

INDIAN FARMERS FERTILISER COOPERATIVE LIMITED PHULPUR UNIT - II

Unit Profile

Indian Farmers Fertiliser Cooperative Limited (IFFCO), globally acclaimed cooperative in fertilizer production and marketing has been striving for socio-economic upliftment of the rural population of India since inception. To ensure timely availability of quality fertilizers to the farmers, IFFCO came into being on 3rd November, 1967. Initially, IFFCO commissioned Kalol and Kandla plants in Gujarat in early 1975.

Due to increasing demand-supply gap of Urea in the country, Govt. of India has given approval for expansion project at Phulpur site since basic infrastructure facilities were available at Phulpur. The unit **Phulpur-II** was commissioned in December 1997 and consists of 1350 MTPD Ammonia Plant based on M/s. HTAS ,Denmark technology and 2200 MTPD Urea Plant based on M/s. Snamprogetti , Italy Technology. One LSHS fired boiler having 200 MT/hr capacities each and 18 MW Turbo-Generator supplied by BHEL , India along with associated offsites facilities like DM water plant, Inert gas plant etc. was commissioned in December,1997 .

Energy Consumption

Ammonia & Urea manufacturing is highly energy intensive and it contributes more than 80% of the total cost of production Urea. Therefore, a slight change in energy consumptions affects the cost of production in a big way. Apart from cost of production reduction in energy saves the valuable fast depleting natural resources such as Naphtha & Coal. Therefore, the Energy conservation is a major corporate objective at IFFCO and it is a continuous process at its units.

IFFCO-Phulpur complex has become one of the lowest energy consuming units amongst Naphtha based fertilizer plants in India. It has substantially reduced its energy consumption during last three years. The details are highlighted below:

Plant	2003-04	2004-05	2005-06	2006-07
Ammonia-II	7.944	7.989	7.796	7.879
Urea - II	6.024	6.052	5.818	5.788

All figures are in **Million kCal/MT**

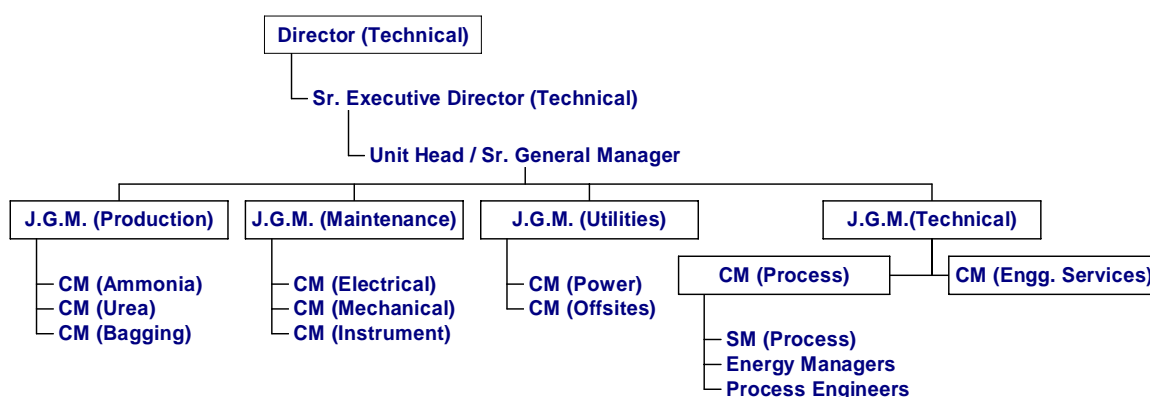
Energy Conservation Commitment, Policy and Organizational Set up

As energy contributes more than 80% of cost of production and sharp rise in energy cost, energy conservation receives top priority at IFFCO Phulpur.

Energy Conservation Cell:

The energy consumption is monitored on daily basis. Phulpur unit has constituted a task force, headed by Joint General Manager – Technical. The task force comprises of senior persons from various departments, viz. Production, Maintenance, Utilities, Technical Services, Finance & accounts etc. It meets periodically to discuss the various loss points either due to plant operating troubles or owing to design limitations or development of new technology. Besides this, for improving the energy efficiency within the existing facilities, studies are carried out and modifications are done in-house.

ENERGY CONSERVATION MONITORING CELL AT IFFCO



The Engineers and operators / technicians connected to each plant are regularly sent for in house / outside training programmes and Seminars on Energy conservation to created their interest in this area as well as make them aware of the latest methods / developments in the field of Energy conservation. Reputed professionals are also invited as Faculty for the in - house training programmes.

Energy Conservation Achievements since Commissioning

Phulpur unit has always been a leader in adopting new developments in the field of fertilizer production and numbers of modifications / revamp have been carried out over the years which have resulted in substantial improvement in energy consumption. In **Phulpur-II** some of the energy saving features which have been incorporated in the new plant since design stage are as follows :

PHULPUR-II

- Gas turbine drive, with Naphtha as fuel, for process air compressor.
- Heat recovery unit connected to the gas turbine for generating high pressure steams to meet the requirement of Ammonia and Urea Plant.
- Medium pressure process condensate stripper.
- GV - Low energy CO2 removal system.

Purge Gas recovery unit based on Membrane Separation Technique has been installed in Dec. 2001 which has resulted in energy saving by 0.11 Gcal / MT of Ammonia.

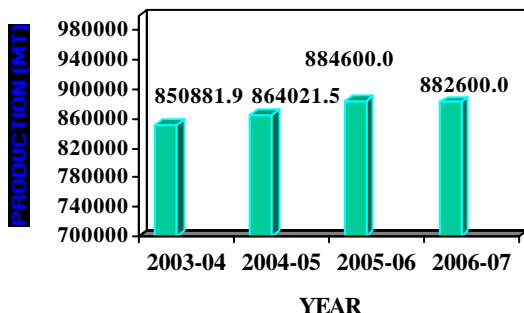
There has been a steady decline in specific electrical and thermal energy consumption. In Phulpur – II the energy consumption is getting decreased day by day and it is at a level of **5.8 Gcal / MT** of urea which is lowest among the contemporary naphtha based plants in the country. Following table shows the energy consumption pattern & savings achieved in energy during last three years which shows a remarkable reduction.

Plant	2003-04	2004-05	2005-06	2006-07	% Reduction over (2003-04)
Ammonia –II	7.944	7.989	7.796	7.879	0.8
Urea - II	6.024	6.052	5.818	5.788	3.9

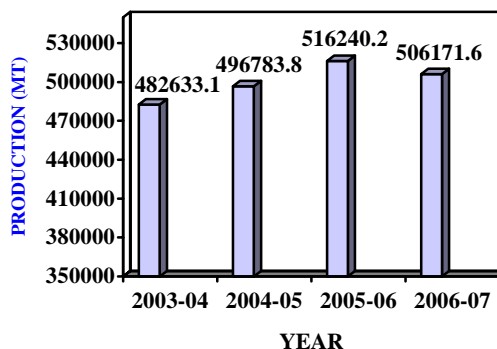
All figures are in **Million kCal / MT**

PERFORMANCE AT A GLANCE

UREA-II PRODUCTION



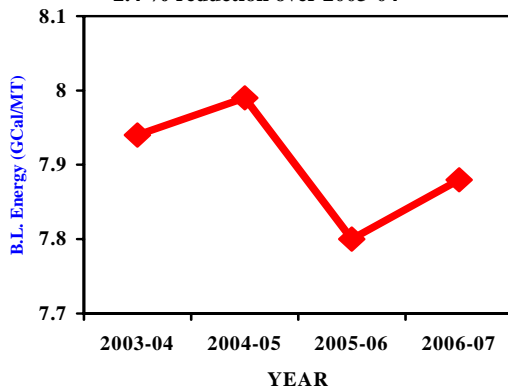
AMM - II PRODUCTION



Energy Cost as percentage of Manufacturing Cost

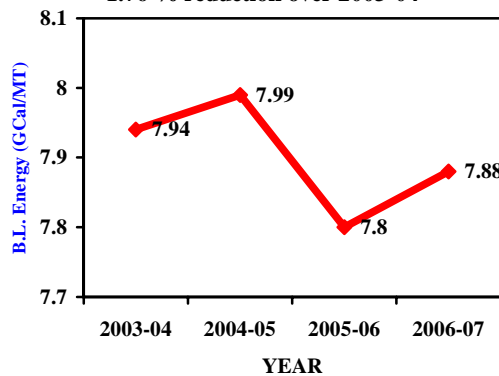
AMM - II ENERGY CONSUMPTION

2.4 % reduction over 2003-04



AMM - II ENERGY CONSUMPTION

1.76 % reduction over 2003-04



Energy Conservation Projects :

Energy conservation is an ongoing process at IFFCO . Following major proposals are in hand at Phulpur unit as a part of its future plans for energy conservation.

- **Energy Saving Project (ESP):**

Phulput unit has completed its major Energy Saving Project (ESP) worth Rs. 55.9 crores for its existing Ammonia plants. Phase- I of the project has been completed during March & April 2005. Phase-II of the project consisting of following schemes in Ammonia-II have been completed in 2006-2007.

ITEM DESCRIPTION	Savings	Investment (Rs.Lakhs)	Project comm. & Compn. Yr.
AMMONIA-II			
S-50 converter and Syn. Loop Boiler	-	-	-
Make-up Gas Chiller	-	-	-
Integrated Energy Savings for above schemes	0.157 MkCal/MT	5121.0	Comm. : Sept.'03 Compl. : Apr-May'06
Installation of Capacitors for Power Factor Improvement	16 kW/hr.	27.0	Compl. : 06-07
Mist Cooling System for additional Cooling water Requirement in Ammonia-II. (3500 M3/hr.)	75 kW/hr.	35.0	Comm. : 2006 Compl. : 2007
Application of Belzona Polymeric Coatings on Ammonia Cooling Water Pump in Phulpur-II	68 kW/hr.	2.1	Compl. : 2007
Reduction of Lighting Energy through T-5 lamps	5.2 kW/hr	1.5	Compl. : 2007
Reduction of Lighting Energy through various schemes (like CFL Lamps , Post Top Lantern fittings, street Light Fittings installation , etc.)	57.3 kW/hr	2.83	Compl. : 2007

■ **Installation of new S-50 Synthesis Converter with Waste Heat Boiler**

For energy reduction in ammonia synthesis loop, installation of a HTAS S-50 ammonia synthesis converter and a new HP-WHB will be beneficial. The S-50 converter is located downstream the existing converter. The S-50 will increase the conversion and reduce the circulation and thereby the pressure drop in the loop. Savings are then seen on the power consumption of the synthesis gas compressor. Furthermore, it is foreseen to install a high - pressure waste heat boiler upstream the S-50 for control of the inlet temperature to the new converter and heat recovery.



S-50 Synthesis Converter with Waste Heat Boiler

Installation of new Naphtha Feed Preheat Coil in Primary Reformer Waste Heat Section.

The main feature of revamp in the waste heat section is to reduce the flue gas stack temperature. Due to the changes in the reformer operation, the amount of flue gas in the waste heat section is slightly reduced.

A new naphtha feed preheat coil , E-3233, will be installed in the WHS downstream the combustion air preheater, E-3205. Consequently , it is allowed to reduce the flue gas temperature to 140 - 150 deg C. In order to keep the coil surfaces above the acid dew point temperature , the feed naphtha is preheated to 98 deg C in a new LP steam preheater, E-3232 A/B.

The naphtha feed is preheated to 135 deg C in the new exchanger system .



Installation of New Make-up Gas Chiller

In order to reduce power on the synthesis gas compressor, K 3431, a make-up gas chiller is introduced to cool the make-up gas to 6 deg. C.

In the present layout the make-up gas is cooled to 33.3 deg. C. before being compressed in the synthesis gas compressor, K 3431. A saving in power by cooling it to 6 deg. C will be very beneficial and have a payback time of less than one year. Furthermore, the refrigeration compressor is operating very close to the surge limit or even with a small kickback flow, A make-up gas chiller will improve the operation.



New Make-up Gas Chiller

The additional load on the 1st stage and subsequent stages of the refrigeration compressor will improve its operation and reduce the wasted power by the kick-back. This chiller cools the make-up gas from the present 33.3 deg. C to 6 deg. C by means of ammonia, which vaporises and is compressed in the refrigeration compressor 1st stage.

◆ **Feed Stock Conversion from Naphtha to R-LNG in Ammonia-II Plant**

Feed stock of Naphtha has been converted to R-LNG to reduce energy & cost of production of Phulpur Unit-II. All major material required LNG Feed Preheater Coil, LNG Burners, GT Fuel Modifications, Changes in DCS including laying of 140 Kms. pipeline from Tulendi to Phulpur have been completed. Project has been completed during March 2006 Annual Turnaround.



RLNG FUEL LET DOWN STATION

■ **CDR Project :**

After conversion of plant feed stock to LNG, it is anticipated that there will be a short fall of CO₂ for the manufacture of Urea. To overcome this a 450 MTPD Carbon di oxide Recovery Plant (CDR) is proposed to be installed in Ammonia-II to recover CO₂ from stack gas. Order was placed on M/s MHI for license & engineering and on M/s TICB on LSTK Basis. This project was successfully commissioned with an investment of Rs. 64.81 crores. This project will substitute costly Naphtha by R-LNG along with lower Carbon-di-Oxide release to the environment.

Environment and Safety

IFFCO Phulpur Unit is totally committed for maintaining an eco-friendly environment. For controlling air pollution, plants have been provided with Bag Filters, Electro Static Precipitators, Dust Extraction Systems, etc. A lush green belt with about 3 lakh trees has been developed all around the factory premises which is a natural means of air purification. To overcome the problem of fly ash disposal, generated in the Captive Power plant, a dense phase dry fly ash disposal plant has been installed which directly fills the fly ash in closed tankers for transportation of the ash to the cement plants manufacturing Portland Pozzolana cement.

Phulpur Unit has always put its best efforts for conserving water. The effluent generated in the plant is recycled back after purification in Reverse Osmosis Plant. Even the sewage water generated in the township is reused in the plant after treatment in sewage treatment plant. The plant is running on zero effluent discharge and total recycle basis. The present specific water consumption is the lowest among the fertiliser industry in the country. Plant and its township have ISO 14001 certification which speaks volumes about its environmental commitment. The complex has won number of awards for its environment improvement efforts. IFFCO-Phulpur Unit Environment Policy is enclosed :

ENVIRONMENTAL POLICY

IFFCO-Phulpur, engaged in manufacture of Urea fertilizer, is committed to :-

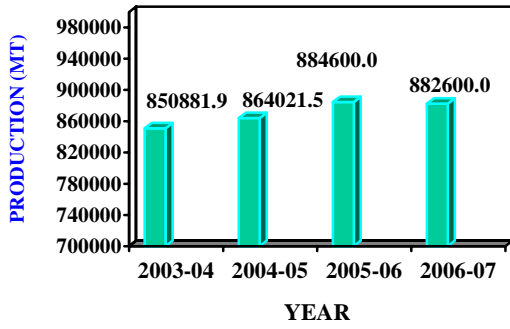
- **Strive for prevention of pollution and sustainable development.**
- **Comply with applicable environmental legislation, regulation and other requirements.**
- **Minimise Waste by its recycling/ reutilisation and optimisation of resource consumption.**
- **Motivate the employees and community for betterment of environment through awareness programmes.**
- **Create Environmental consciousness amongst its associates.**
- **Promote green surroundings through planting of trees around manufacturing and living areas.**
- **Continually improve its environmental performance.**

Safety

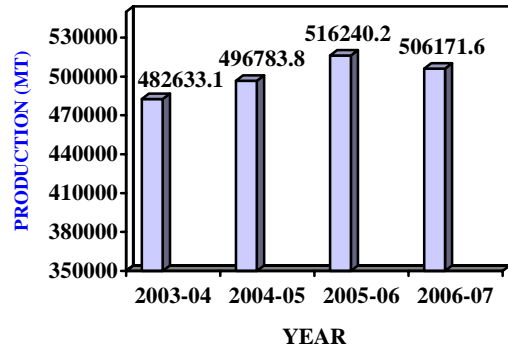
Safety of employees is the prime concern of management at IFFCO Phulpur and all measures are taken so that no untoward incidence took place. Various initiatives on Safety Awareness including Safety Audits, Risk Analysis, Monitoring and Measurement, Routine Health Check-ups of all Employees is religiously being carried out in Phulpur Unit. The safety committee headed by chief of the Fire & Safety Department meets regularly and discuss the safety related problems with plant personnels and remedial actions are taken accordingly.

PERFORMANCE AT A GLANCE

UREA-II PRODUCTION

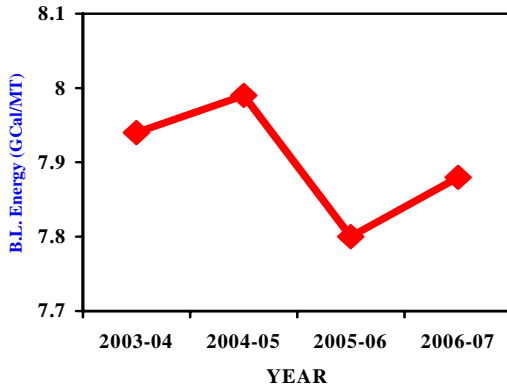


AMM - II PRODUCTION



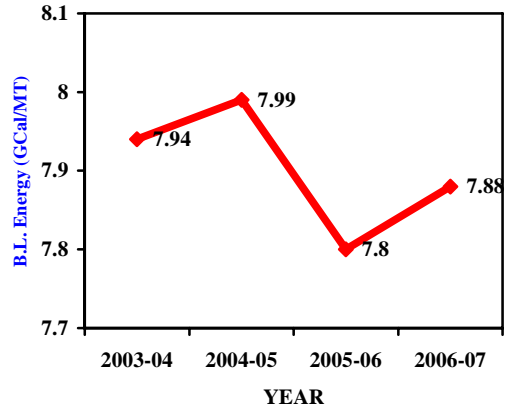
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2.4 % reduction over 2003-04

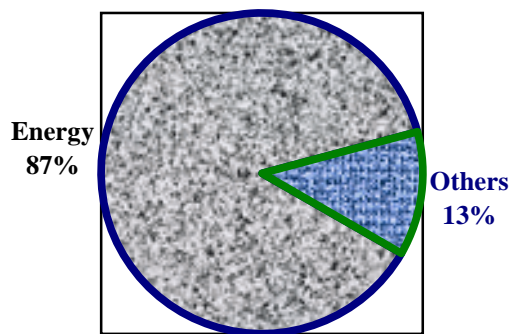


AMM - II ENERGY CONSUMPTION

1.76 % reduction over 2003-04



Phulpur-II (2006-2007)



Energy Cost as percentage of Manufacturing Cost