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

CONTENTS

Annexure

SECTION A. General description of project activity

A.1 Title of the project activity:

>>
Co-generation phase II project at Khatauli Sugar Complex
Version 01,
22th April 2008

A.2. Description of the project activity:

>>
The project activity by Triveni Engineering and Industries Limited (TEIL) involves the setting up of a 22.0 MW bagasse based cogeneration plant at the sugar manufacturing facility of TEIL at Khatauli, Uttar Pradesh.

The project activity has been planned with a purpose to utilize the bagasse generated in the sugar mill to generate steam and electricity. The steam and electricity generated from the project plant would cater to meet the captive steam and power requirements of the sugar manufacturing facility and the surplus electricity would be exported to the electricity starved Uttar Pradesh Power Corporation Limited (UPPCL), based on a power purchase agreement signed between the two entities.

The pre project and post project scenarios are as follows:

Pre Project Activity

Prior to the start of the project activity, the Khatauli sugar unit of TEIL was meeting its internal steam and power requirements from existing low pressure boilers and turbo generators and a 23 MW cogeneration plant, which was implemented considering the CDM revenues. The following table gives the specifications of the boiler and turbo generators deployed in the pre project scenario.

Boilers details

Description	1 no.	1 no.	2 nos.	1 no.
Steam generating capacity (TPH)	65	32	40	120
Steam pressure (kg/cm^2)	42	42	22	87

Turbo Generator details

Description	2 nos. Back pressure	1 no. Back pressure	1 nos extraction cum condensing
Power (KW)	3000	3000	23000
Stem inlet pressure (kg/cm^2)	42	22	87

Post Project Activity

The project activity involves the installation of a new 120 TPH nominal capacity high pressure boiler and a backpressure turbo generator of 22 MW for generating steam and electricity respectively. With the implementation of the project activity the process steam and power requirements of the sugar plant will be met by the high pressure systems (the existing and the proposed cogeneration systems) and some of the existing low pressure boilers and TGs. Following tables give the details of equipments installed in post project scenario.

Boiler Details

Description	**1 no.**	**1 no.**	**1 no.**	**1 no.**	**2 nos.**
Steam generating capacity (tph)	120	120	65	32	40
Steam pressure (kg/cm^2)	87	87	42	42	22
Status	Project Boiler – Used	Used	Used	Shifted to new location	1 Used, 1 shifted to new location

Turbo generator Details

Description	**1 No. back pressure**	**1 No. extraction cum condensing**	**2 nos. Back pressure**	**1 no. Back pressure**
Power (kW)	22000	23000	3000	3000
Stem inlet pressure (kg/cm^2)	87	87	42	22
Status	Project turbine-used	Used	1 Used, 1 shifted to new location	Shifted to new location

Project's contribution to sustainable development

For CDM projects, social, economic, environmental and technological well-being is stipulated as indicators for sustainable development in the interim approval guidelines[1] by Govt. of India. The contributions of the project activity towards sustainable development are as follows:

Socio-economic well being

The project activity would contribute in generating employment opportunities both during the construction stage and the operational stage of the project activity in the rural area.

Environmental Well Being:

Since, the project activity involves use of only bagasse as fuel for power generation, it aids in the reduction of the GHG emissions in to the atmosphere which otherwise would have been caused had the power been produced using fossil fuels like coal, diesel, gas etc. As the project activity replaces

[1] Ministry of Environment and Forest web site: http://envfor.nic.in:80/divisions/ccd/cdm_iac.html

the grid based power generation, it will also support the conservation of fossil fuels and natural resources which, otherwise, would have been consumed in the grid for electricity generation.

Technological Well Being:
The technology stated for use in the project activity represents environmentally safe and sound technology for the application. The equipments, for the project activity, are supplied by well established equipment manufacturers in the Indian market.
Thus it is ensured that the project activity contributes positively to the stipulated sustainable development of the country.

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)	Triveni Engineering and Industries Limited (TEIL)	No

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

>>

A.4.1.1. Host Party(ies):

>>
India

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

>>
Uttar Pradesh

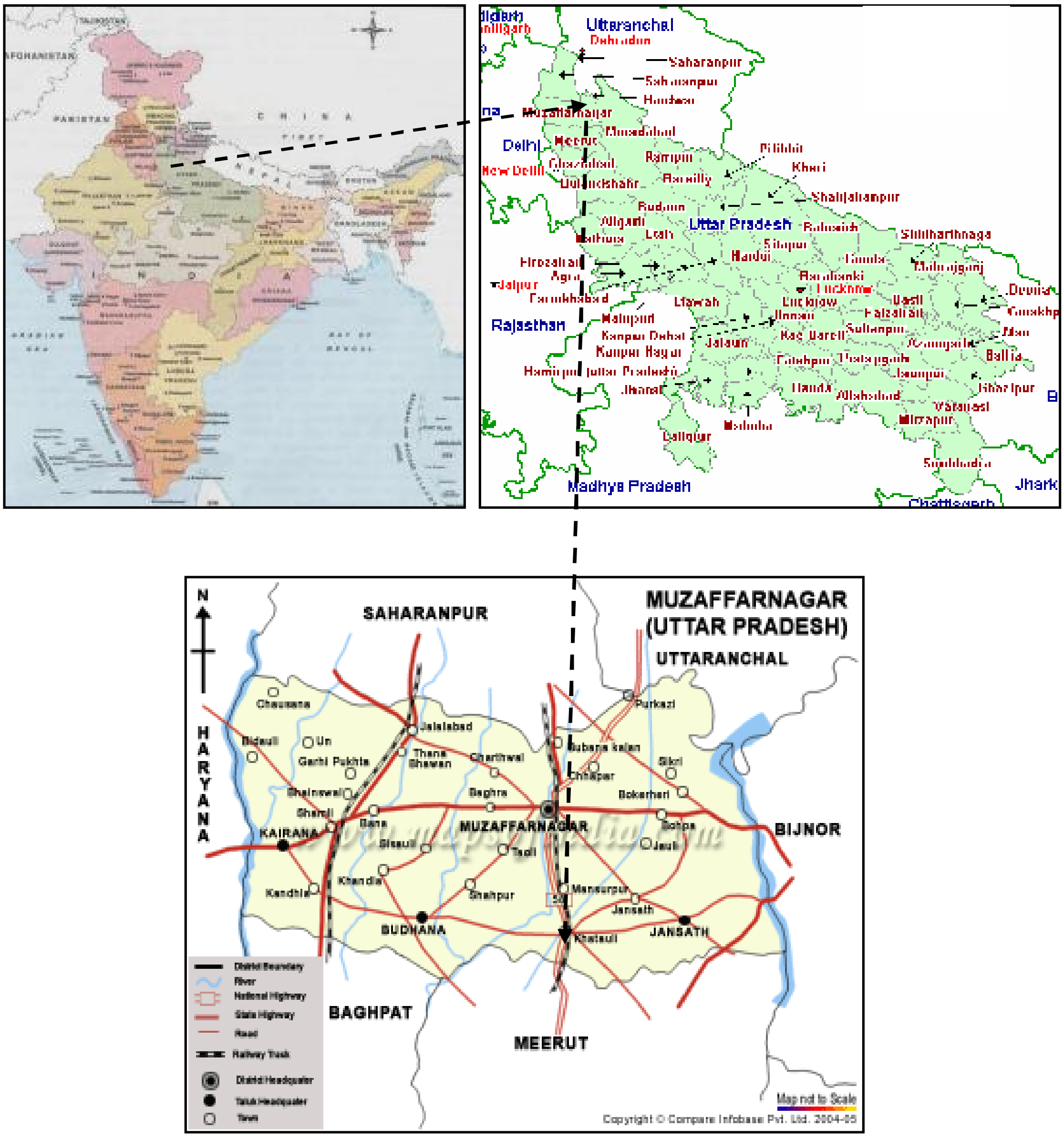
A.4.1.3. City/Town/Community etc:

>>
Khatauli

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

>>
The project plant is located at Khatauli (Muzaffar Nagar Distt, Uttar Pradesh.) The geographical coordinates of the project site can be given by:
Latitude 29^0N16’
Longitude 77^0E42’

The nearest railway station to the project site is at Khatauli. The plant is located across Khatauli – Jansath road. The UPPCL electrical substation of 132 kV for power export is only 5 km from the site. The following maps depict the location of project site on Map of India.



Location of the Project Activity (map not to scale)

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

>>

The project activity belongs to the sectoral Scope 1: Energy industries (renewable/non-renewable sources) as per the sectoral scopes related approved methodologies.

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

>>
The project activity deploys a bagasse fired boiler of capacity 120 TPH which supplies steam to a common steam distribution header, from where the steam is further headed to a 22.0 MW turbine to generate power. The technical specifications of the equipments deployed for the project activity are as follows:

Boiler

Type : Semi outdoor unit, bi-drum, natural circulation, balanced draft, membrane wall radiant furnace with electrostatic precipitators for dust collection
Outlet steam pressure : 87 kg/cm^2
Temperature : 515 $\pm$ 5^0C

Turbine

Type : Backpressure
Inlet steam prerssure : 84 kg/cm^2
Temperature : 510^0C
Flow : 120000 kg/hr

The plant has been designed with all other auxiliary plant systems like

- Compressed air system
- Ventilation system
- Fire protection system
- Main steam and low pressure steam systems,
- Fuel handling system with storage and processing arrangements,
- Ash handling systems,
- Water system which include auxiliary cooling water pump, raw water system, circulating water system, condensate system, De-Mineralised water system and service with potable water system and
- The electrical system for its successful operation.

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

>>

Years	Annual estimation of emission reductions in tonnes of CO_2 e
2008-2009	58321
2009-2010	58321
2010-2011	58321
2011-2012	58321
2012-2013	58321
2013-2014	58321
2014-2015	58321
2015-2016	58321

2016-2017	58321
2017-2018	58321
Total estimated reductions (tonnes of CO_2 e)	583210
Total number of crediting years	**10 years**
Annual average over the crediting period of estimated reductions ((tonnes of CO_2 e)	58321

A.4.5. Public funding of the project activity:

>>

No public funding as part of project financing from parties included in Annex I of the convention 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:

>>

Title: Consolidated methodology electricity generation from biomass residues
Reference – Approved consolidated baseline methodology ACM0006, Version 06, Sectoral Scope: 01, EB 33

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

>>

The said methodology is applicable to electricity generation from biomass residue fired project activities including cogeneration plants. As per the methodology, the project activity may include:
"The installation of a new biomass residue fired power generation unit, which replaces or is operated next to existing power generation capacity fired with either fossil fuels or the same type of biomass residue as in the project plant (**power capacity expansion projects**)"

Further, the project activity meets the applicability criteria of consolidated methodology as under:

Criteria 1: No other biomass types than *biomass residues*, as defined in the methodology, are used in the project plant and these biomass residues are the predominant fuel used in the project plant (some fossil fuels may be co-fired)

The project activity involves setting up of bagasse (a biomass residue) based cogeneration plant. Usage of other biomass types (as fuel in the boiler) like municipal solid waste (MSW) is not envisaged.

Criteria 2: For projects that use biomass residues from a production process (e.g. production of sugar or wood panel boards), the implementation of the project shall not result in an increase of the processing capacity of raw input (e.g. sugar, rice, logs, etc.) or in other substantial changes (e.g. product change) in this process

The bagasse production in the sugar manufacturing facility would not be affected by the implementation of the project activity, either directly or indirectly. Under the structured industrial development policy of government of India, sugar production is closely monitored by the Government and any decision regarding enhancement of sugar production is guided by government regulations. Hence it can be said that implementation of a cogeneration unit does not have any influence on the production capacity of the sugar manufacturing unit.

Criteria 3: The biomass residues used by the project facility should not be stored for more than one year.

Maximum portion of the bagasse generated during crushing season (which spans approximately 160 days in a year) at the sugar plant would be continuously used by the project activity. A small portion of the bagasse generated by the plant would be stored for use in the non-crushing period. This quantity of bagasse would not be stored at the project facility for more than one year.

Criteria 4: No significant energy quantities, except from transportation or mechanical treatment of the biomass residues, are required to prepare the biomass residues for fuel

combustion, i.e. projects that process the biomass residues prior to combustion (e.g. esterification of waste oils) are not eligible under this methodology.

The bagasse produced from the sugar mill would be fired directly in the boiler without any preparation or processing. Thus, no fuel preparation or processing is required for the project activity.

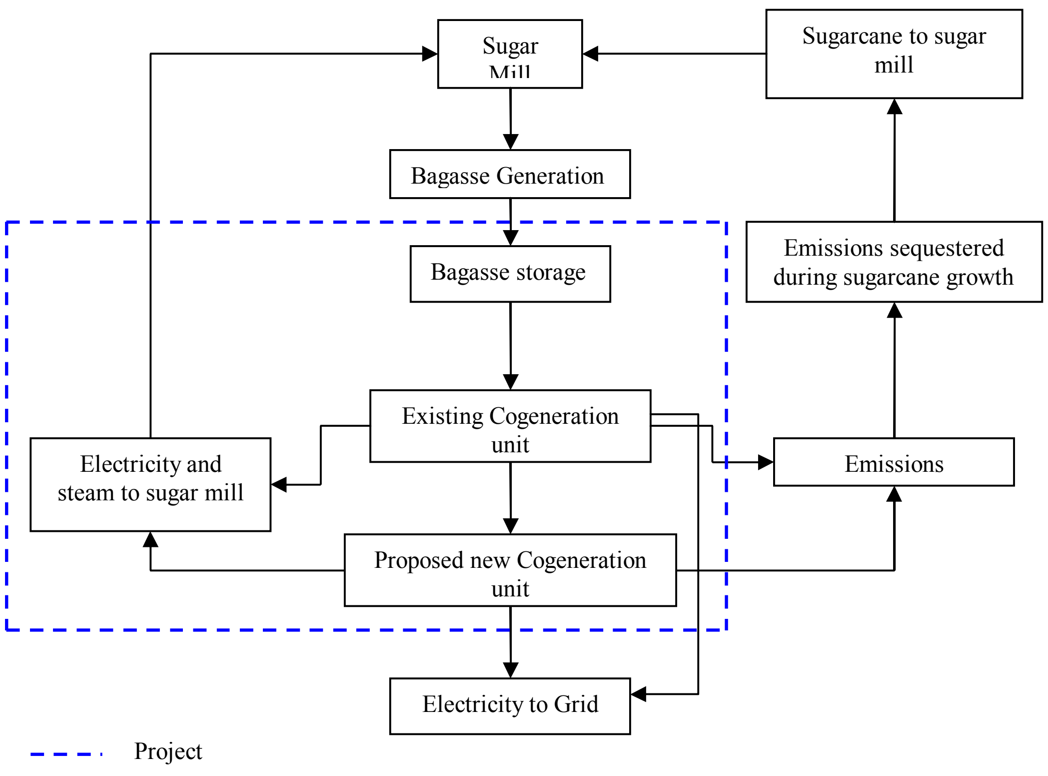
Thus based on the above discussion it can be deduced that the project activity meets all the applicability criteria of the selected approved methodology.

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

>>

Project Boundary:

Project activity boundary includes bagasse fuel storage, power plant (Auxiliary units, boilers and turbines). The project activity uses bagasse generated from the sugar manufacturing facility. Flow chart and project boundary is illustrated in the following figure:



The following table provides an overview of the emission sources included or excluded from the project boundary.

	Source	Gas		Justification/ Explanation
Baseline	Grid electricity generation	CO_2	Included	Main Emission Source
		CH_4	Excluded	Excluded for simplification. This is conservative.
		N_2O	Excluded	Excluded for simplification. This is conservative.
	Heat generation	CO_2	Included	Main Emission Source
		CH_4	Excluded	Excluded for simplification. This is conservative.
		N_2O	Excluded	Excluded for simplification. This is conservative.
	Uncontrolled Burning or decay of surplus biomass residues	CO_2	Excluded	Does not apply to the project activity as in the absence of the project activity the biomass residues would have been burnt in the existing units.
		CH_4	Excluded	
		N_2O	Excluded	
Project Activity	On site fossil fuel and electricity consumption due to the project activity (stationary or mobile)	CO_2	Included	In cases where the fossil fuel might be used for the initial firing / start up of the boiler.
		CH_4	Excluded	
		N_2O	Excluded	
	Off-site transportation of biomass residues	CO_2	Excluded	Does not apply to the project activity as all the bagasse used in generated on site and no amount is transported for the project activity.
		CH_4	Excluded	Does not apply to the project activity as all the bagasse used in generated on site and no amount is transported for the project activity.
		N_2O	Excluded	Does not apply to the project activity as all the bagasse used in generated on site and no amount is transported for the project activity
	Combustion of biomass residues for electricity and/or heat generation	CO_2	Excluded	Does not apply to the project activity as CH_4 emissions from uncontrolled burning or decay of biomass residues are not included in the project boundary.
		CH_4	Excluded	
		N_2O	Excluded	
	Storage of biomass residues	CO_2	Excluded	Does not apply to the project activity as the biomass residues storage period is less than one year.
		CH_4	Excluded	
		N_2O	Excluded	

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

>>

Identification of baseline scenario

As per the consolidated methodology ACM 0006, Version 06 the realistic and credible alternatives should be separately determined regarding:

- How **power** would be generated in the absence of the CDM project activity;

- What would happen to the **biomass residues** in the absence of the project activity; and
- In case of cogeneration projects: how the **heat** would be generated in the absence of the project activity

For **power** generation, the realistic and credible alternatives may include:

P1 The proposed project activity not undertaken as a CDM project activity,

P2 The continuation of power generation in an existing biomass residue fired power plant at the project site, in the same configuration, without retrofitting and fired with the same type of biomass residues as (co-)fired in the project activity.

P3 The generation of power in an existing captive power plant, using only fossil fuels,

P4 The generation of power in grid,

P5 The installation of a **new** biomass residue fired power plant, fired with the same type and with the same annual amount of biomass residues as the project activity, but with a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the project plant and therefore with a lower power output than in the project case.

P6 The installation of a **new** biomass residue fired power plant that is fired with the same type but with a higher annual amount of biomass residues as the project activity and that has a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the project activity. Therefore, the power output is the same as in the project case.

P7 The **retrofitting** of an existing biomass residue fired power, fired with the same type and with the same annual amount of biomass residues as the project activity, but with a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the project plant and therefore with a lower power output than in the project case.

P8 The **retrofitting** of an existing biomass residue fired power that is fired with the same type but with a higher annual amount of biomass residues as the project activity and that has a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the project activity.

P9 The installation of a **new** fossil fuel fired captive power plant at the project site.

Alternative P1 "***The proposed project activity not undertaken as a CDM project activity***" cannot be considered as a plausible baseline scenario due to the barriers associated with it as identified and discussed in the later sections of this document.

Alternative P2 "***The continuation of power generation in an existing biomass residue fired power plant at the project site, in the same configuration, without retrofitting and fired with the same type of biomass residues as (co-)fired in the project activity***". This alternative cannot be considered a plausible baseline scenario as this would not be able to meet the captive power requirements of the sugar manufacturing facility.

Alternative P3 "***The generation of power in an existing captive power plant, using only fossil fuels***" is not relevant to the project activity because existing power plants which run on biomass shall continue to run using biomass residues after implementation of the project plant.

Alternative P4 "***The generation of power in grid***" does not face any barrier and can be one of the credible baseline scenarios. In the absence of electricity export from the project plant, existing and/or new grid connected power plant would have generated that electricity.

Alternative P5 "***The installation of a new biomass residue fired power plant, fired with the same type and with the same annual amount of biomass residues as the project activity, but with a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the project plant and therefore with a lower power output than in the project case.***" would produce lesser electricity with the same thermal firing capacity as that of the proposed activity. This option is therefore, economically unattractive and hence cannot be considered a baseline scenario.

Alternative P6 "***The installation of a new biomass residue fired power plant that is fired with the same type but with a higher annual amount of biomass residues as the project activity and that has a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the project activity. Therefore, the power output is the same as in the project case***". This option cannot be considered as a credible baseline scenario because a larger amount of biomass (than the proposed project activity) would have to be fired for the generation of the same amount of electricity which makes the alternative economically unattractive.

Alternative P7 *"**The retrofitting of an existing biomass residue fired power, fired with the same type and with the same annual amount of biomass residues as the project activity, but with a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the project plant and therefore with a lower power output than in the project case**"* would not have been an economically attractive option because of the low efficiency levels and would also might not have been able to meet the captive requirements of the proponent. Thus, this alternative can not be considered a credible baseline scenario.

Alternative P8 **"*The retrofitting of an existing biomass residue fired power that is fired with the same type but with a higher annual amount of biomass residues as the project activity and that has a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the project activity*.**" would not have been an economically attractive option due to low levels of efficiency and thus cannot be considered a credible baseline scenario.

Alternative P9 "***The installation of a new fossil fuel fired captive power plant at the project site***" would not have been a financially attractive alternative and thus can not be considered as a credible baseline alternative.

As the proposed project activity is a **cogeneration** project so alternatives for heat generation will also have to be identified. For **heat** generation, realistic and credible alternatives may include:

H1 The proposed project activity not undertaken as a CDM project activity

H2 The proposed project activity (installation of a cogeneration power plant), fired with the same type of biomass residues but with a different efficiency of heat generation (e.g. an efficiency that is common practice in the relevant industry sector)

H3 The generation of heat in an existing captive cogeneration plant, using only fossil fuels
H4 The generation of heat in boilers using the same type of biomass residues
H5 The continuation of heat generation in an existing biomass residue fired cogeneration plant at the project site, in the same configuration, without retrofitting and fired with the same type of biomass residues as in the project activity.
H6 The generation of heat in boilers using fossil fuels
H7 The use of heat from external sources, such as district heat
H8 Other heat generation technologies

Alternative H1 "***The proposed project activity not undertaken as a CDM project activity***" faces barrier as discussed in the section B.5 and thus can not form the baseline scenario.

Alternative H2 "***The proposed project activity (installation of a cogeneration power plant), fired with the same type of biomass residues but with a different efficiency of heat generation (e.g. an efficiency that is common practice in the relevant industry sector)"*** would have been an economically unattractive option as more quantity of biomass would have to be fired to generate the same quantity of heat and thus this alternative cannot be one of the plausible baseline scenarios.

Alternative H3 "***The generation of heat in an existing captive cogeneration plant, using only fossil fuels***" is not an alternative scenario, since there is no existing fossil fuel fired cogeneration unit at the sugar manufacturing facility.

Alternative H4 "***The generation of heat in boilers using the same type of biomass residues***" can be taken as a baseline scenario as it is the existing scenario.

Alternative H5 "***The continuation of heat generation in an existing biomass residue fired cogeneration plant at the project site, in the same configuration, without retrofitting and fired with the same type of biomass residues as in the project activity***".This cannot be considered a plausible baseline scenario as it wouldn't be able to meet the heat requirements because of which the cogeneration unit has been planned.

Alternative H6 "***The generation of heat in boilers using fossil fuels***" can not be an alternative scenario, as there is no provision of fossil fuel firing in the existing boilers generating heat.

Alternative H7 "***The use of heat from external sources, such as district heat"*** is not applicable in Indian context so it is excluded from further consideration.

Alternative H8"***Other heat generation technologies (e.g. heat pumps or solar energy)"*** being economically unattractive are not practiced and hence excluded from further consideration.

Alternative scenarios for **biomass residues** in absence of the project activity include following:
B1 The biomass residues are dumped or left to decay under mainly aerobic conditions. This applies, for example, to dumping and decay of biomass residues on fields.
B2 the biomass residues are dumped or left to decay under clearly anaerobic conditions. This applies, for example, to deep landfills with more than 5 meters. This does not apply to biomass residues that are stock-piled or left to decay on fields.

B3 the biomass residues are burnt in an uncontrolled manner without utilizing it for energy purposes.
B4 the biomass residues are used for heat and/or electricity generation at the project site.
B5 the biomass residues are used for power generation, including cogeneration, in other existing or new grid-connected power plants.
B6 the biomass residues are used for heat generation in other existing or new boilers at other sites.
B7 the biomass residues are used for other energy purposes, such as the generation of bio-fuels.
B8 the biomass residues are used for non-energy purposes, e.g. as fertilizer or as feedstock in processes (e.g. in the pulp and paper industry)

Alternative B1 "***The biomass residues are dumped or left to decay under clearly aerobic conditions***" is an uneconomical alternative because of significant price value associated with bagasse as a fuel.

Alternative B2 "***The biomass residues are dumped or left to decay under clearly anaerobic conditions***" cannot be a credible baseline scenario as it is economically unattractive because of the price value associated with bagasse as a fuel.

Alternative B3 "***The biomass residues are burnt in an uncontrolled manner without utilizing it for energy purposes***" is also an uneconomical alternative because of price value associated with bagasse as a fuel.

Alternative B4 "***The biomass residues are used for heat and/or electricity generation at the project site***" is the current practice and does not face any barrier. In absence of the project activity generation of steam in existing low pressure boilers would have been the most probable scenario.

Alternative B5 "***The biomass residues are used for power generation, including cogeneration, in other existing or new grid-connected power plants***" can not be a credible baseline scenario since the bagasse is required at sugar manufacturing facility to produce steam in existing boilers at the project site.

Alternative B6 "***The biomass residues are used for heat generation in other existing or new boilers at other sites***" can not be an alternative scenario, since biomass residues are required for generating steam and electricity in existing boilers and TGs at the project site.

Alternative B7 "***The biomass residues are used for other energy purposes, such as the generation of bio-fuels***"is not an alternative since there is no established practice in the region to convert bagasse into bio fuel.

Alternative B8 "***The biomass residues are used for non-energy purposes, e.g. as fertilizer or as feedstock in processes (e.g. in the pulp and paper industry)***" can not be a plausible alternative since in the absence of the project activity the biomass would have been used in the existing low efficiency boilers.
Among all the identified alternatives, the most credible and plausible alternative is:
Power, **P4-** The generation of power in grid.

Biomass residues, **B4-**The biomass is used for heat and/or electricity generation at the project site.

Heat, H4 - The generation of heat in boilers using the same type of biomass residues**.**

Thus the above alternatives form the baseline scenario. According to the methodology ACM0006 this specific combination of baseline scenario is defined for scenario 12, which states that:

The project activity involves the installation of a new biomass residue fired cogeneration unit, which is operated next to (an) existing biomass residue fired power generation unit(s). The existing units are fired with only biomass residues and will continue to operate after the installation of the new power unit. The power generated by the new power unit is fed into the grid or would in the absence of the project activity be purchased from the grid. The biomass residues would in the absence of the project activity is used for heat generation in boilers at the project site. This may apply, for example, where the biomass residues have been used for heat generation in boilers at the project site prior to the project implementation.

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):

>>

The project activity aims at effective utilization of bagasse generated during the sugar manufacturing process by generating clean electricity. The project activity will not lead to any CO_2 emissions due to bagasse combustion. Bagasse being a renewable biomass fuel does not add any net CO_2 to atmosphere because of recycling of carbon during its growth. In the absence of the project activity, the equivalent amount of electricity would have been generated in the grid and emission of CO_2 would have occurred due to combustion of fossil fuels in the grid. The export of clean electricity to the fossil fuel based grid by the project activity thus results in continuous GHG reductions.

The methodology requires the project proponent to determine the additionality based on 'Combined tool to identify the baseline scenario and demonstrate additionality ', Version 02.1.

According to the tool Combined tool to identify the baseline scenario and demonstrate additionality" Version 02.1, footnote 2 on page 1, if in a project activity one or more alternatives are not available to the project participant latest additionality tool can be used.

Since in the TEIL's project activity there are more than one alternatives which are not available to the project activity, as discussed in the section B.4. Thus, the TEIL has established the additionality using the Version 4 of the additionality tool. The step-wise approach to establish additionality of the project activity is as follows:

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

This step serves to identify all alternative scenarios to the proposed CDM project activity(s) that can be the baseline scenario through the following sub-steps:

Sub-step 1a. Define alternatives to the project activity;
Sub-step 1b. Consistency with mandatory mandatory laws and regulations:

The definitions of alternatives to the project activity have been explained in the section B.4 above of this document. All the alternatives listed in the section are permissible in the current India Laws.

Step 2: Investment analysis

The additionality tool, Version 04 requires the project proponent to determine whether the project is financially or economically less attractive that at least one other alternative identified in Step 1 , without including the sale proceeds of CERs. To carry out such an analysis, the tool proposes the following steps:

Sub-step 2a. Determine appropriate analysis method

Determine whether to apply simple cost analysis, investment comparison analysis or benchmark analysis (sub-step 2b). If the CDM project activity generates no financial or economic benefits other than CDM related income, then apply the simple cost analysis (Option I). Otherwise, use the investment comparison analysis (Option II) or the benchmark analysis (Option III).

Since, the CDM project activity by TEIL also generates economic benefits other than the CDM related income; the simple cost analysis is not a valid method to be adopted for the investment analysis.

Had the project activity not been planned, the same quantity of the power would have been generated in the grid and the steam requirements would have been met by the steam produced in the low pressure boilers. TEIL, thus planned for the cogeneration system and opted to perform the bench mark analysis for the project activity instead of a comparison analysis.

The TEIL had calculated the equity Internal Rate of Return at the time of deciding for the implementation of the project activity and had compared the IRR with the benchmark set for such projects.

The key assumptions for the calculations of the IRR for the project activity are as tabulated below:

Parameter	Units	Assumption	Reference
Plant load factor	%	85	Detailed project report and sugar factory's operational data.
Steam Generation	TPH	120	Technical specification of the equipment
Bagasse Required	MT/Hour	54.5	Detailed project report
Total capital expenditure	Lacs	7200	Detailed project report
Bagasse cost	Rs./MT	750	Company balance sheet
Steam raising ratio	kg steam / kg of fuel	2.2	Detailed project report
O&M Cost	Lacs	144	Detailed project report
Salaries and wages	Lacs	85	Detailed project report
Administration expenses	Lacs	72	Detailed project report

Increase in salary and wages expenses	% / year	12	Industry trend and company's own database.

The equity IRR calculated, considering the cash flows during the entire life time of the project, based on the above assumptions was 9.61 % [2] which is well below the benchmark level of 14% as set by Central Electricity Regulatory Commission (Source: Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2004 dated 26th March 2004).

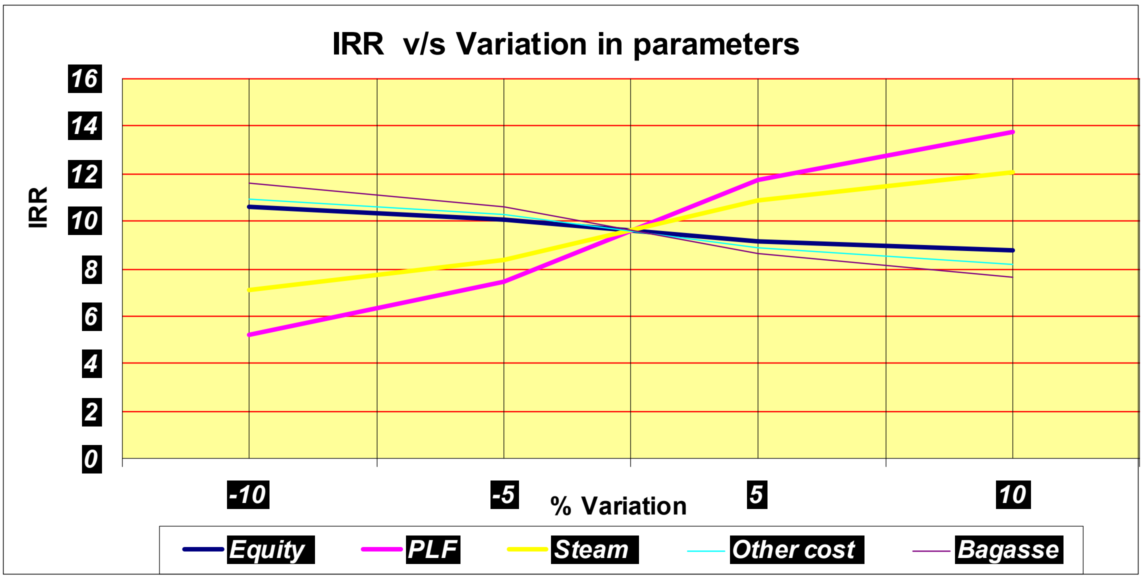
The sensitivity analysis was also performed, introducing a variation of (± 5 %, ±10%)[3] in critical/ variable parameters. The figures obtained on performing the sensitivity analysis are as tabulated below:

% variation	-10	-5	5	10
Equity	10.58	10.08	9.16	8.74
PLF	5.22	7.45	11.71	13.79
Steam	7.13	8.37	10.84	12.08
Other cost	10.96	10.29	8.9	8.16
Bagasse	11.6	10.6	8.61	7.61

It can be observed that with the variations of 5 – 10 % in the parameters, the IRR values do not surpass the bench mark figure of 14%.

2 The detailed IRR calculation sheet has been attached with this document.

[3] Variation of 5 – 10 % only was considered because the variations beyond these percentages are not likely to occur



The chart above gives the IRR with the different variations introduced in the parameters.

The above discussion demonstrates that the project activity was not financially viable for the project proponent and the calculations were made again, with the CDM revenues in consideration. The project financials, after the CDM revenues consideration get improved to 20.46 %[4].

TEIL thus gave the final nod to the project activity only upon consideration of the CDM revenues.

Step 3: Barrier analysis

The project proponent has also adopted the barrier analysis route for the establishment of the additionality.

Identify barriers that would prevent the implementation of type of the proposed project activity

The project activity faces associated barriers towards successful implementation. These barriers are detailed below:

Barriers due to prevailing practice

The TEIL's project activity involves the implementation of a high pressure boiler (87 kg/cm^2) for the cogeneration project is among the first few of its kind being carried out in the region. Even till date most of the sugar manufacturing facilities operating in the region continue are using low/medium pressure boilers in the cogeneration plants. Prior to the mid-1970's, the steam pressure used in the majority of boilers located in Indian sugar mills was in the range of 10-15 kg/cm^2, which subsequently increased to the prevailing average of 21 kg/cm^2. The majority of the boiler systems in Indian sugar mills operate at a pressure of 21 kg/cm^2 and temperature of 340 ^{o}C, although some mills employ 14 kg/cm^2/265 ^{o}C or 32 kg/cm2/380 ^{o}C steam systems. In the mid-

[4] Refer the attached IRR calculation sheet.

1980, a few Indian mills installed medium pressure (42 kg/cm^2) boilers[5], this demonstrates that usage of boilers with higher pressures (87 kg/cm^2) is not being practised in the sugar industry in the region and hence is not a prevalent practice.

As on date there are 148 [6] sugar manufacturing mills in the Uttar Pradesh, state of the project activity. Out of the total number of sugar manufacturing facilities in the state only 15 units have the deployment of high pressure cogeneration systems (87 Kg/Cm^2) similar to the project activity. The names of the units with high pressure cogeneration system are as follows:

- ✓ Balrampur Chini Mills Limited at 2 locations - Balrampur and Haidergarh
- ✓ Triveni Sugar at 2 locations - Khatauli (Phase I) and Deoband
- ✓ Upperganges Sugar Limited - Seohara
- ✓ Mawana Sugar Ltd at 3 locations – Mawana, Nanglamal and Titawi
- ✓ Ramgarh Chini Mills -Sitapur
- ✓ Dalmia sugars at 2 locations -Sitapur and Shahjahanpur .
- ✓ Ajbapur sugar complex -Lakhimpur Kheri
- ✓ Dwarikesh Puram
- ✓ Dwarikesh Dham
- ✓ Simbhaoli sugar

It is to be noted that all the high pressure cogeneration units in the region have come up with the view point of obtaining revenues generated by the sale of carbon credits and are in process of availing CDM funding to overcome the barriers associated with their implementation This clearly proves that in absence of CDM, installation of high pressure configurations cogeneration systems would have not been implemented in the region.

Moreover, the project activity involves the commissioning of a high pressure 87kg/cm^2 fully back pressure turbine. This is the first of its kind[7] initiative by TEIL as the practice in the region has been using the extraction cum condensing turbines. This was for the first time that a large 87kg/cm^2 full back pressure turbine was commissioned in the state of Uttar Pradesh. Thus; there was always an uncertainty and technical risk involved in the successful operation of the plant.

Step 4: Common Practice analysis:

Based on the information about activities similar to the proposed project activity, a common practice analysis is carried out to complement and reinforce the barrier analysis. The project proponent is required to identify and discuss the existing common practice through the following sub-steps:

Step 4a: Analyze other activities similar to the proposed project activity

As discussed earlier, high pressure configuration cogeneration systems, similar to the project activity have been commissioned in only 15 plants in the region. All of these 15 cogeneration

[5] Page 7 of 25 of the report "Promotion of Biomass Cogeneration with Power Export in the Indian Sugar Industry " http://www.netl.doe.gov/publications/carbon_seq/articles/india.pdf

[7] http://www.upexcise.in/scripts/UnitSMList.asp

systems have been implemented with CDM consideration only. Also there are no similar activities in the region which might have come without the consideration of CDM revenues. This clearly substantiates that the project activity by TEIL is not a common practice in the region. The table below further summarises the facts.

Data on Co-generation practices adopted by the Sugar Industries	
Total Sugar manufacturing mills in Uttar Pradesh	148
Number of sugar units with high pressure (87 Kg/Cm^2) cogeneration system	15
Number of high pressure cogeneration systems implemented considering CDM revenues.	15

Step 4b: Discuss any similar options that are occurring

Since there is no similar project activity with a similar investment climate implemented, this sub-step is not applicable.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>

In accordance with ACM0006 (Version 06), Scenario 12 is the applicable baseline scenario for the proposed project activity, which describes the following situation being applicable to the project activity:

The project activity involves the installation of a new biomass residue fired cogeneration unit, which is operated next to (an) existing biomass residue fired power generation unit(s). The existing units are fired only with biomass residues and continue to operate after the installation of the new power unit. The power generated by the new power unit is fed into the grid or would in the absence of the project activity be purchased from the grid. The biomass residue would in the absence of the project activity be used for heat generation in boilers at the project site. This may apply, for example, where the biomass residues haves been used for heat generation in boilers at the project site prior to the project implementation.

Determination of project emissions

Formula used for estimation of the emissions due to the project activity during a given year *y* is as under.

$$PE_y = PET_y + PEFF_y + PE_{EC,y} + GWP_{CH4} \cdot \left(PE_{Biomass,CH4,y} + PE_{WW,CH4,y}\right)$$

Where,

PET_y are the CO_2 emissions during the year *y* due to transport of the biomass residues to the project plant in tCO_2/y,

$PEFF_y$ are the CO_2 emissions during the year *y* due to fossil fuels co-fired by the generation facility or other fossil fuel combustion at the project site attributable to the project activity (tCO_2/y),

$PE_{EC,y}$	are the CO_2 emissions during the year *y* due to electricity consumption at the project site that is attributable to the project activity (tCO_2/y),
GWP_{CH4}	is the Global Warming Potential for methane valid for the relevant commitment period,
$PE_{Biomass,CH4,y}$	are the CH_4 emissions from the combustion of biomass residues during the year *y* (tCH_4/y).
$PE_{WW,CH4,y}$	CH4 emissions from waste water generated from the treatment of biomass residues in year *y* (tCH4/yr)

1. **Carbon dioxide emissions from combustion of fossil fuels for transportation of biomass residues to the project plant (*PETy*)**

As the bagasse used as fuel for project activity would be provided by the sugar mill at the project site itself; no transportation of bagasse is involved. Therefore, there are no emissions due to transportation of bagasse to the project plant.

2. **Carbon dioxide emissions from on-site consumption of fossil fuels ($PEFF_y$)**

The boilers deployed for the project activity are not designed for firing coal/oil or any other fossil fuels. However, in case any fossil fuel is fired in the boilers for the initial firing or start up of the boiler at the project site attributable to the project activity the same would be monitored and equivalent project emission would be calculated as follows:.

$$PEFF_y = \sum_i (FF_{projectplant,i,y} + FF_{projectsite,i,y}) * NCV_i * EF_{CO2,FF,i}$$

Where,

$FF_{project\ plant,i,y}$	Quantity of fossil fuel type *i* combusted in the project plant during the year *y* (mass or volume unit per year)
$FF_{project\ site,i,y}$	Quantity of fossil fuel type *i* combusted at the project site for other purposes that are attributable to the project activity during the year *y* (mass or volume unit per year)
NCV_i	Net calorific value of fossil fuel type *i* (GJ / mass or volume unit)
$EF_{CO2,FF,I}$	CO_2 emission factor for fossil fuel type *i* (tCO_2/GJ)

3. **Carbon dioxide emissions from electricity consumption ($PE_{EC,y}$)**

There would not be any CO_2 emissions due to the electricity consumption at the project site. No electricity is required for the preparation of the biomass residues as the bagasse obtained from the sugar manufacturing unit is used as it is in the boiler as fuel.

4. **Methane emissions from combustion of biomass residues ($PE_{Biomass,CH4,y}$)**

This source does not fall within the project boundary, hence the methane emissions due to biomass combustion are not considered.

5. **Methane emissions from waste water treatment ($PE_{WW,CH4,y}$)**

The bagasse generated from the sugar unit is directly used as the fuel without giving any prior treatment. Thus, there are no emissions associated within this category.

Baseline emissions

Determination of electricity generation (EGy)

According to the applied methodology, for the scenario 12 , *EGy* is determined as the difference between:

- the lower value between (a) the net quantity of electricity generated in the new power unit that is installed as part of the project activity and (b) the difference between the total net electricity generation by the new power unit and the existing power unit(s) and the historical generation of the existing power unit(s), based on the three most recent years, and
- the quantity of electricity that could be generated by other power plant(s) using the same quantity of biomass residues that are fired in the project plant, as follows:

$$EG_y = MIN\begin{Bmatrix} EG_{project\ plant,y} \\ EG_{total,y} - \dfrac{EG_{historic,3yr}}{3} \end{Bmatrix}$$

Where

$EG_{project\ plant,\ y}$	net quantity of electricity generated in the project plant during the year *y* in MWh,
$EG_{total,\ y}$ -	net quantity of electricity generated in all power units at the project site, generated from firing the same type(s) of biomass residues as in the project plant, including the new power unit installed as part of the project activity and any previously existing units, during the year y in MWh.
$EG_{historic,\ 3yr}$	net quantity of electricity generated during the most recent three years in all power plants at the project site, generated from firing the same type(s) of biomass as in the project plant, in MWh,

Estimation of EF $_{electricity,\ y}$

Estimation of emission factor

The emission factor has been taken from the Baseline Carbon Dioxide Emission Database Version 3.0 (http://www.cea.nic.in)

CO_2 emission factor for the northern grid = 0.8104 t CO_2 /MWh

Estimation of emission reductions

The project activity would reduce CO_2 emissions through substitution of power and heat generation with fossil fuels in the grid by energy generation with biomass residues. The emission reduction ER_y by the project activity during a given year y is the difference between the emission reductions through substitution of electricity generation with fossil fuels ($ER_{electricity,y}$), the emission reductions through substitution of heat generation with fossil fuels ($ER_{heat,y}$), project emissions (PE_y), emissions due to leakage (L_y) and, where this emission source is included in the project boundary and relevant, baseline emissions due to the natural decay or burning of anthropogenic sources of biomass residues ($BE_{biomass,y}$), as follows:

Formula used for estimation of the total net emission reductions due to the project activity during a given year y is as under.

$$ER_y = ER_{heat,y} + ER_{electricity,y} + BE_{biomass,y} - PE_y - L_y$$

where

ER_y	emissions reductions of the project activity during the year y in tons of CO_2,
$ER_{electricity,y}$	emission reductions due to displacement of electricity during the year y in tons of CO_2,
$ER_{heat,y}$	emission reductions due to displacement of heat during the year y in tons of CO_2,
$BE_{biomass,y}$	baseline emissions due to natural decay or burning of anthropogenic sources of biomass during the year y in tons of CO_2 equivalents,
PE_y	project emissions during the year y in tons of CO_2, and
L_y	leakage emissions during the year y in tons of CO_2.

Emission reductions due to the displacement of electricity

Emission reductions due to the displacement of electricity are calculated by multiplying the net quantity of increased electricity generated with biomass residues as a result of the project activity (EG_y) with the CO_2 baseline emission factor for the electricity displaced due to the project ($EF_{electricity,y}$), as follows:

$$ER_{electricity,y} = EG_y \times EF_{electricity,y}$$

Where,

$ER_{electricity,\ y}$	emission reductions due to displacement of electricity during the year y in tons of CO_2,
EG_y	net quantity of increased electricity generation as a result of the project activity (incremental to baseline generation) during the year y in MWh,
$EF_{electricity,\ y}$	CO_2 emission factor for the electricity displaced due to the project activity during the year y in tons CO_2/MWh

Emission reductions or increases due to displacement of heat

The heat generation in the baseline and the project case is both through the use of biomass and there is no substitution of heat generation with fossil fuels or any diversion of heat from any fossil fuel based thermal generation unit to the project activity. Therefore, $ER_{heat,y}$ = 0 as a simplified assumption.

Baseline emissions due to natural decay or uncontrolled burning of anthropogenic sources of biomass residues

In the project activity scenario, the biomass would not be left to natural decay or uncontrolled burning of anthropogenic sources of biomass. Thus

$BE_{Biomass} = 0$.

Life time Aspects

The existing power plants or heat generation facilities at the project site have considerable life and no replacement is anticipated within the crediting period. Hence, there would not be any change in the baseline scenario as no replacement/retirement of the existing facilities during the crediting period would take place.

Leakage

As the diversion of biomass residues due to the project activity has already been considered in the calculation of baseline reductions, leakage efforts not need be addressed (as per ACM0006).

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

>>

Data / Parameter:	$EG_{historic,3yr}$
Data unit:	MWh
Description:	Quantity of electricity generated during the most recent three years in all power plants at the project site, generated from firing the same type of biomass residues as in the project plant.
Source of data used:	Plant records
Value applied:	68330
Justification of the choice of data or description of measurement methods and procedures actually applied :	The quantity of electricity generated in the past recent three years have been taken. This quantity has been measured using the energy meters at the plant site.
Any comment:	-

Data / Parameter:	EF_{grid}
Data unit:	tCO_2/MWh
Description:	CO_2 emission factor for northern regional grid
Source of data used:	Baseline Carbon Dioxide Emission Database Version 3.0 (http://www.cea.nic.in) and Annex III of this document
Value applied:	0.8104
Justification of the choice of data or description of measurement	CEA is a statutory organisation under Ministry of Power which collects and records the data concerning the generation, transmission, trading, distribution and utilization of electricity.

methods and procedures actually applied :	
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

>>

Emission reductions due to the displacement of electricity

Emission reductions due to the displacement of electricity are calculated by multiplying the net quantity of increased electricity generated with biomass as a result of the project activity (*EGy*) with the CO2 baseline emission factor for the electricity displaced due to the project (*EFelectricity,y*), as follows:

$$ER_{electricity,y} = EG_y \times EF_{electricity,y}$$

Baseline emissions

EG_y (Net quantity of increased electricity generation)

$$EG_y = MIN\left\{\begin{matrix} EG_{project\ plant,y} \\ EG_{total,y} - \frac{EG_{historic,3yr}}{3} \end{matrix}\right\}$$

$EG_{total,y}$ (MWh/y) = 235932.1

$EG_{Project\ plant,y}$ (MWh/y) = 71965.10

$EG_{historic,3y/3}$ (MWh/y) = 68330

$EG_{total,y} - EG_{historic,3y/3}$ = **167602.77**

$\mathbf{EF_{grid}}$ (tCO_2/MW) = 0.8104

Baseline emissions = (Min ($EG_{Project\ plant,y}$, ($EG_{total,y} - EG_{historic,3y/3}$))* $\mathbf{EF_{grid}}$

= **58321**

Project emissions

There are no emissions occurring as a result of the project activity.

Emission reduction

The reduction in GHG emissions is calculated by the difference of baseline emissions and project emissions due to leakage

Emission reduction = Baseline emission – Project emission

= 58321 - 0

= 58321

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

>>

Year	Estimation of Baseline emissions (tonnes of CO_2e)	Estimation of Project activity emissions (tonnes of CO_2e)	Estimation of Leakage (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
2008-2009	58321	0	0	58321
2009-2010	58321	0	0	58321
2010-2011	58321	0	0	58321
2011-2012	58321	0	0	58321
2012-2013	58321	0	0	58321
2013-2014	58321	0	0	58321
2014-2015	58321	0	0	58321
2015-2016	58321	0	0	58321
2016-2017	58321	0	0	58321
2017-2018	58321	0	0	58321
TOTAL	**583210**	**0**	**0**	**583210**

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

>>

B.7.1 Data and parameters monitored:

Data / Parameter:	**$EG_{project\ plant,\ y}$**
Data unit:	MWh/yr
Description:	Total electricity generated in the project plant during the year y
Source of data to be used:	Plant records and log books
Value of data applied for the purpose of calculating expected emission reductions in section B.5	71965.1
Description of measurement methods and procedures to be applied:	The project activity would use electronic meters/power monitoring system which will permit continuous monitoring and measurement. Hourly recordings of data will be taken from energy meters and logged in the daily log books. Separate meters would be used for the monitoring gross and auxiliary electricity consumption for the project plant.
QA/QC procedures to be applied:	In order to ensure the highest levels of accuracy the meter used would be calibrated regularly as per the manufacturers' specifications. To ensure a systematic recording of the parameters and the maintenance of log books TEIL has constituted a monitoring team as depicted in section B.7.2 of this document.
Any comment:	

Data / Parameter:	**$EG_{existing\ plant,\ y}$**
Data unit:	MWh/yr

Description:	Total quantity of electricity generated in existing power units at the project site, generated from firing the same type(s) of biomass residues as in the project plant, including the new power unit installed as part of the project activity and any previously existing units, during the year *y*.
Source of data to be used:	Plant records and log books
Value of data applied for the purpose of calculating expected emission reductions in section B.5	163967
Description of measurement methods and procedures to be applied:	The project activity utilize the electronic meters to continuously monitor the total electricity generation of the existing power plant fired with same type of biomass residues as the project plant. Separate meters would be used for the monitoring gross and auxiliary electricity consumption for the existing plant
QA/QC procedures to be applied:	The meters would be calibrated regularly to ensure the highest levels of accuracy in the measurement procedures. To ensure a systematic recording of the parameters and the maintenance of log books TEIL has constituted a monitoring team as depicted in section B.7.2 of this document.
Any comment:	

Data / Parameter:	**$BF_{k,y}$**
Data unit:	Mass or volume unit(tonnes)
Description:	Quantity of biomass residue type *k* combusted in the project plant during the year *y*
Source of data to be used:	Fuel record book
Value of data applied for the purpose of calculating expected emission reductions in section B.5	209400. This adjusted for moisture content (approx 50%) gives dry quantity of biomass as 104700.
Description of measurement methods and procedures to be applied:	The total bagasse consumed in the project activity would be monitored continuously through the direct monitoring system and adjusted for moisture content to calculate dry biomass quantity. The dry quantity of biomass residues would be used or CER calculations.
QA/QC procedures to be applied:	The instruments would be calibrated regularly to ensure the highest levels of accuracy. To ensure a systematic recording of the parameters and the maintenance of log books TEIL has constituted a monitoring team as depicted in section B.7.2 of this document.
Any comment:	-

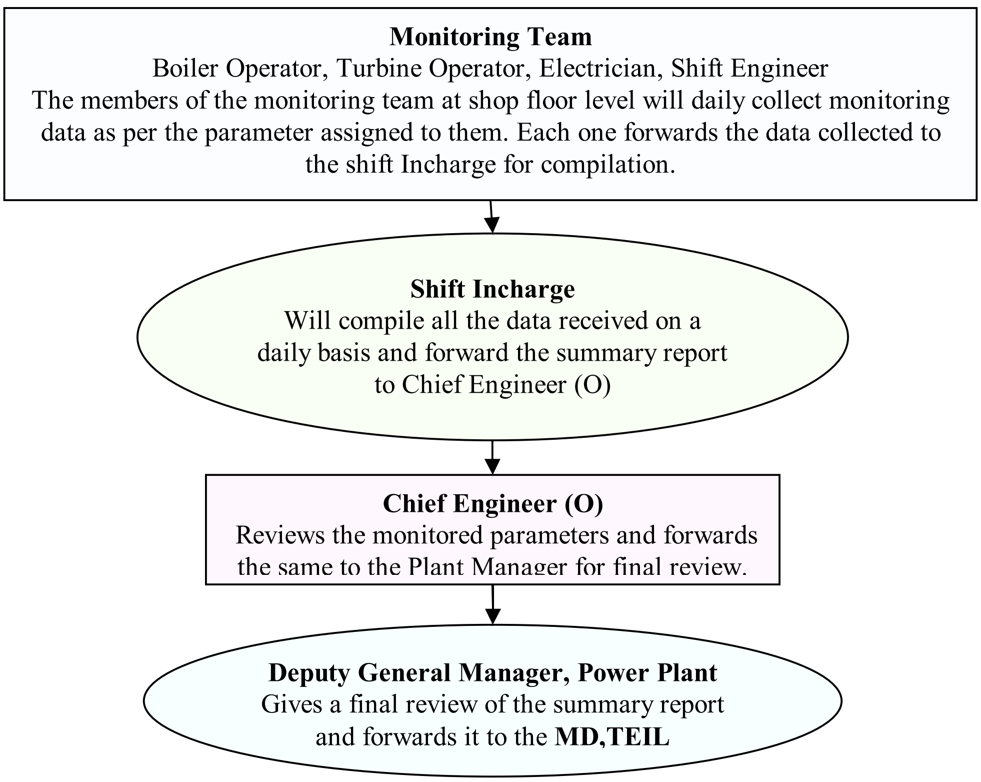
Data / Parameter:	**NCV_k**
Data unit:	kcal/kg
Description:	Net calorific value of biomass residue type *k* combusted in the project

	plant during year *y*
Source of data to be used:	Sample test reports
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Bagasse: 2100. This adjusted for moisture content (approx 50%) gives moisture content of dry biomass as 4200.
Description of measurement methods and procedures to be applied:	The NCV of biomass residue shall be determined through sample testing at regular intervals. Further, the same shall be adjusted for moisture content to obtain NCV of dry biomass.
QA/QC procedures to be applied:	The calorific value of the bagasse would be measured regularly through the bomb calorimeter. To ensure a systematic recording of the parameters and the maintenance of log books TEIL has constituted a monitoring team as depicted in section B.7.2 of this document.
Any comment:	

B.7.2 Description of the monitoring plan:

>>

The monitoring team at the floor level would be assigned with the responsibility of monitoring and recording of parameters as per the monitoring plan. The following operational and management structure would be implemented for the project activity.



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 completion of the application of the baseline study and monitoring methodology 21/03/2008

Name of the responsible person(s)/entity(ies):

The details of the responsible person/ entity have been provided in the 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:

>>
7th October 2005 [8]

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

>>
20 years

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

Fixed crediting period has been opted for the project activity

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.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
01/10/2008
The crediting period will start only upon the successful registration of the project activity with UNFCCC.

C.2.2.2. Length:

>>
10y-0m

[8] Date of the placement of order of the boiler.

SECTION D. Environmental impacts

>>

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

>>

TEIL has already procured the No Objection certificate from the Uttar Pradesh State Pollution Control Board. The summary of the Environmental Impact Assessment (EIA) study conducted by TEIL is as follows:

Both primary and the secondary impacts of the project activity were taken into consideration while conducting the impact assessment study of the project activity. Primary impacts are caused directly by the project; secondary impacts are the indirect, induced and associated impacts, on investment, social and economic activities, by the proposed action.

The impacts due to the project activity have been discussed in two distinct phases:

- During the construction phase and
- During the operation phase which would have long term effects.

IMPACTS DURING CONSTRUCTION The impacts during the construction phase are regarded as temporary or short term and hence do not have an everlasting affect on the soil, air, noise or water quality of the area. The impacts envisaged during the construction of the proposed plant are:
Impact on Land use The land use pattern is not expected to show any noticeable change due to the project activity. The plant is being constructed adjacent to the existing sugar mill within the mill premises and does not requires additional land.
Impact on Soil The impact of project plant would be negligible on soil quality. Land development activities will help reduce the soil erosion in the adjacent land.
Demography and Socio-Economics During construction of project plant, the nearby local villagers and skilled people near project area get employment opportunities. The economic activities in the project area would increase due to more employment, development of basic infrastructure and hence would improve the living standard of people.
Impact on Air The movement of equipment at site, earthworks, foundation works and other related activities would generate dust and increase the SPM levels in the area. However this temporary effect would be confined within the project boundary by regular sprinkling of water on the roads, construction site etc.

Impact on Noise Levels

Heavy construction equipments, loading and offloading of raw materials are likely to cause an increase in noise levels. However the noise levels associated are considered to be negligible. The impact would be further restrained by providing earplugs and earmuffs to the employees and providing caps on the equipments and their regular maintenance.

IMPACTS DURING OPERATION

The operational phase will involve power production using bagasse. The following activities in relation to the operational phase will have varying impact on the environment and are considered for impact prediction.

Impact on Air Quality

The EIA study establishes that the existing status of the ambient air quality of the area is well within the national ambient air quality standard.

The pollutants envisaged from project plant are Suspended Particulate Matter (SPM)

Electrostatic Precipitator of adequate efficiency would be installed to limit the SPM limit within the statutory limits.

Impact on Soil

The impacts anticipated to occur on soil due to the project are negligible and restricted to the construction phase and will get stabilized during the operational phase. Ash emissions from the high efficiency ESP would be very low and no significant impact on the soil quality is envisaged.

Impact On Water Resources

No contamination of the ground water is envisaged to occur due to the project activty.

Impact on Noise

The provision of protective personnel equipment in like ear plugs and ear muffs will reduce the impact of noise level. Hence these noise levels may not be of much concern from occupational health point of view. However under the general health check-up scheme as per factory act, a trained doctor will check up the workers for any Noise Induced Hearing Loss (NIHL).

The greenbelt, which is being provided by TEIL will act as noise attenuator.

Impact on Ecology

Ecology and Green belt Development

TEIL has proposed an extensive program for the development of green belt around the plant. The green belt is being proposed for the following objectives:

- Mitigation of fugitive dust emissions including any odour problems
- Noise pollution control
- Controlling soil erosion

- Balancing eco-environment - Aesthetics

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:

>>

No significantly adverse impacts are anticipated to occur due to the project activity by TEIL.

SECTION E. Stakeholders' comments

>>

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

>>

The various stakeholders identified for the TEIL'S project activity are as follows:

1. Local residents
2. Local academic institutions like schools and colleges
3. Village panchayat.
4. Representatives of UPPCL.

In order to inform the interested stakeholders on the environmental and social impacts of the project activity and discuss their concerns regarding the project activity, the project proponent convened a stakeholder consultation meeting, inviting the identified stakeholders.

TEIL representatives presented the salient features of their project activity at Khatauli to the stakeholders. The stakeholders were well apprised of the socio – economic benefits envisaged to occur as a result of the project activity. In the end, the stakeholders were requested to raise their concerns (if any) regarding the TEIL's project activity.

E.2. Summary of the comments received:

>>

The stakeholders were very appreciative of the project activity by TEIL and did not raise any adverse comments for the project activity during the stakeholder consultation meeting. The local college and school governing bodies seemed to be appreciative of the project activity as it would relieve them of the power shortage problems apart from causing overall development of the area.
The representatives of the gram panchayat also fostered their support and appreciation towards the implementation of the cogeneration plant at Khatauli.

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

>>

Considering the various direct and indirect benefits (social, economical, and environmental) associated with the project activity, no serious concerns were raised during the consultation with stakeholders. Further, as prescribed by the UNFCCC, the PDD would be available at the validator's web site for public comments.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Triveni Engineering & Industries Limited (TEIL)
Street/P.O.Box:	15-16, Sector 16-A
Building:	8th Floor, Express Trade Towers
City:	Noida
State/Region:	Uttar Pradesh
Postfix/ZIP:	201301
Country:	India
Telephone:	+91-120-4308000
FAX:	+91-120-4311010-11
E-Mail:	ssinha@ho.trivenigroup.com
URL:	www.trivenigroup.com
Represented by:	
Title:	Vice President – Corporate Planning
Salutation:	Mr.
Last Name:	Sinha
Middle Name:	-
First Name:	Sameer
Department:	-
Mobile:	-
Direct FAX:	
Direct tel:	
Personal E-Mail:	

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

As described in section B.4.

Calculation of the northern grid emission factor

Source: Baseline Carbon Dioxide Emission Database Version 2.0
http://www.cea.nic.in

Operating margin (t CO_2/MWh) 2003 -04 = 0.9801

Operating margin (t CO_2/MWh) 2004 -05 = 0.9991

Operating margin (t CO_2/MWh) 2005 -06 = 0.9984

Average operating margin (t CO_2/MWh) = **0.9925**

Build margin (t CO_2/MWh) 2005 -06 = **0.6283**

Combined margin (t CO_2/MWh) 2005 -06 = (OM+BM)/2

= (0.9925+0.6283)/2 = **0.8104**

Annex 4

MONITORING INFORMATION

The methodology requires the project-monitoring plan to consist of metering the electricity generated by the project activity, total electricity generated by all the units at site, quantity of bagasse fired in project activity, calorific value of bagasse.

Energy meters would be used for monitoring the energy generated by all the units. All energy meters used would be electronic meters of accuracy class 0.2 %. The energy meters would be maintained in accordance with electrical standards in India. Each meter would be inspected and sealed and shall not be interfered with by anyone. All the energy meters would be tested for accuracy and compliance every half year by independent agency, which is accredited with National Accreditation Board for Testing & Calibration Laboratories, Department of Science & Technology, Government of India. If during half yearly test check, meters are found to be beyond permissible limits of error, they would be calibrated immediately.

The monitoring team formed by TEIL comprising of a special group of operators will be assigned the responsibility of monitoring of different parameters and record keeping. On a weekly basis, the monitoring reports would be checked and discussed by the senior team members/managers. On monthly basis, these reports would be forwarded at the management level.

Monthly joint meter reading of main meters installed at interconnection point will be taken and signed by authorized officials of TEIL and UPPCL.