CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006

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SECTION A. General description of project activity

A.1 Title of the project activity:

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Fuel switchover from higher carbon intensive fuels to Natural Gas (NG) at Indian Farmers Fertiliser Cooperative Ltd (IFFCO) in Phulpur Village, Allahabad, Uttar Pradesh by M/s Indian Farmers Fertiliser Cooperative Ltd (IFFCO)

Version 04
Date: November 19, 2007

A.2. Description of the project activity:

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The Phulpur plant of Indian Farmers Fertiliser Cooperative Ltd. (IFFCO) has two Ammonia Urea complexes - Unit 1 and Unit 2. Phulpur plant has two Primary Reformers which reform the feed. Naphtha is used as a fuel in the Primary Reformer, Desulphuriser feed heater, Gas Turbine Generator (GTG) and Heat Recovery Unit (HRU). GTG is used for driving CO2 compressor of urea plant and steam from HRU is used for process. GTG & HRU is not used for electricity generation. Phulpur plant has a LSHS fired boiler (Boiler number 4) to meet steam requirements of the plant.

Purpose

The purpose of the project activity is to switch over from existing higher carbon intensive fuels used in identified utilities (Primary reformers, Desulphuriser Feed Heater, GTG&HRU and Boiler No 4) to less carbon intensive fuel Natural Gas (NG). Since NG fuel is less carbon intensive, fuel switch over would result in reduction in CO_2 emissions i.e., Green House Gas (GHG) reduction. The utilities (element processes) involved in fuel switch over are tabulated below:

Utility	Fuel used before the Project Activity	Fuel used after the Project Activity
Phulpur I		
Desulphuriser Feed Heater(103-B)	Naphtha	Natural Gas
Primary reformer	Naphtha	Natural Gas
Phulpur II		
Primary Reformer	Naphtha	Natural Gas
GTG&HRU	Naphtha	Natural Gas
Boiler No. 4	LSHS/FO/HSD	Natural Gas/LSHS

Project Activity's contribution to Sustainable Development

The project activity contributes positively to "Sustainable development of India" in following ways:

Environmental Well Being
The project activity aids in reduction of CO_2 emitted to the atmosphere. The project activity also results in lowering SO_x emissions and associated environmental degradation. Thus the project aids in environmental well being.

Social Well Being

Project activity would marginally increase employment opportunity for semi-skilled, skilled labour and professionals in the region during the construction phase. Therefore, the project contributes towards social well being aspects.

Economic Well Being
Fertilizer in India is a controlled commodity and fertilizer industry in India is being provided with subsidies by the Government of India to ensure that farmers get fertilizer at a reasonable rate. The project activity is expected to reduce the subsidy bill of Government of India. The saved subsidy amount could be utilized for various development schemes and activities of the government thereby leading to economic well being.

Hence, IFFCO project activity is in-line with the sustainable development criteria given by the Indian Government. The project activity would thus contribute to the sustainable development of the country.

A.3. Project participants:

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Name of Party involved* ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	The Party involved wishes to be considered as project participant (Yes/No)
India	Indian Farmers Fertiliser Cooperative Ltd. (IFFCO)	No
Spain	Fondo de Carbono de la Empresa Española (FC2E)	No

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

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A.4.1.1. Host Party(ies):

>>
India

A.4.1.2. Region/State/Province etc.:

>>
Uttar Pradesh

A.4.1.3. City/Town/Community etc:

>>
Phulpur Village, Allahabad

A.4.1.4. Detail of physical location, including information allowing the unique identification of this project activity (maximum one page):

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The Phulpur Plant is located on Allahabad-Gorakhpur road and is 30 km away from Allahabad. The plant is spread in an area of 321 acres. The nearest railway station is in Phulpur Town which is 10 km from the Plant. The geographical position of the plant is:
Latitude - 25° 33' 0 N

Longitude- 82° 5' 60 E

A.4.2. Category(ies) of project activity:

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The project activity is a large scale potential CDM project which fits under the Category 4: Manufacturing Industry as per "List of Sectoral Scopes", Version 04.

A.4.3. Technology to be employed by the project activity:

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The project activity requires modifications / installations to be carried out for conversion from Naphtha fuel to NG fuel. Gas Authority of India Ltd. (GAIL) is supplying NG / Liquefied Natural Gas (LNG) to Phulpur plant through a Spur Line from HBJ Gas pipeline. The gas receiving and metering station is installed by GAIL**.** The technological improvement and modification carried out for NG/LNG fuel usage at plant is as follows:

A) Phulpur Unit- I: Primary reformer and Desulphuriser Feed Heater (103-B), hydrocarbon feed pre-heater burners and auxiliary boiler burners are converted for NG firing.

B) Phulpur Unit- II: Primary reformer and GTG&HRU, the furnace burners are converted for NG firing

C) Boiler No 4: The existing burners are replaced with dual fuel firing burners to use NG as well as LSHS as and when required.

The training for the project activity would be carried out according to procedure mentioned in CDM manual.

A.4.4 Estimated amount of emission reductions over the chosen crediting period:

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Years	Annual estimation of emission reductions in tonnes of CO_2e
Nov 2007- Mar 2008	45765
Apr 2008- Mar 2009	177802

Apr 2009- Mar 2010	**191395**
Apr 2010- Mar 2011	**191395**
Apr 2011- Mar 2012	**191395**
Apr 2012- Mar 2013	**191395**
Apr 2013- Mar 2014	**191395**
Apr 2014- Mar 2015	**191395**
Apr 2015- Mar 2016	**191395**
Apr 2016- Mar 2017	**191395**
Apr 2017- Oct 2017	**111647**
Total estimated reductions (tonnes of CO_2e)	**1866374**
Total number of crediting years	**10**
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	**186,637**

The Annual CER quantity has increased from 113 616 tonnes of CO_2e (as estimated in the PDD that was posted for Global Stakeholders' Process) to 186637 tonnes of CO_2e (Emission Reductions Submitted for Request for registration) due to following reasons:

1. Previously, the emission reduction was derived after taking into account the leakage for upstream CO_2 emission from Liquefied Natural Gas (LNG) as per the methodology, as the project activity uses LNG that is sourced from outside the host country.
2. Now IFFCO has entered into an agreement with Reliance Industries Limited on June 9, 2007 for purchase of Natural Gas (NG) from Krishna Godavari Basin, Andhra Pradesh, India w.e.f. June, 2008. Hence, NG would be utilised in the project activity thereafter and hence the upstream CO_2 emission from LNG would not be applicable and not considered.

The annual leakage emission due to project activity has therefore decreased from 129960 tonnes of CO_2e to 49260.2 tonnes of CO_2e, resulting into increase in the emission reduction from 113 616 tonnes of CO_2e to 186637 tonnes of CO_2e annually. However, in case, IFFCO uses any LNG in the project activity during the verification period, the upstream CO_2 emission from LNG (actually used) would be considered as leakage.

A.4.5. Public funding of the project activity:

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No public funding from parties included in Annex – I is involved in the project activity.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the project activity:

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Title: "Consolidated baseline methodology for fuel switching from coal or petroleum fuel to natural gas"

Reference: UNFCCC Approved consolidated baseline methodology **ACM0009 / Version 03**, Sectoral Scope: 01 & 04, 28th July 2006.

B.2 Justification of the choice of the methodology and why it is applicable to the project activity:

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The consolidated methodology is applicable to project activities that switch in one or several *element processes* from coal or petroleum fuel to natural gas. The fuel switching is undertaken in processes for heat generation that are located at and are directly linked to an industrial process with a main output other than heat or that provide heat to a district heating system by means of heat-only boilers. Furthermore, methodology requires project activity to comply the following applicability conditions:

- Prior to the implementation of the project activity, only coal or petroleum fuel (but not natural gas) have been used in the element processes;

  In IFFCO Phulpur, prior to the implementation of the project activity, naphtha fuel (not natural gas) was used in Primary reformers, Desulphuriser Feed Heater, GTG & HRU and LSHS/FO/HSD fuel (not natural gas) was used in Boiler no 4. GTG is used for driving CO2 compressor of urea plant and steam generated from HRU is used for process. GTG & HRU is not used for electricity generation.

- Regulations/programs do not constrain the facility from using the fossil fuels being used prior to fuel switching;

  There is no regulation/legislation that constrains the facility from using the fossil fuel prior to fuel switching.

- Regulations do not require the use of natural gas or any other fuel in the element processes;

  There is no regulation/legislation that constraints the facility to use natural gas in Primary reformers, Desulphuriser Feed Heater, GTG & HRU and Boiler no 4.

- The project activity does not increase the capacity of thermal output or lifetime of the element processes during the crediting period (i.e. emission reductions are only accounted up to the end of the lifetime of the relevant element process), nor is there any thermal capacity expansion planned for the project facility during the crediting period;

  IFFCO's project activity (fuel switching) neither increases the capacity of thermal output or lifetime nor is there any thermal capacity expansion planned for the Primary reformers, Desulphuriser Feed Heater, GTG & HRU, boiler during the crediting period.

- The proposed project activity does not result in integrated process change;

IFFCO project activity does not result in the integrated process change.

It is evident from above that IFFCO's project activity meets all applicability conditions of baseline methodology.

B.3. Description of the sources and gases included in the project boundary

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The description of sources included in the project boundary is summarised in the following table:

	Source	Gas	Included?	Justification / Explanation
Baseline	Naphtha Fuel used in furnaces (Desulphuriser Feed Heater, Primary reformers, GTG and HRU)	CO_2	Included	Main emission source
		CH_4	Excluded	Minor emission source
		N_2O	Excluded	Minor emission source
	LSHS/FO/HSD Fuel used in Boiler No 4	CO_2	Included	Main emission source
		CH_4	Excluded	Minor emission source
		N_2O	Excluded	Minor emission source
Project Activity	Natural Gas Fuel used in furnaces and boiler (Desulphuriser Feed Heater, Primary reformers, GTG and HRU, Boiler no 4	CO_2	Included	Main emission source
		CH_4	Excluded	Minor emission source
		N_2O	Excluded	Minor emission source

The project activity is carried out in following equipments (Element process), hence project boundary would constitute the below equipments of Phulpur I and II:

- Desulphuriser Feed Heater,
- Primary reformers of Phulpur I and II
- GTG and HRU
- Boiler-No 4

B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

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The methodology as applied to the project activity has the following steps:

1. Selection of baseline scenario

2. Assessing the project additionality

According to ACM0009, (version 03, 28 July 2006), ensuing steps is to be followed for selecting plausible baseline scenario.

1. Identify all realistic and credible alternatives for the fuel use in the element process

2. Eliminate alternatives that are not complying with applicable laws and regulations

3. Eliminate alternatives that face prohibitive barriers

4. Compare economic attractiveness of remaining alternatives

Step 1: Identify all realistic and credible alternatives for the fuel use in the element process

According to ACM0009, (version 03, 28 July 2006), the Project participant should consider the following alternatives for fuel switch project:

- Continuation of the current practice of using coal or petroleum fuel
- Switching from coal or petroleum fuel to a different fuel than natural gas (such as biomass)
- The project activity not undertaken under the CDM (switching from coal or petroleum fuel to Natural gas)
- Switching from coal or petroleum fuel to natural gas at a future point in time during the crediting period.

The alternatives for IFFCO's project activity are given below:

Alternative 1: Continuation of current practice of using Naphtha in Primary reformers, Desulphuriser Feed Heater, GTG & HRU and LSHS/FO/HSD fuel in Boiler no-4.

Alternative 2: Switching from higher carbon intensive fuels to a different fuel than natural gas (such as biomass).

Alternative 3: The project activity not undertaken under the CDM

Alternative 4: Switching from higher carbon intensive fuels to Natural Gas at a future point in time during the crediting period.

Step 2. Eliminate alternatives that are not complying with applicable laws and regulations

All these alternatives are in line with applicable laws and regulations and thus can be part of the baseline scenario.

Step 3. Eliminate alternatives that face prohibitive barriers

Alternative 1: Continuation of current practice of using Naphtha in Primary reformers, Desulphuriser Feed Heater, GTG & HRU and LSHS/FO/HSD fuel in Boiler no-4.

IFFCO-Phulpur uses Naphtha as a fuel in the Primary reformers, Desulphuriser Feed Heater, GTG & HRU and LSHS/FO/HSD fuel in Boiler no-4 in absence of the project activity. Continuation of the usage of higher carbon intensive fuels would not require any modification/installation in the Primary reformers, Desulphuriser Feed Heater, GTG & HRU or boiler. Hence there would be no investment requirement. The usage of higher carbon intensive fuels, therefore, does not face any barriers and is the credible baseline scenario.

Alternative 2: Switching from higher carbon intensive fuels to a different fuel than natural gas (such as biomass).

The fuel switch takes place in Primary reformers, Desulphuriser Feed Heater, GTG & HRU and Boiler-4. These utilities operate at very high temperature and pressure. Biomass fuel is not suitable for combustion condition (High temperature and Pressure) that prevails in these utilities. As well as, no Urea manufacturing facility in India uses biomass as a fuel in their element processes. Hence, this alternative is not a feasible baseline option for the project activity.

Alternative 3: The project activity not undertaken under the CDM (switching from coal or oil to natural gas);
IFFCO may propose to implement the project activity, not undertaken as a CDM project activity. However, this alternative would have faced the barriers (financial barrier) faced by the project activity (Please refer Section-B.5 for details). As the project activity is financially not attractive, without CDM revenues this alternative would not have been a feasible option for IFFCO. Hence this alternative cannot be the baseline scenario.

Alternative 4: Switching from coal or oil to natural gas at a future point in time during the crediting period;
IFFCO may propose to implement the project activity at a future point during the crediting period. However, this alternative would have faced the barrier (financial barrier) as faced by the project activity (Please refer Section-B.5 for details) at any future point in time during crediting period as well. Since the project activity is not financially attractive at any future point during crediting period, without CDM revenues this alternative would not be a feasible option for IFFCO. Hence this alternative is not a feasible option for IFFCO.

Step 4. Compare economic attractiveness of remaining alternatives.

After Step 3, only one alternative (alternative-1) exists for the project activity. Hence, there is no need to carry out Step 4.

Therefore, Alternative -1 is chosen as baseline scenario for IFFCO's project activity.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of additionality)

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In 1977 Government of India (GoI) introduced Retention Pricing Scheme (RPS) to provide Urea to the farmers at affordable price and simultaneously facilitating growth of fertilizer industry. Under this scheme, the ex-works price was worked out by GoI based on certain norms, which constitutes variable cost (like feed and fuel cost), operating capacity (production volume), fixed cost of production, capital related charges, conversion cost, return on net worth etc. The difference between the retention price and notified sale price of Urea to farmer was borne by GOI as subsidy.
GoI vide circular dated 30th January, 2003, introduced Group Concession Scheme (GCS) replacing RPS w.e.f. 1st April, 2003. Under GCS, the fertilizer plants are grouped according to type of feed/fuel used technology and vintage. The subsidy is reimbursed to plant according to feed used, technology and vintage.
(source :http://www.fert.nic.in/)

For example, the cost of production of Urea (ex-works price including feed, fuel and marketing cost) using Naphtha as a fuel is Rs.16000/tonne of urea and that from NG as a fuel is Rs.10000/tonne of urea and if the notified sale price of Urea is Rs.4000/tonne, then GoI will pay a subsidy of Rs.12000 /tonne of urea and Rs.6000/tonne of urea to the urea manufacturing facilities using Naphtha and NG as a fuel respectively.

Further, if a Urea manufacturing facility switches over from Naphtha fuel to NG fuel then the subsidy given by the GoI to the urea manufacturing facility would be Rs.6000 /tonne of urea instead of Rs.12000 /tonne of urea (in case of naphtha fuel). The subsidy given by the GoI to the urea manufacturing facility is based on actual fuel used (NG or Naphtha). Thus, Urea manufacturing facility cannot get the cost benefit (Cost benefit due to cost difference between Natural gas fuel and Naphtha Fuel) due to fuel switch over. In other words fuel switch over leads to reduction in subsidy burden of GoI and there is hardly any incentive for IFFCO to switch over from Naphtha fuel to NG fuel.

In 2003, GoI introduced Group Concession Scheme (GCS) replacing RPS .Under GCS, the fertilizer plants are grouped according to type of feed/fuel used, technology and vintage. The subsidy is reimbursed to plant according to feed used, technology and vintage. Under the Policy, the cost benefit due to any energy efficiency is not been reimbursed (subsidized) to the fertilizer plant based on actual cost of fuel saved. Whereas the reimbursement is based on the basic cost (cost excluding tax and transportation) of the cheapest fuel used in the plant. For example, if a plant conserves energy and subsequently saves naphtha fuel, reimbursement of cost benefit of the project would be based on basic cost of the cheapest fuel used (say coal) in the plant. So the reimbursement is not based on naphtha fuel, but based on coal fuel cost. Hence, the cost savings due to avoidance of energy required for Naphtha and HSD handling is calculated based on lowest cost fuel used in phulpur i,e coal

(Reference: Policy on Energy norms, raw material mix and mechanism for providing escalation/de-escalation in prices of inputs for urea units during Stage-II of the New Pricing Scheme, Website: http://www.fert.nic.in)

Therefore for IFFCO-Phulpur regardless of type of fuel used the operating cost (fuel cost) would be reimbursed by GoI to IFFCO (according to the type of fuel used by IFFCO). So there is hardly any incentive for IFFCO to go for fuel switchover project activity.

Further, the Department of Fertilizer, GoI, also issued policy guidelines vide circular dated 29th January, 2004 for treatment of existing non-gas based Urea units converting to NG/LNG for feedstock / fuel. The policy provides modalities for conversion of non-gas based Urea plant to gas based Urea plant and is expected to reduce the cost of Urea production and in turn reduce subsidy outgo of government. However, the operational efficiency including energy efficiency arising from the conversion to NG/LNG will not be mopped up by the Government for a period on the basis of energy efficiency and financial returns subject to maximum five years. As discussed in above paragraph, according to the fertiliser policy, any operational efficiency occurring due to fuel switch is passed to the project proponent till 5 years after project implementation or till project investment is realized by the project proponent, which ever may be the earlier. But there is no legislation that requires fertilizer industry to carry out fuel switching.
(Reference: Policy for treatment of existing non-gas based urea units converting to NG/LNG for feedstock/fuel. Website: Website: http://www.fert.nic.in)

As per the Policy parameters as announced by GoI vide circular dated 29th July, 2003, the benefit arisen due to any energy efficiency (if the actual energy consumption is lower than the pre-set energy norms) will be reimbursed (subsidized) to the fertilizer plant based on the basic cost (cost excluding tax and transportation) of the cheapest fuel used in the plant and not on actual cost of fuel saved. For example, if a plant conserves energy and subsequently saves naphtha fuel, reimbursement of cost benefit of the project would be based on basic cost of the cheapest fuel used (say coal) in the plant. So the reimbursement is not based on naphtha cost, but based on coal cost. Hence, the cost savings due to avoidance of energy required for Naphtha and HSD handling is calculated based on lowest cost fuel used in Phulpur i,e coal.

In any fuel switch project, the major cost benefit that project proponent would be gaining is on the account of the following:

1. *Cost Benefit due to differential cost of the fuels used*:
   As explained above, there is hardly any incentive or cost benefit (Cost benefit due to cost difference between Natural gas fuel and Naphtha Fuel) for IFFCO in switching over from Naphtha fuel to NG fuel.
2. *Cost benefit due to efficiency improvement*.
   In case of IFFCO's project activity there is hardly any efficiency improvement in identified utilities after converting to NG fuel. Please refer to the table **B.6.1.2.** in section **B.6.1**

Accordingly, NPV analysis has been carried out. There would be cost savings due to avoidance of energy required for Naphtha and HSD handling. The energy consumption for Naphtha and HSD handling for the last three years (2002-05) have been used to estimate the anticipated energy saved due to avoidance of Naphtha and HSD handling. (Please refer enclosure-1, NPV analysis of fuel switch project)

IFFCO has implemented the project over and above the national or sectoral requirement and the GHG reductions achieved by the project activity are additional to those directed by the governmental policies and regulations. The NPV analysis of the project (please refer section B for details) also purports that the project is not financially attractive and IFFCO is implementing the project by considering revenue stream from Clean Development Mechanism (CDM).
The methodology requires the project proponent to assess the project additionality in following three steps:
Step 1: Investment & sensitivity analysis
Step 2: Common practice analysis
Step 3: Impact of CDM registration

Step-1: Investment & Sensitive Analysis

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Step-2: Common Practice Analysis

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Step-3: Impact on CDM Registration

↓

Project is Additional

Flowchart for demonstrating additionality of the project

Step 1: Investment & sensitivity analysis

According to ACM0009 (version 03, 28 July 2006), the Net Present Value (NPV) analysis of the project activity is to be conducted and explicitly state the following parameters:

- Investment requirements (incl. break-up into major equipment cost, required construction work, installation)

The anticipated project cost with break up is tabulated below:

Table B.5.1

Sl.No.	Description	Cost associated (Rs in Crores)
1	Equipment Cost including piping etc	15.44
2	Consultancy services	0.7
3	Freight, Inland handling, Insurance, Taxes & duties etc.	4.65
4	Construction	0.25
5	Erection	0.85
6	Financial Charges	0.73
Total		**22.62**

- A discount rate appropriate to the country and sector (Use government bond rates, increased by a suitable risk premium to reflect private investment in fuel switching projects, as substantiated by an independent (financial) expert)

  Annual Discount rate is considered as 12.00 %, which is the post tax return rate set by Government of India for providing subsidy to fertiliser sector in the country. Thus 12% discount rate is considered minimum rate of return on investments made in fertiliser sector projects.

- Efficiency of each element process, taking into account any differences between fuels

  Due to project activity (fuel switchover from Naphtha fuel to NG fuel in element processes), there is hardly any improvement in the efficiency of each of the element processes. Please refer to the table **B.6.1.2.** in section **B.6.1.** There is no cost benefit due to efficiency improvement due to fuel switching. Hence, efficiency of each of the element process is not considered in NPV analysis**.**

- Current price and expected future price (variable costs) of each fuel (Note: As a default assumption the current fuel prices may be assumed as future fuel prices. Where project

participants intend to use future prices that are different from current prices, the future prices have to be substantiated by a public and official publication from a governmental body or an intergovernmental institution.)
There would not be any effect of the variation in the fuel prices on the project activity. As explained in this section above regardless of the fuel switched over by IFFCO, GoI provides subsidy to the urea manufacturing facility according to the actual fuel used. For example, Naphtha fuel based plant would get subsidy according to cost of Naphtha fuel and similarly NG fuel based plant would get subsidy according to cost of NG fuel. If a fertiliser plant switches over from Naphtha fuel to NG fuel, the plant would automatically start get subsidy according to NG fuel (not subsidy based on Naphtha Fuel). Urea manufacturing facility does not get the benefit of the cost difference between Naphtha and NG fuel, whereas the GoI gets the cost benefit in terms of reduced subsidy bill. IFFCO would not gain on any fuel cost benefit due to fuel switch over .Hence the cost of Naphtha and NG is not considered in NPV analysis.

- Operating costs for each fuel (especially, handling/treatment costs for coal)

  Cost Saving due to avoidance of Naphtha and HSD handling is considered in NPV analysis (Please refer to the Enclosure – I NPV Analysis – fuel handling sheet for more details).The cost saving due to avoidance of Naphtha and HSD handling is calculated based on the lowest cost fuel of Phulpur i,e coal.

- Lifetime of the project, equal to the remaining lifetime of the existing heat generation facility and

  The project activity would not alter the life time of any of the element processes.

- Other operation and maintenance costs

  Nil

Following are the other assumptions considered while conducting NPV analysis of the project.

1. Insurance cost is 0.861 % of project assets cost per year. This is calculated from the rate of insurance premium paid by IFFCO for Phulpur-I and II for the year 2004-05.
2. Corporate tax adjustments are made at the rate of 31.36 % as per existing Income Tax act, 1961 of India.
3. The unit CER value is assumed to be 10 Euros.

Accordingly, NPV analysis of fuel switch project (Please refer Enclosure-1 NPV Analysis of project for more details) was carried out and is given below.

Table B.5.2

Annual Discount Rate	12.00%
NPV of the project without considering CER revenue	Negative
NPV of the project considering CER revenue	Rs 258.70 Million

The NPV analysis of the project purports that the project is not financially attractive and IFFCO is implementing the project by considering revenue stream from Clean Development Mechanism (CDM).

Sensitivity Analysis

Sensitivity analysis is conducted considering following deviations in assumptions to find out worst case NPV of CDM project, to analyze whether the project remains financially additional inspite of expected deviations in assumptions.

Table B.5.3

Sr. No.	Assumptions	NPV without CDM fund	NPV with CDM fund
1	Considering insurance cost per year as 0.75 % of Initial investment	Negative	Rs259.65 Million

As per the sensitivity analysis also, the NPV of project activity remains negative without the CERs revenue purporting financial additionality. Please see Enclosure-2 (NPV calculation considering insurance cost per year as 0.75 % of Initial investment).

Step 2: Common Practice analysis:

The common practice analysis is to be carried out as follows:

Sub-step 2a. Analyze other activities similar to the proposed project activity:

As of now none of the Urea fertilizer plant in India has converted from Naphtha / LSHS / HSD / FO fuel to Natural gas. IFFCO-Phulpur is the first among all the fertilizer plants in India to implement fuel switch project activity. The project activity is not an attractive proposition due to the prohibitive barriers related to the project activity detailed out in barrier section. This illustrates the low penetration of such projects and little willingness to change current operating practices in the country and global. The status of the existing Urea manufacturing facilities in India is as follows:

The certificate dated 17th May, 2007 from Fertiliser Association of India (which has been submitted to DOE) substantiates that IFFCO is the first among all the fertilizer plants in India to implement fuel switch project activity.

The Fertiliser Association of India (FAI) is the national representative body of all fertiliser manufacturers in India comprising public, private, joint and cooperative sectors. It is a non-profit, non-trading organization of fertiliser manufactures distributors, technologists, plant/equipment manufactures, research institutes and others interested in fertilisers. (source: http://www.faidelhi.org /)

Thus indicating that fuel switchover from Naphtha to NG is not a common practice in the Country.

Sub-step 2b. Discuss any similar options that are occurring:
As per the above table it is evident that no such similar options are being carried out in the fertiliser sector in the Country.
Step 3: Impact of CDM registration

Following impacts of CDM fund are identified from the point of view of removal of barriers discussed above.

- Improves financial viability of the project
- As of now none of the Urea fertilizer plant in India has converted from Naphtha / LSHS / HSD / FO fuel to Natural gas. IFFCO-Phulpur is the first among all the fertilizer plants in India to implement fuel switch project activity. Since the project activity is the first of its kind in India and not a common practice, the CDM funds will provide additional coverage to the risk due to failure of project activity, shut down of plant and loss of production. The support will be available to the losses already incurred after commissioning of project
- CDM funds will encourage IFFCO to come up with more GHG abatement projects for its plants.

- Also the CDM funds to IFFCO-Phulpur fuel switch project activity would encourage other fertilizer industries in the country to also pursue such initiative for the betterment of the environment.

The following documents substantiate that incentive from CDM was seriously considered during the implementation of the project activity:

1. Internal approval note (dated 20th December 2004) addressed to the senior management (Senior Executive Director and Managing Director of the company) apprising about CDM and associated benefits by implementing the project activity
2. Copy of contract with CDM consultant (dated 19th April 2005) and related approval documents
3. Internal approval document of IFFCO for appointing DOE

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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Baseline emissions calculation: - Baseline emission (BE_y) include CO_2 emissions from the combustion of the quantity of coal or oil that would in the absence of the project activity be used in all element processes *i*. Baseline emissions are calculated based on the quantity of coal or oil that would be combusted in each element processes *i* in the absence of the project activity and respective net calorific values and CO_2 emission factors. The quantity of coal or oil that would be used in the absence of the project activity in an element process *i* ($FF_{baseline,i,y}$) is calculated based on the actual monitored quantity of natural gas combusted in this element process ($FF_{project,i,y}$) and the relation of the energy efficiencies and the net calorific values between the project scenario (use of natural gas) and the baseline scenario (use of coal or oil).

$BE_y = \Sigma\, FF_{baseline,i,y}\ x\ NCV_{FF,i}\ x\ EF_{FF,CO2,i}$

With

$FF_{baseline,i,y} = FF_{project,i,y}\ x\ (NCV_{NG,y}\ x\ \varepsilon_{project,i}) / (NCV_{FF,i}\ x\ \varepsilon_{baseline,i,y})$

Where:

BE_y = Baseline emissions during the year y in t CO_2e

$FF_{baseline,i,y}$ = Quantity of coal or oil that would be combusted in the absence of the project activity in the element process *i* during the year *y* in a volume or mass unit

$FF_{project,i,y}$ = Quantity of natural gas combusted in the element process *i* during the year *y* in m³

$NCV_{NG,y}$ = Average net calorific value of the natural gas combusted during the year *y* in GJ/m³

$NCV_{FF,I}$ = Average net calorific value of the coal or oil that would be combusted in the absence of the project activity in the element process *i* during the year *y* in GJ per volume or mass unit

$EF_{FF,CO2,i}$ = CO_2 emission factor of the coal or oil type that would be combusted in the absence of the project activity in the element process *i* in t CO_2/TJ

$\varepsilon_{project,i,y}$ = Energy efficiency of the element process *i* if fired with natural gas

$\varepsilon_{baseline,I}$ = Energy efficiency of the element process *i* if fired with coal or oil respectively

Note that the most plausible baseline scenario may be that several fuel types would be used in the different element processes or that several fuel types would be used in one element process. Where several fuel types have been used in one element process prior to the implementation of the project activity and where the continuation of this practice is the most plausible baseline scenario, project participants should, as a conservative approach, select the fuel type with the lowest CO_2 emission factor from the fuels used in that element process during the last three years as the baseline emission factor ($EF_{FF,CO2,i}$) and the baseline net calorific value ($NCV_{FF,i}$). For last three years, the Boiler no 4 of Phulpur –

II has been using LSHS, FO and HSD as fuel (baseline fuel). The emission factor value for each of these fuels is tabulated below:

Table B.6.1.1

Fuel Type	Emission factor (tCO_2 e /TJ)	Source
LSHS	77.4	IPCC
FO	77.4	IPCC
HSD	74.1	IPCC

The emission factor of HSD is the lowest amongst the fuels (LSHS, FO,HSD) used in the Boiler no 4. Hence as a conservative approach the emission factor of HSD fuel (74.1 tCO_2e /TJ) has been selected and used in emission reduction calculation for Boiler No.4.

For the determination of emission factors and net calorific values, guidance by the 2000 IPCC Good Practice Guidance should be followed where appropriate. Project participants may either conduct measurements or they may use accurate and reliable local or national data where available. Where such data is not available, IPCC default emission factors (country-specific, if available) may be used if they are deemed to reasonably represent local circumstances. All values should be chosen in a conservative manner (i.e. lower values should be chosen within a plausible range) and the choice should be justified and documented in the CDM-PDD. Where measurements are undertaken, project participants may estimate the emission factors or net calorific values ex-ante in the CDM-PDD and should document the measurement results after implementation of the project activity in their monitoring reports.

As per the monitoring methodology, IFFCO would measure the NCV of fuel used in element processes on a monthly basis. While for determining emission factor of fuel used in the element process, IPCC default value would be considered.
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The energy efficiencies have to be determined for each element process for the project activity ($\varepsilon_{project,i}$) and the baseline scenario ($\varepsilon_{baseline,i}$). The efficiencies should be determined by undertaking measurements at the element process firing the relevant fuels. Efficiencies for the project activity ($\varepsilon_{project,i}$) should be measured monthly throughout the crediting period and annual averages should be used for emission calculations. Efficiencies for the baseline scenario ($\varepsilon_{baseline,i}$) should be measured monthly during 6 months before project implementation and the 6 months average should be used for emission calculations. Project proponents can choose not to measure efficiencies for the baseline scenario. In this case, either efficiencies indicated by the equipment manufacturer should be used or a conservative default efficiency of 100% may be assumed. All measurements should be conducted at a representative load factor (or operation mode), following national or international standards. Where a representative load factor (or operation mode) can not be determined, measurements should be conducted for different load factors (or operation modes) and be weighted by the time these load factors (or operation modes) are typically operated. The same load factor(s) (or operation mode(s)) and weight factors should be used in the determination of $\varepsilon_{project,i}$ and $\varepsilon_{baseline,i}$. Where project participants can reasonably demonstrate that the efficiency of the element process does not change due to the fuel switch or that any changes are negligible (i.e. $\varepsilon_{project,i}$ - $\varepsilon_{baseline,i}$ < 1%) or that $\varepsilon_{project,i}$ can be expected to be smaller than $\varepsilon_{baseline,i}$, project participants may assume $\varepsilon_{project,i} = \varepsilon_{baseline,i}$ as a simplification. The values determined for $\varepsilon_{baseline,i}$ should be documented in the CDM-PDD and shall remain fixed throughout the crediting period.

IFFCO has measured the efficiency of the element processes on a monthly basis for a period of 6 months prior to the implementation of the project activity (baseline). To determine the actual efficiency (baseline) of each element process, an average of the monthly efficiency measured over a period of 6 months has been used. The baseline efficiency of element processes is fixed for entire crediting period.

IFFCO would measure monthly efficiency of each of the element processes for a period of 1 year after implementation of the project activity (project scenario). The average of the monthly efficiency measured over this period of 12 months (post project activity) would be used to determine the project efficiency of each of the element processes.

At the time of PDD preparation, the monthly efficiency data (post project scenario) of each of the element processes was available only for 7 months. Therefore, to determine project efficiency of each of the element processes, average of the monthly efficiency measured over the period of 7 months (post project activity) has been used.

The average monthly efficiency for each of the element processes measured before and after project implementation is given in the table below:

Table B.6.1.2

Actual efficiency	Desulphuriser Feed Heater(103-B (Phulpur I)	Primary Reformer (Phulpur I)	Boiler 4 (Phulpur I)	GTG & HRU (Phulpur II)	Primary Reformer (Phulpur II)
Using Naphtha Fuel (Baseline)	80.90%	86.62%		87.11%	91.23%
Using HSD fuel (Baseline)	-	-	94.01%	-	-
Using NG fuel (Project)	80.72%	86.60%	93.832%	84.16%	91.15%

The above table clearly purports that the efficiency of the equipments (element process) with NG firing ($\varepsilon_{project,i}$) is less than efficiency of the equipments (element process) with Naphtha firing ($\varepsilon_{baseline,I}$) hence according to the methodology, we have assumed $\varepsilon_{project,i} = \varepsilon_{baseline,i}$ as a simplification for the ex-ante emission reductions calculations.

IFFCO would monitor efficiency of each of the element processes for the remaining 5 months to complete the 1 year post project monitoring period. The project efficiency of each of the element processes would be determined by averaging the monthly efficiency of each of the element processes measured over the period of 12 months (post project activity).

After determining project efficiency of each of the element process (considering monthly efficiency values over a period of 12 months), IFFCO would compare the project efficiency with the corresponding baseline efficiency of each of element processes. If project efficiency of the element process is less than baseline efficiency of the element process or that any efficiency changes are negligible (i.e. $\varepsilon_{project,i}$ - $\varepsilon_{baseline,i}$ < 1%), then, according to the methodology, IFFCO would assume $\varepsilon_{project,i} = \varepsilon_{baseline,i}$ as a simplification for the ex-ante emission reductions calculations. Otherwise IFFCO would measure project efficiency of each of the element processes on monthly basis through out the crediting period.

Project emission calculation- Project emissions (PE_y) include CO_2 emissions from the combustion of natural gas in all element processes *i*. Project emissions are calculated based on the quantity of natural gas combusted in all element processes *i* and respective net calorific values and CO_2 emission factors for natural gas ($EF_{NG,CO2}$).

$PE_y = FF_{project,y}\ x.NCV_{NG,y}\ .\ x\ EF_{NG,co2,y}$
With
$FF_{project,y} = \Sigma FF_{project\ i\ y}$

Where:

PE_y = Project emissions during the year y in t CO_2e
$FF_{project,y}$ = Quantity of natural gas combusted in all element processes during the year *y* in m³
$FF_{project,i,y}$ = Quantity of natural gas combusted in the element process *i* during the year *y* in m³
$NCV_{NG,y}$ = Average net calorific value of the natural gas combusted during the year *y* in GJ/m³
$EF_{NG,CO2,y}$ = CO_2 emission factor of the natural gas combusted in all element processes in the year y in t CO_2/TJ

For the determination of emission factors and net calorific values, guidance by the 2000 IPCC Good Practice Guidance should be followed where appropriate. Project participants may either conduct measurements or they may use accurate and reliable local or national data where available. Where such data is not available, IPCC default emission factors (country-specific, if available) may be used if they are deemed to reasonably represent local circumstances. All values should be chosen in a conservative manner (i.e. lower values should be chosen within a plausible range) and the choice should be justified and documented in the CDM-PDD. Where measurements are undertaken, project participants may estimate the emission factors or net calorific values ex-ante in the CDM-PDD and should document the measurement results after implementation of the project activity in their monitoring reports.

As per the monitoring methodology, IFFCO would measure the NCV of fuel used in element processes on a monthly basis. While for determining emission factor of fuel used in the element process, IPCC default value would be considered.

Leakage:

Leakage emissions could occur due to the project activity due to the following conditions:

1. Fugitive CH_4 emissions from fuel production; and

2. CO_2 emissions from fuel transportation based on mode of transportation. Emission from transportation in pipeline could be considered negligible in case of properly managed project activity.

Leakage may result from fuel extraction, processing, liquefaction, transportation, re-gasification and distribution of fossil fuels outside of the project boundary. This includes mainly fugitive CH_4 emissions and CO_2 emissions from associated fuel combustion and flaring. In this methodology, the following leakage emission sources shall be considered:

• Fugitive CH_4 emissions associated with fuel extraction, processing, liquefaction, transportation, re-gasification and distribution of natural gas used in the project plant and fossil fuels used in the grid in the absence of the project activity.

• In the case LNG is used in the project plant: CO_2 emissions from fuel combustion / electricity consumption associated with the liquefaction, transportation, re-gasification and compression into a natural gas transmission or distribution system.

Thus, leakage emissions are calculated as follows:

$LE_y = LE_{CH4,y} + LE_{LNG,CO2,y}$

where:

LEy = Leakage emissions during the year y in t CO_2
$LE_{CH4,y}$ = Leakage emissions due to fugitive upstream CH_4 emissions in the year y in t CO_2

$LE_{LNG,CO2,y}$ = Leakage emissions due to fossil fuel combustion / electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system during the year y in t CO_2

Note that to the extent that upstream emissions occur in Annex I countries that have ratified the Kyoto Protocol, from 1 January 2008 onwards, these emissions should be excluded, if technically possible, in the leakage calculations.

Fugitive methane emissions

For the purpose of determining fugitive methane emissions associated with the production – and in case of natural gas, the transportation and distribution of the fuels – project participants should multiply the

quantity of natural gas consumed in all element processes *i* with a methane emission factor for these upstream emissions ($EF_{NG,upstream,CH4}$), and subtract for all fuel types *k* which would be used in the absence of the project activity the fuel quantities multiplied with respective methane emission factors ($EF_{NG,upstream,CH4}$), as follows:

$$LE_{CH4y} = [FF_{project,y} \ x \ NCV_{NG,y} \ x \ EF_{NG,upstream,CH4} - \Sigma \ FF_{baseline,k,y} \ x \ NCV_k \ x \ EF_{k,upstream,CH4}] \ x \ GWP_{CH4}$$

With

$$FF_{project,y} = \sum_{i} FF_{project,i,y} \ and$$

$$FF_{baseline,k,y} = \sum_{i} FF_{baseline,I,k,y}$$

where:

$LE_{CH4,y}$ = Leakage emissions due to upstream fugitive CH_4 emissions in the year y in t CO_2e

$FF_{project,y}$ = Quantity of natural gas combusted in all element processes during the year *y* in m³

$FF_{project,i,y}$ = Quantity of natural gas combusted in the element process *i* during the year *y* in m³

$NCV_{NG,y}$ = Average net calorific value of the natural gas combusted during the year *y* in GJ/m³

$EF_{NG,upstream,CH4}$ = Emission factor for upstream fugitive methane emissions from production, transportation and distribution of natural gas in t CH_4 per GJ fuel supplied to final consumers.

$FF_{baseline,k,y}$ = Quantity of fuel type *k* (a coal or oil type) that would be combusted in the absence of the project activity in all element processes during the year *y* in a volume or mass unit

$FF_{baseline,i,k,y}$ = Quantity of fuel type *k* (a coal or oil type) that would be combusted in the absence of the project activity in the element process *i* during the year *y* in a volume or mass unit

NCV_k = Average net calorific value of the fuel type *k* (a coal or oil type) that would be combusted in the absence of the project activity during the year *y* in GJ per volume or mass unit

$EF_{k,upstream,CH4}$ = Emission factor for upstream fugitive methane emissions from production of the fuel type k (a coal or oil type) in t CH_4 per GJ fuel produced

GWP_{CH4} = Global warming potential of methane valid for the relevant commitment period

Where reliable and accurate national data on fugitive CH_4 emissions associated with the production, and in case of natural gas, the transportation and distribution of the fuels is available, project participant should use this data to determine average emission factors by dividing the total quantity of CH_4 emissions by the quantity of fuel produced or supplied respectively. Where such data is not available, project participants may use the default values provided in Table 2 of ACM0009, (version 03, 28 July 2006). In this case, the natural gas emission factor for the location of the project should be used, except in cases where it can be shown that the relevant system element (gas production and/or processing/transmission/distribution) is predominantly of recent vintage and built and operated to international standards, in which case the US/Canada values may be used.

Note that the emission factor for fugitive upstream emissions for natural gas ($EF_{NG,upstream,CH4}$) should include fugitive emissions from production, processing, transport and distribution of natural gas, as indicated in the Table 2 of ACM0009, (version 03, 28 July 2006). Note further that in case of coal the emission factor is provided based on a mass unit and needs to be converted in an energy unit, taking into account the net calorific value of the coal.

In IFFCO's project activity the gas production/processing/ distribution is of recent vintage and built and operated to international standards, hence Fugitive methane emissions corresponding to US/Canada has been used. The LNG is sourced by Petronet LNG Limited. Petronet LNG obtains LNG from Ras Laffan Liquefied Natural Gas Company Limited (Ras Gas) Liquefaction Trains. Ras Gas is a joint venture company established in 2001 by Qatar Petroleum and an US Oil Major, Exxon Mobil. A commercially proven and advanced technology has been used for construction and operation of liquefaction terminals that has been built recently. The Dahej terminal that processes the gas has been recently built for production, processing and distribution of LNG to offtakers. The terminal has been commissioned recently for supply of LNG to its offtakers in February 2004. The terminal has been constructed according to the latest international design standards like European EN–1473, US National Fire Protection Association's NFPA–59A, and British BS7777.The terminal is also under compliance with the ISO 9001 and OHSAS 18001. IFFCO obtains NG from the new spur pipeline of latest design and technology. Thus it is evident that the gas production/ processing / distribution is a recent vintage and technology and fugitive methane emissions corresponding to developed nations can be used. Further, IFFCO has entered into an agreement with M/s Reliance Industries Limited on June 9' 2007 for purchase of NG w.e.f. June, 2008.

The NG would be procured from Krishna Godavari Basin, Andhra Pradesh, India and would be utilised in the project activity. The gas production and processing at KG basin would be of modern technology and the commercial operation of the gas terminal shall start from early 2008. For the distribution of gas there is no existing gas pipeline to the manufacturing facility from the KG basin terminal. However, new pipeline of advanced and futuristic technology will be laid for supply of gas from the KG basin gas terminal to the manufacturing facility at IFFCO.

CO_2 emissions from LNG

Where applicable, CO_2 emissions from fuel combustion / electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system ($LE_{LNG,CO2,y}$) should be estimated by multiplying the quantity of natural gas combusted in the project with an appropriate emission factor, as follows:

$$LE_{LNG,CO2,y} = FF_{project,y} \text{ x } EF_{CO2,upstream,LNG}$$

where:

$LE_{LNG,CO2,y}$ = Leakage emissions due to fossil fuel combustion / electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system during the year y in t CO_2

$FF_{project,y}$ = Quantity of natural gas combusted in all element processes during the year y in m^3

$EF_{CO2,upstream,LNG}$

Emission factor for upstream CO_2 emissions due to fossil fuel combustion / electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system Where reliable and accurate data on upstream CO_2 emissions due to fossil fuel combustion / electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system is available, project participants should use this data to determine an average emission factor. Where such data is not available, project participants may assume a default value of 6 t CO_2/TJ as a rough approximation.

IFFCO has entered into an agreement on June 9' 2007 with Reliance Industries Limited for purchase of NG . The NG is procured from Krishna Godavari Basin, Andhra Pradesh, India and would be utilised in the project activity .The Gas is expected to be supplied to IFFCO w.e.f. June, 2008.

According to the methodology, the upstream CO_2 emission from Liquefied Natural Gas (LNG) has to be accounted if the project activity uses LNG that is sourced from outside the host country. Since IFFCO has entered into contract with Reliance Industries Limited for procuring and utilizing NG, the upstream CO_2 emission from LNG need not to be considered from June 2008 onwards. However in the crediting period for the months prior to June, 2008 the upstream CO_2 emission from Liquefied Natural Gas (LNG) has been accounted as well as during the verification period, if IFFCO uses any LNG for the project activity then accordingly the upstream CO_2 emission from LNG will be accounted for and Emission reductions will be calculated.

B.6.2. Data and parameters that are available at validation:

Data / Parameter:	$NCV_{Naphtha,y}$
Data unit:	MWh / tonne
Description:	Average net calorific value of the Naphtha used before the project activity during the year 'y' in MWh/ tonne
Source of data used:	Laboratory
Value applied:	12.317
Justification of the choice of data or description of measurement methods and procedures actually applied :	This parameter is calculated as average of monthly values of NCV of Naphtha ($NCV_{Naphtha}$).The Net Calorific Value (NCV) of Naphtha is measured and calculated on daily basis by chemist of laboratory. The Lab report is generated and forwarded by "Laboratory in charge" to CDM coordinator. The CDM coordinator (process department) calculates monthly average of NCV of Naphtha from daily values. The monthly value is documented and signed by CDM coordinator and subsequently from the monthly values, the yearly average of NCV of Naphtha is calculated. A data review meeting is conducted once in 6 months which is chaired by CDM Chairman (Head of Process department). In this meeting, data complied by CDM coordinator is cross checked with Laboratory data. Subsequently to check further the data authenticity and accuracy, data is verified, audited and signed by senior plant officials. The instruments and equipments used in laboratory for NCV measurement are calibrated once in a year.
Any comment:	-

Data / Parameter:	$NCV_{HSD,y}$
Data unit:	MWh / tonne
Description:	Average net calorific value of the HSD used before the project activity during the

	year 'y' in MWh/ tonne
Source of data used:	Laboratory
Value applied:	11.893
Justification of the choice of data or description of measurement methods and procedures actually applied :	This parameter is calculated as average of monthly values of NCV of HSD (*NCV_{HSD})*.The Net Calorific Value (NCV) of HSD is measured and calculated on daily basis by chemist of laboratory. The Lab report is generated and forwarded by "Laboratory in charge" to CDM coordinator. The CDM coordinator (process department) calculates monthly average of NCV of HSD from daily values. The monthly value is documented and signed by CDM coordinator and subsequently from the monthly values, the yearly average of NCV of HSD is calculated. A data review meeting is conducted once in 6 months which is chaired by CDM Chairman (Head of Process department). In this meeting, data complied by CDM coordinator is cross checked with Laboratory data. Subsequently to check further the data authenticity and accuracy, data is verified, audited and signed by senior plant officials. The instruments and equipments used in laboratory for NCV measurement are calibrated once in a year.
Any comment:	-

Data / Parameter:	$EF_{NG,CO2,y}$
Data unit:	tCO_2/MWh
Description:	Emission factor of Natural gas used in the project activity during the year y
Source of data used:	2006 IPCC Good Practice Guidance
Value applied:	0.2019
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default IPCC factor is used.
Any comment:	-

Data / Parameter:	$EF_{Naphtha,CO2,y}$
Data unit:	tCO_2/MWh
Description:	Emission factor of Naphtha used in the project activity during the year y
Source of data used:	2006 IPCC Good Practice Guidance
Value applied:	0.2639
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default IPCC factor is used.
Any comment:	-

Data / Parameter:	$EF_{HSD,CO2,y}$
Data unit:	tCO_2/MWh
Description:	Emission factor of HSD used in the project activity during the year y
Source of data used:	2006 IPCC Good Practice Guidance
Value applied:	0.267

Justification of the choice of data or description of measurement methods and procedures actually applied :	Default IPCC factor is used.
Any comment:	-

Data / Parameter:	$\varepsilon_{baseline,Desulphuriser\ feed\ heate.r,y}$
Data unit:	%
Description:	Average Efficiency of the Desulphuriser feed heater fired with Naphtha
Source of data used:	Monthly efficiency values of Desulphuriser feed heater
Value applied:	80.90%
Justification of the choice of data or description of measurement methods and procedures actually applied	International standard procedure API 560 is used for estimating efficiency of Desulphuriser feed heater. The monthly efficiency is calculated by process department and is documented, signed by senior official of process department. Average Efficiency is calculated by CDM coordinator from 6 monthly efficiency values of Desulphuriser feed heater before implementation of the project activity.
Any comment:	-

Data / Parameter:	$\varepsilon_{baseline,\ primary\ reformer\text{-}I\ ,y}$
Data unit:	%
Description:	Average Efficiency of the Primary Reformer of Phulpur unit-I fired with Naphtha
Source of data used:	Monthly efficiency values of Primary Reformer
Value applied:	86.62%
Justification of the choice of data or description of measurement methods and procedures actually applied	International standard procedure API 560 is used for estimating efficiency of Primary Reformer. The monthly efficiency is calculated by process department and is documented, signed by senior official of process department. Average Efficiency is calculated by CDM coordinator from 6 monthly efficiency values of Primary Reformer before implementation of the project activity
Any comment:	-

Data / Parameter:	$\varepsilon_{baseline,\ primary\ reformer\text{-}II\ ,y}$
Data unit:	%
Description:	Average Efficiency of the Primary Reformer of Phulpur unit-II fired with Naphtha
Source of data used:	Monthly efficiency values of Primary Reformer
Value applied:	91.23%
Justification of the choice of data or description of measurement methods and procedures actually applied	International standard procedure API 560 is used for estimating efficiency of Primary Reformer. The monthly efficiency is calculated by process department and is documented, signed by senior official of process department. Average Efficiency is calculated by CDM coordinator from 6 monthly efficiency values of Primary Reformer before implementation of the project activity
Any comment:	-

Data / Parameter:	$\varepsilon_{baseline,GTG\ and\ HRU,y}$
Data unit:	%
Description:	Average Efficiency of the GTG and HRU fired with Naphtha
Source of data used:	Monthly efficiency values of GTG and HRU
Value applied:	87.11%
Justification of the choice of data or description of measurement methods and procedures actually applied	International standard procedure API 560 is used for estimating efficiency of GTG and HRU. The monthly efficiency is calculated by process department and is documented, signed by senior official of process department. Average Efficiency is calculated by CDM coordinator from 6 monthly efficiency values of GTG and HRU before implementation of the project activity
Any comment:	-

Data / Parameter:	$\varepsilon_{baseline,Boiler\ no\ 4,y}$
Data unit:	%
Description:	Average Efficiency of the Boiler No 4 fired with LDO/HSD/FO
Source of data used:	Monthly efficiency values of Boiler No 4
Value applied:	94.01%
Justification of the choice of data or description of measurement methods and procedures actually applied	International standard procedure ASME PTC -4.1 is used for estimating efficiency of Boiler No 4. The monthly efficiency is calculated by process department and is documented, signed by senior official of process department. Average Efficiency is calculated by CDM coordinator from 6 monthly efficiency values of Boiler no 4 before implementation of the project activity
Any comment:	-

B.6.3 Ex-ante calculation of emission reductions:

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Project emissions (PE_y):

The following parameters have been assumed for the estimation of project activity emissions:

$PE_y = FF_{project,y}\ x.NCV_{NG,y}\ .\ x\ EF_{NG,co2,y}$

With

$FF_{project,y} = \Sigma FF_{project\ i\ y}$

Where:

PE_y = Project emissions during the year y in t CO_2e
$FF_{project,i,y}$ = Quantity of natural gas combusted in the element process *i* during the year *y* in m³
$NCV_{NG,y}$ = Average net calorific value of the natural gas combusted during the year *y* in GJ/m³
$EF_{NG,CO2,y}$ = CO_2 emission factor of the natural gas combusted in all element processes in the year y in t CO_2/TJ

Table B.6.3.1

Sl. No.	Year	Total Project Emissions

1	Nov 2007- Mar 2008	317740
2	Apr 2008- Mar 2009	762575
3	Apr 2009- Mar 2010	762575
4	Apr 2010- Mar 2011	762575
5	Apr 2011- Mar 2012	762575
6	Apr 2012- Mar 2013	762575
7	Apr 2013- Mar 2014	762575
8	Apr 2014- Mar 2015	762575
9	Apr 2015- Mar 2016	762575
10	Apr 2016- Mar 2017	762575
11	Apr 2017- Oct 2017	444836
Total		**7625753**

Leakage

Thus, leakage emissions are calculated as follows:

$LE_y = LE_{CH4,y} + LE_{LNG,CO2,y}$

where:

LEy = Leakage emissions during the year y in t CO_2
$LE_{CH4,y}$ = Leakage emissions due to fugitive upstream CH_4 emissions in the year y in t CO_2
$LE_{LNG,CO2,y}$ = Leakage emissions due to fossil fuel combustion / electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system during the year y in t CO_2

Fugitive methane emissions

$LE_{CH4y} = [FF_{project,y} \text{ x } NCV_{NG,y} \text{ x } EF_{NG,upstream,CH4} - \Sigma FF_{baseline,k,y} \text{ x } NCV_k \text{ x } EF_{k,upstream,CH4}] \text{ x } GWP_{CH4}$

With
$FF_{project,y} = \sum_i FF_{project,i,y}$ *and*
$FF_{baseline,k,y} = \sum_i FF_{baseline,I,k,y}$
where:

$LE_{CH4,y}$ = Leakage emissions due to upstream fugitive CH_4 emissions in the year y in t CO_2e
$FF_{project,y}$ = Quantity of natural gas combusted in all element processes during the year *y* in m³
$FF_{project,i,y}$ = Quantity of natural gas combusted in the element process *i* during the year *y* in m³
$NCV_{NG,y}$ = Average net calorific value of the natural gas combusted during the year *y* in MWh/m³
$EF_{NG,upstream,CH4}$ = Emission factor for upstream fugitive methane emissions from production, transportation and distribution of natural gas in t CH_4 per GJ fuel supplied to final consumers.
$FF_{baseline,k,y}$ = Quantity of fuel type *k* (a coal or oil type) that would be combusted in the absence of the project activity in all element processes during the year *y* in a volume or mass unit
$FF_{baseline,i,k,y}$ = Quantity of fuel type *k* (a coal or oil type) that would be combusted in the absence of the project activity in the element process *i* during the year *y* in a volume or mass unit
NCV_k = Average net calorific value of the fuel type *k* (a coal or oil type) that would be combusted in the absence of the project activity during the year *y* in MWh per volume

or mass unit

$EF_{k,upstream,CH4}$ = Emission factor for upstream fugitive methane emissions from production of the fuel type k (a coal or oil type) in t CH_4 per GJ fuel produced

GWP_{CH4} = Global warming potential of methane valid for the relevant commitment period

CO_2 emissions from LNG

$LE_{LNG,CO2,y} = FF_{project,y} \times EF_{CO2,upstream,LNG}$

where:

$LE_{LNG,CO2,y}$ = Leakage emissions due to fossil fuel combustion / electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system during the year y in t CO_2

$FF_{project,y}$ = Quantity of natural gas combusted in all element processes during the year *y* in m³

$EF_{CO2,upstream,LNG}$ = Emission factor for upstream CO_2 emissions due to fossil fuel combustion / electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into natural gas transmission or distribution system.

Table B.6.3.2

Sl. No.	Year	Total leakage Emissions
1	Nov 2007- Mar 2008	52526
2	Apr 2008- Mar 2009	58096
3	Apr 2009- Mar 2010	44503
4	Apr 2010- Mar 2011	44503
5	Apr 2011- Mar 2012	44503
6	Apr 2012- Mar 2013	44503
7	Apr 2013- Mar 2014	44503
8	Apr 2014- Mar 2015	44503
9	Apr 2015- Mar 2016	44503
10	Apr 2016- Mar 2017	44503
11	Apr 2017- Oct 2017	25960
Total		**492602**

Baseline Emissions

$BE_y = \Sigma\, FF_{baseline,i,y} \times NCV_{FF,i} \times EF_{FF,CO2,i}$

With

$FF_{baseline,i,y} = FF_{project,i,y} \times (NCV_{NG,y} \times \varepsilon_{project,i}) / (NCV_{FF,i} \times \varepsilon_{baseline,i,y})$

where:

BE_y = Baseline emissions during the year y in t CO_2e

$FF_{baseline,i,y}$ = Quantity of coal or oil that would be combusted in the absence of the project activity in the element process *i* during the year *y* in a volume or mass unit

$FF_{project,i,y}$ = Quantity of natural gas combusted in the element process *i* during the year *y* in m³

$NCV_{NG,y}$ = Average net calorific value of the natural gas combusted during the year *y* in GJ/m³

$NCV_{FF,I}$ = Average net calorific value of the coal or oil that would be combusted in the absence of the project activity in the element process i during the year y in GJ per volume or mass unit

$EF_{FF,CO2,i}$ = CO_2 emission factor of the coal or oil type that would be combusted in the absence of the project activity in the element process i in t CO_2/TJ

$\varepsilon_{project,i,y}$ = Energy efficiency of the element process i if fired with natural gas

$\varepsilon_{baseline,I}$ = Energy efficiency of the element process i if fired with coal or oil respectively

Table B.6.3.3

Sl. No.	Year	Total Baseline Emissions
1	Nov 2007- Mar 2008	416031
2	Apr 2008- Mar 2009	998473
3	Apr 2009- Mar 2010	998473
4	Apr 2010- Mar 2011	998473
5	Apr 2011- Mar 2012	998473
6	Apr 2012- Mar 2013	998473
7	Apr 2013- Mar 2014	998473
8	Apr 2014- Mar 2015	998473
9	Apr 2015- Mar 2016	998473
10	Apr 2016- Mar 2017	998473
11	Apr 2017- Oct 2017	582443
Total		**9984733**

Emission Reductions

The emission reduction by the project activity during a given year y (ER_y) is the difference between the baseline emissions (BE_y) and project emissions (PE_y) and leakage emissions (L_y), as follows:

$ER_y = BE_y - PE_{y,} -LE_y$

Where,

ER_y Emissions reductions of the project activity during the year y in t CO_{2e}

$BE_{,y}$ Baseline emissions during the year y in t CO_{2e}

PE_y Project emissions during the year y in t CO_{2e}

LE_y Leakage emissions in the year y in t CO_{2e}

B.6.4 Summary of the ex-ante estimation of emission reductions:

>>

Year	Total Baseline Emissions	Total Project Emissions	Total Leakage Emissions	Emission Reductions
Nov 2007- Mar 2008	416031	317740	52526	45765
Apr 2008- Mar 2009	998473	762575	58096	177802
Apr 2009- Mar 2010	998473	762575	44503	191395
Apr 2010- Mar 2011	998473	762575	44503	191395
Apr 2011- Mar 2012	998473	762575	44503	191395
Apr 2012- Mar 2013	998473	762575	44503	191395
Apr 2013- Mar 2014	998473	762575	44503	191395
Apr 2014- Mar 2015	998473	762575	44503	191395
Apr 2015- Mar 2016	998473	762575	44503	191395

Year	Total Baseline Emissions	Total Project Emissions	Total Leakage Emissions	Emission Reductions
Apr 2016- Mar 2017	998473	762575	44503	191395
Apr 2017- Oct 2017	582443	444836	25960	111647
Total	**9984733**	**7625753**	**492602**	**1866374**

The Annual CER quantity has increased from 113 616 tonnes of CO_2e (as estimated in the PDD that was posted for Global Stakeholders' Process) to 186637 tonnes of CO_2e (Emission Reductions Submitted for Request for registration) due to following reasons:

1. Previously, the emission reduction was derived after taking into account the leakage for upstream CO_2 emission from Liquefied Natural Gas (LNG) as per the methodology, as the project activity uses LNG that is sourced from outside the host country.
2. Now IFFCO has entered into an agreement with Reliance Industries Limited on June 9' 2007 for purchase of Natural Gas (NG) from Krishna Godavari Basin, Andhra Pradesh, India w.e.f. June, 2008. Hence, NG would be utilised in the project activity thereafter and hence the upstream CO_2 emission from LNG would not be applicable and not considered.

The annual leakage emission due to project activity has therefore decreased from 129960 tonnes of CO_2e to 49260.2 tonnes of CO_2e, resulting into increase in the emission reduction from 113 616 tonnes of CO_2e to 186637 tonnes of CO_2e annually. However, in case, IFFCO uses any LNG in the project activity during the verification period, the upstream CO_2 emission from LNG (actually used) would be considered as leakage.

B.7 Application of the monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

(Copy this table for each data and parameter)	
Data / Parameter:	$FF_{project\ Desulphuriser\ feed\ heater\ ,y}$
Data unit:	Sm^3
Description:	Quantity of natural gas combusted in the Desulphuriser feed heater during the year *y* in Sm³
Source of data to be used:	Control Panel Log sheet of plant
Value of data applied for the purpose of calculating expected emission reductions in section B.5	2,894,000
Description of measurement methods and procedures to be applied:	Gas Flow rate meters with Integrator
QA/QC procedures to be applied:	NG fuel consumption in Desulphuriser feed heater is monitored and logged in control panel log sheets (ISO document) by Panel operator. This data is checked by Shift in charge and signed. Based on the logged data, a monthly report is generated and which is again checked and signed by the CDM team member (Plant Manager/Senior Manager) of the plant and is forwarded to the CDM Coordinator (Process department) of project. A data review meeting is conducted once in 6 months which is chaired by CDM Chairman (Head of Process

	department). In this meeting, data complied by CDM coordinator is cross checked with plant data. Subsequently to check further the data authenticity and accuracy, data is verified, audited and signed by senior plant officials. The gas flow meter is calibrated once in year according to procedure mentioned in ISO.
Any comment:	Data monitored and required for verification and issuance are to be kept for two years after the end of the crediting period or the last issuance of CERs for the project activity whichever occurs later.

Data / Parameter:	$FF_{project\ Primary\ Reformer\ phulpur\text{-}I\ ,y}$
Data unit:	Sm^3
Description:	Quantity of natural gas combusted in the Primary Reformer of Phulpur-I during the year *y* in Sm^3
Source of data to be used:	Control Panel Log sheet of plant
Value of data applied for the purpose of calculating expected emission reductions in section B.5	97,771,000
Description of measurement methods and procedures to be applied:	Gas Flow rate meters with Integrator
QA/QC procedures to be applied:	NG fuel consumption in Primary Reformer of Phulpur-I is monitored and logged in control panel log sheets (ISO document) by Panel operator. This data is checked by Shift in charge and signed. Based on the logged data, a monthly report is generated and which is again checked and signed by the CDM team member (Plant Manager/Senior Manager) of the plant and is forwarded to the CDM Coordinator (Process department) of project. A data review meeting is conducted once in 6 months which is chaired by CDM Chairman (Head of Process department). In this meeting, data complied by CDM coordinator is cross checked with plant data. Subsequently to check further the data authenticity and accuracy, data is verified, audited and signed by senior plant officials. The gas flow meter is calibrated once in year according to procedure mentioned in ISO.
Any comment:	Data monitored and required for verification and issuance are to be kept for two years after the end of the crediting period or the last issuance of CERs for the project activity whichever occurs later.

Data / Parameter:	$FF_{project\ Primary\ Reformer\ Phulpur – II\ ,y}$
Data unit:	Sm^3
Description:	Quantity of natural gas combusted in the Primary Reformer of Phulpur-II during the year *y* in Sm^3
Source of data to be used:	Control Panel Log sheet of plant

Value of data applied for the purpose of calculating expected emission reductions in section B.5	125,455,000
Description of measurement methods and procedures to be applied:	Gas Flow rate meters with Integrator
QA/QC procedures to be applied:	NG fuel consumption in Primary Reformer of Phulpur-II is monitored and logged in control panel log sheets (ISO document) by Panel operator. This data is checked by Shift in charge and signed. Based on the logged data, a monthly report is generated and which is again checked and signed by the CDM team member (Plant Manager/Senior Manager) of the plant and is forwarded to the CDM Coordinator (Process department) of project. A data review meeting is conducted once in 6 months which is chaired by CDM Chairman (Head of Process department). In this meeting, data complied by CDM coordinator is cross checked with plant data. Subsequently to check further the data authenticity and accuracy, data is verified, audited and signed by senior plant officials. The gas flow meter is calibrated once in year according to procedure mentioned in ISO.
Any comment:	Data monitored and required for verification and issuance are to be kept for two years after the end of the crediting period or the last issuance of CERs for the project activity whichever occurs later.

Data / Parameter:	$FF_{project\ Boiler\ no\ 4\ ,y}$
Data unit:	Sm^3
Description:	Quantity of natural gas combusted in the Boiler no 4 during the year *y* in Sm^3
Source of data to be used:	Control Panel Log sheet of plant
Value of data applied for the purpose of calculating expected emission reductions in section B.5	81,579,000
Description of measurement methods and procedures to be applied:	Gas Flow rate meters with Integrator
QA/QC procedures to be applied:	NG fuel consumption in Boiler no 4 is monitored and logged in control panel log sheets (ISO document) by Panel operator. This data is checked by Shift in charge and signed. Based on the logged data, a monthly report is generated and which is again checked and signed by the CDM team member (Plant Manager/Senior Manager) of the plant and is forwarded to the CDM Coordinator (Process department) of project. A data review meeting is conducted once in 6 months which is chaired by CDM Chairman (Head of Process department). In this meeting, data complied by CDM coordinator is cross checked with plant data.

	Subsequently to check further the data authenticity and accuracy, data is verified, audited and signed by senior plant officials. The gas flow meter is calibrated once in year according to procedure mentioned in ISO.
Any comment:	Data monitored and required for verification and issuance are to be kept for two years after the end of the crediting period or the last issuance of CERs for the project activity whichever occurs later.

Data / Parameter:	$FF_{project\ GTG\ and\ HRU\ ,y}$
Data unit:	Sm^3
Description:	Quantity of natural gas combusted in the GTG and HRU during the year *y* in Sm^3
Source of data to be used:	Control Panel Log sheet of plant
Value of data applied for the purpose of calculating expected emission reductions in section B.5	92,428,000
Description of measurement methods and procedures to be applied:	Gas Flow rate meters with Integrator
QA/be applied:	NG fuel consumption in GTG and HRU is monitored and logged in control panel log sheets (ISO document) by Panel operator. This data is checked by Shift in charge and signed. Based on the logged data, a monthly report is generated and which is again checked and signed by the CDM team member (Plant Manager/Senior Manager) of the plant and is forwarded to the CDM Coordinator (Process department) of project. A data review meeting is conducted once in 6 months which is chaired by CDM Chairman (Head of Process department). In this meeting, data complied by CDM coordinator is cross checked with plant data. Subsequently to check further the data authenticity and accuracy, data is verified, audited and signed by senior plant officials. The gas flow meter is calibrated once in year according to procedure mentioned in ISO.
Any comment:	Data monitored and required for verification and issuance are to be kept for two years after the end of the crediting period or the last issuance of CERs for the project activity whichever occurs later.

Data / Parameter:	$NCV_{NG,y}$
Data unit:	MWh/ Sm^3
Description:	Average net calorific value of the natural gas used in the project activity during the year ‘y’ in MWh/ Sm^3
Source of data to be used:	Gas Authority of India Limited (GAIL-Supplier of NG)- A reputed Government organisation
Value of data applied for the purpose of	0.009438

calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	This parameter is calculated as average of monthly values of NCV of NG (NCV_{NG})
QA/QC procedures to be applied:	The Net Calorific Value (NCV) of Natural gas is measured on daily basis and the daily value is forwarded by GAIL to process department. The CDM coordinator (process department) calculates monthly average of NCV of NG from daily values. The monthly value is documented and signed by CDM coordinator and subsequently from the monthly values, the yearly average of NCV of NG is calculated. A data review meeting is conducted once in 6 months which is chaired by CDM Chairman (Head of Process department). In this meeting, data complied by CDM coordinator is cross checked with GAIL data. Subsequently to check further the data authenticity and accuracy, data is verified, audited and signed by senior plant officials. The gas chromatographer has online calibration facility and is calibrated by GAIL on regular basis. Moreover, NCV of NG is one of the imperative parameter on the basis which payment for natural gas consumption is made to GAIL.
Any comment:	Data monitored and required for verification and issuance are to be kept for two years after the end of the crediting period or the last issuance of CERs for the project activity whichever occurs later.

B.7.2 Description of the monitoring plan:

>>

For estimating the baseline emissions, project emissions and leakage emissions the following parameters need to be monitored during the crediting period:

- Quantum of NG used as fuel in the element process (equipments)of project plant
- Net calorific value of NG fuel used in the element process(equipments)
- Average monthly efficiency of each of the element processes
- The CO_2 emission factor of natural gas on monthly basis to lead to annual average based on national or international standards.

Essentially these parameters are related to the main activity of production of Urea in the manufacturing facility so would be monitored on a daily basis as per the standard operating procedures or best practices guidelines. The process, including all the variables that need to be monitored, is controlled and monitored from the Plant Control Room, where all the information is available electronically and with historic back up. Sr. Executive Director (Technical) would be responsible for monitoring and archiving of data required and for estimating the emission reductions. He would be supported by Plant in-charge, who would continuously monitor the data and would generate Daily, Monthly report of the same.

B.8 Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)

>>

Date of completing the final draft of this baseline study and monitoring methodology *(DD/MM/YYYY)*:
10/12/2006

Name of person/entity:
IFFCO and its associated consultants have determined the baseline. IFFCO is also the project participant and the contact information is given in Annex 1.

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>>
01/03/2006

C.1.2. Expected operational lifetime of the project activity:

>>
Expected lifetime: 15 years 0 months

C.2 Choice of the crediting period and related information:

>>
The project activity will be using a fixed crediting period.

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the first crediting period:

>>
Not applicable

C.2.1.2. Length of the first crediting period:

>>
Not applicable

C.2 Fixed crediting period:

C.2.2.1. Starting date:

>>
15/11/2007 or the date of registration, which ever occurs later.

The project participant hereby confirms that the crediting period will not commence prior to the date of registration.

C.2.2.2. Length:

>>
10 years 0 months

SECTION D. Environmental impacts

>>

D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

>>

The EIA study was carried out for the project and environmental clearance was granted by Ministry of Environment and Forest (MoEF) vide Letter No.J-11011/150/2006-IA –II (I) dated 14th July, 2006.Uttar Pradesh Pollution Control Board (UPPCB) has provided “No Objection Certificate” for the project activity.

According to Article 12 of Kyoto Protocol, it is mandatory for any CDM project activity to contribute to the sustainable development of the host country. Thus assessment of the project activity’s positive and negative impacts on the local environment and society is a key element for each CDM project.

The positive impacts of the project activity on environment are presented in the ensuing points:

- The ensuing air, ground water quality and noise levels are well within acceptable norms and will continue to remain same after project activity.
- No risk is envisaged to flora, fauna and soil by the project activity.
- IFFCO is an Environmental conscious organisation. This is apparent from various environment friendly activities carried out by IFFCO and various environmental accolades won by IFFCO plants.

IFFCO being an ISO 14001 organization has specialized environmental management plans. The environmental targets are met by consistent evaluation of the impacts and mitigation measures. The impact over the environment during the construction phase is regarded as temporary or short term and hence does not affect the environment.

The possible impacts due to the project activity are discussed in detail in the following table.

S. No.	Environmental Impacts & Benefits	Mitigation Measures / Remarks
1.	***Category: Environmental – Air***	
	By replacing Naphtha/LSHS/FO/HSD by Natural Gas as a fuel, there will be reduction in CO_2 and SO_2 emissions to atmosphere.	Reduction in emissions of CO_2 and SO_2 help combating global warming and acid rains.
2.	***Category: Environmental –Water***	
	No adverse effect over water environment, due to the project activity.	-----
3.	***Category: Environmental – Land***	
	The project activity does not contribute to any undesired impact over land conditions. Industry has also developed green belt in and around the plant premises. No possible soil or land pollution is associated with the project	The project activity has only positive impact on Land environment.

	activity.	
4.	***Category: Environmental – Noise***	
	No scope for any noise pollution because of the project activity.	-----
5.	***Category: Social-Economic***	
	The project activity is carried out within the existing premises of the IFFCO-Phulpur plant therefore no further land acquisition is required. Thus no rehabilitation programme is needed. The project activity facilitates generation of employment opportunities for local population during construction phase.	The project creates positive impact over the local standard of living.
6.	***Category: Ecology***	
	There are no endangered species located in and around the plant area.	-----

It is evident from the above table that the project activity has mostly positive impacts on the local and global environment. The project activity meets all the requirements provided by the State Pollution Control Board and is in harmony with all environmental legislations.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>>

The environmental impact assessment study has been conducted through a consultant and EIA report has been submitted to Government of India and project activity has been granted Environmental clearance from Ministry of Environment and Forest (MoEF) vide Letter No.J-11011/150/2006-IA –II (I) dated 14th July, 2006.

SECTION E. Stakeholders' comments

>>

E.1. Brief description how comments by local stakeholders have been invited and compiled:

>>
IFFCO have identified various stakeholders for the project activity on the basis of their direct or indirect involvement at various phases of the project activity. The list of relevant stakeholders includes governmental, private and non-governmental organization, which are communicated /applied to get necessary clearances. The various stakeholders identified for the project activity are listed below:

- Local population
- Uttar Pradesh Pollution Control Board (UPPCB)
- Ministry of Environment & Forest (MoEF), Government of India
- Project Consultants
- Equipment Suppliers

Local villagers and population were invited for a public hearing of the project activity and public hearing was conducted on 8th August 2005 in presence of

i) Public representatives including Block Pramukh- Phulpur, Chairman Nagar Panchayat - Phulpur, Ex. B.D.C., Gram Pradhan etc.
ii) Pollution Control Board / Authority representative: Regional Officer UPPCB, Dy. Director - Environment UP Govt.
iii) Government Representative: Representative of District Industry Centre, Additional District Magistrate (Administration) - Allahabad, District Magistrate –Allahabad

Project consultants/ equipment suppliers are involved in the project to take care of various pre contract and post contract project activities like preparation of basic and detailed engineering documents, preparation of tender documents, selection of vendors / suppliers, supervision of project implementation, successful commissioning and trial runs.

E.2. Summary of the comments received:

>>
The company's policy about working innovatively for growth in compliance with the sustainable development received appreciative backing by the local villagers on the project activity and no adverse comment was raised during public hearing.

IFFCO has got No Objection Certificate (NOC) from UPPCB for the project activity and also has got environmental clearance from MoEF. IFFCO periodically submits environmental statement to UPPCB and has got consent to operate plant.

The consultants and technology suppliers expressed their consent for the project activity and signed pre negotiated terms and conditions for the execution of the same.

E.3. Report on how due account was taken of any comments received:

>> No adverse comments have been raised by the local population during public hearing. As per the UNFCCC requirement the PDD would be published at the validator's web site for public comments.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Indian Farmers Fertiliser Cooperative Ltd. (IFFCO)
Street/P.O.Box:	C-1, Distt. Centre
Building:	IFFCO Sadan, Saket
City:	New Delhi
State/Region:	-
Postfix/ZIP:	110017
Country:	India
Telephone:	+ 91 – 11 - 4259 2761
FAX:	+ 91 - 11- 4059 3161
E-Mail:	bsingh@iffco.nic.in
URL:	www.iffco.nic.in
Represented by:	
Title:	Joint General Manager (PS)
Salutation:	Mr.
Last Name:	Singh
Middle Name:	-
First Name:	Birender
Department:	
Mobile:	
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Direct tel:	+ 91 – 11 - 4259 2761
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State/Region:	
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URL:	www.fc2e.com
Represented by:	
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Salutation:	Mr.
Last Name:	Winkels
Middle Name:	--
First Name:	Michael
Department:	
Mobile:	
Direct FAX:	+ 34 - 91- 5562880
Direct tel:	+ 34 - 91- 4177089
Personal E-Mail:	

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding is involved in the project activity.

Annex 3

BASELINE INFORMATION

Please refer section B.6

Annex 4

MONITORING PLAN

Please refer section B.7

Appendix - 1

LIST OF ABBREVIATIONS

CC	Climate Change
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CO_2	Carbon di-oxide
CP	Credit Period
Cum	Cubic Meter
EB	Executive Board
EIA	Environmental Impact Assessment
GHG	Green House Gas/es
GOI	Government of India
IPCC	Intra-governmental Panel for Climate Change
IFFCO	Indian Farmers Fertiliser Cooperative
KP	Kyoto Protocol
LSHS	Low Sulphur Heavy Stock
MT	Metric Ton
NG	Natural Gas
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change
UPPCB	Uttar Pradesh Pollution Control Board

Appendix - 2

LIST OF REFERENCES

Sr.No	Particulars of the references
	Kyoto Protocol / UNFCCC Related
1.	Kyoto Protocol to the United Nations Framework Convention on Climate Change
2.	Website of United Nations Framework Convention on Climate Change (UNFCCC), http://unfccc.int
3.	UNFCCC Decision 17/CP.7 : Modalities and procedures for a clean development mechanism as defined in article 12 of the Kyoto Protocol.
4.	UNFCCC document, Clean Development Mechanism-Project Design Document (CDM-PDD) version 3.1
5.	Intergovernmental Panel on Climate Change (IPCC) Document on emission factors. IPCC-2006
6.	National Document to refer fuel emission factor, if any.
	Project Related
7.	Project scheme documents and records from IFFCO records