1.0 EXECUTIVE SUMMARY

Indian Farmers Fertiliser Co-operative Limited (IFFCO) is a national level cooperative society engaged in the manufacture and marketing of various fertilizers including the training to the farmers for skill development related to agro-based requirement through the country. The Society, registered as an autonomous cooperative under the Multi State Cooperative Societies Act, 2002, was born out of the Indian farming community's initiative along with the Government of India on 3rd November, 1967.

IFFCO Kalol Unit (An ISO 9001 & 14001 certified Co-operative Society was commissioned in 1974-75. Initially IFFCO Kalol Unit was designed for production of a 910 MTPD gas-based Ammonia Plant and 1200 MTPD Urea Plant. In 1997, capacities of both Ammonia and Urea Plants were enhanced to 1100 MTPD and 1650 MTPD respectively, for a total investment of Rs.150 crores, utilizing largely the available design margins in the original equipment with minor additions / modifications in the Plant. A naphtha Pre-reformer was installed as an add-on unit in Ammonia Plant to provide flexibility to use naphtha as mixed-feed along with gas, keeping in view the constraints in supply of natural gas from the Mehsana gas fields.

Naphtha pre-reformer unit of IFFCO Kalol is not in line since April 2009. The Ministry of Chemical & Fertilisers, Department of fertilizer (DOF), Government of India vide notification No 12012/3//2006-FPP dated 8th March 2007 asked all the naphtha and LSHS/FO based fertilizer units to get converted to NG/LNG within a period of 3 years. Now, Kalol Unit is in operation with 100% RNLG. Presently, Kalol Unit produces Urea at the rate of 1780 Metric Tons per day (MTPD) capacity and Ammonia (Intermediate Product) at the rate of 1140 MTPD to meet the annual target. As per Consent to Operate issued by GSPCB, IFFCO Kalol Unit has been allowed to produce 6,02,000 MT of urea per annum.

IFFCO Kalol unit is committed to use the energy in the most efficient way. "Energy Saving" is one of the major objectives of IFFCO. This has enabled to run the old vintage Ammonia and Urea Plants with better performance level even after 40 years of operation. IFFCO Kalol has been continuously improving its performance by implementing several modifications and by adopting best operating philosophy under scientifically based emerging technology. IFFCO Kalol Unit is reluctantlessly striving to be prove itself as the lowest energy consumer in the fertilizer industry. To achieve its

goal, a number of energy conservation schemes have been identified, planned and implemented in stages under Energy Saving Projects (ESP).

Production of Ammonia is an energy intensive process. Ammonia production accounts about 80-90% of total energy consumption in Ammonia-Urea Complex. Energy is a major factor in the cost of Ammonia & Urea production and hence, there has always been a big scope for energy conservation efforts in Ammonia – Urea Plants.

IFFCO proposes the energy saving project to implement the latest available proven technological solution to meet the target of substantial reduction in energy consumption at its Kalol Complex. With implementation of energy saving project, around 10% increase in Ammonia and urea production has been envisaged.

IFFCO has engaged Projects & Development India Ltd (PDIL) as consultant for preparation of Pre Feasibility Report. PDIL has prepared the PFR on the basis of site visit and data / documents provided by IFFCO officials.

1.1 PROJECT LOCATION

IFFCO Kalol fertilizer complex is located near village Saij in Gandhinagar District of Gujrat State. IFFCO Kalol Unit is spread over an area of about 96 Hectares of land. Kalol Unit is located near the State Highway No. 41 (connecting Ahmedabad-Mehsana), 25 Kms North-east of Ahmedabad city and about 4 km from Kalol town. The nearest railway station is Kalol, which is on Ahmedabad-Mehsana section and about 4 km north from the site. Geographically the fertilizer complex is located at Longitude 23º 12’ 44” N and Latitude 72º 31’ 22” E at an elevation of 60 to 65 m above mean sea level (MSL). Location map has been presented in Plate-1 & 2.

1.2 SCOPE OF ENERGY SAVING PROJECT

The scope of Feasibility Study has been aimed at to reduce the Urea specific energy consumption by about 0.221 Gcal per MT of Urea at Kalol Fertiliser Complex. To achieve the target, the following energy saving schemes have been considered.

1.2.1 Schemes to be Implemented in Kalol

Following schemes have been envisaged in ESP:

(A) Ammonia

Table-1.1
Schemes Considered for Ammonia Plant

Sr.No.	Schemes under consideration
1.	Installation of New single steam turbine for Synthesis gas Compressor
2.	New air burner for Secondary Reformer
3.	Installation of saturated coil at suction of ID fan.
4.	Installation of Fuel gas Expander with preheaters and bypass arrangement
5.	Hot desulphurization of feed gas in place of activated carbon
6.	New additional MP Boiler in between Ammonia Converters
7.	Ammonia Recovery from Synthesis Loop LP Purge Gases
8.	Installation of MP Stripper for Process Condensate Stripping
9.	Installation of New Methanator Feed/ Effluent Heat Exchanger
10.	Installation of New Trim Heater at the exit of HTS (For Methanator Temperature Control)
11.	Installation of new BFW Pre Heater at exit of HTS (in place of existing 104C)
12.	Replacement of Ammonia Converter BFW Pre Heater 123C
13.	Saturated MP Steam Export from Synthesis Loop to Urea Plant
14.	Reduction in Steam to Carbon Ratio from 3.3 to 3.0

(B) Urea

Table-1.2
Schemes Considered for Urea Plant

1.	VAM for cooling of CO2 Compressor Suction Chilling
2.	High Efficiency Trays in Urea Reactor
3.	HP Split Flow Configuration Ejector and new HPCC
4.	Replacement of Second Evaporator Heat Exchanger
5.	Installation of HP Ammonia Pre Heater

1.2.2 Scope of Work of Engineering Consultant

M/s CASALE would prepare basic engineering design package (BEDP) for the proposed project as under:

(i) Design basis

(ii) Material balance, cooling water and steam & condensate balance

(iii) Process flow diagram for all section of the plants. The PFD shall be prepared for design condition

(iv) Equipment list of new and modified equipments

(v) Engineering Process Specifications and data sheet for new and modified equipments

(vi) Details of Tie-in points for taking tapping in plant turn-around marked on PIDs

(vii) Engineering specification for piping with reference to existing piping specifications

(viii) Preliminary equipment arrangement for new and modified equipments

(ix) Electrical motors specification with emergency power requirement for new and modified equipments

(x) First edition of P&I diagrams for all new and modified sections of the plants
The P&I diagrams shall show nominal diameters and medium symbols, walls and instrumentation, i.e., control loops and measuring points, control logic and analyzers, etc. Details of changes and modifications to the safety inter-lock trip systems for new and modified parts shall be shown in separate diagrams.

(xi) Line list for new and modified piping based on existing pipings class specifications.

(xii) Insulation requirement, if any.

(xiii) Slope requirements of lines, if any.

(xiv) Proposed modified plot plan showing the general layout for all new and modified section of the plant

(xv) Marked up existing plot plan showing the available area for the new equipments

(xvi) Layout of the equipments and space required.

(xvii) Trip interlock logic diagram of new and modified sections showing trip set points, alarm annunciation and set points & delay time and manual reset.

(xviii) Data sheet for new and modified control valves and new safety valves

(xix) Typical Hook-up drawing for new and modified instruments loops

(xx) Functional instrument diagrams and loop diagrams for documenting very complicated loops

(xxi) HAZOP study for new installations and modifications

(xxii) Operating Manual / guidelines for the new installations and their integration in existing plants, highlighting normal operations, start-up and shut-down operations which are modified after revamping.

1.3 RAW MATERIAL AND UTILITIES

Basic purpose of implementation of energy saving schemes at each unit is to conserve the raw materials i.e. natural gas and water. There will be over all saving of natural gas of 13360 Sm^3/day and 200 m^3/day water in Kalol Unit. No additional raw materials will be required for the proposed project.

1.4 PROJECT IMPLEMENTATION PLAN & TIME SCHEDULE

The ESP will be implemented in two Phases. Energy savings schemes which required short lead time will be implemented during year 2016 turnaround and energy savings schemes which required long lead time will be implemented during year 2017 turnaround.

1.5 ESTIMATED PROJECT CAPITAL COST

The estimated capital cost of ESP is as under (Rs. Crore):

Table-1.4
Estimated Cost

Sr No	Units	Equipment Cost (including 3% Contingency)	BEDP	DEDP	Total
1.	Kalol	192	17	4	213
2.	TOTAL	192	17	4	213

BEDP : Basic Engineering Design Package
DEDP : Detailed Engineering Design Package

1.6 FINANCIAL ANALYSIS OF PROJECT

The overall saving in Urea specific energy at each Unit and the financial analysis will be as under:

Table-1.5
Financial Analysis

ESP	**UNIT**	Kalol
Urea Production	MTPD	1780
Total Energy Saving	Gcal	393
Energy Saving	Gcal/MT	0.221
Estimated Investment	Rs. Crore	213
Energy Cost	Rs./Gcal	2900
Monetary Savings /Year	Rs Crore	42
Payback	**Years**	5.1

1.6 SAVINGS OF RAW MATERIAL OF PROJECT

The present raw material consumption is as under:

Table-1.6
Raw Material Consumption

Particulars	**Unit**	**Kalol**
Urea Production	MTPD	1780
Total gas consumption	SM^3/day	1190901
Feed gas in Ammonia	SM^3/day	684461
Fuel gas in Ammonia	SM^3/day	373997
Fuel to Steam generation	SM^3/day	132443
Power (imported from State grid)	MWH/day	159.8
Urea Energy	Gcal/MT	5.573

Savings of raw material after ESP is as under:

Table-1.7
Savings on Raw Material

Particulars	Unit	Raw Material Consumption		
		Existing	Proposed	Saving
Total NG	SM3/day	1190901	1177541	13360
Water	m^3/day	14,000	13800	200

1.7 NEED & JUSTIFICATION

The need and justification of the proposed project is summarized as under:

- It will reduce overall energy consumption leading to a substantial reduction in pollution load.
- It will decrease the dependency of IFFCO, Kalol unit over GSEB grid
- ***It will reduce the consumption of natural resources viz. water (approx. 200 m^3/d) & NG (13360 Sm^3/day)) which in turn will have positive impact on environment***
- It will impose positive impact on the consumption pattern of electricity in near-by area
- ***It will reduce the subsidy burden of Government of India (GOI).***
- It will maintain the profitability of IFFCO.
- It will maintain stability in indigenous / domestic market for Urea.
- It will check the import possibility of fertilizers to some extent and yield national savings
- There will be temporary employment generation during construction period.
- It will ease the availability of chemical fertilizers to farmers.
- Adoption of proven long lasting emerging technology will produce the intangible effect to reduce the present stress of environment.
- It will fulfill the aims and objective of EIA related to continual improvement in the field of Energy Saving by adopting emerging technology.
- The reduction of green house gas emissions from the stack will contribute to INTENDED NATIONALLY DETERMINED CONTRIBUTION (INDC) under UNEPCCC.
- ESP is a complement to ***"India's Low Carbon Strategy"*** to meet the target of carbon reduction equivalent to 20-25% of GDP by 2020 against the base of 2005.

1.8 Conclusion

As energy cost is increasing with passage of time, it is prudent to take the measures to save the energy at each location of IFFCO Plants. It is always the endeavour of IFFCO's top management to adopt the latest available and proven technology for improving the productivity of the Society. With the efforts taken by IFFCO management in the past, the IFFCO Plants are running at comparable energy consumption with global benchmarks. The proposed Energy Saving Project (ESP) will further reduce the energy consumption at all the nitrogenous fertiliser units. With implementation of the proposed Energy Saving Project (ESP), the overall urea specific energy will be reduced by about 0.221 Gcal per MT of Urea with payback of 5.1 Years. Thus, there will be reduction in the emission levels with implementation of Energy saving project due to reduction in consumption of natural gas, imported power and water.

The ESP is simply a change-over scheme without any change in production rate. For this type of project, EIA Notification 2006 is also silent on preparation of EIA report and issuance of EC. ***Further, it would not be out of place to mention here that the area around IFFCO Kalol Unit has never been identified as "CRITICALLY POLLUTED AREA / ZONE" by CPCB.*** Further, the ESP fulfills the IFFCO policy related to protection & safe guard of environment and measures for energy conservation. It also fulfills the aims & objective of EIA.

Considering the above facts, it requires a critical review with due diligence regarding exemption of Public Hearing and preparation of EIA report in generic form for grant of EC on priority basis.