CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

>> 2.25 MW Rice Husk based cogeneration plant at Siddeshwari Industries Pvt Ltd
Version 01
23/01/2008

A.2. Description of the small-scale project activity:

>> **Purpose**

The purpose of the project activity is to utilize rice husk available in the region for effective generation of electricity for in-house consumption. The project activity is the 2.25 MW rice husk based cogeneration power plant generating electricity and steam for captive consumption. The project activity is helping in conservation of natural resources like coal and HSD.

Salient features of the project

Siddeshwari Industries Pvt Ltd (SIPL), manufacturer of craft paper is the promoter of the project activity. The major equipments of the project activity comprise of a new 2.25 MW condensing cum extraction turbine and one boiler. This cogeneration system replaced three existing Diesel generating (DG) set and one boiler.

Present Scenario

The total power requirement of the paper mill was being met by three nos of DG sets of total capacity 1750 KVA and total process steam requirement of around 5 TPH at 8 kg/cm^2 was being met by coal fired boiler.

Project Scenario

The project activity, which is a 'carbon neutral fuel' based cogeneration plant, generates electricity in addition to steam to meet SIPL's captive electricity requirement thereby displacing power generation from DG sets. Apart from the electricity, project activity is saving the equivalent coal which otherwise would have been used for the steam generation in process plant. The new boiler is a high pressure boiler with 18 TPH steam production.

Project's contribution to sustainable development

This project activity has good contribution towards sustainable development and addresses the key issues:

Environmental well-being

1. Substituting the electricity requirement from DG set by cogeneration scheme thereby eliminating the generation of equivalent quantum of electricity using conventional fuel HSD.
2. Conserving coal by avoiding the process steam generation from coal fired boiler.

3. Mitigating the emission of GHG (CO_2) as rice husk is a carbon neutral fuel.

Socio-economic well being

1. Saving the coal and HSD and allowing it to be diverted to other needy sections of the economy
2. Contributing to a small increase in the local employment by employing skilled and un-skilled personnel for operation and maintenance of the equipment.

Technological well being

1. Adopting an advanced and sustainable technology for long term benefits.

A.3. Project participants:

>>

Name of Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (Host)	Siddeshwari Industries Pvt Ltd, Muzaffarnagar (UP) (Private)	No

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

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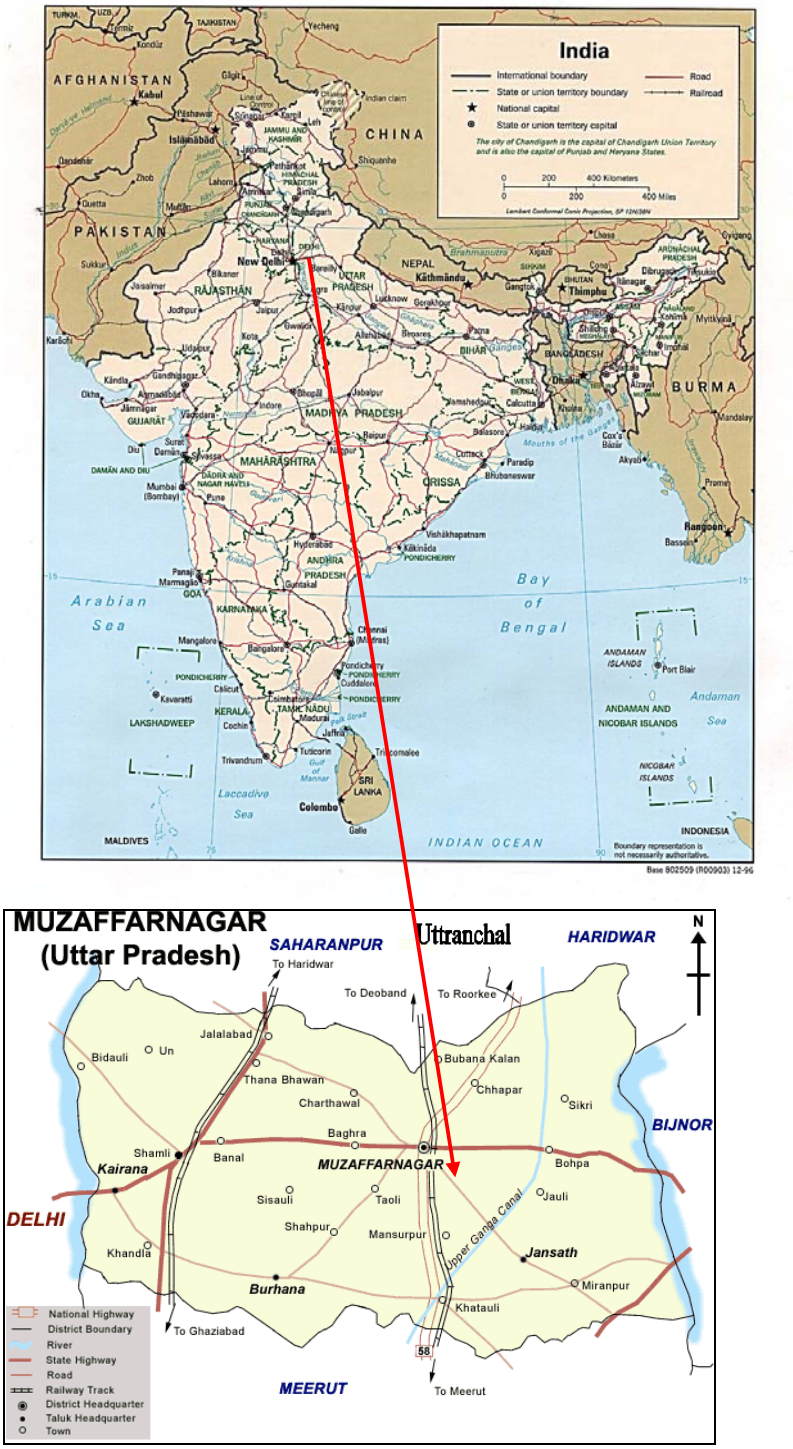
The location of project activity site is shown in map below.


India
International boundary
State or union territory boundary
National capital
State or union territory capital
Road
Railroad
AFGHANISTAN
PAKISTAN
CHINA
NEPAL
BHUTAN
BANGLADESH
BURMA
Kabul
Islamabad
New Delhi
Kathmandu
Thimphu
Dhaka
Rangoon
RAJASTHAN
UTTAR PRADESH
BIHAR
MADHYA PRADESH
MAHARASHTRA
ORISSA
ANDHRA PRADESH
KARNATAKA
GOA
KERALA
TAMIL NADU
LAKSHADWEEP
ANDAMAN AND NICOBAR ISLANDS
Arabian Sea
Bay of Bengal
Andaman Sea
Laccadive Sea
INDIAN OCEAN
SRI LANKA
Colombo
MALDIVES
INDONESIA
Uttranchal
MUZAFFARNAGAR
(Uttar Pradesh)
SAHARANPUR
HARIDWAR
BIJNOR
DELHI
To Haridwar
To Deoband
To Roorkee
Jalalabad
Bidauli
Un
Thana Bhawan
Charthawal
Bubana Kalan
Chhapar
Sikri
Baghra
Shamli
Banal
Kairana
Bohpa
Sisauli
Taoli
Jauli
Shahpur
Mansurpur
Upper Ganga Canal
Jansath
Khandla
Burhana
Miranpur
Khatauli
To Ghaziabad
58
MEERUT
To Meerut
N
National Highway
District Boundary
River
State Highway
Road
Railway Track
District Headquarter
Taluk Headquarter
Town

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:

>> 8.6 K. M., Jansath Road
Muzaffarnagar 251 001,
Uttar Pradesh, India

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :

>> The project activity site is located at Jansath Road in district Muzaffarnagar. The project site is located 8.6 km from the heart of city. The site is well connected with road and rail network. The latitude[1] and longitude for the district is 29.28 N and 77.44 E respectively.

A.4.2. Type and category(ies) and technology/measure of the small-scale project activity:

>> Type & Category

Main Category: Type I - Renewable energy power project

Sub Category: C – Thermal Energy for the User ver 12 (EB33)

Technology employed for the project activity

The plant installed one condensing cum extraction turbine along with 18 TPH high pressure boiler with steam parameters of 65 kg/cm^2 and 480 ^{o}C. This boiler is of modern design with fludised bed furnace suitable for outdoor installation with water scrubber for dust collection. Uninterrupted flow of rice husk to the boiler enabled by a twin bunker system located in front of the boiler. In case of exigencies of biomass fuel scarcity, SIPL proposes to use coal as fuel. The plant has seven days storage capacity for rice husk.

Fuel Handling System: Rice husk is loaded in the twin type bunkers, installed near the boiler with the help of conveyor belts. One drag chain conveyor for each bunker is provided for mixing of fuel in the twin bunker.

For generating maximum of 100 % steaming capacity of the boiler at rated parameters, about 4 TPH of Rice husk (100 % Rice husk firing) is required.

The plant also has coal handling facilities with necessary crushers and conveyors to meet the requirement in case of exigencies of biomass fuel scarcity.

[1] http://www.mapsofindia.com/lat_long/uttarpradesh/uttarpradesh.htm

The plant has Distributed Control System (DCS)/Supervisory Control And Data Acquisition (SCADA) for operation and generates a gross output of 2250 kW at the generator terminals. The power generation in the cogeneration plant is at 440 V level.

No transfer of technology is involved to host country because technology is available within India from reputed manufacturers.

The plant is designed with all other auxiliary plant systems like:
1. Rice husk and coal handling system
2. Ash handling system
3. Air pollution control devices
4. Water system consists of following sub-systems:
5. Raw water system
6. Condensate system
7. Water treatment system
8. Service and potable water system
9. Compressed air system
10. Fire protection system
11. Complete electrical system for power plant including, instrumentation and control systems etc.

The technology used for the project activity is environmentally safe and sustainable.

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

>>
The GHG emission reductions for a 10 year crediting period for SIPL are provided in Table.

Emission reductions at SIPL

Year	Annual estimation of emission reduction in tones of CO_2 e
2008-09 (1st April to 31st March)	17814
2009-10	17814
2010-11	17814
2011-12	17814
2012-13	17814
2013-14	17814
2014-15	17814
Total estimated reductions (tonnes CO_2 equ.)	**124698**

Year	Annual estimation of emission reduction in tones of CO_2 e
Total number of crediting years	**7 years**
Annual average over the crediting period of estimated reductions (tonnes of CO_2 e)	**17814**

A.4.4. Public funding of the small-scale project activity:

>> There is no public funding available in this project.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

According to appendix C of simplified modalities and procedures for small-scale CDM project activities, '***debundling'*** is defined as the fragmentation of a large project activity into smaller parts. A small-scale project activity that is part of a large project activity is not eligible to use the simplified modalities and procedures for small-scale CDM project activities.

According to para 2 of appendix C[2]

A proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

- With the same project participants;
- In the same project category and technology/measure;
- Registered within the previous 2 years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small- scale activity at the closest point

According to above-mentioned points of de-bundling, SIPL's project activity does not comply with above, therefore, considered as small scale CDM project activity.

[2] Appendix C to the simplified M&P for the small-scale CDM project activities, http://cdm.unfccc.int/Projects/pac/ssclistmeth.pdf

SECTION B. Application of a baseline and monitoring methodology

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

>>

Main Category:
Type I - Renewable energy power project

Sub Category:
C – Thermal Energy for the User

The reference has been taken from the recent list of the small-scale CDM project activity categories contained in Appendix B of the simplified M&P for small-scale CDM project activities. (Version 12, EB33)

B.2 Justification of the choice of the project category:

>>

This project falls under the "Type I: Renewable energy projects" and "Category I C: Thermal energy for the user". According to the methodology:

Applicability condition	*Justification for project activity*
This category comprises renewable energy technologies that supply individual households or users with thermal energy that displaces fossil fuels. Examples include solar thermal water heaters and dryers, solar cookers, energy derived from renewable biomass for water heating, space heating, or drying, and other technologies that provide thermal energy that displaces fossil fuel. Biomass-based co-generating systems that produce heat and electricity are included in this category.	The project activity at SIPL is rice husk (biomass) based cogeneration plant and producing heat and electricity. This type of project activities is included in the methodology and therefore the methodology fulfills this requirement.
Where thermal generation capacity is specified by the manufacturer, it shall be less than 45 MW.	The thermal generation capacity is f 17 MW $_{thermal}$ based on the design conditions. The project activity qualifies this applicability criterion as it is within the limit of 45 MW $_{thermal}$.
For co-fired systems the aggregate installed capacity (specified for fossil fuel use) of all systems affected by the project activity shall not	The project activity may use fossil fuel in certain percentage (maximum 20%), the aggregate capacity of the system including all systems is 17

exceed 45 MWth. Cogeneration projects that displace/ avoid fossil fuel consumption in the production of thermal energy (e.g. steam or process heat) and/or electricity shall use this methodology. The capacity of the project in this case shall be the thermal energy production capacity i.e. 45 MWth.	$MW_{thermal}$ and is less than 45 MW.
In the case of project activities that involve the addition of renewable energy units at an existing renewable energy facility, the total capacity of the units added by the project should be lower than 45 MWth and should be physically distinct from the existing units.	The project activity is new installation and therefore this applicability criteria is not applicable for the project activity.

B.3. Description of the project boundary:

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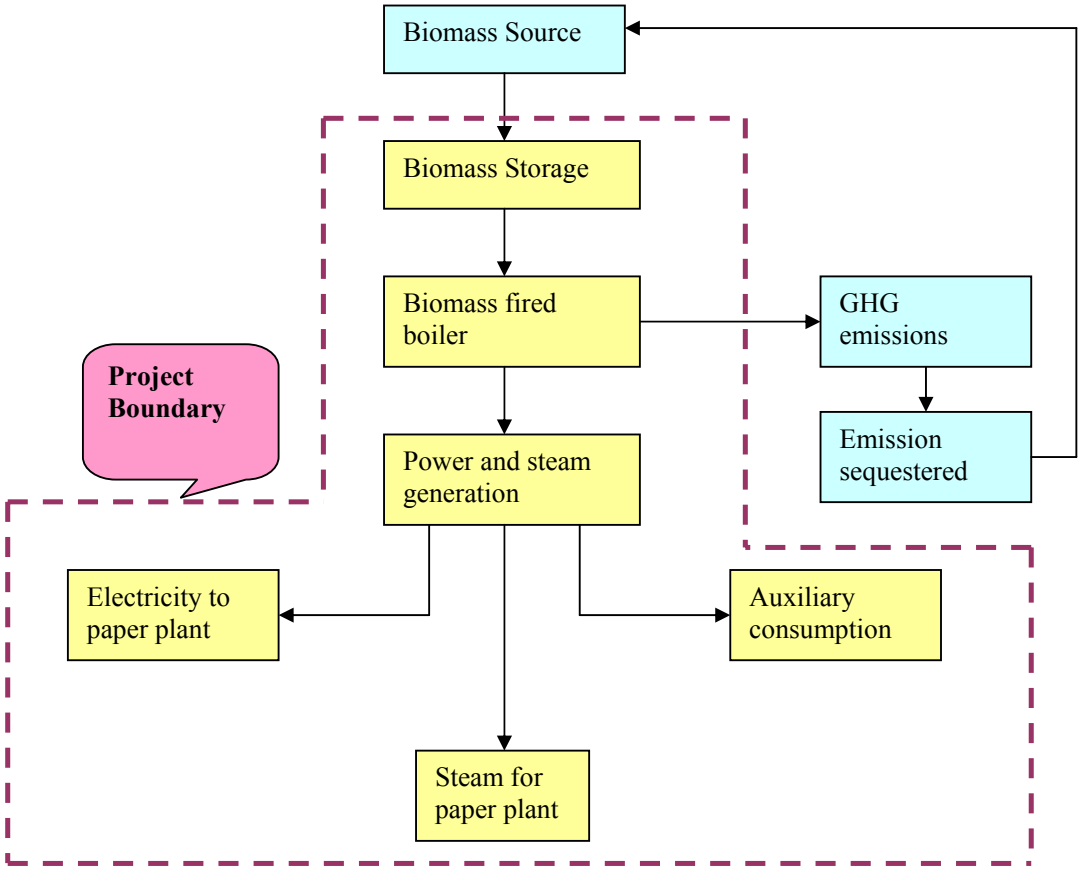
As mentioned under Type I.C. of '*Appendix-B of the simplified modalities and procedures for small scale CDM project activities'*, project boundary encompasses the physical and geographical site of the renewable generation source. For the proposed project activity the project boundary is from the point of fuel storage to the point of electricity and steam supply to the paper mill where the project proponent has a full control.

Thus, project boundary covers fuel storage, boiler, steam turbine generator and all other accessory equipments.

Flow chart and project boundary is illustrated in the following diagram:



B.4. Description of baseline and its development:

>>

The project activity is rice husk based cogeneration system. In absence of the project activity there were following options for the project activity:

1. **Continuation of current practice in absence of project activity (Electricity from DG set[3] and steam from coal based boiler):** In the plant pre-project scenario was electricity from electricity grid and DG set and steam from coal based power plant. Although the steam from coal based

[3] There can be one more option of generating electricity from coal based power plant using full condensing turbine (where exhaust steam is also used for power generation). Project proponent has not thought of this option because the requirement steam (heat) was also required in the plant and the overall efficiency of full condensing turbine is lower with respect to extraction – condensing turbine used by project proponent. With respect to emission factor the coal based power generation is always higher carbon emission with respect to liquid and gaseous fuels.

power plant is economically attractive option but the electricity from DG set was very costly. The project proponent was operating in this scenario and therefore this alternative may be a probable baseline alternative.

2. **Purchasing the electricity from the state grid and steam from coal based boiler:** Purchasing electricity from grid was an alternative, but it was not a feasible option as state grid is severely short of power supply. According to Uttar Pradesh Power Corporation Limited, grid has a peak supply deficit of 14.93% in year 2004-05[4]. The project proponent was using electricity from DG set in pre project activity and hence this option for electricity was not a good alternative and it was not an economically viable as well. The steam from coal based power plant was already in the plant and therefore overall this alternative can also be a baseline option.
3. **Captive Co-generation unit using coal as fuel:** Coal is the primary fuel for power generated in the state. More than 81% of total power generated[5] in the state is produced using coal. Coal is also an economical option for power generation as it does not face supply barriers. Price fluctuations of fuel are not high which makes it a less risky fuel option. The cogeneration system is the more energy efficient with respect to individual generation of electricity and steam and therefore this can be the best baseline alternative.
4. **Captive Co-generation unit using biomass as primary fuel i.e. project activity:** The project activity plant is situated in the agriculture belt of Uttar Pradesh. There is an abundant supply of crop residue (mainly rice-husk) in the region[6]. However in normal practice it is burned in inefficient & improper way or is left for rotting in the fields. Supply related constraints are evident by the fact that despite availability of good quality biomass, it is not used for power generation in the state. There are barriers prohibiting implementation of the project activity.

Alternative scenario	**Investment barriers**	**Technological barriers**	**Barriers due to prevailing practices**	**Other barriers**
Continuation of current practice in absence of project activity (Electricity from DG set and steam from coal based boiler)	No investment	No	No	No
Purchasing the	No	No	No	No

[4] Annex-3: Demand-Supply situation in Uttar Pradesh- Source: UPPCL

[5] Installed Generation Capacity as on 31.01.2005- Ministry of Power Data, **powermin.nic.in**

[6] Based on Biomass assessment report of region that the availability of rice husk is more than 25% of the all the users.

electricity from the state grid and steam from coal based boiler				
Captive Co-generation unit using coal as fuel	Yes, the project proponent needs to invest in this option	No, the project proponent is having experience in coal based boiler operation and therefore no technical barriers in this option.	No	No
Captive Co-generation unit using biomass as primary fuel i.e. project activity:	Yes, the project proponent needs to invest in this option.	Yes, the project proponent has no experience in biomass based power plant and therefore technical barriers are expected in the project activity.	No	Yes

From the above analysis it is clear that the above discussed alternative scenario can be a baseline scenario. The project activity can not be a baseline option because the project activity faces maximum barrier for implementation.

Selection of baseline emission factor: As discussed above any of the below options can be a baseline option. Therefore the lowest emission factor on all options is considered as baseline option. The baseline options as discussed above are:

1. Continuation of current practice in absence of project activity (Electricity from DG set and steam from coal based boiler)
2. Electricity from state electricity grid (Northern grid) and steam from coal based boiler
3. Captive Co-generation unit using coal as fuel

The baseline emission factors for all the three alternatives were calculated and shown in the table below (The calculation excel sheet is attached with the PDD):

Evaluation of baseline scenario

Average net electricity requirement of the project activity	32666	kWh/day
Average steam requirement in the project activity	156	ton/day
Average enthalpy of steam	680	Kcal/kg
	2847	KJ/kg
Average heat requirement per day	444132	MJ/day
Average opting days	330	days
Annual electricity required (EGy)	**10.78**	GWh/annual
Annual heat requirement (HGy)	**146.56**	TJ/annual

Emission factors			
Electricity from DG (EF_{DG})	800	tCO2/GWh	According to Approved Methodology AMS I.D
Grid electricity (EF_{Grid})	813	tCO2/GWh	According to Approved Methodology AMS I.D
Coal emission factor (EF_{coal})	96.1	tCO2/TJ	Table 2.2 page 2.16, IPCC 2006

Baseline option	Electricity required (GWh)	Heat required (TJ)	Formula used	Total baseline emissions
1	10.78	146.56	$EGy*EF_{DG}+HGy*EF_{coal}$	22708
2	10.78	146.56	$EGy*EF_{Grid}+HGy*EF_{coal}$	22849
3	10.78	146.56	$(EGy*3.6+HGy)*EF_{coal}/\eta_{cogen+}$	17814

+ Cogeneration efficiency is 100%

It is clear from the above table that the baseline emission is lowest in the scenario in which electricity and the steam will be generated from coal based cogeneration power plant. Therefore this baseline scenario is the most conservative scenario for emission reduction calculation.

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 small-scale CDM project activity:

In accordance with 'Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities, a simplified baseline and monitoring methodology listed in Appendix B may be used for a small-scale CDM project activity if project participants are able to demonstrate to a designated operational entity that the project activity would otherwise not be implemented due to the existence of one or more barrier(s) listed in attachment A of Appendix. B.

It is established here that the project activity has associated barriers to its implementation which would be overcome with the availability of carbon financing against a sale consideration of carbon credits that would be generated during project operation.

The alternatives for the project activity applicable with current laws and regulations:

1. Continuation of current practice in absence of project activity (Electricity from DG set and steam from coal based boiler): In the plant pre-project scenario was electricity from DG set and steam from coal based power plant. Although the steam from coal based power plant is economically good option but the electricity from DG set was very costly. Therefore this alternative may be a probable baseline alternative.
2. Purchasing the electricity from the state grid and steam from coal based boiler: Purchasing electricity from grid is an alternative, but in current scenario it is not a feasible option as state grid is severely short of power supply. According to Uttar Pradesh Power Corporation Limited, grid has a peak supply deficit of 14.93% in year 2004-05[7]. The project proponent was using electricity from DG set in pre project activity and hence this option for electricity was not a good alternative and it was not an economically viable as well. The steam from coal based power plant was already in the plant and therefore overall this alternative can also be a baseline option.
3. Captive Co-generation unit using coal as fuel: Coal is the primary fuel for power generated in the state. More than 81% of total power generated[8] in the state is produced using coal. Coal is also an economical option for power generation as it does not face supply barriers. Price fluctuations of fuel are not high which makes it a less risky fuel option.
4. Captive Co-generation unit using biomass as primary fuel i.e. project activity: Propose plant location is situated in the agriculture belt of Uttar Pradesh. There is an abundant supply of crop residue (mainly rice-husk) in the region[9]. However in normal practice it is burned in inefficient & improper way or is left for rotting in the fields. Supply related constraints are evident by the fact that despite availability of good quality biomass, it is not used for power generation in the state. There are barriers prohibiting implementation of the project activity.

Investment barrier

The main investment barriers for the project activity are discussed below:

1. The project participants are small scale paper manufacturing unit and an investment of this magnitude was impossible for it alone therefore it has approached financial institutions to finance the project (Please see the breakup of project financing below).
2. In an event of any technical failures or delay in the project activity there is a grave risk of interests building up and threatening the financial capacity of SIPL. The project activity actually

[7] Annex-3: Demand-Supply situation in Uttar Pradesh- Source: UPPCL

[8] Installed Generation Capacity as on 31.01.2005- Ministry of Power Data, **powermin.nic.in**

[9] Based on Biomass assessment report of region that the availability of rice husk is more than 25% of the all the users.

got delayed by 6 months and project proponent pays additional interest on the money taken from bank.

3. After the success of this project activity it is natural that there will be similar projects which will push the biomass prices upwards. Therefore escalation of biomass prices due to increase in demand for this fuel could hamper the financial prospects of the project activity. The detailed analysis of the same is done in the section below.
4. Conceiving this project without CDM benefits would have been impossible. The CDM fund will help the project proponent to run the cogeneration plant smoothly in-spite of rising biomass prices. CDM funding to project participants would also encourage other paper industries to follow suit and thereby contribute towards GHG emission reduction.

The major investment barrier to the project is the perceived risk in case of reduced supply of rice husk or increased rice husk prices in future. Investors are worried that shortage in supply of rice husk in future, may lead to steep rise in prices of rice husk which might render the project financially unstable.
This is evident from the fact that the cost of rice husk during the financial closure was around INR 1,500-1600/ton, which has increased to more than INR 1800-1900/ton in a period of 6 months (an increase of 18.5 %). Current prevailing prices of rice husk are INR 2200/ton (15% more). This escalation in the rice husk prices was expected at the time of project conception and the same is expected to continue in future.

Financial analysis Rice husk		
Quantity of Rice husk required in a year	7500	Tons
Cost of Rice husk while conceptualization of project	1500	INR/tons
Expense for Rice husk	11250000	INR/year
Cost of rice husk after commissioning of project	2200	INR/tons
Expense for Rice husk	16500000	INR/year
Annual increase in expenditure due to increased cost of rice husk:	5250000	INR/year
Expected annual earnings from sale of CER (@ Euro 6/CER)	6794525	INR/year

As per the prevailing prices of CER (Euro 8/CER) the CDM fund will compensate the increase in the rice husk prices. This CDM fund is expected to increase in future and the rice husk price as well. The CDM revenue will help to improve the sustainability of the project which will otherwise be rendered financially unstable. The coal based cogeneration project would not have been faced such barriers.

Comparison with coal based cogeneration project before the starting of project		
Quantity of Rice husk required in a year	7500	Tons
Calorific value of rice husk	3150	Kcal/kg
Calorific value of coal	4000	Kcal/kg
Cost of Rice husk	1500	INR/ton
Cost of coal	1400	INR/ton

Cost per million Kcal from Rice husk	476	INR/million Kcal
Cost per million Kcal from Coal	350	INR/million Kcal

The project proponent has taken secured and unsecured loans from banks and paying huge interest for the project. This interest is an additional burden on project proponent. The details of finance are as below:

Means of Finance	INR in millions
Loan from state bank of India	45
Equity shares	7.5
Unsecured loan	2.5
Internal accruals	6.5
Total	**61.5**

Project proponent is paying the money back at interest rate of 9.25%.

Due to high initial investment in starting the cogeneration plant and due to its associated financial risk mentioned above it was not possible for the project proponent to install rice husk based cogeneration power plant. The project proponent had an alternative to install coal based cogeneration plant which is risk free and cheaper option with respect to coal based power plant. In spite of these factors, SIPL is one such entrepreneur to initiate this GHG abatement project under Clean Development Mechanism. It is ascertained here that, if SIPL is successful in securing the proposed carbon financing, it will help in offsetting this barrier and encourage other entrepreneurs to come up with similar project activities.

Other Barriers

Energy is not a core business of SIPL. They are mainly manufacturers of craft paper. The rice husk based cogeneration project activity is a steep diversification from the core business fields to power sector economics, where the project proponent has to meet challenges of techno-commercial problems associated with the project activity.

Apart from this UP's paper industry does not have any incentive to invest in high efficiency biomass cogeneration for electricity generation. In such circumstances they will continue to use rice husk for in-efficient burning in low pressure boilers with no electricity generation.

Fuel Supply Barriers

Biomass, though abundant in supply, doesn't have proper logistics network for collection and delivery. In normal practice it burned in improper way or is left for rotting in the field. As per expectation, this has also been observed (Rice-husk procured in the plant in past one year) that biomass prices increase

significantly due to increased demand in the power plant. This happens due to lack of proper collection mechanism and delivery of biomass, this leads to short-term shortage and thus increased prices.
This is a fuel availability risk, and to ensure continuous & economical fuel supply project participants will have to invest in developing a viable fuel supply mechanism.

The barriers discussed above are sufficient to hinder growth of the cogeneration plants in sector. While the country has a clean energy strategy, the reality is that coal will continue to dominate in the near term and the paper industry will burn coal in inefficient boilers unless financial incentives, such as carbon financing, exist.

This project activity is a renewable energy project with net zero CO_2 emission due to the carbon sequestration. Paddy re-grows at the same rate as it is being harvested, and acts as a sink for atmospheric carbon dioxide and the net flux of CO_2 to the atmosphere is zero. The project activity will save coal (which would have been used for coal based cogeneration plant). The estimated emission reduction from the project activity is **17814** ton/annum.
In view of the above mentioned prohibitive barriers and GHG emission reductions, it is understood that the project activity is additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>
As established in Section above the project activity falls under Category I.C. Generation of electricity for captive consumption using rice husk as fuel in SIPL's cogeneration plant will lead to mitigation of GHG emissions from the fossil fuel based plants, which supply steam and power to SIPL. In order to monitor the mitigation of GHG due to at the project activity at SIPL, the total electricity produced, total steam generated for process and auxiliary consumption need to be measured.

Baseline emissions:
According to the approved methodology para 7

Cogeneration projects shall use one of the four following options for baseline emission calculations depending on the technology that would have been used to produce the thermal energy and electricity in the absence of the project activity:

(a) Electricity is supplied from the grid and steam/heat is produced using fossil fuel;
(b) Electricity is produced in an onsite power plant (with a possibility of export to the grid) and steam/heat is produced using fossil fuel;
(c) A combination of (a) and (b);
(d) Electricity and steam/heat are produced in a cogeneration unit, using fossil fuel.

It is clear from the above calculation (in baseline scenario section) that the option d will generate lowest baseline emissions and therefore considered as baseline option.

For option d according to methodology para 12:

12. For electricity and steam produced in a cogeneration unit, using fossil fuel, the following formula shall be used:

$BEy = (HGy + EGy*3.6) * EF_{CO2} / \eta$ cogen

Where:

BEy the baseline emissions from electricity and steam displaced by the project activity during the year y in tCO2e.

EGy the amount of electricity supplied by the project activity during the year y in GWh 3.6 conversion factor, expressed as TJ/GWh.

HGy the net quantity of steam/heat supplied by the project activity during the year y in TJ.

EF_{CO2} the CO2 emission factor per unit of energy of the fuel that would have been used in the baseline cogeneration plant in (tCO2 / TJ) obtained from reliable local or national data if available, otherwise IPCC default emission factors are used.

ηCogen the total efficiency (thermal and electrical both included) of the cogeneration plant using fossil fuel that would have been used in the absence of the project activity.

Efficiency should be calculated as total energy produced (electricity and steam/heat extracted) divided by thermal energy of the fuel used.

13. Efficiency of the baseline units shall be determined by adopting one of the following criteria:

(a) Highest measured efficiency of a unit with similar specifications,

(b) Highest of the efficiency values provided by two or more manufacturers for units with similar specifications,

(c) Maximum efficiency of 100%.

In the project activity the baseline emissions will be calculated based on the formula above. In the first crediting period the cogeneration efficiency will be considered as 100%.

The net electricity generated will be calculated from the gross generation and the auxiliary consumption.

The heat required will be calculated from the quantity of steam (ton) send to process plant multiplying the same with 2847 KJ/Kg of steam. The same will be converted to TJ by dividing it with 1000000.

The baseline emissions will adjust any electricity generation with the use of fossil fuel in the following manner:

18. For projects where only biomass or biomass and fossil fuel are used the amount of biomass and fossil fuel input shall be monitored.
The project activity may use the coal also. The project proponent will monitor both fossil fuel and biomass in the project activity.

19. For projects consuming biomass a specific fuel consumption of each type of fuel (biomass or fossil) to be used should be specified ex-ante. The consumption of each type of fuel shall be monitored.
The project activity will use mainly rice husk and sometime coal also.

The ex ante factors based on the plant performance are as below:
Coal : 1.2 ton/MWh
Rice husk : 1.4 ton/MWh

20. If fossil fuel is used the thermal energy or the electricity generation metered should be adjusted to deduct thermal energy or electricity generation from fossil fuels using the specific fuel consumption and the quantity of fossil fuel consumed.

21. If more than one type of biomass fuel is consumed each shall be monitored separately.

22. The amount of thermal energy or electricity generated using biomass fuels calculated as per paragraph 20 shall be compared with the amount of thermal energy or electricity generated calculated using specific fuel consumption and amount of each type of biomass fuel used. The lower of the two values should be used to calculate emission reductions.

In the case if the project proponent will use the coal the project proponent will follow the para 20-22 of the approved methodology and will claim conservative emission reduction.

Project emissions
There will not be any project emissions from the project activity. The expected project emissions from the fossil fuel used is already addressed in the baseline emission section above.

Leakage:
There is no technology transfer in project activity, therefore any leakage emissions are not expected from project activity. The biomass is available in the nearby region to the project site and the coal mines are very long distant. Therefore the emission due to transportation for biomass can be assumed to be negligible.

Emission reduction:
ERy = BEy

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

(Copy this table for each data and parameter)

Data / Parameter:	Emission factor of Coal

Data unit:	Kg CO_2/TJ
Description:	Carbon emissions factor of Coal used
Source of data used:	IPCC 2006
Value applied:	96100
Justification of the choice of data or description of measurement methods and procedures actually applied :	Table 2.2, 2.6 IPCC 2006 value is used.
Any comment:	Data will be kept for crediting period + 2 years.

Data / Parameter:	**Specific coal consumption**
Data unit:	Ton/MWh
Description:	Specific coal consumption for power generation
Source of data used:	Plant test
Value applied:	1.2
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated ex ante for the conservative emission reduction in case of coal usage.
Any comment:	Data will be kept for crediting period + 2 years.

Data / Parameter:	**Specific biomass consumption**
Data unit:	Ton/MWh
Description:	Specific biomass consumption for power generation
Source of data used:	Plant test
Value applied:	1.4
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated ex ante for the conservative emission reduction in case of coal usage.
Any comment:	Data will be kept for crediting period + 2 years.

B.6.3 Ex-ante calculation of emission reductions:

>>

Baseline Emissions:

Average net electricity requirement of the project activity	32666	kWh/day
Average steam requirement in the project activity	156	ton/day
Average enthalpy of steam	680	Kcal/kg

	2847	KJ/kg
Average heat requirement per day	444132	MJ/day
Average operating days	330	days
Annual electricity required (EGy)	**10.78**	GWh/annual
Annual heat requirement (HGy)	**146.56**	TJ/annual

Emission factors			
Coal emission factor (EF_{coal})	96.1	tCO2/TJ	Table 2.2 page 2.16, IPCC 2006

Electricity required (GWh)	Heat required (TJ)	Formula used	Total baseline emissions
10.78	146.56	$(EGy*3.6+HGy)*EF_{coal}/\eta_{cogen+}$	**17814**

+ Cogeneration efficiency is 100%

Emission reduction = Baseline emissions
= 17814

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

>>

Year	Estimated Project Activity Emissions (tonnes of CO_2e)	Estimated Baseline Emissions (tonnes of CO_2e)	Estimated leakage(tonnes of CO_2e)	Estimated Emission Reduction (tonnes of CO_2e)
2008-09 (1st April to 31st March)	0	17814	0	17814
2009-10	0	17814	0	17814
2010-11	0	17814	0	17814
2011-12	0	17814	0	17814
2012-13	0	17814	0	17814
2013-14	0	17814	0	17814
2014-15	0	17814	0	17814
Total	**0**	**124698**	**0**	**124698**

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

B.7.1 Data and parameters monitored:

Data / Parameter:	**Net Electricity**

Data unit:	KWh/day
Description:	Net electricity generated from cogeneration plant
Source of data to be used:	Plant.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	32666
Description of measurement methods and procedures to be applied:	Monitoring: electronic meters at the plant and DCS will measure the data. In case the net is not monitored directly the net electricity is calculated based on the gross and net electricity; which is also measured regularly. Data Type: measured Frequency: Daily Archiving Policy: Paper & Electronic Responsibility: Manager (power plant) would be responsible for regular calibration of the meter. Calibration Frequency: Once in every year.
QA/QC procedures to be applied:	Yes, Quality Management System will be used and the same procedures would be available at the project site
Any comment:	The project proponent will monitor net electricity generated or the gross electricity generated and auxiliary consumption. In case of both the monitoring conservative value will be used for emission reduction.

Data / Parameter:	**Coal**
Data unit:	Ton/annum
Description:	Coal consumption in cogeneration plant
Source of data to be used:	Plant.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0
Description of measurement methods and procedures to be applied:	Monitoring: Weigh bridge will monitor the data. Data Type: measured Frequency: Monthly Archiving Policy: Paper & Electronic Responsibility: Manager (power plant) would be responsible for regular calibration of the meter. Calibration Frequency: Once in every year.
QA/QC procedures to be applied:	Yes, Quality Management System will be used and the same procedures would be available at the project site
Any comment:	Data archived: Crediting period + 2 yrs

Data / Parameter:	**Steam**

Data unit:	kg
Description:	Steam extracted from the turbine that is used in the process
Source of data to be used:	Plant.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	156000
Description of measurement methods and procedures to be applied:	Monitoring: steam flow meter at plant Data Type: measured Frequency: Daily Archiving Policy: Paper & Electronic Responsibility: Manager (power plant) would be responsible for regular calibration of the meter. Calibration Frequency: Once in every year.
QA/QC procedures to be applied:	Yes, Quality Management System will be used and the same procedures would be available at the project site
Any comment:	Data archived: Crediting period + 2 yrs

Data / Parameter:	**Biomass used**
Data unit:	Ton
Description:	Quantity of biomass used in the plant
Source of data to be used:	Plant.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not used in emission reduction calculation.
Description of measurement methods and procedures to be applied:	Monitoring: Monitored annually based on the data recorded at the weigh bridge in the gate. Data Type: measured Frequency: Monthly Archiving Policy: Paper & Electronic Responsibility: Manager (power plant) would be responsible for regular calibration of the meter. Calibration Frequency: Once in every year.
QA/QC procedures to be applied:	Yes, Quality Management System will be used and the same procedures would be available at the project site
Any comment:	Data archived: Crediting period + 2 yrs

Data / Parameter:	**Availability of Biomass**
Data unit:	Ton
Description:	Quantity of biomass available for the use
Source of data to be used:	Published literature/ survey by the plant/third party survey
Value of data applied for the purpose of calculating expected emission reductions in section B.5	The value is not used in the calculation.

Description of measurement methods and procedures to be applied:	Monitoring: The data will be taken from the published report or surveys by the plant. Data Type: Data will be taken from third party or surveys. Frequency: Annually Archiving Policy: Paper & Electronic Responsibility: Manager (power plant). Calibration Frequency: Data is from third party or estimation therefore calibration is not required.
QA/QC procedures to be applied:	Yes, Quality Management System will be used and the same procedures would be available at the project site
Any comment:	Data archived: Crediting period + 2 yrs

B.7.2 Description of the monitoring plan:

>>

Emission monitoring and calculation procedure will follow the following organisational structure. All data and calculation formula required to proceed is given in the section B in PDD.

Organisational structure for monitoring plan

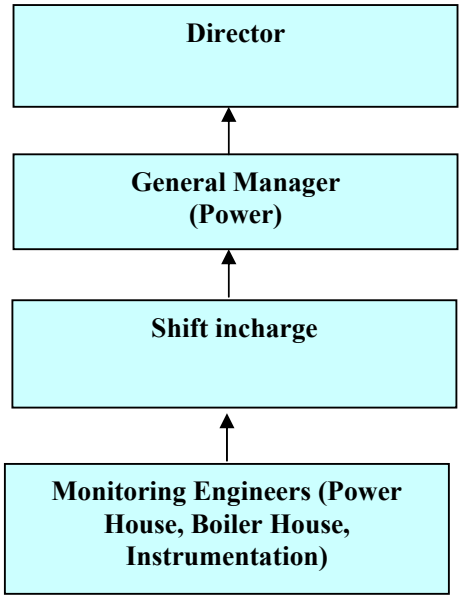


Table --: Monitoring and calculation activities and responsibility

Monitoring and calculation activities	**Procedure and responsibility**
Data source and collection	Data is taken from the power plant. Data will be monitored with the installed electronic data recording system.
Frequency	Monitoring frequency should be as per section B of PDD.
Internal Review	All received data is reviewed by the engineers in the power plant.
Data compilation	All the data is compiled and stored in power plant.
Emission calculation	Emission reduction calculations will be done annual based on the data collected. Engineers/Executives of power plant will do the calculations
Review	General Manager, power will review the calculation.
Emission data review	Final calculations is reviewed and approved by Director.
GHG performance and uncertainties assessment	The director will review the calculation and make the GHG performance review. The director will address the uncertainties as per inter procedure laid down for CDM project.
Record keeping	All calculation and data record will be kept with the power plant.

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

>>

Date of completing the final draft of this baseline and monitoring methodology:

23/01/2008

Name of person/entity determining the baseline:

SIPL, Muzaffarnagar (UP)

The person/entity is also a project participant as listed in Annex 1 of this document.

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:

>> 27/05/2004 (Date of release of purchase order for the major equipments)

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

>> 25 years 0 months

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

C.2.1. Renewable crediting period

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

>> The crediting period will start after the registration of the project activity. For the calculation purposes the crediting period is considered from 1st April 2008.

C.2.1.2. Length of the first crediting period:

>> 7 years 0 months

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>> Not applicable

C.2.2.2. Length:

>> Not applicable

SECTION D. Environmental impacts

>>

D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

>>

The project does not fall under the purview of the Environmental Impact Assessment (EIA)[10] notification of the Ministry of Environment and Forest, Government of India. However the design philosophy of this cogeneration project activity is driven by the concept of providing the low cost energy with acceptable impact on the environment hence the environment and safety aspects of the project activity can be are discussed as follows:

Particulate matter and gases

The elements polluting the air that are discharged from the Cogeneration power plant are,

1. Dust particulate from fly ash in flue gas
2. Nitrogen oxide in flue gas
3. Sulphur di-oxide in flue gas

Water scrubber is installed for the plant steam generator to contain the dust emission from plant to a level of less than 115 mg/Nm3. The water scrubber is designed such that the dust concentration at the ESP outlet will be 115 Mg/Nm3 even during the plant is fired by coal in future. Adequate height of the stack for the Rice husk fired boiler, which disburses the pollutants has been provided as per guidelines given by the pollution regulations for dust and sulphur-di-oxide emissions into the atmosphere.

The temperatures encountered in the boiler while burning the specified fuels, are low enough not to produce nitrogen-oxides. Hence, no separate measures are taken to contain the nitrogen oxide pollutants.

Dry fly ash

The ash will be collected manually by using Trolleys. The dry fly ash from the economiser, air heater and ESP hoppers will be collected by dense phase ash handling system and stored in ash bunker, will be used for land filling in the nearby lowland areas. Provision is made in the system for water spray to eliminate dust nuisance in the plant.

Wastewater

Effluent from water treatment plant: Hydrochloric acid and sodium hydroxide is used as regenerants in the water treatment plant. The acid and alkali effluent generated during the regeneration process of the ion-exchangers are drained into a lined underground neutralizing pit. Generally these effluents are self neutralizing. The effluent is then pumped into the effluent treatment ponds which form part of the main paper unit as well as cogeneration power plant's effluent disposal system. The neutralizing pit are sized with sufficient capacity. The rejects from plant has high TDS which could be diluted and used for cleaning purposes in the project activity. This water also could be used for plantation.

[10] http://envfor.nic.in/legis/legis.html#H

Chlorine in cooling water: In the condenser cooling water, residual chlorine of about 0.2 ppm is maintained at the condenser outlet. This chlorine dosing is done mainly to prevent biological growth in the cooling tower system. This value would not result in any chemical pollution of water and also meets the national standards for the liquid effluent.

Monitoring

The characteristics of the effluents from the plant are monitored and maintained to meet the requirements of State Pollution Control Board and the minimum national standards for effluent from thermal power plants. Air quality monitoring is also undertaken to ensure that the dust pollution level is within limits.

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:

>> As per the impacts discussed in the above section, there are no significant impacts envisaged on implementation of the project.

SECTION E. Stakeholders' comments

>>

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

>> SIPL organised stakeholder consultation with the objective to inform the interested stakeholders on the environmental and social impacts of the project activity and discuss their concerns regarding the project activity.

SIPL representatives presented the salient features of the company and the project activity to the stakeholders and requested their suggestions/objections. The project proponent has sent the letters to different stakeholders for their views for the project activity. The opinions expressed by them were recorded and are available for validation.

The other stakeholders identified for the project activity are as under:

1. State Pollution Control Board
2. Consultants
3. Equipment suppliers

Stakeholders list includes the government and non-government parties, which are involved in the project activity at various stages. At the appropriate stage of the project development, stakeholders /relevant bodies would be involved to get the clearance.

E.2. Summary of the comments received:

>>

Stakeholders Involvement

The local community mainly comprises of local population around the project area. In addition to this, it also includes local manpower since; the project activity provides direct and indirect employment opportunities to local populace thus encouraging the project activity.

The project activity did not cause to any displacement or adverse social impacts on the local population and is helping in improving the quality of life for them.

State Pollution Control Board (SPCB) has prescribed standards of environmental compliance and monitor the adherence to the standards. SIPL has received NOC from SPCB.

Projects consultants were involved in the project activity to take care of the various pre contract and post contract issues / activities like preparation of basic and detailed engineering documents, preparation of tender documents, and selection of vendors / suppliers, supervision of project operation, implementation, successful commissioning and trial run.

The project proponent has received comments from local population in appreciation for such an effort on SIPL's part. They have no objection to the installation of the proposed cogeneration plant. The copies of the comments received from the stakeholders are available for validation.

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

>>

In view of various direct and indirect benefits (social, economical, environmental), no concerns were raised during the consultation with stakeholders, hence it is not required to take due account of the comments.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Siddeshwari Industries Pvt Ltd
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding as part of project financing from parties included in Annex I of the convention is involved in the project activity.

Annex 3

BASELINE INFORMATION

Power scenario in UPPCL

UTTAR PRADESH-ENERGY & AVAILABILITY OF POWER BY THE END OF IX PLAN AND ONWARDS

Year	Energy Requirement/availability in Million Units						Peak Demand in MW			
	Energy Demand As per XVI EPS	Availability			Shortage		Peak Demand As per XVI EPS	Availability	Shortage	
		State Generation	Import	Total	In MU	(%)			in MW	(%)
2000-01	46763	22506	18505	41011	5752	12.30	7477	5648	1829	24.46
2001-02	50087	22814	19060	41874	8213	16.40	8018	5716	2302	28.71
2002-03	53671	23124	24633	47757	5914	11.02	8601	6889	1712	19.90
2003-04	57531	24607	26280	50887	6644	11.55	9230	7470	1760	19.07
2004-05	61681	24563	31910	56473	5208	8.44	9907	7994	1913	19.31
2005-06	66103	24563	40139	64702	1401	2.12	10626	9040	1586	14.93
2006-07	70803	26312	43189	69501	1302	1.84	11384	9967	1417	12.45

Source: UPPCL

Annex 4

MONITORING INFORMATION

As per section B.7.2

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