

## 1. COMPANY PROFILE

National Fertilizers Limited, a Govt. of India Undertaking, was incorporated on 23<sup>rd</sup> August 1974. It is the second largest producer of nitrogenous fertilizer in the country and has four operating fertilizer units located at Nangal, Bhatinda, Panipat and Vijaipur with a total installed capacity of 32.083 lakh tones Urea.

The Vijaipur unit, which is a ISO 9001:2000, 14001:2004 & OHSAS: 18001:1999 certified unit, comprises of two streams-Vijaipur-I and Vijaipur-II, which went into commercial production in July, 1988 and March, 1997 respectively. Both the streams are based on “*Steam reforming process*” of Haldor Topsoe (Denmark) for Ammonia plants with Natural gas feed in Vijaipur-I & NG/Naphtha feed in Vijaipur-II. The Urea plants are based on Snam Progetti (Italy) ‘s “*Ammonia stripping process*”

## 2. ENERGY CONSUMPTION

The details of various energy inputs and specific energy consumption during the last three years are highlighted in the table below. NFL Vijaipur has made a strategic tie up with M/s IOCL & M/s BPCL w.e.f. 01.04.2005 to get Regasified Liquefied Natural Gas (RLNG), which is cheaper than Naphtha. Furthermore, it is cleaner fuel as compared to Naphtha. This has resulted in considerable reduction in the energy cost of Urea. However, availability of RLNG is not sufficient to phase out the use of Naphtha. The % mix of NG, RLNG & Naphtha use depends on the availability of Natural Gas from M/s GAIL & RLNG availability from IOCL & BPCL. Specific energy consumption for the Vijaipur-I unit was brought down from 5.807 Gcal/MT Urea for the year 2004-05 to 5.756 Gcal/MT Urea for the year 2006-07 which is the lowest ever-annual specific energy consumption. However, the specific energy consumption for the year 2007-08 has increased to 5.808 Gcal/MT urea because of operation of plant at low load arising out of **NG limitation from GAIL (external factor)**.

DESCRIPTION	UNIT	2005-06	2006-07	2007-08
Annual Urea Production	Lakh MT	9.16103	8.7461	8.99679
Total Energy consumption (Electrical + Thermal + Raw material)	Gcal	5308817	5034255	5225336
Total Sp. Energy Cons. (Electrical + Thermal + Raw material)	Gcal/MT	5.795	5.756	5.808
Total Manufacturing Cost	Lakhs Rs.	42438.28	42583.76	47725.93
Total Energy Cost	Lakhs Rs.	35619.64	37458.42	41396.61
Total Energy cost as % age of Manufacturing Cost	%	83.93	87.96	86.74

### 3. ENERGY CONSERVATION COMMITMENT, POLICY AND SET UP

NFL, Vijapur is very much committed to Energy Management and for the same has a dedicated Energy management / Conservation Cell, comprising of members from various Deptt. / Disciplines & headed by DGM (TS). Energy Manager, who is also a Certified Energy Auditor, is coordinator of the cell. Energy conservation Cell is associated with energy monitoring & recommends for energy improvement schemes & day-to-day trimming of plant to improve energy. Based on in-house study / energy audit, a number of energy saving schemes have been implemented / are being implemented / planned to be implemented. For all ENCON measures, the EC Cell is the principal functioning & Coordinating cell. The functioning of Energy Management is from the top. The head of the unit holds regular weekly meetings to discuss the status of energy consumption levels & action taken on ENCON options. The middle management, consisting of departmental in charges, reviews the ENCON options identified by the Energy Cell or the Audit Group for implementation. ENCON options / schemes, requiring higher investment are put up to the top management (Head of unit, CMD, Directors) for approval of budget & implementation. Further, suggestion scheme system for workers is in vogue in the unit. Energy saving suggestions are given utmost priority for implementation & are suitably rewarded. Energy saving modifications from plant are also given top priority for early implementation. Energy conservation awareness programme are held through out the year.

In addition to the monthly energy audit based on inputs, detailed plant wise energy audit is carried out by in-house energy cell or selected technical audit team. Energy audit was also conducted by M/s HTAS, Denmark for Ammonia-I Plant. It was decided to implement the recommendation of the audit team. Accordingly, Energy Saving Project was taken up. However, the project has presently been kept abeyance in view of escalation cost & non-conducive Government Policy.

The specific energy consumption for the last three years are highlighted below.

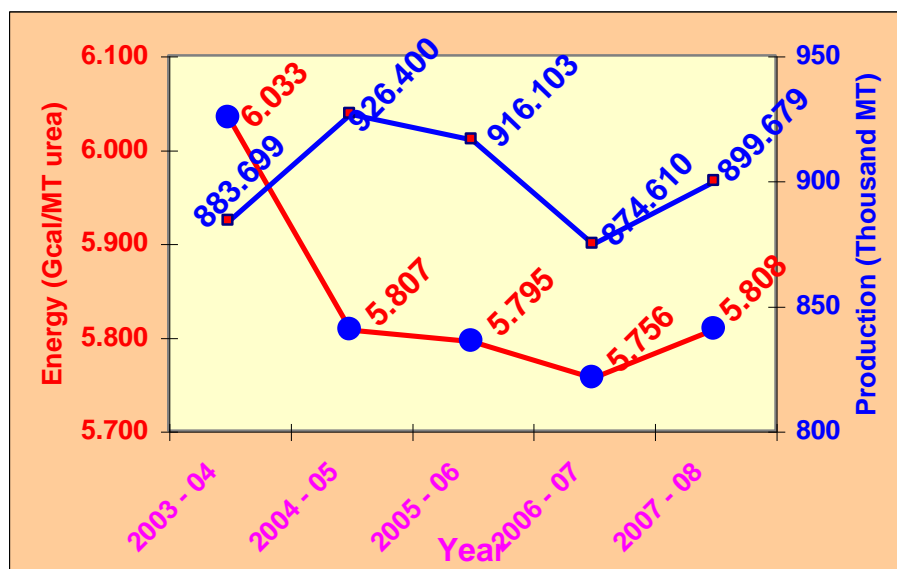
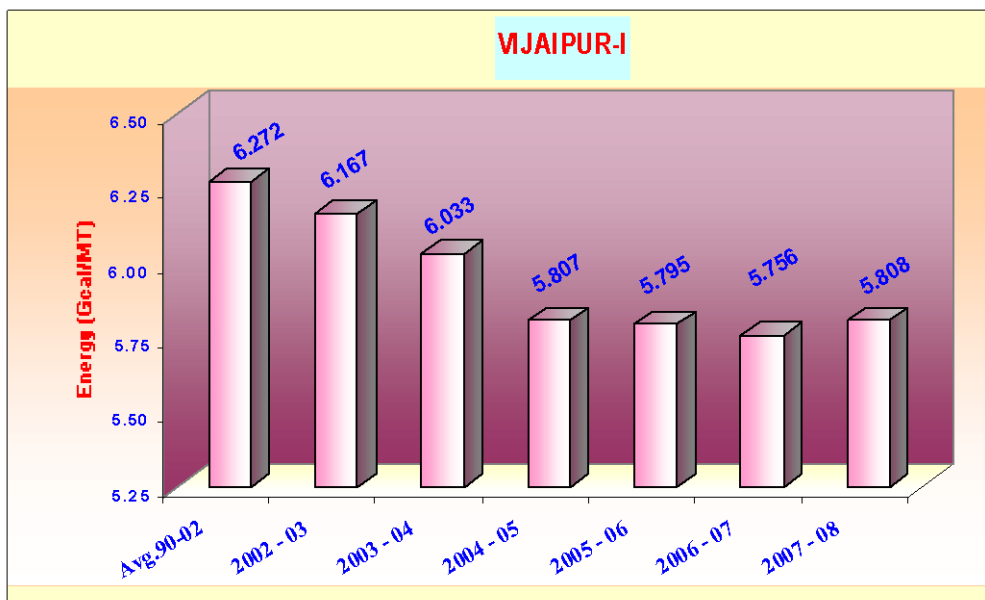
#### PERFORMANCE OF VIJAIPUR-I AT A GLANCE

<b>AMMONIA PLANT</b>				
ITEM	UNIT	2005-06	2006-07	2007-08
AMMONIA PRODUCTION	MT	529272	502263	517332
CAPACITY UTILIZATION	%	105.52	100.13	103.14
ON STREAM DAYS	DAYS	348.18	329.06	344.49
AVG. PLANT LOAD	MTPD	1520	1526	1502
SPECIFIC ENERGY CONS.	Gcal/MT	7.863	7.788	7.840

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UREA PLNT				
ITEM	UNIT	2005-06	2006-07	2007-08
UREA PRODUCTION	MT	916103	874610	899679
CAPACITY UTILIZATION	%	105.96	101.16	104.06
ONSTREAM DAYS	DAYS	340.45	320.23	338.07
AVERAGE PLANT LOAD	MTPD	2691	2731	2661
SPECIFIC ENERGY CONS.	Gcal/MT	5.795	5.756	5.808

Production & Energy performance of Urea Plant:



MAJOR ENERGY SAVING SCHEMES IMPLEMENTED DURING 2007-2008 ARE

**HIGHLIGHTED BELOW.**

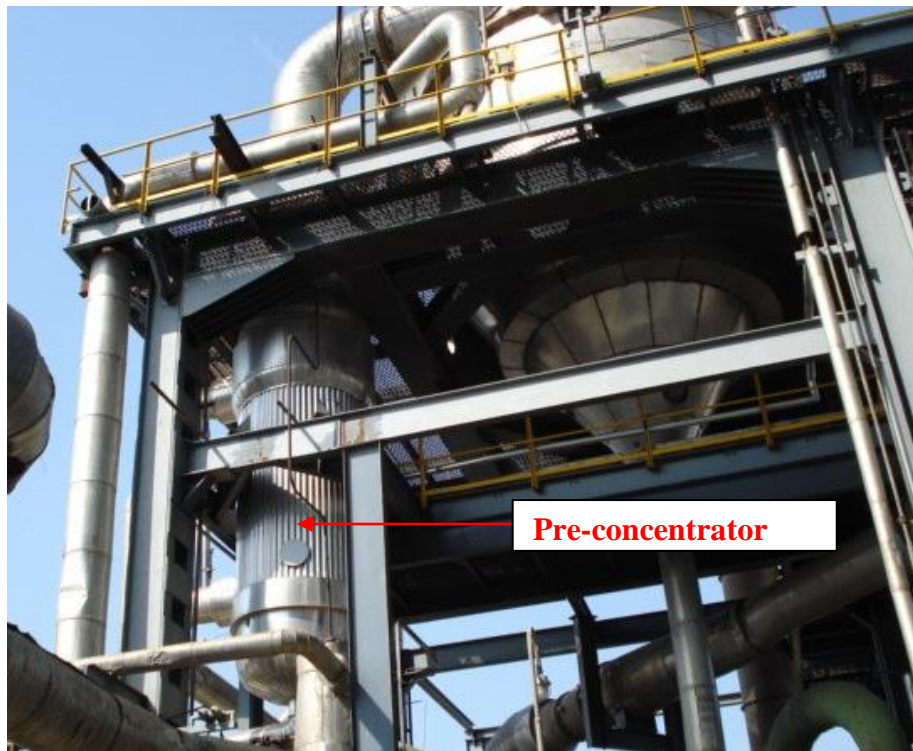
In its constant endeavour to optimise and improve upon the present systems, besides optimization of process parameters & maintenance practices, energy saving schemes was implemented recently after thorough & extensive study in the related fields.

**INSTALLATION OF PRE-CONCENTRATOR IN 11-STREAM OF UREA PLANT:**

In Urea Plant the vapour from MP Decomposer was earlier cooled from 120°C to 75°C & condensed in MP condenser before recycling back to the reactor. In the process the useful heat of condensation of 9.396 Gcal/hr was being lost in Cooling Water.

By installation of Pre-concentrator, it has been possible to recover 60% of the useful heat. The vacuum concentrator, as per CASALE design, has been installed in 11 stream of Urea Plant.

Pre-concentrator is an additional vacuum stage utilizing heat of condensation of Carbamate vapours coming from Medium Pressure. In this scheme, the first vacuum concentrator has been replaced with modified Heat Exchanger in which, in the lower part, heat of condensation of Carbamate vapour coming from the MP decomposer is used for heating Urea solution & in the upper part, Low Pressure steam is being used. LP steam saving to the tune of 210 kg/MT steam, against guaranteed saving of 195 kg/MT Urea, has been achieved. Moreover, Prill quality of urea has also improved.



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**In view of NG limitation from M/s GAIL, we had been forced to use Naphtha. Hence, all Energy savings has directly resulted in saving in terms of naphtha.**

- Annual saving : Rs.1814 Lakhs
- Investment : Rs. 450 lakhs
- Payback : Around about 3 months

**Besides, we have also replaced the damaged / defective insulations, steam traps, steam leakages through valves / joints, replacement of tubelights with CFL and halogen lamps with metal hallides, installation of sloar lighting system at Factoty Main Gate , which has resulted in significance energy & financial savings.**

➤ **Replacement of defective steam traps / valves & attending other steam leakages:**

- Annual savings :Rs. 198.66 Lakhs
- Investment : Rs. 2.61 lakh
- Payback : Around < 1 month

➤ **Replacement of damaged Insulations:**

- Annual savings :Rs. 58.09 Lakhs
- Investment : Rs. 4.54 lakh
- Payback :Around < 1 month

➤ **Replacement of Halogen lamps with Metal halides & tube lights with CFL in township :**

- Annual savings : Rs. 0.5 lakhs
- Investment : Rs. 0.93 lakhs
- Payback : Around 22 months

➤ **Installation of solar lighting system at Factory Main gate for usage of renewable energy and conservation of fossil fuel.**

- Investment : Rs. 0.3 lakhs
- Annjual Savings: : Nominal



**Solar lighting system**

➤ **Replacement of 50 Nos. CRT computer monitors with LCD monitors:**

- Annual savings : Rs.1.74 lakhs
- Investment : Rs. 1.32 lakhs
- Payback : Around 09 months

**5.ENERGY CONSERVATION PLANS AND TARGETS**

On the basis of Internal Energy Audit and the detailed Energy Audit of Ammonia- carried out by M/s HTAS, the unit has the following future action plan in the pipeline for conservation of energy.

Sl. No.	Plan	Implementation (Year)	Annual Savings	
			Energy, GCal	Lakh, Rs.
1.	Implementation of Energy Saving Project (ESP) of Ammonia Plant of Vijaipur-I (installation of S-50, Retrofit of Benfield to GV, Installation of Process Air preheater & other modifications) along with capacity enhancement of urea plant & installation of Carbon Dioxide Recovery(CDR) Plant	The ESP was earlier kept in abeyance in view of escalated cost. Now, it has been revived after clubbing with Capacity Enhancement of Urea plant based on New Urea Investment Policy. The project has been approved by Board of Directors & is likely to be commenced at the earliest.	196000 (for energy saving in ammonia plant)	2740

**6.0 ENVIRONMENTS AND SAFETY**

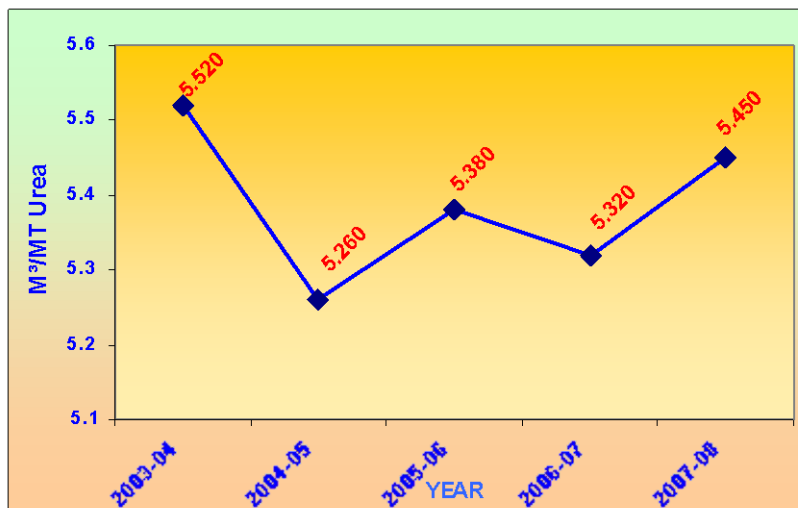
**6.1. ENVIRONMENT**

National Fertilizers Limited has its own corporate Environment Management Policy, which gives utmost importance to 'Environment Protection' in and around the complex. N.F.L., Vijaipur is an ISO-14001: 2004 unit, which is a testimony of its commitment towards Environment consciousness. The unit has been consistently upgrading the concept of conservation, recycle & reuse for optimum utilization of inputs. This has also helped in reducing waste discharges thus preventing pollution. Over the year, there has been considerable reduction in specific energy consumption resulting in significant reduction in

emission of green house gases. The unit has bagged many prestigious awards for efficient environment control.

A separate Effluent Monitoring Cell (EMC) has been established to keep round the clock vigilance on effluent quality so that the discharges are much lower than Minimal National Standards. In order to inoculate Environment awareness amongst masses, World Environment Day, Earth Day, Ozone Day are observed.

### PROCESS WATER CONSUMPTION (VIJAIPUR I & II)



### 6.2 SAFETY

National Fertilizers Limited, Vijaipur has its own Safety policy. It aims at creating safe working conditions & habits in order to eliminate Industrial Accidents. National Fertilizers Limited, Vijaipur has adopted several measures to achieve this goal.

- Integration of safety with various departments, familiarization of the employees with the general and special safety practices like Safe Work Permit and enforcing them in their work place.
- Safety audit is conducted every year by external agencies.
- Plant level & Central Safety Committees are set up who suggest safe practices for implementation.
- Existence of on site as well as offsite emergency plan.
- Combined Risk Analysis report of Hazardous Plant i.e. M/s GAIL, IOCL and NFL at Vijaipur was carried out by M/s PDIL Sindri.
- Mutual Aid Agreement with M/s GAIL, Vijaipur.
- Accident free period: 48,000,00 Hrs (2007-08); cummulative accident free period : 22193353 hrs (09.09.2003 to 31.03.2008)