit	31.00	11.60	19.40	CW Pump for Aqueous Reboiler	47.68	27.35	20.33	CW Pump for Codex plant	11.05	4.94	6.11	CW Pump for HCL Scrubber	18.16	10.99	7.17	CW Circ. Pump for DETC-I	24.40	21.50	2.90	<b>Total</b>	<b>200.94</b>	<b>141.54</b>	<b>59.40</b>
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<b>Total</b>	<b>200.94</b>	<b>141.54</b>	<b>59.40</b>																																				
<p><b>Picture/ sketch/ drawing before modification</b></p> <p>53% Efficiency pump.</p>	<p><b>Picture/ sketch/ drawing after modification</b></p> <p>70% Efficiency pump.</p>																																						
																																							




Agency that executed the project (with complete address and email): Excel Industries Ltd.(In house)					
Total investment, Rs.: 2.5 Lacs			Year of implementation: 2007-08		
First year energy cost savings, Rs.: 8.4 Lacs					
First year other savings, Rs:-- NIL					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before		-	-	-	-
Energy consumption after		-	-	-	-
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...				-	
Company complete address: EXCEL INDUSTRIES LIMITED Plot No.112, 20/1- OS-2, M.I.D.C.Area At-Po: Dhatav, Tal: ROHA, Dist: RAIGAD, MAHARASHTRA PIN:402116				We authorise Bureau to use this information for dissemination	
Contact person who could be contacted for more information: Mr. P.P. Dhamangaonkar, General Manager - Roha Site				Signature  Date	

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## Energy Conservation Measure implemented in 2007-2008

(To be filled up separately for each Energy Conservation Measure)

	Title of the measure	Sector :- Chemical			
	<u>Installation of Mechanical Seals in Place of Gland packing to reduce frictional Losses and Material Wastage</u>	Technology:- Energy substitution/switching measures			
<p>Description of the energy conservation measure:</p> <p>By replacing conventional gland packing in stuffing box, which causes frictional resistance to the pump shaft, with mechanical seals, has helped us in reduction in current drawn by pump motor; in addition to elimination of Asbestos Gland Packing.</p> <p>The current drawn by motors was reduced by average 1.5 to 3 amps.          Total reduction: 10 Amps = 6.9 KW          Annual Reduction @ 5280 hours operation= 36432 KWh          Agency that executed the project: In House &amp; Orbit Engineers, Mumbai</p>					
<b>Picture/ sketch/ drawing before modification</b> (if available)	<b>Picture/ sketch/ drawing after modification</b> Pump with Mechanical Seal				
Not Available					
Agency that executed the project (with complete address and email): In House & Orbit Engineers, Mumbai					
Total investment, Rs.: 1.25 Lacs			Year of implementation: 2007-08		
First year energy cost savings, Rs.: 1.59 Lacs					
First year other savings, Rs:-- NIL					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before		-	-	-	-
Energy consumption after		-	-	-	-
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...				-	





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**Schedule your operations to maintain a high load Factor.**

## Energy Conservation Measure implemented in 2007-2008

	Title of the measure	Sector :- Chemical			
	<u>Use of Natural Day Light instead of Artificial Lighting</u>	Technology:- Energy substitution/switching measures			
<p>Description of the energy conservation measure:</p> <p>In several departments such as engineering stores, refrigeration units, godowns there were common practice to have lights on during day time. We decided to take advantage of natural sun light during day time to illuminate the space and to switch off lighting load.</p> <p>Replace two or four roof A.C. sheets in engineering stores, refrigeration units and godowns with transparent F.R.P. corrugated sheets.</p> <p>So, natural day light was available for illumination with no need to switch on lighting except in night hours.</p>					
<b>Picture/ sketch/ drawing before modification</b>		<b>Picture/ sketch/ drawing after modification</b>			
Conventional Lighting		Natural Lighting			
					
Agency that executed the project (with complete address and email): Excel Industries Ltd.(In house)					
Total investment, Rs.: 8400			Year of implementation: 2007-08		
First year energy cost savings, Rs.: 28547					
First year other savings, Rs:-- NIL					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before	13.82	-	-	-	-
Energy consumption after	6.91	-	-	-	-
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...	4.13			-	





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## Energy Conservation Measure implemented in 2007-2008

(To be filled up separately for each Energy Conservation Measure)

	Title of the measure	Sector :- Chemical			
	<u>Use of Energy Efficient Lighting</u>	Technology:- Energy substitution/switching measures			
<p>Description of the energy conservation measure:</p> <p>Most of the production plants were fitted with conventional 80W/160W HPMV lamps in the Flameproof fixture. With little modifications, we were used 23W CFL lamps without compromising on Lux levels or hampering illuminance level significantly.</p> <p>At required places where luminaries height was also reduced to get sufficient illumination. Tube light fixtures in offices were replaced by CFL Bulbs of 18 Watt.</p> <p>No of 80 W HPMV Lamps replaced:80          No of 160W HPMV Lamps replaced:35          No of 52W FTL replaced:60          Electrical saving achieved:  <math>11.39 \text{ KW} \times 12 \text{ Hrs} \times 360 \text{ Days} = 49226 \text{ kWh}</math></p>					
<b>Picture/ sketch/ drawing before modification</b>		<b>Picture/ sketch/ drawing after modification</b>			
80W HPMV Lamp fitting		30W CFL lamp fitting			
					
Agency that executed the project (with complete address and email): Excel Industries Ltd.(In house)					
Total investment, Rs.: 0.5 Lacs			Year of implementation: 2007-08		
First year energy cost savings, Rs.: <b>2.15 Lacs</b>					
First year other savings, Rs:--					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before		-	-	-	-
Energy consumption after		-	-	-	-





Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...				-	
Company complete address: EXCEL INDUSTRIES LIMITED Plot No.112, 20/1- OS-2, M.I.D.C.Area At-Po: Dhatav, Tal: ROHA, Dist: RAIGAD, MAHARASHTRA PIN:402116				We authorise Bureau to use this information for dissemination	
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**Let there be Light ..... Forever.**

**Energy Conservation Measure implemented in 2007-2008**

(To be filled up separately for each Energy Conservation Measure)

	Title of the measure		Sector :- Chemical		
	<u><b>Installation Natural Draft Cooling tower in place of Induced draft Cooling tower</b></u>		Technology:-		
<p>Description of the energy conservation measure:          We had already replaced 6 nos of Induced draft cooling towers by natural draft cooling towers.          Even if the natural draft cooling towers require more space than induced draft cooling tower, it eliminates the requirement of fan for cross flow of air in cooling tower.          In 2007-08, Induced draft Cooling Towers at two locations were replaced by Natural Draft Cooling Towers. This resulted in elimination of cooling fan &amp; motor for following locations:          1. DETC-I plant: Elimination of 10 HP motor          2. P2S5 plant: Elimination of 7.5 HP motor          The total reduction is 13 KW.          i.e. 13 KW x 24 Hours x 330 Days =          93056 kWh per year @ 0.9 load factor</p>					
<b>Picture/ sketch/ drawing before modification</b> Induced Draft C.T.		<b>Picture/ sketch/ drawing after modification</b> Natural Draft C.T.			
					
Agency that executed the project (with complete address and email): Excel Industries Ltd.(In house)					
Total investment, Rs.: 4.5 Lacs			Year of implementation: 2007-08		
First year energy cost savings, Rs.: 4.07 Lacs					
First year other savings, Rs:-- NIL					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before	13.82	-	-	-	-
Energy consumption after	6.91	-	-	-	-
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...	4.13			-	

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