

**First Prize**

**General Category**

**LARSEN & TOUBRO LIMITED**  
**Heavy Engineering Division, Powai, Mumbai (Maharashtra)**

**Unit Profile**

L&T's Heavy Engineering division (HED) activities are organized under self reliant strategic business units (SBUs) catering to the needs of core sector industries through supply of equipment to Process Plant Industries, Defence, Nuclear Power & Aerospace sectors. HED caters to equipment for Process Industries worldwide, including fertilizer, Petrochemical, Refinery, Cracker, Oil & Gas Chemical, Cement, and power sectors. HED also has been supplying critical equipment and systems such as Torpedo launcher for Defence, Steam generator for Nuclear Power Plant, Rocket motor casing and such other products for Aerospace sectors.

The Manufacturing activities of HED are located at Powai in Mumbai, Hazira near Surat and Ranoli near Baroda. All the data given in these documents is for HED Powai Plant.

**Energy Management Policy**

At L&T we shall conserve resources like water, fuel, electricity and take all possible efforts to reduce consumption of these resources of national importance through,

- Awareness of all the employees on energy conservation
- Upgradation of old machines with energy efficient retrofitting
- Replacing old machine with energy efficient machine
- Improve manufacturing processes to reduce energy consumption
- Continuously monitor and control energy consumption by setting up well designed administrative system
- Promoting the use of alternate natural energy resources.

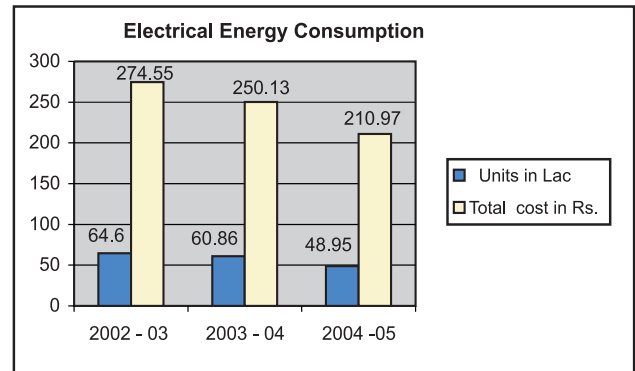
**Energy Management Cell**

HED Powai has well designed Energy management structure with Energy conservation activities initiated by highly experienced Sr. Executive assisted by officer for promoting various improvement projects. The activities of Energy management cell includes identify new avenues of energy saving and their implementation, conduct internal and external Energy audit, evaluate the audit and implement the recommendation of the auditor.

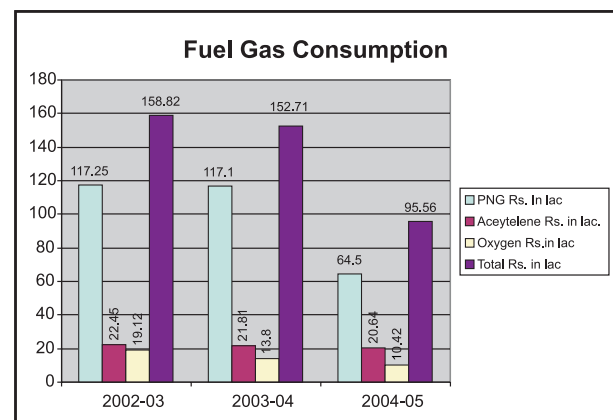
## Energy Consumption

The Energy Conservation Activities are focussed on resources like Electrical Energy and Fuel gases such as pipe natural gas, Acetylene, Oxygen and natural resources such as water.

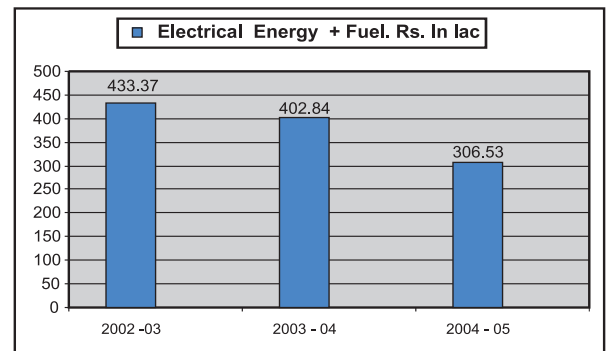
Electrical Energy		
Year	Units in Lac	Total cost in Rs.
2002 - 03	64.6	274.55
2003 - 04	60.86	250.13
2004 - 05	48.95	210.97



Fuel Consumption:				
YEAR	PNG Rs. In Lac	Acetylene Rs. in Lac.	Oxygen Rs. in Lac	Total Rs. in Lac
2002-03	117.25	22.45	19.12	158.8
2003-04	117.1	21.81	13.8	152.7
2004-05	64.5	20.64	10.42	95.56



Total Energy Cost	
YEAR	Electrical Energy + Fuel. Rs. In Lac
2002 - 03	433.37
2003 - 04	402.84
2004 - 05	306.53



## **Energy Conservation Achievements**

### **Major Energy Conservation Activities implemented during the year 2004 – 2005**

#### **1) Replacement of Welding Generator by welding Inverter**

Motor Generator type-welding machines consume large power and are low efficiency machines. L&T HED replaced these machines in phased manner with Welding Inverters, which are high efficiency machines.

For the same welding parameter the Inverter consume 60% power compared to welding Generator which gives saving as follows.

For 200 Amp / 20 Volts arc Voltage.

Generator Consumes 6.7kw and Inverter consumes 4.13kw.  
Saving per hour  $6.7 - 4.13 = 2.57\text{kwh}$

The welding machine work for 16 hrs. A day.

Hence per Inverter saving on yearly basis for 300 days in  $2.57 \times 16 \times 300 = 12336\text{kwh}$ . @ Electricity rate of Rs. 4.31 = Rs.53168.

The cost of one Inverter is Rs. 130000/-  
Hence the pay back is years 2 .44yr.

Plant Introduced 23 Inverters in the year 2004 – 05 replacing old welding Generators.

**The Investment is Rs. 29.9 Lakhs**

**Saving is – Rs.12.22 Lakhs**

#### **2) Partial Acrylic Sheets for shop roof to increase day light in the shop and reduce power consumption:**

Partial acrylic sheets are provided in the shop roof. This reduced the requirement of overhead lights in the shops during daytime.

During the year 2004-2005 the acrylic roof was provided in Aerospace Shop having lighting load of 7.2 kW,

**The investment on Acrylic roof : Rs.2.1 Lakhs**  
**Saving in Energy:  $7.2 \times 1500 = 10800$  kWh**  
**Rate of Electricity : Rs. 4.31**  
**Total saving in Rs : Rs. 46548**  
**Payback : 4.5 yr.**

Although the payback is not attractive there is no recurring lost involved once installed,

**View of Aerospace shop showing partial acrylic roof**



### **3) Occupancy sensors installed in the manufacturing shop offices:**

Many times the cabin of shop supervisors is empty and the lights and Air conditioner remain On. Unit installed occupancy sensors in the cabin to switch off lights and Air-conditioners if the cabin is unoccupied for more than 5 min. The shop supervisor's offices work round the clock.

Annual Savings = Rs. 25860

**Cost of occupancy sensor: Rs. 6000/-**  
**Payback : Less than 3 months**

This unit is installed in 10 cabins during the year 2004-2005 with an Investment, Rs. 60,000/-



**Occupancy Sensor Installed in Cabin**

#### **4) Installed inverter drive with AC Induction Motor on EOT crane long travel motion:**

Inverter drives save power by reducing heat losses. This modification when done during manufacturing of EOT crane is much cheaper than doing it for old crane already existing with slip ring motors. The unit installed inverter drives on one of its new crane during manufacturing stage.

The difference of cost with inverter drive for long travel movement: 10 kW

Inverter and 5kw \* 2 Induction motors :Rs. 50,000/-

Saving on power on yearly basis considering 8hrs/day LT operation : Rs. 31032

Payback period : 1.6 yr.

#### **5) Modified Preheating Arrangement for Multiwall shell to Reduce PNG Consumption**

8 burner used on the job – consumption @ 70 Sm<sup>3</sup>/hr.

Activity cycle time – 1 week

Total gas cost without hood, without insulation – Rs.88, 000

Savings in gas cost due to application of hood and insulation – 20,000 Rs.

No. of joints executed – 14 in two months.

Total savings – Rs. 2,80,000

Cost of hood

and Insulation - Rs. 65000

Savings - Rs.2, 15,000



## 6) Providing Insulation for reducing Natural Gas consumption

### Nozzle forging covered with Insulation,

- Avoids heat loss from surface by radiation.
- Welder Comfort, Welder exposed to less heat.

### Cost benefit analysis –

First job welding done without insulation required 5 burners operating at full flame to maintain a preheat of 200-250 deg C.

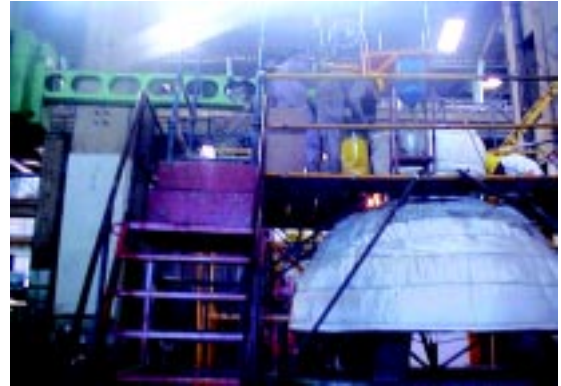
The provision of Insulation required only 3 burners, operating at 30 % opening.

Savings on the gas cost @ Rs. 250 per hour.

### Activity –

D'End to Nozzle welding

Radiation heat losses from D'End & Nozzle avoided by covering the surfaces using insulation.



## 7) Preheating arrangement for the D'End positioned on turntable



The gas supply pipeline subjected to high temperature is made from Copper to avoid damage to the same

ST80 Burner

Low velocity burner.

D'End

**Second Prize**

**General Category**

**HARITA SEATING SYSTEMS LIMITED**  
**Hosur (Tamil Nadu)**

**Unit Profile**

**Harita is the Sanskrit word for verdant prosperity.** Harita Seating Systems Limited (HSSL) established and promoted by members of TVS family to provide customized seating solutions, taking into account the difficult Indian road conditions. Commercial production was started in 1988 and the company soon went public. HSSL had developed in-house competence in seat technology relevant for Indian market through the product launches made in the past decade.

HSSL is the only seat manufacturer to provide complete seating solution to all segments of automotive industry by serving more than 50 major customers across India with 170 products and 368 variants along with add on features in nine different segments. HSSL continue to strive to exceed customer's ever increasing expectation by developing innovative products. This poses a challenge to continuously improve in all spheres of business.

HSSL has been consistently growing right from inception from a level of 14 lakhs and closed the last financial year (FY05) with a figure of 119 crores of turnover.

**Energy Consumption**

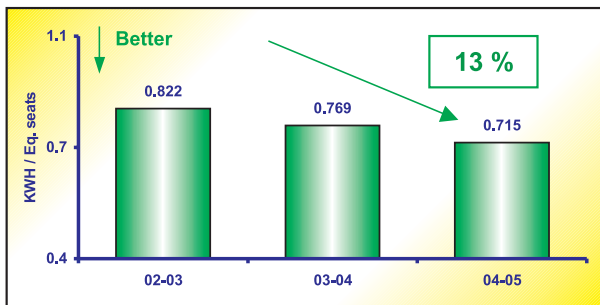
Thanks to the implementation of various energy conservation initiatives, there has been a significant decline in energy consumption at HSSL in the last 3 years which is evident from the below table:

Description	Units	2002-03	2003-04	2004-05
Annual production (equivalent seats)	Numbers in Lakhs	18.51	22.25	27.41
Total energy consumption/annum	Lakhs kWh	15.22	17.11	19.61
Specific energy consumption – Electrical	kWh / Eq.seats	0.822	0.769	0.715
Total thermal energy consumption / annum	Million kCal	1364	1412	1302
Specific energy consumption – Thermal	Million kCal / Eq.seats(Lakhs)	73.7	63.45	47.5
Energy cost as % of total manufacturing cost	Percentage	13.8	13.2	12.5

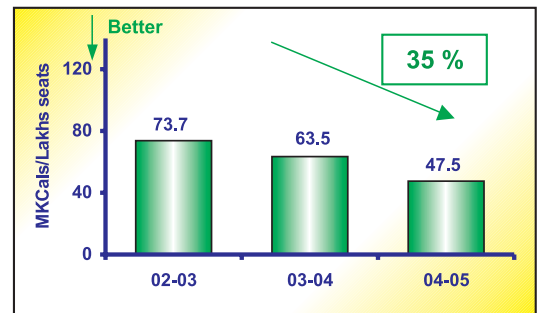
**Reduction in specific energy consumption (SEC) per equivalent seat in last 3 years**

Year	Electricity Consumption (kWh/ Eq. seats)	% of reduction over 2002-2003	Thermal Consumption (kCal / Eq. Seats)	% of reduction over 2002-2003
2002-2003	0.822	-	737	-
2003-2004	0.769	6.45 %	635	13.84 %
2004-2005	0.715	13.02 %	475	35.55 %

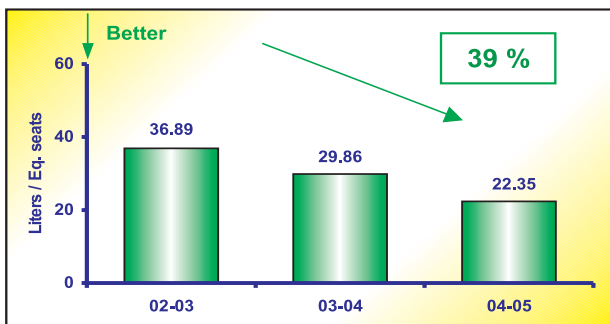
**ELECTRICAL CONSUMPTION**



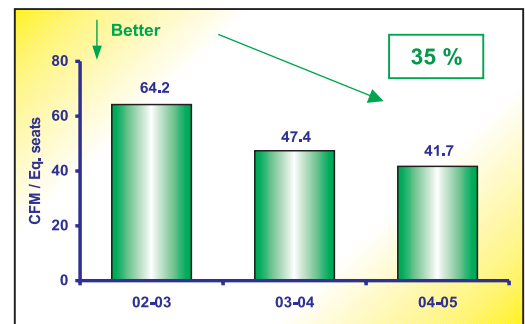
**THERMAL CONSUMPTION**



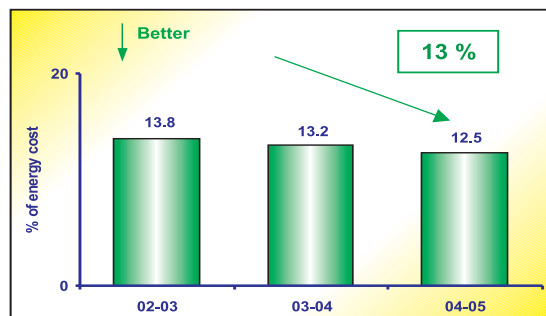
**WATER CONSUMPTION**



**COMPRESSED AIR CONSUMPTION**



**ENERGY COST**



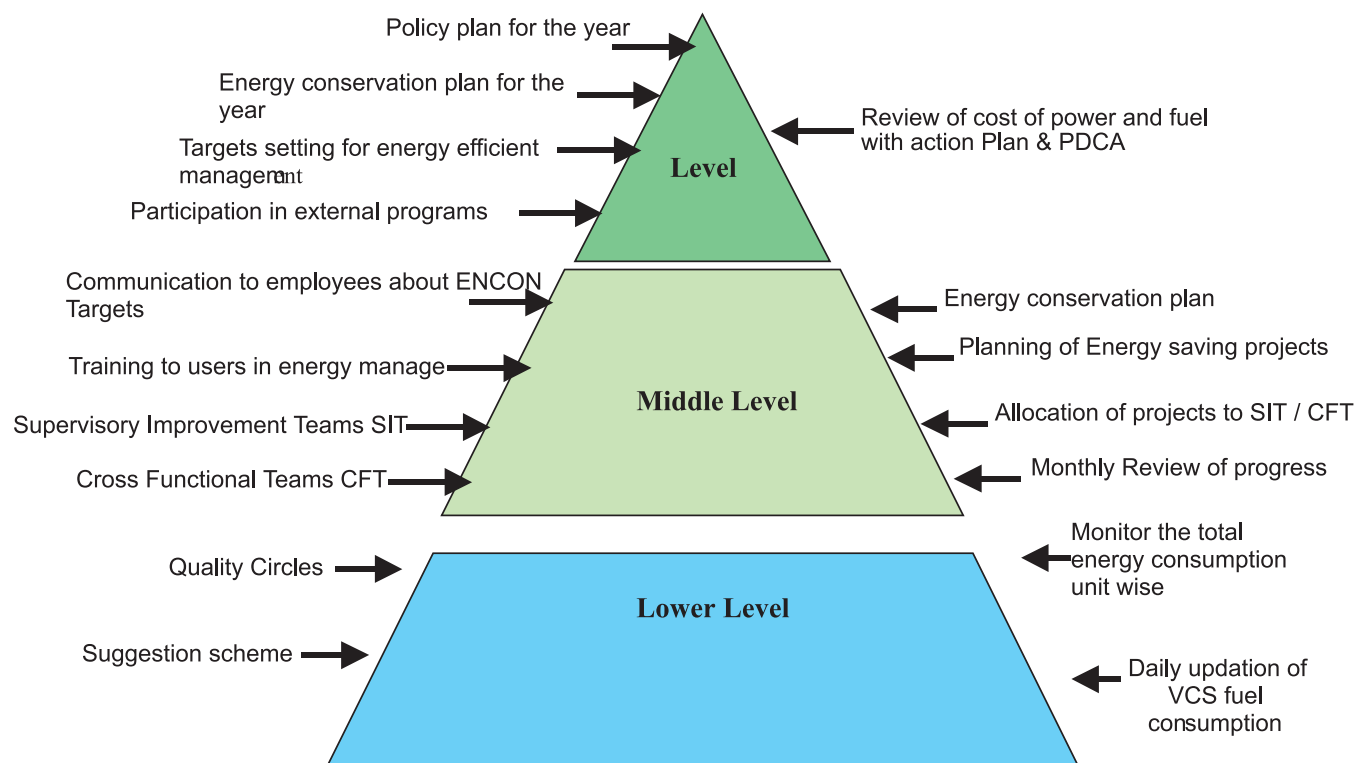
## Energy Conservation Commitment, Policy and Set-up

HSSL strongly believes in integrating the environment with every sphere of our business activity through establishing a clear policy to ensure well being of the employees and society at large.

Energy conservation is nurtured as a culture at HSSL and forms part of actions initiated towards this commitment.

### Energy Conservation Set up

#### Working System of Energy Management



## Energy Conservation Achievements

From 1997 onwards, Harita Seating Systems is actively involved in inventing new ways of conserving energy. During the period of 1998 to 2005, 93 projects have been implemented to save energy to the tune of Rs. 92.15 Lakhs with an investment of Rs. 22.84 lakhs. This has resulted in a reduction of 41% in specific electrical energy consumption and 58 % in specific thermal energy consumption.

The major mile stone activities during the year 2004-05 are

## 1. Energy Substitution – Alternate Fuel

### Old method

The plant has 7 tank automated pretreatment processes followed by spray type powder coating process for finishing the metal parts of our products. Sprayed powder coated parts are fed into a powder curing oven. High-speed diesel (HSD) is used as fuel to create thermal energy for baking the parts at 200deg C.

### New Method

As an alternate method, plant modified the heating system with Liquefied Petroleum Gas (LPG) in place of HSD. The consumption of fuel is reduced. The temperature accuracy is maintained within one degree. Plant has achieved fuel saving of 40 - 45 %, since all the burnt fuel is converted into heat and there is no wastage. This is an environmental friendly system.

Savings : Rs 11.14 Lakhs per annum  
Investment : 2.5 Lakhs  
Payback : 2.5 months



## 2. Redesign Operation Controls of Hydraulic Press ( 200 MT )

### Old design of program

Hydraulic press is used for cutting and forming operation of fabrics, rexine and SRIM(structure reinforced injection moulding) products.

Earlier, the hydraulic power pack was working continuously throughout each cycle time. This results in huge power consumption.

### New design of program

Trials were conducted by switching off the hydraulic power pack other than during cutting/forming operation. This showed a potential to reduce electrical power consumption. Hence, the hydraulic and electrical circuit is redesigned and modified to effect these changes for implementation of the project.

Savings : Rs 0.33 Lakhs per annum  
Investment : 0.2 Lakhs  
Payback : 7 months



### 3. Automatic Switching off compressor during unloading operation

#### Old method

Plant was using two pneumatic compressors of 55 kW each to support foaming, powder coating and assembly processes Both compressors were operating simultaneously in three shifts continuously.

#### New Method

The compressor electrical and pressure control system are modified to operate both the compressor during peak load and switching off one compressor when the pressure reaches the max set point of 6.2 bar .

Savings	:	Rs 5.4 Lakhs per annum
Investment	:	0.5 Lakhs
Payback	:	2 months



### 4. Higher efficiency low rating pumps

#### Old method

In our powder coating system, we were using 4 numbers of 5HP centrifugal pumps for circulating the chemicals for treatment process

#### New Method

The above said pumps are replaced with 0.75 KW, high energy low rating new generation compact pumps.

Savings	:	Rs 1.69 Lakhs per annum
Investment	:	0.92 Lakhs
Payback	:	7 months



## 5. Redesigning of oven control system

### Old method

Dry off oven is used for drying of components in pretreatment process. The oven is equipped with blower for circulation of hot air inside the chamber. The blower is running continuously through out the day.

### New Method

It was observed that the blower is running continuously throughout even when there were no parts inside the oven.. The electrical control circuit has been modified to operate the blower only when the parts are placed inside the oven and oven door is closed. .

Savings : Rs 3.1 Lakhs per annum  
Investment : 0.45 Lakhs  
Payback : 2 months



## 6. FRP insulation for mould temperature control system

### Old method

Mould temperature control system (MTCU) is used for maintaining the temperature of mould in the PU foaming process. 16 numbers of MTCU system are equipped with heater capacity of 3 kW for heating the media. Heat energy is dissipated to the atmosphere due to absence of insulation.

### New Method

MTCU tanks are insulated with FRP which eliminates the heat losses and sustains the set temperature. Hence, the running time of the heater is reduced to a large extent.

Savings : Rs 3.95 Lakhs per annum  
Investment : 0.65 Lakhs  
Payback : 2 months



Other projects implemented during 2004-05

- Energy efficient motors for phosphating blowers.
- Low rating energy efficient pumps for chilling water circulation.
- Energy saving devices for rotary drive system.
- Solar heating for distilled water system.
- Switching off PC monitor during idle time.
- Modify electrical circuit for granulator machine.
- Modify electrical circuit for canteen grinder equipment.

### **Energy conservation Plan and Targets**

Adoption of “Clean Technology “and “Achieve Zero Accidents” is taken up as the company’s goal

Energy Conservation Measures Planned	Anticipated savings in energy (Rs. Lakhs)	Approx. investment (Rs.lakhs)	Project Commencement & Completion year
Conversion of variable frequency drives for motors	1.5	2.0	2005-2006
Conversion of fuel from SKO to LPG for pretreatment process operation	25.5	22.0	2005-2006
Energy efficient motors for process equipments	1.1	1.3	2005-2007
Solar heating for Mould temperature control	16.0	9.0	2005-2006
Energy efficient transformer for Power and	27.0	4.0	2005-2006
Mobile inverter for lighting	0.9	0.5	2005-2006
T5 energy saving lighting system for factory and	2.0	3.5	2005-2007
Automatic power factor controller - power system	3.2	1.5	2005-2006
Energy saving devices for air conditioning system	0.8	0.4	2005-2006

### **Environment and Safety**

#### **Clean and safe work environment**

Harita seating systems is committed to protect the environment by Prevention of Pollution and continual improvement in our processes and systems to improve Environmental Performance. The company is ISO 14001:2004(EMS) certified by BVQI and working towards implementation of OSHAS 18001.

In house audit is carried out every year and by a continuous process of educating the employees about the importance of effective utilisation and conservation of the natural resources. The teams are motivated to implement “KAIZENS & KAIKAKUS” to optimise the consumption.

Followings are few examples :

- **Exhaust system for welding process**

- *120 air changesovers /hour*
- *5% reduction in Co<sub>2</sub> and argon in air*
- *Improved ambient air quality*



Fig 1

- **Solar evaporation systems**

- *High TDS reject from effluent recycling*
- *Its stored for natural evopration*
- *Sludge after evopation is disposed as per TNPCB norms*



Fig 2

- **Acoustic enclosure for Granulator**

- *To reduce noise level below 85 dB*
- *Clean and safe work environment*



Fig 3

**KIRLOSKAR COPELAND LIMITED**  
**Karad, Satara (Maharashtra)**

***Unit Profile***

Kirloskar Copeland Limited is a joint venture between Kirloskar Brothers Limited, India's leading engineering company and Copeland Corporation of the USA, the world leader in air-conditioning and refrigeration compressors.

1. The company is into in-house development of air-conditioning and refrigeration compressors, having manufacturing unit at Karad & Atit in Maharashtra.
2. Its sales turnover exceeds over 50 million US Dollars.
3. KCL is a leader in hermetic compressor market in India having over 40% share of RAC market, over 55% share of commercial Refrigeration market & over 65% share of Commercial Air Conditioner market.

KCL is working with a vision to "Be the most preferred supplier to the Air conditioning & Refrigeration customers in India & Middle East". In order to fulfill this vision, KCL has embarked upon with set of objectives like

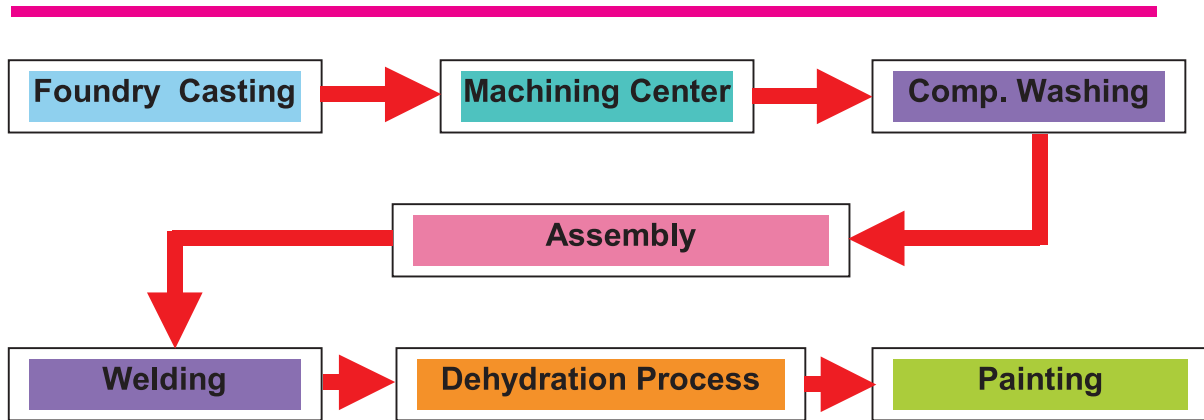
- ❖ Providing proactive response to customer needs & expectations.
- ❖ Achieving excellence in quality
- ❖ Be cost effective to compete in Global markets.
- ❖ Develop innovative & energy efficient products.
- ❖ Implement effective & efficient systems to meet delivery commitments at all the times.

Explore continuously new market opportunities & develop into profitable business.

At the companies research and development facilities, a team of scientist and engineers sharing global know how and having access to state of art infrastructure and equipment are shaping the compressor of tomorrow, relentlessly and silently - two traits that are also common in the working of all its compressors.

At its two state of art plants, team of manufacturing & quality professionals are building the compressors to meet every application

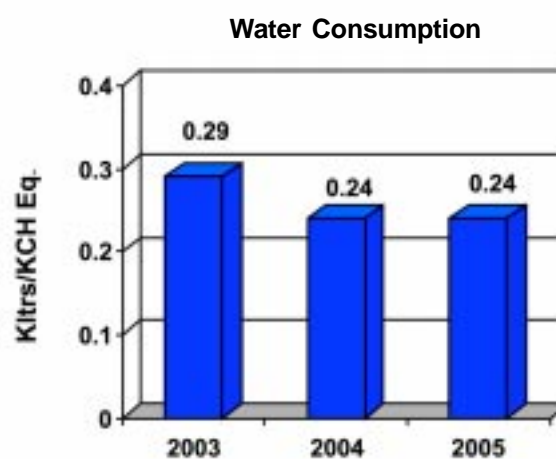
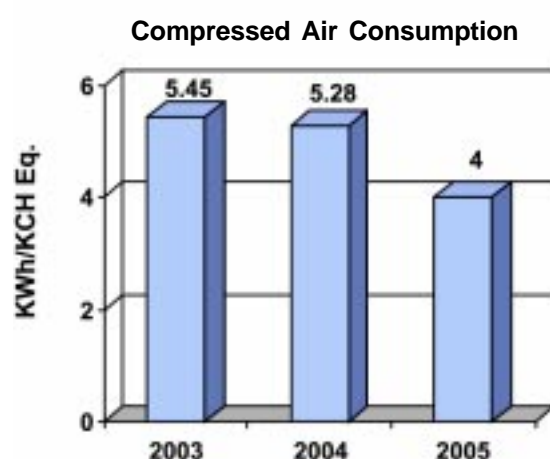
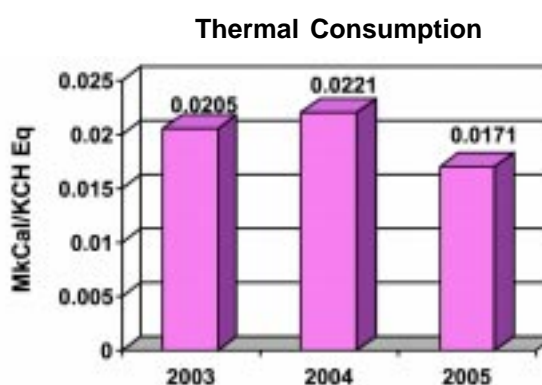
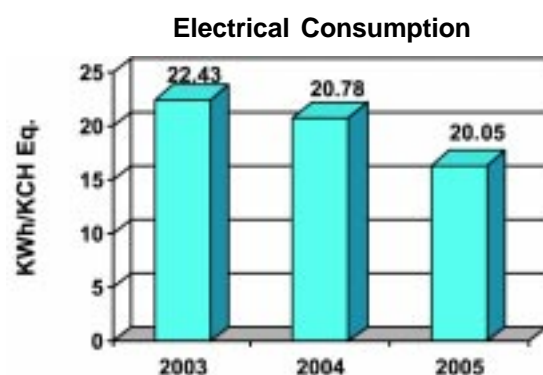
### Process Flow Chart



### Energy Consumption

Description	Unit	2002-2003	2003-2004	2004-2005
Annual Production per KCH Eq.	Nos.	401406	411955	597426
Total Electrical Energy consumption/annum	Lakhs kWh	90.03	85.59	97.65
Specific Energy Consumption – Electrical	KWh/KCH Eq.	22.43	20.78	16.35
Total Thermal Consumption/annum	Million kCal	8242.85	9106.68	10205.67
Specific Energy Consumption -Thermal	MkCal/KCH Eq.	0.0205	0.0221	0.0171

Year	Electricity		Thermal ( Fuel )	
	KWh/ KCH Eq.	% reduction over 2002-2003	MkCal/KCH Eq.	% reduction over 2002-2003
2002 - 2003	22.43	-	0.0205	-
2003 - 2004	20.78	7.35%	0.0221	(7.80)%
2004 - 2005	16.35	27.10%	0.0171	16.58%



### ***Energy Conservation Commitment Policy and Set Up***

KCL has developed the culture of reviewing all processes by RKQP model (Ravi Kirloskar Quality Prize). This model has derived from CII-EXIM BANK Business Excellence model. KCL has set 14 programs as Key Business processes. Cost reduction is one of the main Key Business process in which Energy Cost reduction is major sub process.

At the beginning of the financial year, according to business forecast & planning, all projects are reviewed by Top Management & targets are set a annual basis. Individual teams then does SWOT analysis (Strengths, Weakness, Opportunities & Threats) and prepare action plan.

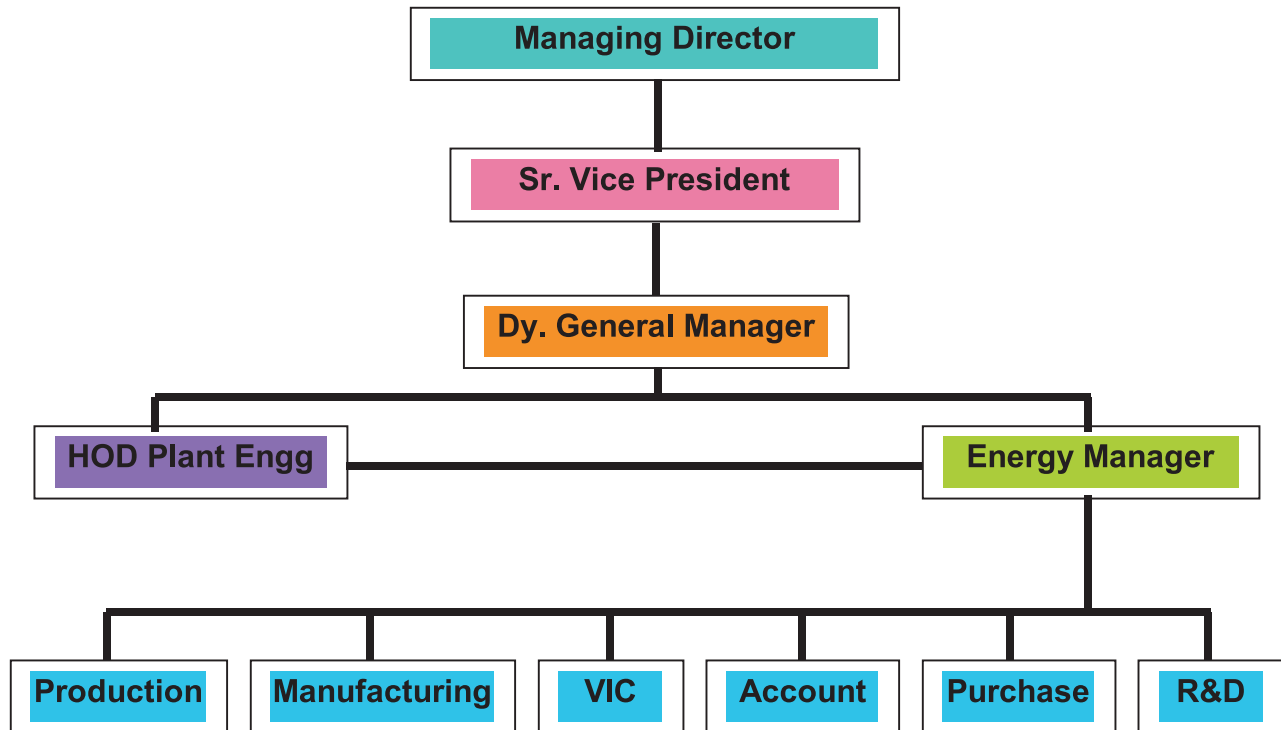
In Energy Management activity a dedicated team of 24 members from various functional department is involved. This activity is lead by BEE certified Energy Managers,

Over the period KCL has developed a Encon culture at all level to reduce specific energy consumption per unit, bring improvement in process & imbibed a Encon culture in society by the way of

- ❖ Minimizing Waste
- ❖ Using energy efficient processes and equipment

- ❖ Conducting periodic energy efficiency improvement studies and implementing improvement measures.
- ❖ Involvement of employees of all levels in the energy conservation efforts
- ❖ Effective dissemination of information
- ❖ Establishing norms and initiating programmes to reach these norms
- ❖ Promotion of non-conventional energy usage

## ENERGY CONSERVATION CELL STRUCTURE



\*Cross Functional Department team members

### **Energy Conservation Achievements**

During the period 2004-2005, Kirloskar Copeland has implemented 53 Nos energy saving proposals through Engineering initiatives, workmen's suggestions scheme, internal audits and Total Productive Maintenance methodology resulting into total saving Rs 96.60 Lakhs. This has resulted in to a reduction of 27.10% in specific electrical energy consumption and 16.58% in specific thermal energy consumption over 2002-2003. In water conservation also the unit has reduced the consumption by 17.24%

This Encon activity initiated in 1989 and is in force for last 15 years and added a savings into companies profit Rs 520.40 Lakhs

## Energy Conservation Projects Implemented During The Year 2004-2005

### 1. Indirect Solar Water Heating System for Ultrasonic Crankshaft Washer

**Before –**

Electrical heating,  
Electrical Consumption 62155 kWh,  
Loss of productivity

**After –**

Converted Electrical heating to solar heating  
Energy Saving – 21600 kWh ( sun hrs only)  
Productivity improved, taking hot water for top up the tanks

**Investment – Rs 5.50 Lakhs**  
**Saving – Rs 0.734 Lakhs**  
**SPP – 90 Months**



### 2. Recover Waste Heat From Exhaust of the Burner-Off Zone and use it to generate steam for utilization of Bluing Zone.

**Before –**

Electrical steam generator used for steam generation,  
Electrical consumption 15 kWh/day

**After –**

Steam generated from waste heat exhaust burn-off zone,  
No Electrical consumption,

**Investment – Rs 4.40 Lakhs**  
**Saving – Rs 4.59 Lakhs**  
**SPP – 11 Months**



### 3. Replaced Constant Frequency Motor-Generator Drives by Static Frequency Converter.

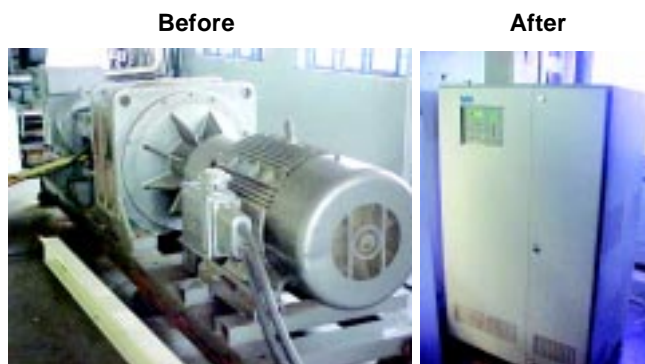
**Before –**

Motor- Generator set used for constant freq. Supply to testing purpose.  
High Mechanical and Drive losses

**After –**

MG set replaced by Static frequency Converter.  
Mechanical and Drive losses eliminated.

**Investment – Rs 3.50 Lakhs**  
**Saving – Rs 1.86 Lakhs**  
**SPP – 24 Months**



#### 4. Use Heat Recovery Unit for 300CFM Air Compressor for Elimination of Electrical Heaters

**Before –**

Generated heat dumped in to the atmosphere.

**After –**

Heat recovered through WHR unit and generate hot water @ 55°C used for washing section.

**Investment – Rs 0.50 Lakhs**  
**Saving – Rs 1.46 Lakhs**  
**SPP – 4 Months**



#### 5. Paint Baking Oven Painted by Heat Repellant Paint

**Before –**

Oven wall heat losses was more.  
 Oven Skin temperature was 49°C

**After –**

Painted oven by high emissivity heat repellant paint.  
 Reduced wall heat losses of oven.  
 Oven skin temperature reduced by 8°C

**Investment – Rs 1.10 Lakhs**  
**Saving – Rs 0.50 Lakhs**  
**SPP – 26Months**



#### 6. Variable Frequency Drive for 300 CFM Low Pressure Air Compressor.

**Before –**

At 3rd shift 300 VFM compressor was catering the load,  
 Actual requirement was 200 CFM,  
 Low capacity compressor was not available & new  
 compressor cost was high,  
 Loading – 4.5 Hrs. Unloading – 3.5 Hrs.

**After –**

Compressor Capacity controlled by VFD & Pressure  
**controller** No unloading,

**Power consumption reduced by 76kWh/day**

**Investment – Rs 2.49 Lakhs**  
**Saving – Rs 0.884 Lakhs**  
**SPP – 34 Months**



## Other Encon Projects Implemented During 2004-2005

**No of Projects implemented** **55 Nos.**

- Installation of waste heat recovery units on Paint baking Oven, Thermic Fluid Heating System Exhaust.
- Installation of Variable Frequency Drive for Variable Load.
- Reduction of Fixed Energy by installation of Energy Efficient Tubes, FRP Fan Blades, Human Motion sensors, Stabilizer for street lighting etc.
- Making Process Better and Better and Energy Efficient.
- Waste Identification and Elimination like under loaded motor connected in Star, Use of cooling tower waster in place of Chiller.
- Adopt new technologies for Energy conservation like Fan less cooling tower, Heat repellent Paint, Energy Efficient Air guns, Static Freq. Converters Etc.
- 3<sup>rd</sup> Party Wind Power Purchase by 20 Paise less than MSDC kWh
- Avail the Maximum benefits by maintaining a Power factor Unity.
- Benefits from Super Express Feeder.
- Encon Kaizens scheme added a additional benefits in Total Encon Benefits,

No. of Encon Kaizens Implemented - 12 Nos

### **Energy Conservation Plan and Targets**

Program	Target	Projects	Target Taken	
			From	To
		Reduction of Variable	11 kWh	9.87 kWh
Energy Cost Reduction	From Rs 85/KCH Eq. to Rs 80/KCH Eq.	Reduction of Fixed Energy	6.35 kWh	4.39 kWh
		Reduction of Fuel	0.0171 MkCal	0.0145 MkCal

### **Environment and Safety**

Kirloskar Copeland Limited have a two plants located at Karad & Atit. Both plant have certified by **ISO 14001-2004** for Environment Management System by BVQI Pvt. Ltd,

Following activities implemented under environmental improvements made during 2001-2004 as,

#### **A. Improvement in Products :-**

Recently unit has developed almost all products replacing R-12 refrigerants by R-134a gas, which is environmental friendly.

### **B. Improvement in Processes:**

All CFC chemicals required for chemical treatment are replaced by non CFC chemicals 10 No. gas recovery units installed for R-12, R-22 gases. Open washing tanks replaced by automatic closed power washers & solvent fumes are extracted through ducts & chimneys. All toxic & hot fumes from newly installed paint shop are extracted through FRP chimneys at each individual locations.

### **C. Rain Water Harvesting:**

Construction earthen bandhra at various locations in vacant areas of factory premises.

The bigger one is constructed across the original nallah passing thru' our premises by taking the advantage of natural slope of the ground as per contour map.

The purpose of the bandhra is to retain the rain water & allow it to percolate in ground, in order to improve the ground water level table in our premises.

Main target of this project is to increase the output of bore wells & open wall. The area covered under the harvesting system is app. 3 Acres.

Also connection the roof rain water drainage to the ponds created by the bandhra. Major quality of storm water drainage which is diverted for storage & percolation instead of going waste.

The Excess water from irrigation scheme is arranged to retain & percolate in the pond located at upstream area. Also it is stored in the existing open wall in the premises. All the trees planted nearby this area are going to be benefited.

Water Storage Capacity is 90 Lakh Liters, fulfill 2 months water requirement of Atit Plant.



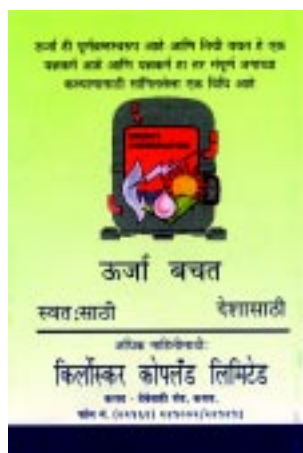
### ***Energy Conservation for Society***

Three day Exhibition of Energy Efficient Products for household appliances at Town hall in the Karad City.



Distributed 2000 Nos Encon Caps among the KCL employees and vendors.

Encon Documentary Film produced by KCL on Day-to-day Energy Conservation tips. The film was telecasted on local cable network during the Encon week



Printed and distributed leaflets of non-invested and easily possible Energy Conservation tips in day-to-day life.

Encon activity initiated with Karad Municipal Corporation by forming a Joint Encon team



## KIRLOSKAR COPELAND LIMITED

### ENERGY POLICY

Achieving optimum use of energy in our operations and bringing about improvements in the energy efficiency of our processes and products will form an important component of the continuous improvement efforts in our organisations.

We shall strive to reduce energy consumption per unit of value added by:

- Minimising Waste
- Using energy efficient processes and equipment
- Conducting periodic energy efficiency improvement studies and implementing improvement measures
- Involvement of employees of all levels in the energy conservation efforts
- Effective dissemination of information
- Establishing norms and initiating programmes to reach these norms.
- Promotion of non-conventional energy usage.

In achieving these, we shall utilise the knowledge and expertise available from various sources including sister organisations, collaborators and outside experts.

We shall make efforts to bring about continuous improvement in the energy efficiency of our products.



29th May 2003

  
 K. Taranath  
 Managing Director

## KIRLOSKAR COPELAND LIMITED

### Environmental Policy

We, at Kirloskar Copeland Limited, are committed to protect environment through,

- continual improvement of our environmental performance by prevention of pollution
- complying with all applicable legal and other requirements related to environmental aspects
- continuously making our products ecofriendly
- conserving natural resources
- adoption of appropriate and safe disposal practices of hazardous waste
- promoting environmental awareness and participation of employees



February 10, 2005

  
 K. Taranath  
 Managing Director