

## **BRIEF WRITE UP ON ENERGY MANAGEMENT AND CONSERVATION**

### **UNIT PROFILE:**

Bharat Electronics Ltd. (BEL), the “**NAVARATNA**” public sector and the pioneer in professional electronics in India, has always been a frontrunner in forwarding the cause of Energy Conservation. Founded in 1954 to meet the Defence needs of the Government of India, BEL today, is India’s premier Electronics Organization, churning out amazing systems keeping pace with progressive technologies, the world over.

Today the company stands tall with over 53 glorious years of service to the nation. A commemoration in the making of over 350 different products, comprising communications equipment, solar – powered traffic signals, solar energy, radars for military and civil use, optical and opto–electronic equipment, sound and vision broadcasting equipment, electronic components and electronic voting machines etc., etc.,.

Even after 53 years of rigorous innovation and creation, BEL has never let its Energy Conservation philosophy get behind the scene. The approach has always been simple, focussed and result oriented.

### **APPROACH TO ENERGY CONSERVATION:**

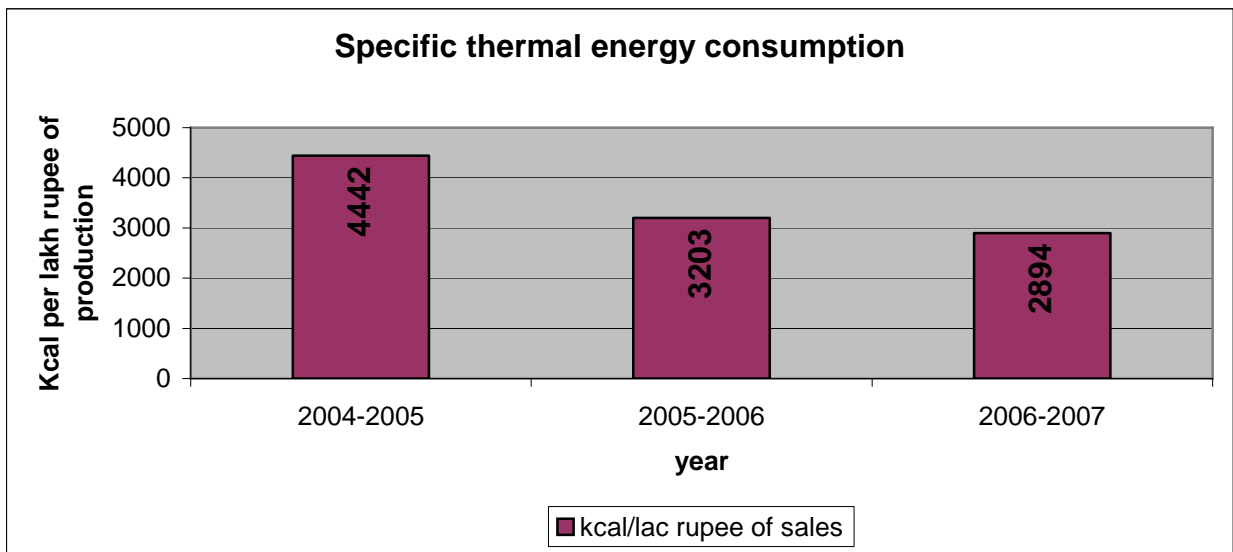
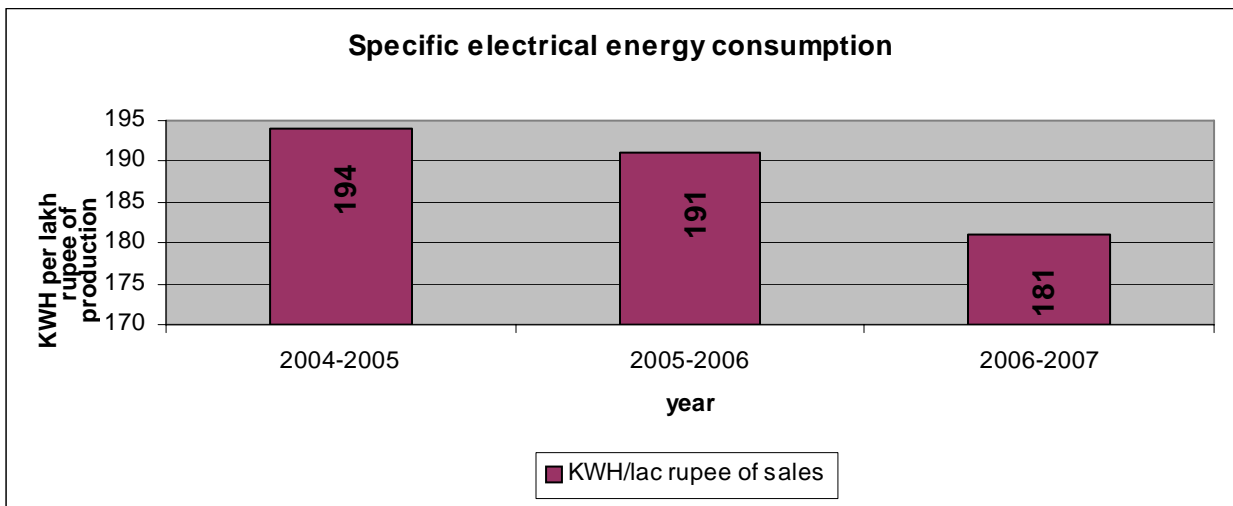
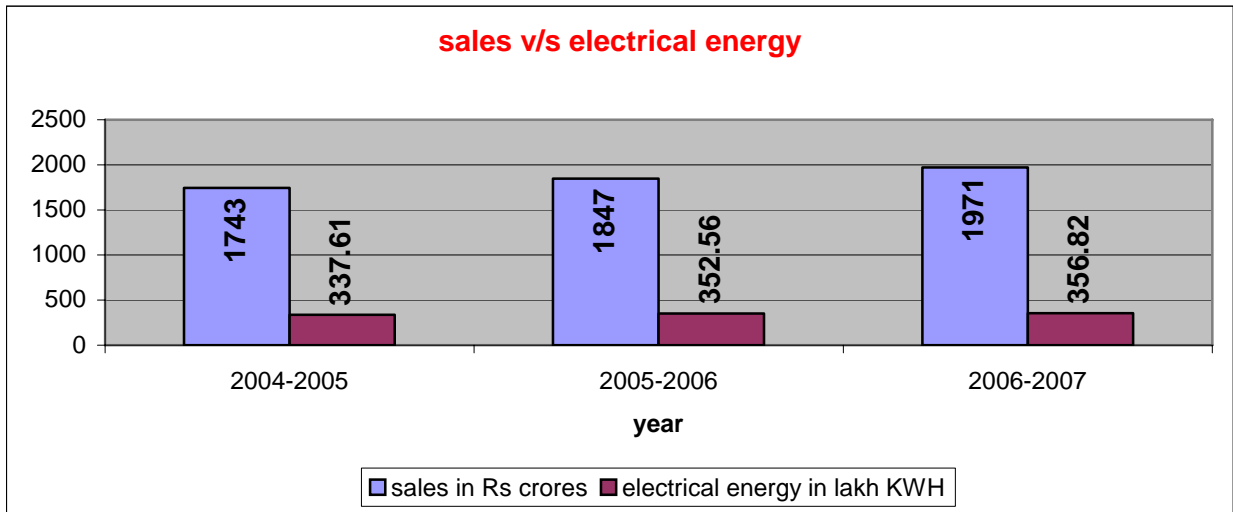
The various forms of energy in-put in Bharat Electronics are :

- Electricity - For Production and services
- HSD - For Transport
- Petrol - ForTransport
- LPG - For Production & Canteens

However, the major form of energy input is Electricity.

### **ENERGY CONSUMPTION DATA OF BANGALORE COMPLEX:**

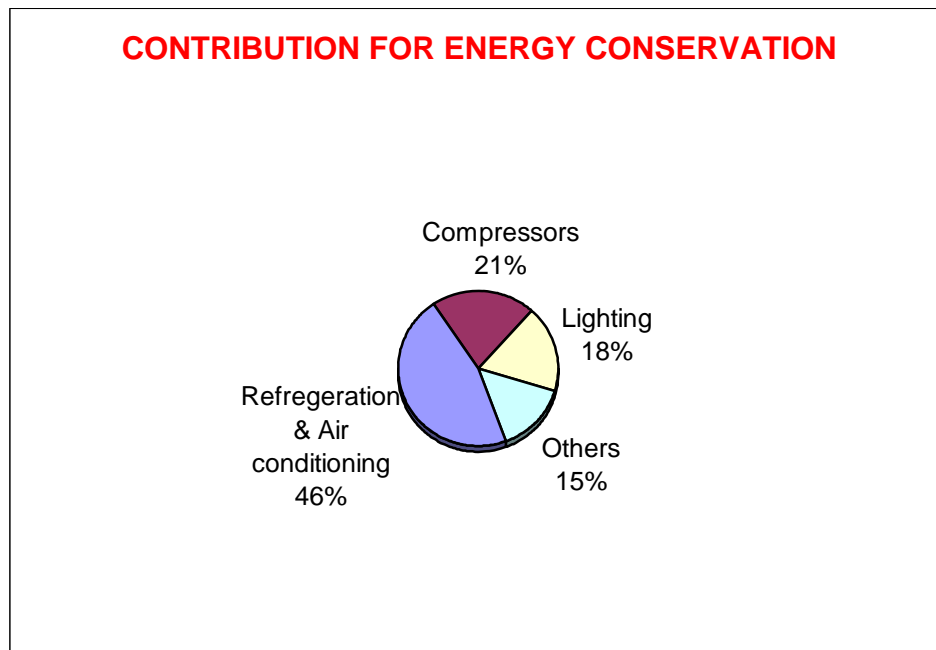
<b>SPECIFIC POWER CONSUMPTION DETAILS</b>	<b>UNIT</b>	<b>2004-2005</b>	<b>2005-2006</b>	<b>2006-2007</b>
Annual sales turnover	Rs lakhs	174300	184700	197100
Total electrical Energy consumption	KWH (lakhs)	337.61	352.56	356.82
Total Thermal Energy consumption for process	Million Kcal	774	592	570
Total energy cost (Electrical +Thermal)	Rs. (Lakhs)	1737.37	1728.64	1771.85
Total Manufacturing Cost in Rs. (lakhs)	Rs. (Lakhs)	126541	141374	148894
Energy Cost as % of manufacturing cost	%	1.38%	1.26%	1.19%
Specific Electrical Power Consumption	KWH/lac rupee of sales	194	191	181
Specific Thermal energy Consumption	Kcal/lac rupee of sales	4442	3203	2894



# ELECTRICAL ENERGY CONSERVATION

The entire plant load is categorized as follows

- Air conditioning
- Compressed air
- Lighting
- Others ( includes equipments, motors, drives, pumps etc.,)



The air conditioning in the production facility is provided with the help of centrally air conditioning plants and direct expansion (DX) plants. The installed refrigeration (generation) system consists of 14 chillers of 100 TR capacity each, 4 chillers of 280 TR capacity each and DX plants of total installed capacity 3500 TR in the plant. The operating load estimated is 1.5 MW for compressor plant and gas plant. As BEL being the electronic industry with high AC&R requirement for clean room atmosphere, special effort was made to reduce the energy consumption by rescheduling the operation in air conditioning plants, compressed air plants with the provision of split A/Cs & portable compressors to keep the operation at actual required time and shifts for optimum utilization and efficiency improvement through technology upgradation. The connected lighting load was estimated at 1.5 MW with around 22000 light fittings and operating load is estimated to be around 900 KW. The lighting load in the factory is made more energy efficient by replacing with energy efficient light fixtures and CFL lamps. Replacement with energy efficient motors, pumps, cooling towers incorporated with advanced variable frequency drives with microprocessor based monitoring system is in place to augment the energy conservation activities.

## **ENERGY CONSERVATION COMMITMENT, POLICY AND SET UP**

### **COMMITMENT:**

Realizing the importance of energy conservation and effective implementation of energy conservation measures, BEL management has set up a Standing Committee on Energy Conservation and Energy Audit (EC&EA) at Corporate level in 1988 with the following terms of reference.

- Identify and quantify various forms of energy inputs and peak demand in all Units.
- Prepare specific proposal on implementation of energy conservation measures and reduction of peak demand, along with investment needed.
- Study the scope of energy conservation and usage of non-conventional energy sources,.
- Audit the usage of energy and suggest conservation measures.
- Maximizing the Capacity Utilization.
- Technology Up-gradation with energy efficient processes and equipments.
- Motivating, training and encouraging our employees for continual improvement in processes resulting in energy conservation.
- Promoting the use of renewable natural resources.
- Recommending Best performing unit in energy conservation for annual award.

The committee has been continuously monitoring the energy consumption and several steps have been initiated towards energy conservation in the company. It has also conducted several energy audits and formulated guidelines for implementation of energy conservation measures and distribution of Energy Conservation awards for best performing Units in the area of Energy Conservation. Committee is also responsible for arranging energy audits through The Energy and Resources Institute (TERI) at regular intervals and follow up for implementation of audit recommendations.

### **ENERGY CONSERVATION POLICY:**

**Policy emphasizes on conservation of natural resources like Water, Fuel & Energy with continual improvement in all our operations and processes issued by CMD of the company.**

### **ENERGY CONSERVATION CELL STRUCTURE:**

**Corporate level standing committee headed by the General Manager with members from each unit is formed. Energy conservation committee at each unit is also functioning to monitor and review regularly on energy conservation activities for continual improvement.**

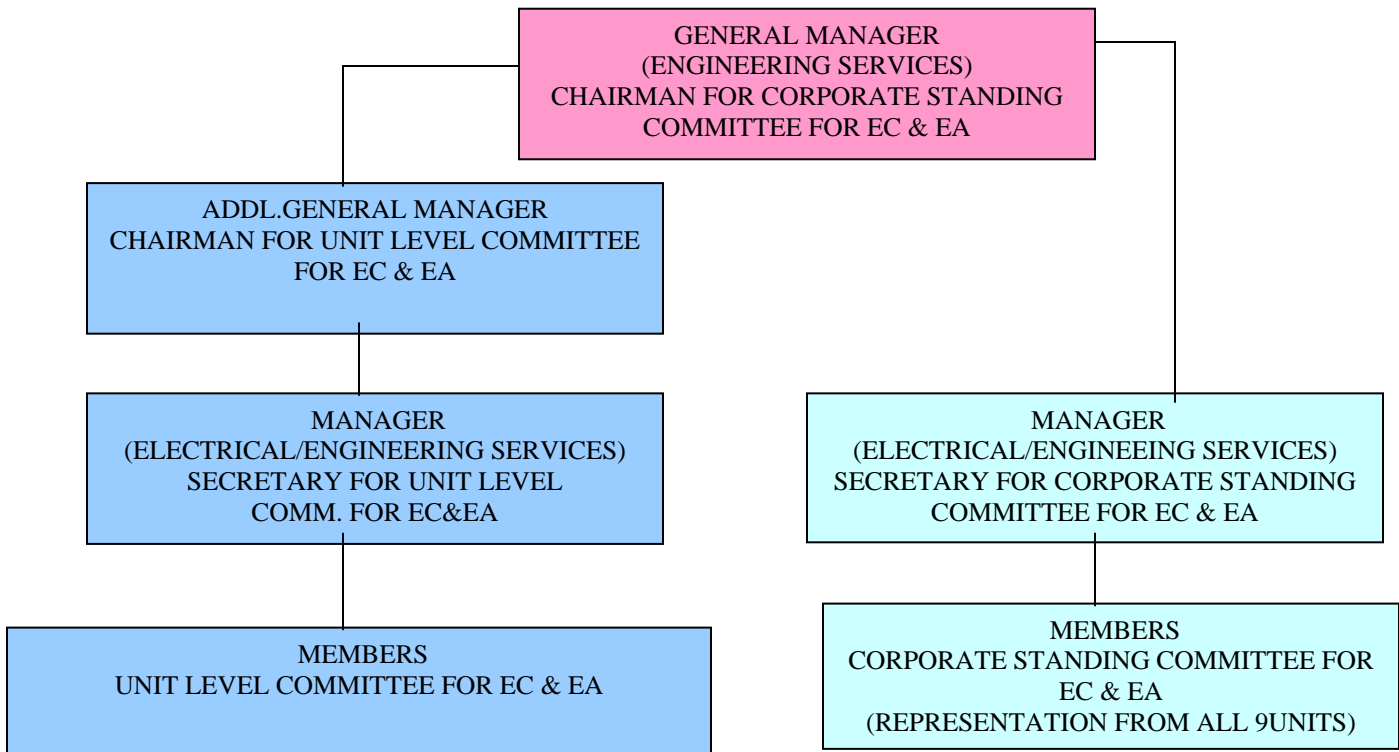
**Award for best performance of the unit in energy conservation is also being given annually. Award will be distributed by one of our directors after study and approval of the proposal.**

**To give more impetus on energy conservation , energy conservation day is celebrated through out the company during energy conservation month(December) of every year.**

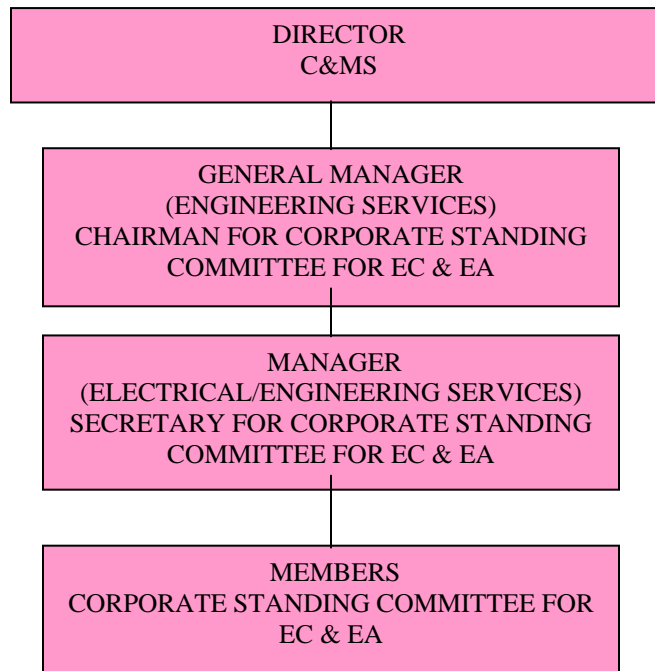
**The corporate standing committee for energy conservation and energy audit is also responsible for fixing the energy conservation target, monitor, audit, review and assists for implementation of energy conservation measures.**

**Corporate standing committee for energy audit and conservation is in active role from 1988-89.**

## ORGANISATIONAL SET UP FOR MONITORING AND ENHANCING ENERGY CONSERVATION ACTIVITIES ACROSS THE COMPANY:



## ENERGY CONSERVATION AWARD COMMITTEE



## ENERGY CONSERVATION ACHIEVEMENTS:

Major energy conservation achievements at Bangalore complex during FY: 2006-07 are as follows:

Year of the project	Achievement of energy saving s per year basis			
	Major project description	Electricity (Lakh Kwh)	Cost saving (Rs Lakh)	Investment (Rs Lakh)
2006-07	1.Optimisation of Pressure settings of Air Compressor system operation by PLC based automation system	1.2	5.98	0
	2.Installation of variable speed drives for Blowers in AHU's	1.68	8.01	12
	3.Installation of Two way valves near AHU's	0.619	3.05	3.5
	4.Reduction in specific energy consumption from 40.5 units to 35units per tube manufacturing in passive vacuum devices by production process improvement & optimum utilisation of capacity	1.75	8.77	6.00
	5.Power factor improvement from 0.95 to 0.98 and distribution system load management	0.64	9.96	11.20
	6. Turbine Air ventilation system for PVD, NS, Radar hangers eliminate the exhaust fans	0.54	2.71	2.50
	7. Downsizing and installation of energy efficient motors	1.34	6.71	8.10
	8.Installation of Electronic chokes in place of Conventional copper chokes for tube lights	1.386	6.84	8.2
	9.Improvement in borewell water yield and timer based control for borewells	1.54	7.76	1.00
	10.Installation of Building Management system for optimization Chiller plant operation & reduction in Specific energy consumption	3.26	16.43	9.00
	11. Other projects & measures implemented as part of modernisation with energy efficient systems and equipments like overhauling of DX plant	1.58	1.71	4.54
	sub total	15.54	77.93	66.04

## ENERGY CONSERVATION PLANS AND TARGETS:

Energy conservation is on going process at Bharat Electronics Limited, Bangalore and plant is committed for its continual improvement and always looking for new avenues on continuous basis. Following major proposals are in hand as part of the future plans for energy conservation.

### COMPREHENSIVE ENERGY PLAN FOR 2007-10

Year	Estimated Energy Consumption in Kwh	Energy Saving target (in %)	Target Energy saving (in Kwh)	Energy Cost saving (Rs. Lakhs/year)	CO2 emission reduction in Tons (approx)
2006-2007 (Base year)	55557361				
2007-2008	54168391	2.50%	1388970	70	1172
2008-2009	52814181	2.50%	1354210	68	1142
2009-2010	51493826	2.50%	1320355	66	1114

## **VISION IS TO BECOME THE LEADER IN ENERGY CONSERVATION AMONGST SIMILAR INDUSTRIES.**

### **ENVIRONMENT AND SAFETY**

#### **Environment:**

- The Unit has been accredited with ISO: 14001 and OHSAS certificates.
- The Unit has installed Effluent Treatment Plant for treating industrial and domestic effluents.
- The Unit is dedicated for safe environment and has an “Environment Policy”.
- The Unit has been getting NOC from Karnataka Pollution Control Board regularly.
- The Unit is continuously managing itself ‘ ECO- Friendly ‘ and is committed for decrease in utilization of hazardous chemicals and consistent efforts are being made to replace these by Non – hazardous chemicals in planned phased manner.
- The unit is in process of obtaining ISO: 14001 for it’s township- consisting of 1600 quarters.
- Various methods have been implemented for water conservation also
- Rain water harvesting

#### **Safety:**

The Bharat electronics Limited, Bangalore believes that the Safety of the employees is of the greatest interest to the Organization and ranks in importance with production, quality of products and cost. The Unit has its Safety Policy. The Unit has meritorious record of Safety Awards, which are as detailed below:

##### **1. National safety award by British safety council for 11 consecutive years**

- Plant safety index is calculated at every month for assessing the Safety performance of different divisions.
- Joint fire safety inspection is conducted to assess the potential hazards on monthly basis.
- Safety training is conducted regularly and many awareness programmes are conducted regularly to create awareness among employees and their families.
- Personal protective equipments are provided to the employees and their use is in the Unit.

**ENERGY CONSERVATION & ENVIRONMENT AWARDS** The unit has a glorious track record of awards from national level as given below

Sl.No	LIST OF AWARDS	year
1	<b>NATIONAL SAFETY AWARD BY BRITISH SAFETY COUNCIL FOR 11 CONSECUTIVE YEAR</b>	
2	RAJIV GANDHI MEMORIAL NATIONAL AWARD FOR EXCELLENT ENERGY CONSERVATION IMPLEMENTATION'	2001
3	INDIRA GANDHI MEMORIAL NATIONAL AWARD FOR "BEST POLLUTION CONTROL IMPLEMENTATION"	2002
4	LAL BAHADUR SHASTRI MEMORIAL NATIONAL AWARD FOR "BEST ENERGY CONSERVATION IMPLEMENTATION GOLD AWARD	2002
5	" GREENTECH ENVIRONMENT EXCELLENCE AWARD (U.K)	2002
6	GREENTECH ENVIRONMENT EXCELLENCE GOLD AWARD	2003
7	WORLD ENVIRONMENTAL FOUNDATION, NEW DELHI. GOLDEN PEACOCK ENVIRONMENT MANAGEMENT AWARD. UNDER LARGE MANUFACTURING ELECTRONICS INDUSTRIAL CATEGORY FOR 2004	2005
8	THE FIRST PRIZE FOR ENERGY CONSERVATION FOR 2005-06 IN THE GENERAL CATEGORY FROM THE DEPARTMENT OF ENERGY (GOVERNMENT OF KARNATAKA) AND KARNATAKA RENEWABLE ENERGY DEVELOPMENT LTD (KREDL).	2006

