

Write Up on Question No 20

UNIT PROFILE :

Emerson Climate Technologies (India) Limited is India's No 1 manufacturer of Hermetically Sealed Reciprocating Gas Compressors. It has 2 state-of-the art plants at Karad & Atit (Maharashtra) producing more that 7,00,000 compressors per year to serve refrigeration and air conditioning market in India & Middle East. Annual Turnover has reached Rs. 343 Corers in FY07 with 30 % Exports in middle east.. Our product range is 300 BTU/Hr to 480000 BTU/Hr. Organization is having its own Research & Development set up and always to focus on Energy Efficient Products. CR & CK Models are highly Efficient Models have an EER 11+

ENERGY MANAGEMENT POLICY :

Achieving optimum use of Energy in our operation and brining about improvements in the Energy Efficiency of our processes and products will form an important component of the continuous improvement efforts in our organisation.

We shall strive to reduce Energy consumption per unit of value added by ,

- ❖ Minimising Waste.
- ❖ Using Energy Efficiency processes and equipment.
- ❖ Conducing periodic Energy Efficiency improvement studies and improvement measures.
- ❖ Involvement of employees of all level in the Energy Conservation efforts.
- ❖ Effective dissemination of information.
- ❖ Establishing norms and initiating programs to reach the norms.
- ❖ Promotion of non-conventional energy usage.

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

We shall make efforts to brining about continuous improvement in the Energy Efficiency of our products.

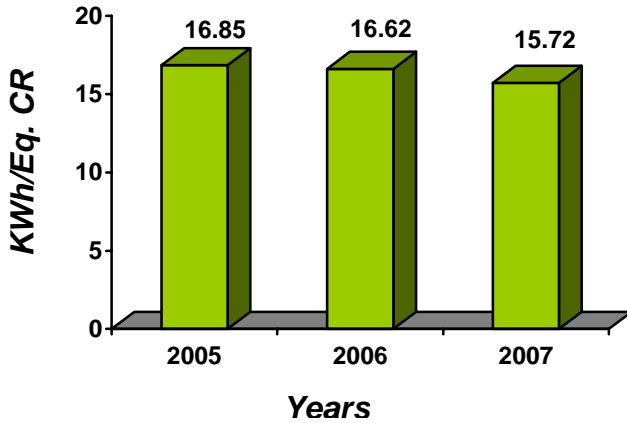
ENERGY CONSUMPTION

SPECIFIC ENERGY CONSUMPTION DETAILS	UNIT	2004-05	2005-06	2006-07
Production Eq. CR Compressor	Eq. CR	579426	508333	571043
Specific Electricity Consumption per Eq.CR	KWh	16.85	16.62	15.72
Specific Fuel Consumption per Eq.CR	Mn kCal	0.0167	0.0153	0.0140
*Use of Green Energy w.r.t. Total Energy	%	61.60	64.84	76.85

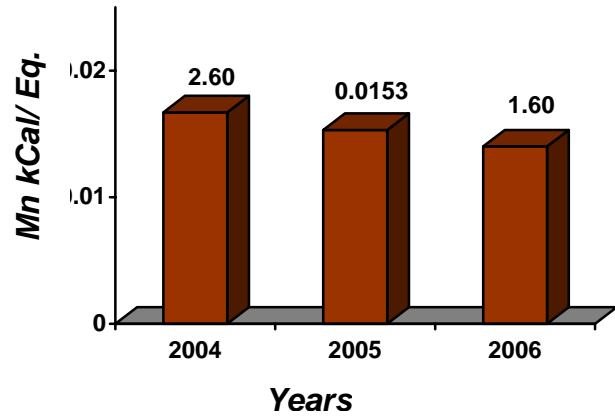
**Green energy includes own windmill generation, 3rd party green energy purchase & other renewable projects*

SPECIFIC ENERGY CONSUMPTION CHART

Specific kWh Consumption/Eq. CR



Specific Fuel Consumption Ltrs/Eq.CR



ENERGY CONSERVATION SET UP

The energy conservation movement was initiated in 1989

This was done with a foresight to recognize importance of Energy conservation activity As a weapon against Global competition.

- To offer Energy efficient products to Global and Domestic customers.
- To counterattack rising energy tariffs.
- To promote Awareness at all levels in Kirloskar group companies.

This mission is continued till date because of boundless energy of our Encon team, it's innovation, creativity, relentless efforts. This was widely supported by various plant functions and Management.

Over the period Encon cultured has developed to reduce energy in our operations and bringing about improvements in our Products and processes by way of Non Conventional Energy Usage, New Technology, Waste identification & Elimination, Making our processes better and Energy Efficient, Encashing ENCON expertise and knowledge into new projects ,Elevating plant performance to improve capacity utilization, Energy efficient products to customers, Training and Awareness, Examining ourselves – External energy audits and identifying Opportunities.

Management has taken up ENCON as a High Focus Project.

ENCON activities & targets are finalized in the beginning of the financial year & they are reviewed weekly, monthly & yearly at various management levels.

As a part of Energy Conservation, Company stepped in to the Green Energy by installing 2.4 MW Wind Mill at Matrewadi, Varekarwadi & Pachpatta sites

As a part of training & awareness programme, Company has arranged unique awareness program for employees, family members, & society in the Karad city, First of its kind, booklet "CHETANA" in Marathi language was published. 2000 copies distributed to all employees, Vendors & Ancillary employees. The booklet covers Energy Measures for MY SELF , MY COMPANY and MY NATION. Various Energy efficient products for household exhibitions are organized in Karad & Atit city. Rewarding to employees, Vendors for Best Encon efforts. Encon Kaizens.

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.

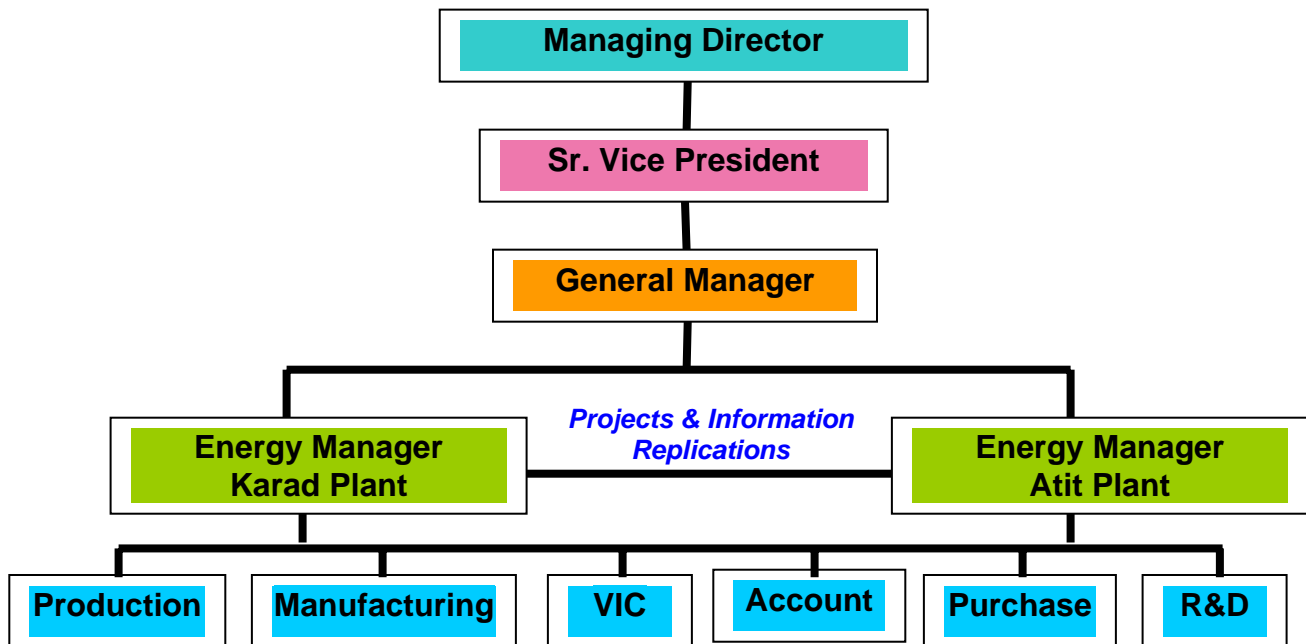
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In achieving these, we shall utilise the knowledge and expertise available from various sources including sister organisations, collaborators and outside experts.

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

ENERGY CONSERVATION CELL STRUCTURE



- Both Plants cross functional department members are separate, They report to Energy Manager.
- Energy Managers are set the Encon targets in its Personal Appraisal

REVIEW MECHANISM :

Review	Reviewed by	Frequency
Review No 01	Managing Director, Sr.Vice President, General Manager & other Senior offers	Monthly
Review No 02	General Manager, HOD Plant Engg.	Fortnightly
Review No 03	HOD Plant Engg	Weekly
Review No 04	Energy Manager	Daily

ENERGY CONSERVATION ACHIEVEMENT

During the period 2006-2007, Emerson Climate Technologies (India) Ltd has implemented 23 Nos energy saving proposals through Engineering initiatives, workmen’s suggestions scheme, internal audits and Total Productive Maintenance methodology resulting into total saving **Rs 46.53 Lakhs**. This has resulted in to a reduction of **5.47%** in specific electrical energy consumption and **12.00 %** in specific thermal energy consumption. In water conservation also the unit has reduced the consumption by **10%**

This Encon activity initiated in 1989 and is in force for last 17 years and added a savings into companies profit **Rs 655.06 Lakhs**

List of Certificates and Awards won by Emerson Climate Technologies (India) Limited during 2001-2007 as,

Year	Name of Awards to the Organization	Received from which organization
2006-2007	National Award for “Excellence in Energy Management” 2007	Confederation of Indian Industries – CII
2005-2006	National Award for “Energy Efficient Unit”	Confederation of Indian Industries – CII
2004-2005	National Level Award “Certification of Merit in General Category.	Bureau of Energy Efficiency-BEE
2004-2005	National Award for “Energy Efficient Unit”	Confederation of Indian Industries – CII
2004-2005	ISO 14001-2004 Certification for “Environment Management System” for Karad & Atit	BVQI
2003-2004	State Level 1 st Award for Excellence in Energy Conservation and Management	Maharashtra Energy Development Agency - MEDA
2003-2004	State Level 1 st Award for Excellence in Renewable Energy	Maharashtra Energy Development Agency - MEDA
2003-2004	National Award for Best innovative Project	Confederation of Indian Industries – CII
2002-2003	State Level 2 nd Award for Excellence in Energy Conservation and Management	Maharashtra Energy Development Agency – MEDA
2002-2003	DSK Prestigious Energy Award	DS Kulkarni & The Institute of Engineers –Pune Local
2000-2001	National Award for Excellence in Energy Conservation and Management	Confederation of Indian Industries – CII
1989-2005	16times for Outstanding Achievement in Excellence in Energy Conservation	Kirloskar Group

MAJOR ENERGY CONSERVATION PROJECTS

Instillation of Solar Water Heating System for Pre-Treatment Bath Heating

Seven tank washing system for pre-treatment was working on Thermic Fluid. It is converter to solar panel heating system,

Total Heat load was 1.5 Mn kCal/dya,

Solar heat output is 0.730 Mn kCal/day,

Furnace Oil Saving Achieved 85 Liters

Investment 2.358 Mn

Annual Savings 0.475 Mn

Payback 5 years



Captive Power Generation – 2.4 MW Wind Turbine

Installed 0.8 kW capacity – 03 Nos Wind Turbine at Pachpatta, Nasik District,

Total Capacity	2.4 MW
Green Energy Generation	4.8 Mn kWh/annum
Investment	114.0 Mn
Payback	3.8 years

(considering the tax benefits also)
CO2 emission reduction 4080 Tons / annum



Utilization of Paint Baking Oven Exhaust Heat for Compressor Drying (Project identified by Paint shop worker)

Paint baking oven exhaust was released into atmosphere. It is recovered by installing additional Heat duct & recovered heat utilized for compressor drying purpose & Cut off Thermic fluid heating,

Invsetment	0.025 Mn
Annual Savings	0.190 Mn
Payback	1.5 Months



Industrial Fan Blades Replaced by FRP

Industrial Fan was Aluminum Fan blades, It is replaced by Fiber Reinforced Plastic blades, Electrical power is reduced due to reduction of Fan weight.

24" & 30" No. of Fan Blades Replaced 78 Nos

24" Blade		30" Fan Blade	
Aluminum	FRP	Aluminum	FRP
1025 gms	810 gms	1750 gms	955 gms
190 Watt	140 Watt	280 Watt	170 Watt
7.87 m/s	7.00 m/s	11.50 m/s	10.50 m/s

Investment	0.102 Mn
Savings	0.090 Mn
Payback	14 Months



OverJack Insulation to Thermic Fluid Boiler

Boiler surface temperature was observed 92°C, Thermic fluid boiler insulated through over jack. Surface temperature is reduced up to 52°C, Heat losses was reduced by 16860.99 kCal/hr, Furnace oil saved 19.44 Liters/day,

Investment	0.036 Mn
Annual saving	Rs 0.112 Mn
Payback	4 Months



Evaporative Cooling Pad for Air- Conditioner

Water cooled evaporative cooling pad is installed to Split air conditioner to improve the system efficiency.

No of Pads Installed	07 Nos
Investment	0.048 Mn
Power saving	1.542 kW/unit
Annual Saving Rs	0.119 Mn



Auto Air Control Damper for Thermic Fluid Boilers

During the OFF condition of air was sucked through air blower & passed on heated boiler coils to chimney due to negative pressure generation at boiler. Boiler temperature was come down. These heat losses was reduced by installing Auto air controller damper at blower side. This is only open when blower is ON & Close during OFF condition.



Future Plan

Our management has taken a target to reduce the Energy cost by 10% every year and as against we have prepared a long range plan for Energy Cost reduction, which is given below as

Performance Area	FY'08	FY'09	FY'10
Specific kWh Reduction	14.54	13.09	12.50
Specific kCal Process Heat reduction	0.0132	0.0119	0.1000
Improve compressed pressure air yield	10% reduction every year		
Reduce Heat losses/Recovery of waste heat	1 Lac kCal/hr	1.2Lac kCal/hr	1.2Lac kCal/hr
Reduce Energy cost by machine condition monitoring / improving process	25 kW	30 kW	35 kW
Start additional green energy source from Wind Mill	1.0 MW	2.0 MW	2.0 MW
Optimization / Elimination of Air-conditioning system	5 TR each	5 TR each	7 TR each
Reduction of fixed Energy consumptions	50 cfm	80 cfm	110 cfm
Modification of long process	10% reduction every year		

Energy Conservation Efforts to Society

1. Campaign Program for 8000 School Students

Society service cell in the month of January for schools in and round Karad organized ENVICONFE-06. "ENCON, Safety and Environment" – information for school students is an effort to spread awareness amongst the students about these subjects.

Karad Encon team proactively participated in the event.

Around 8,000 students from 13 schools were covered from 1st to 31st January, 2005. A two hour program was planned for every school. These covered topics like:

- a) Information given to all students and senior citizens on today's Energy Scenario, Why Energy Conservation is must, Benefits of Energy Conservation, How we can save energy etc. etc.
- b) Demonstration of Energy Efficient equipments like CFL lamps, Gas Geyser, Solar Panels, Electronic Ballast etc.
- c) Distributed ENCON leaflets

HODs and senior officers devoted their valuable time and also deployed officials from departments for the program

2. Encon Exhibition for Karad & Satara Citizens

Three days Exhibition of Energy Efficient Products for household application at Old Balaji Sanskritik Bhavan, Somwar Peth, Karad on 19th December 2005 to 21st December, 2006.

Very good response received from society and employees

ENCON exhibition inaugurated by Shri. Bhagat, Executive Engg. MSDCL, Karad

3. "ENCON Documentary" film produced by KCL, shown in the exhibition. This film is having a energy saving tips, which we can follow in our day-to-day life and save the energy without any investment
4. 10,000 printed leaflets covering easy possible energy tips in our day-to-day life were distributed during the Exhibition
5. Various ENCON banners and posters were displayed in Karad city for awareness

6. Encon support to Local Bodies

- a) Shared a best ENCON practices with Karad Municipal Corporation, Chief Engineer Mr. Mulla and his 15 member team attended the program at KCL, Karad.
- b) On request of Karad Municipal Corporation, KCL Engineer conducted an energy audit of water pumping station. Final report submitted to KMC with few recommendation and suggestions.
- c) 2 Hrs. Encon Awareness Session for Malkapur Gram Panchayat and Gokak Irrigation System operators on Pump and Lighting.

ENVIRONMENTAL AND SAFETY

Emerson Climate Technologies (India) 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 2004-2007 as,

a) Improvement in Products

Recently we have developed almost all products replacing R-12 refrigerants by R-134a gas, which is environmental friendly. We are the first Indian Compressor manufacturing company to introduce above product. We have released 17 compressor models with R134a. & We are working on replacement of R-22 refrigerant by R-401a & 407c environmental friendly refrigerant gas.

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) Improvement in Effluent Treatment:

As a responsible industrial unit, we constantly assess environmental impact of waste generated in our factory. We are in all four ET plants at our both the units in Karad & Atit & their ancillaries. These plants are constantly monitored & maintained to satisfy MPCB norms. Re-circulated the treated waste water to the garden. This helps 75% need of water for garden fulfilled. Water Saving 80 Kliters/day

The dry sludge generated from the effluent treatment plant is used as a good quality of manure for the garden.

d) 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 Lac Liters, fulfill 2 months water requirement of Atit Plant.

e) Improvement in Housekeeping by implementing 5'S' Module & Plantation:

We recommend this as one of the major areas of environmental improvement

We have about 50 labours deployed for day to day house keeping & safety at our plants & ancillaries. Passages, roads shops are kept clean & clear for movement easiness & safety. Areas like machine shop, process shop are kept dust free using heavy duty industrial vacuum cleaners.

Distributed Plants to all employees (500 Nos) during National Environment day

We have maintained very large garden & trees at our premises to keep the same green & cool.

Plantation of approx 3000 Nos trees in factory premises.

We have planted about 125 nos. of shadow trees along the Government owned approach road to our company.

We have improved garden structure in our main plant.

Plantation of 10 kg seeds on Pali & Agashiv hills during the rainy reason

f) Improvement in waste management

prepared a scrap yard to segregate the waste generated in our factory (hazardous & non-hazards)

Vermiculture plant for canteen waste and use to garden.

g) Improvement in drinking water quality:

We have installed complete water system for drinking water and the treated water is distributed to canteen & various water booths in the premises. The plant is still running very efficiently with an yield of almost 1 lac Ltrs. Per day.

h) Improvement in Safety:

The factory is well equipped with number of fire extinguishers and fire hydrant units located at stipulated points as per IS standards. Water reservoir of 1.80 lacs liters is provided to feed constant water supply to hydrant.

Safety belts are allotted to the labors that work at heights while cleaning the roofs, replacing sheets etc. Safety shoes are issued free and safety helmets are issued at subsidized rates to all employees and labours in the factory.

Safety committee reviews the safety measures across the company areas covered as Training & Awareness, Emergency Control, Safety on Shop floor, Electrical Safety, Outside plant visits external audits.

Movement control system for all vehicles moving to & fro inside factory is prepared to avoid conjunction & accidents.

[These all activities are covered under ISO 14000 \(EMS\) & OHSAS](#)



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Environmental Policy

We, at Emerson Climate Technologies (India) 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

November 29, 2006


Shrikant Bapat
Managing Director