

Rashtriya Chemicals & Fertilizers Ltd, Trombay Unit

1. THE COMPANY PROFILE

Rashtriya Chemicals and Fertilizers Limited, Chembur, a Government of India Undertaking is one of the largest integrated Fertilizer and Industrial chemicals complex in the country. It was incorporated on 6th March'1978 on reorganization of the erstwhile Fertilizer Corporation of India Ltd. and National Fertilizer Limited.

RCF has always selected the best available technology at the time of inception of every plant and followed it up with up-gradation from time to time to improve energy efficiencies and make the plants eco-friendly and competitive.

The first phase plants of Trombay Unit, Ammonia, Urea, Complex Fertilizer Suphala (15:15:15), Sulfuric Acid and Nitric Acid were commissioned in October-November, 1965. In the second phase, Methanol Plant was put up in 1966 which was known as Trombay II diversification. This was followed by further diversification schemes, which included Ammonium Bicarbonate Plant, Sodium Nitrite/Nitrate Plant, Methylamines Plant, Concentrated Nitric Acid Plant, and Phosphoric Acid Plant.

Further expansion in terms of Nitric Acid Plant, Complex Fertilizer Ammonium Nitrate Phosphate (20.8:20.80:0), additional Steam Generation and Water Treatment Plant, Bagging and Effluent Treatment Plant was commissioned in 1979. This was termed as Trombay-IV expansion. In 1977 further expansion (Trombay-V) was launched which had one Ammonia and one Urea Plant with Associated Gas Compressor, Steam Generation, Water Treatment and Bagging Plant. This project was commissioned in 1981. The main products and their present installed capacities are given in the Table below:-

Installed Capacities of RCF Plants

Plants	Present Capacity	Year of Commissioning
A. <u>Trombay-I</u>		
Ammonia (Revamped)	350	1965
Nitrophosphate (15:15:15)	1100	1965
Sulphuric Acid (DC DA)	300	1966
Nitric Acid	320	1965
B. <u>Trombay-II</u>		
Methanol (Revamped)	150	1966
C. <u>Trombay - III (Diversification)</u>		
Ammonium Bicarbonate	12	1968
Sodium Nitrate/Nitrite	12	1972
Methylamines	12	1974
Conc. Nitric Acid	60	1972
Phosphoric Acid	100	1975
D. <u>Trombay-IV</u>		

Ammonium Nitrate Phosphate (20.8:20.8:0)	1200	1979
Nitric Acid	750	1979
E. Trombay-V		
Ammonia	900	1981
Urea	1000	1981

2. Energy Consumption:

RCF is a highly energy intensive unit, using the energy in the form of

- Associated gas,
- Electricity and
- Process steam.

Commissioning of Ammonia I syn Loop & other energy reduction programmes the power & Associated gas bills have reduced. The average electricity demand of Trombay complex **during 2004 - 2005 was 259200 MWH**. Associated gas which is used both as feed and fuel has annual consumption of the order of **427 Million SM³**. About 28620 MT of sulphur and 226637 MT of Rock Phosphate are also consumed annually.

- **The average annual fuel and Electricity bills are of the order of Rs. 123.21 crores & Rs. 102.84 crores respectively at the present rates of inputs.**

The annual energy bill for the R.C.F Trombay complex is given below in the table that follows:

	Total Electricity Bill (In Rs. Lakhs)	Total Fuel Bill (In Rs.Lakhs)	Total Energy Bill (In Rs. Lakhs)
2002-03	10072	11897	21969
2003-04	9337	10647	19984
2004-05	10284	12321	22605

3. Energy Conservation commitment, policy and set up.

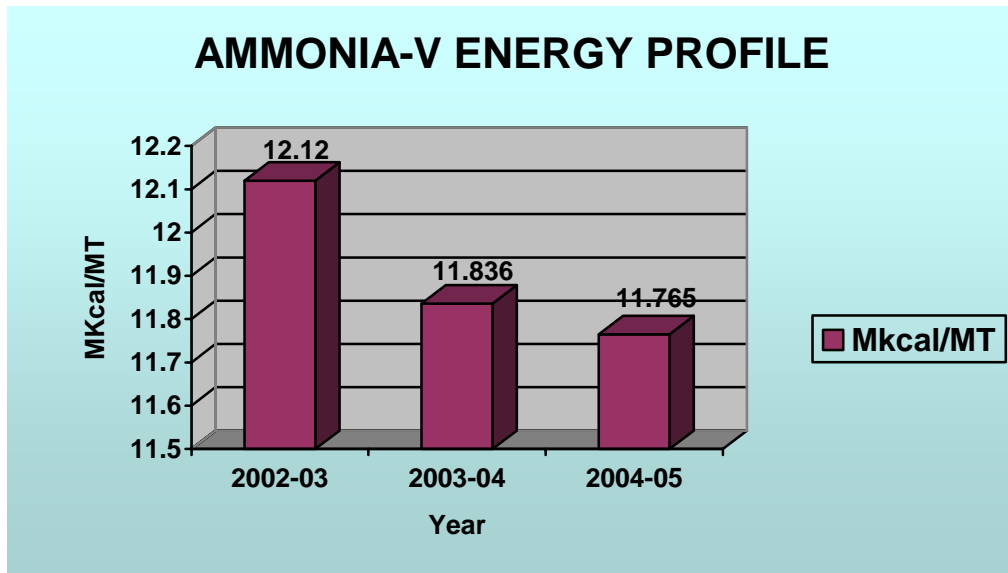
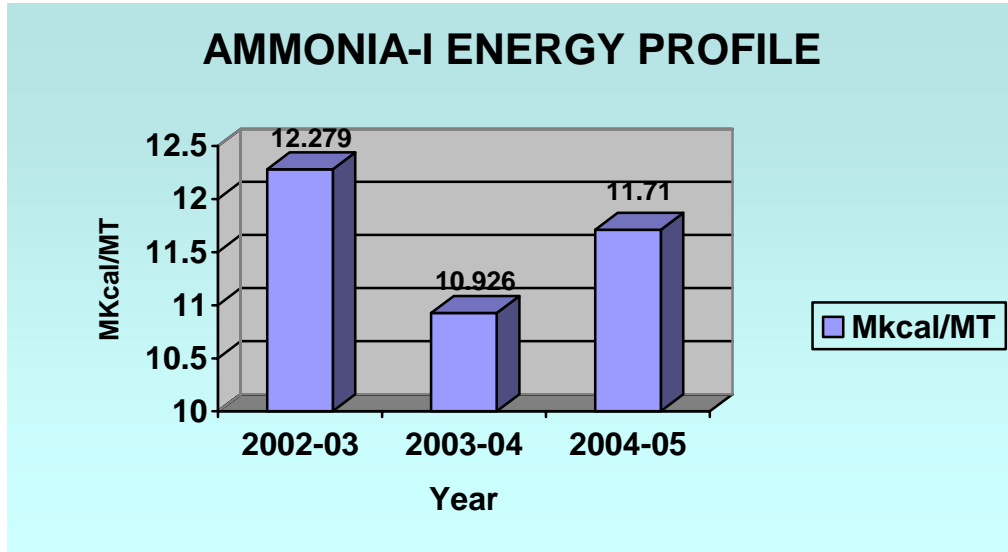
Considerable efforts have been made to reduce consumption of raw materials and energy in age-old energy intensive plants since beginning. A system of reporting and reviewing was initiated in order to optimize the energy consumption, raw material consumption as well as utility consumption.

An Energy Cell with qualified engineers and an Energy Manager has been set up to analyze the day to day energy consumption and variation in the factory. Jobs of carrying out energy conservation programs are also part of the energy cell. Regular reports are being generated to identify the areas of improvement with respect to energy conservation and also equipment's which are causing production constraints. On the basis of these reports, a number of proposals for energy conservation already have been under taken and implemented.

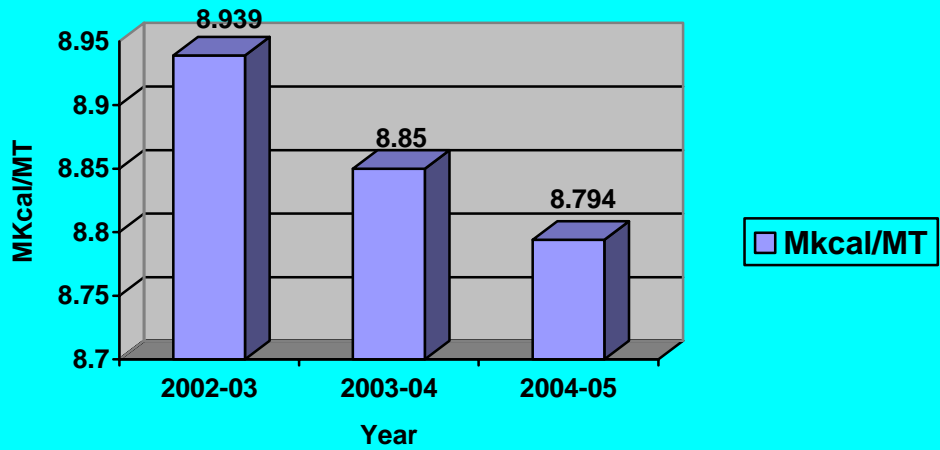
Energy conservation opportunities are usually identified based on energy audits, case histories of successful conservation measures implemented by other plants and through suggestions received from the operating and technical personnel etc.

4. **Energy Conservation Achievements**

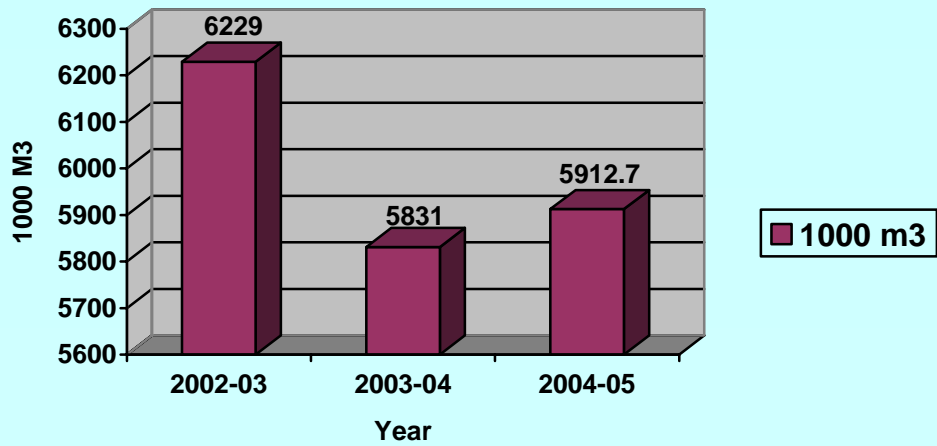
A selected number of energy conservation measures over the last few years show continual improvements, which have given substantial energy savings. The graphical representations of these conservations are as given below:



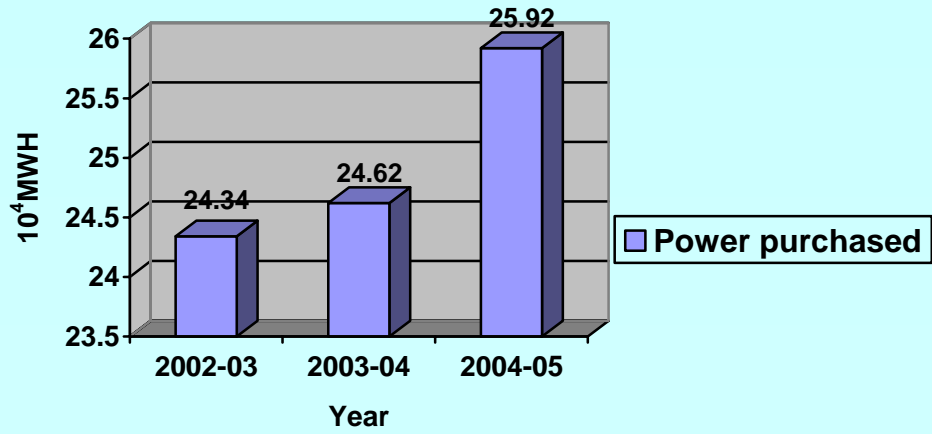
METHANOL ENERGY PROFILE



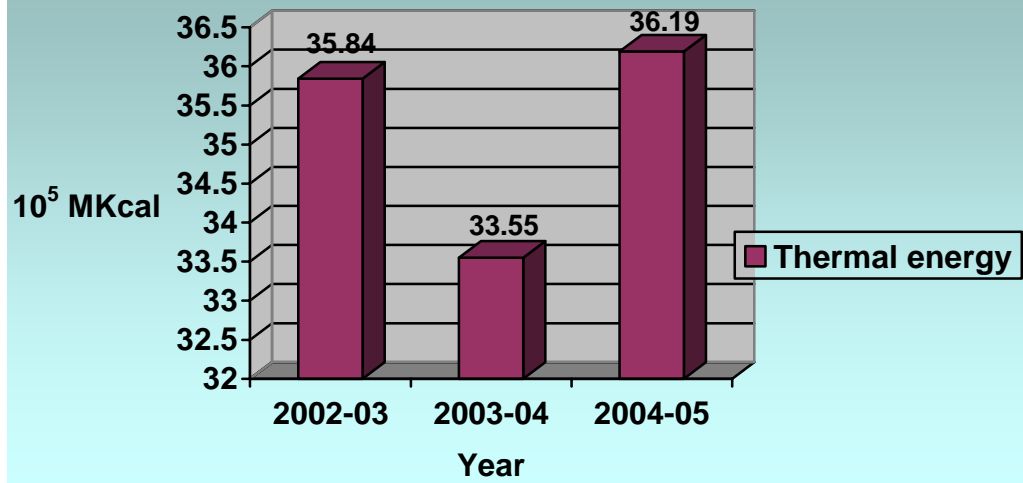
WATER CONSUMPTION



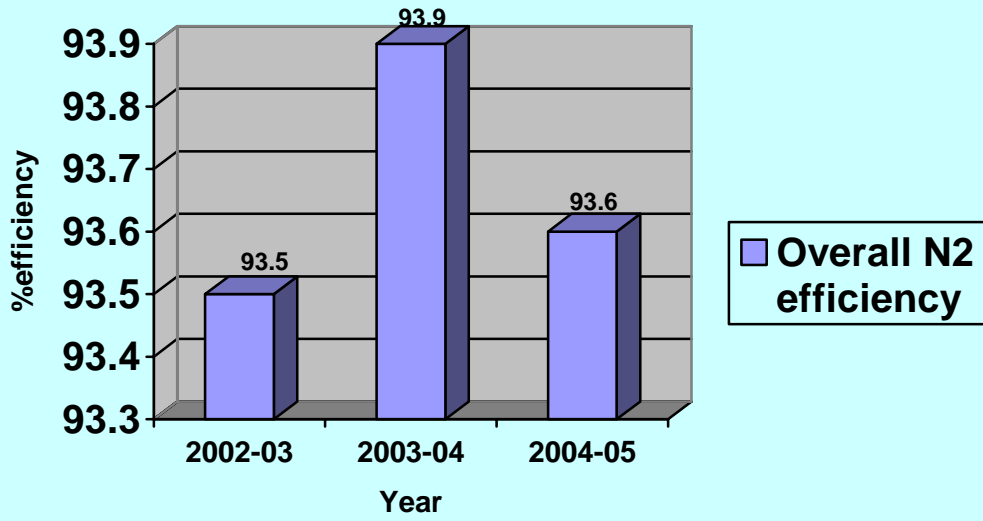
POWER PURCHASED



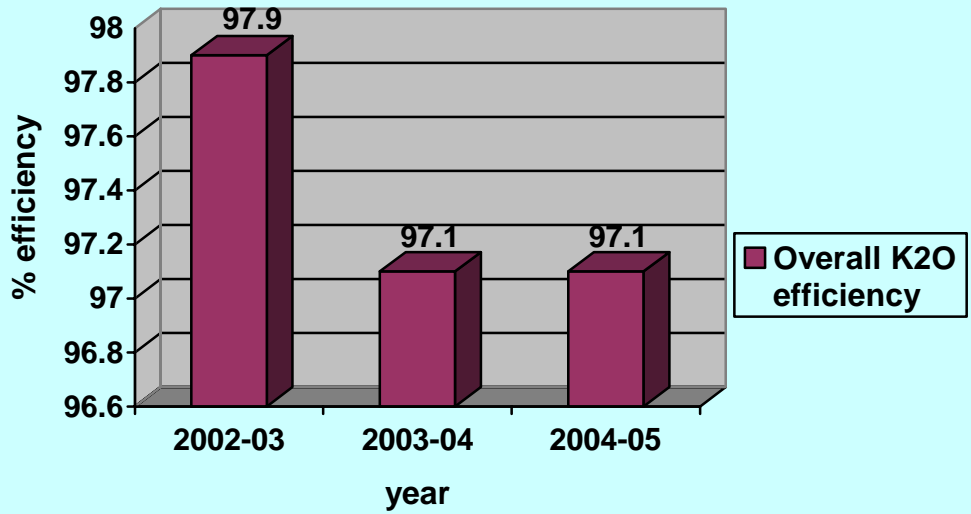
THERMAL ENERGY



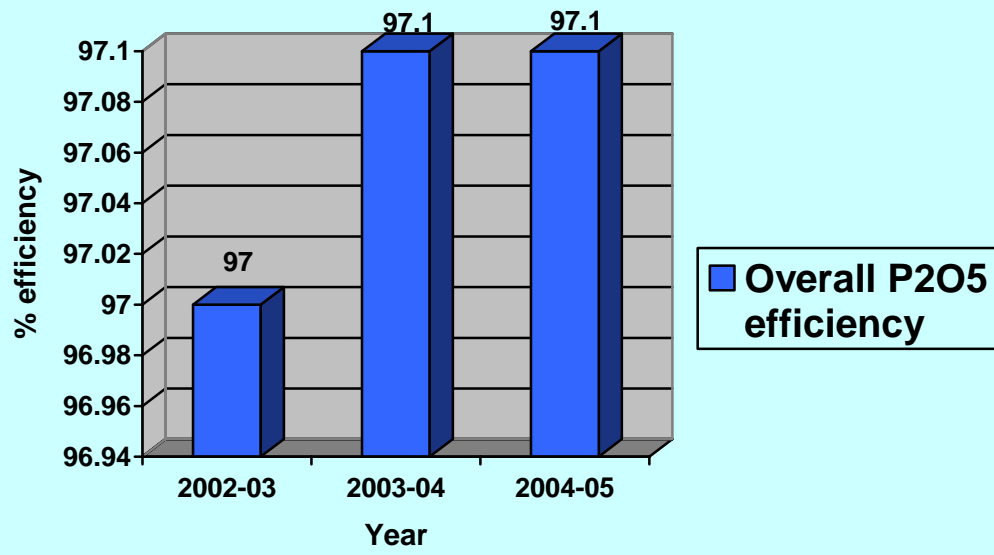
Overall N₂ efficiency



Overall K₂O efficiency



Overall P₂O₅ efficiency



Summary of classified energy saving measures implemented during 2004-05
(Please tick mark (√) measures implemented in 2004-05 and provide consolidated information on investment incurred and the saving accrued in the year 2004-05)

(a) Retrofitting/Minor modification of existing equipment – Low investment options

	Total Investment (Rs.lakhs)	Total saving (Rs. in Lakhs/annum)
<u>SUPHALA</u>		
(i) Optimization of capacity of fume exhauster	0.20	4.0
(ii) Stoppage of Instrument air compressors (CPT 5,6)	Nil	25
(iii) Downsizing of slurry sparging pump motor from 125 hp to 75 hp	2.0	0.50
<u>PHOSPHORIC ACID PLANT</u>		
(i) Increase in capacity of ball mill Capacity increased from 50 MT/hr to 53 MT/hr resulting in energy saving	Nil	6.39
(ii) Stoppage of Pneumatic air compressor whenever IAC is running	Nil	14.28
<u>NEW NITRIC ACID PLANT</u>		
(i) Stoppage of PO5 pump	0.05	5.0
<u>BAGGING & MATERIAL HANDLING</u>		
(i) Stopping of Instrument air compressor	Nil	5.76
<u>METHANOL</u>		
(i) Removal of wire mesh filter at inlet of Dehydrator unit (at discharge of instrument Air compressor) causing unwanted pressure drop of 1.0 kg/cm ² g. It has resulted in reduction in loading time (4 hrs/day) which has subsequently resulted in electrical energy saving	Nil	6.50
<u>ELECTRIC REPLACEMENTS—LAMPS/TUBES</u>		
	Total Investment (Rs.lakhs)	Total saving (Rs. in Lakhs/annum)
<u>NEW STEAM GENERATION PLANT</u>		
(i) Replacement of MV lamp with HPS 70W Fitting	5.06	2.22

(ii) Lighting device voltage control transformer	3.05	1.60
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METHANOL

(i) Replacement of 50 Nos. of HPMV (125 W) and 25 Nos. HPMV (250W) lamp with Metal Halide lamps of 50W and 150W respectively in industrial lighting thereby saving electrical energy	2.0	0.92
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BAGGING & MATERIAL HANDLING

(i) Replacement of 250W HPSV to 150W HPSV on NBP loading platform	Nil	0.72
(ii) Provision of transparent sheets on ET-2/ET-3 in ANP bagging	Nil	0.65

ETP/STP

(i) STP control room 300W flood light fittings replaced by 70/150W HPSV fitting	Nil	0.07
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(b) Replacement/Installation/Modification of old and inefficient existing equipment and system High investment options

		Total Investment (Rs.lakhs)	Total saving (Rs. in Lakhs/annum)
<u>SUPHALA</u>			
(i) Commissioning of Dehumidifier Energy conservation achieved due to of LA/LBexhausters	45.0	120.0	stoppage
(ii) Installation of LT capacitor bank	8.0	16.0	
<u>PHOSPHORIC ACID PLANT</u>			
(i) Higher capacity pump (50 HP motor) for pumping water for repumping of gypsum has been replaced with lower capacity (20HP motor)	Nil	5.24	

(c) Energy substitution/switching measures

NIL

(d) Combined heat and power systems

NIL

(e) Waste heat recovery system(Low temperature—less than 350/400 deg C)

	Total Investment (Rs.lakhs)	Total saving (Rs. in Lakhs/annum)
<u>METHANOL</u>		
(i) Increasing Air preheater outlet temp. (air used in burners) from 260°C to 290°C by using hydrojet cleaning of air preheater tubes externally and internally in waste heat recovery section of primary reformer	0.10	20.0

SULPHURIC ACID PLANT

(i) Installing additional Economizer on gas inlet line to IAT to recover waste heat and produce additional 3MT/hr of steam	25.0	108.0
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(f) Process Monitoring and Control

BAGGING & MATERIAL HANDLING

(i) Stoppage of idle conveyor belts through PLC	Nil	5.76
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(g) Reduction in usage of energy intensive raw materials

NIL

(h) Reduction of rejects in the production process

NIL

(i) Reduction of water consumption in the plant

NIL

(j) Recycling of Material

NIL

(k) Reduction of Transport fuel

NIL

(l) Human resource development for energy efficiency improvement

- A Specific training need assessment study carried out by internal team or external consultants for providing appropriate training to the employees : (I) We have elaborate system for training need identification. Training need is assessed periodically through interaction of HRD's personnel with HOD from various functions. In this, all needs, including requirement for training in Energy efficiency is brought out
(II) Our performance appraisal system has an elaborate system of training need identification. The format is sent to HR department on the training requirement for all officers who are assessed on the basis of this point
- B In-House training programmes conducted : Four training programmes covering total 303 officers and workers are organized
- C Employees sent for training within India : Four employees attended Energy Efficiency related training programmes in India
- D Employees sent for training abroad : No employee was sent abroad for Energy efficiency related programmes
- E Study undertaken to assess the impact of training provided to employees : We have elaborated system on training impact assessment. This is normally done through elaborate discussion with HODs and assessing the impact of programmes

Total cost in 2004-05 : Rs.



05/09/2005



