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

CONTENTS

Annexes

SECTION A. General description of project activity

A.1 Title of the project activity:

>>
DSM-Asmoli Bagasse Cogeneration Project,
Version 4,
09/04/2007

A.2. Description of the project activity:

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The proposed project activity involves expansion of the electricity generation capacity of the Dhampur Sugar Mills Ltd. (DSM) sugar unit located in Asmoli. The expansion involves installation of a new high pressure (105 kg/cm^2) and high capacity (170 TPH) boiler along with a 30 MW double extraction-condensing type turbine. The newly installed boiler and turbine will be operating along with the existing system. The implementation of the project activity will permit the plant to supply electricity to the Paschimanchal Vidyut Vitran Nigam Limited (PVVNL)[1] and thereby reducing the GHG emissions by the substitution of fossil fuel dominated generation in the northern region grid with a renewable electricity source.

The present captive steam and power requirement of the sugar mill is met by two 80 TPH, 62 kg/cm^2 bagasse fired boilers and four 5 MW & one 11 MW backpressure turbines. DSM management is planning to expand the cane crushing capacity of Asmoli unit from 6000 TCD to 9000 TCD, thereby increasing its captive steam and power requirement. The present system meets this requirement, however DSM management has decided to install a new high pressure (105 kg/cm^2) and high capacity (170 TPH) boiler along with a 30 MW turbo-generator[2]. Bagasse[3] will be used to generate steam in the boiler which in turn will power the turbines to generate electricity. The surplus electricity generated from this system will be exported to the regional grid. The export of this renewable source of electricity to regional grid will displace the same amount of electricity generated by fossil fuel dominated power plants in the regional grid. Thus the project activity will assist in reduction of the green house gases (GHG).

Project contribution to sustainable development:
The project is complying with the sustainable development policy of the Ministry of Environment and Forests through following scenarios:

Contribution to Social well-being:
DSM-Asmoli sugar mill has taken substantial measures for the upliftment and welfare of local communities - from the arrangement of social awareness programme to the construction of basic

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[1] PVVNL is an operating public utility in the state of Uttar Pradesh and has license to supply power in parts of state and whereas the PVVNL in its board of directors meeting held on 24/08/05 has authorised Uttar Pradesh Power Corporation Limited (UPPCL) to execute/sign the power purchase agreement and also authorised UPPCL to do the necessary relevant works on behalf of PVVNL. As such, all the obligations under this agreement are being undertaken by UPPCL on behalf of PVVNL.

Source: Power Purchase Agreement (PPA) between M/s DSM-Sugar Asmoli (A unit of The Dhampur Sugar mills Ltd) and PVVNL dated 7 April 2006.

[2] As outlined in the baseline section the present system is sufficient to meet the captive power requirement of the sugar mill.

[3] Bagasse is a by-product of sugar manufacturing process.

infrastructure for the rural community. DSM group is undertaking the following programmes in the region:

- Cultural Programmes like Dusshera, Holi and Navratri are organised by the mill management during and after the cane crushing seasons.
- Several heath awareness campaign including the polio drop vaccination camp and hepatitis-B vaccination camps are organised for rural communities.
- The DSM management has installed hand pumps in the rural areas for providing safe drinking water.

The project activity will create direct and indirect employment opportunities for the local people.

Contribution to Economic development:
DSM-Asmoli sugar unit is providing 234 direct and 200 indirect employment opportunities to the local community. Asmoli sugar mill also provides crop loans at subsidised rates of interest to cane growers, along with a subsidy on fertiliser and other agricultural equipment and inputs.

The proposed project activity, which is expansion of the existing cogeneration system to supply electricity to grid, should strengthen the returns of the factory. Thus, the higher returns associated with a broadening of its activities, diversification from sugar manufacturing to power production, should filter back to farmers supplying cane to the sugar factory.

Contribution to Environmental well being:
The proposed project activity aims to reduce GHG emissions through the generation of renewable energy and exporting it to the regional grid, displacing the fossil fuel dominated electricity from grid-based power plants. In addition to the reduction in GHG emissions the project activity will also reduce the emission of NOx and SOx emitted from the combustion of fossil fuels. Also, there will be reduced ash generation as the ash content in bagasse is lower as compared to coal.

A.3. Project participants:

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Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity (ies) project participants (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (host)	**Private entity:** The Dhampur Sugar Mills Ltd.	No
India (host)	**Private entity**: DSCL Energy Services Company Ltd.	No
United Kingdom	**Private entity:** Agrinergy Ltd	No
(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.		

The Dhampur Sugar Mills Ltd. is the project owner, and DSCL Energy Services Company Ltd. and Agrinergy Ltd. are CDM project developers. The official contact for the CDM project activity is The Dhampur Sugar Mills Ltd.

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

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A.4.1.1. Host Party(ies):

>>
India

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

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District Moradabad, Uttar Pradesh

A.4.1.3. City/Town/Community etc:

>>
Asmoli

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

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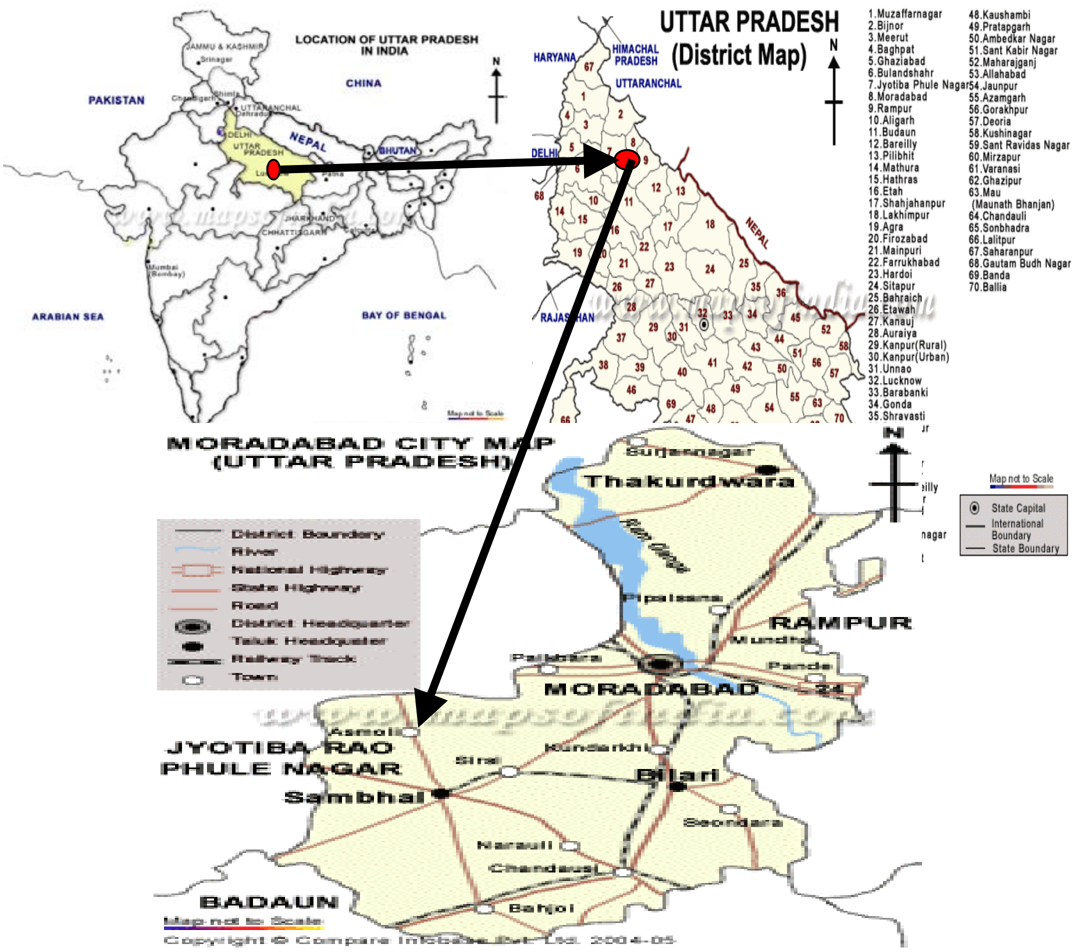
The unit is located at Asmoli in western Uttar Pradesh. The exact postal address is as:

DSM SUGAR ASMOLI
Village Asmoli, Sambhal
Distt. Moradabad - 244304 (U.P.)
Khasra Number – 198,207

DSM Sugar Asmoli is located in the midst of a progressive cane belt in district Moradabad, off the Moradabad-Delhi national highway. It is situated at a latitude and lontitude of 28°35'N and 78°37'E respectively. The map below shows the exact location of the project plant.



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

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The DSM-Asmoli Bagasse cogeneration project is a renewable energy supply side grid-connected project activity, which corresponds to sectoral scope number 1 of the UNFCCC sectoral scope list for project activities. The project involves the reduction of greenhouse gases emissions in the energy sector.

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

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The proposed project activity is a grid-connected bagasse based cogeneration plant with a high-pressure steam-turbine configuration. The project activity involves the installation of a new travelling grate type high pressure (105kg/cm2) and high capacity (170TPH) boiler along with a 30 MW double extraction-condensing type turbo-generator.

The generated steam will be used to run the newly installed turbine to generate power. The turbine is of extraction condensing type allowing for power generation both in the sugar season and off-season. The use of high pressure system allows for increased efficiency levels for electricity generation.

The 170 TPH, 105 kg/cm^2 pressure and 540 deg C temperature travelling grate type boiler is manufactured by ISGEC John Thompson, India. The 30 MW double extraction-condensing turbine is manufactured by Shin Nippon, Japan. Power will be generated at 11 kV and stepped-up on-site to 132 kV

before being transmitted to the nearby UPPCL sub-station at Sambhal. Sambhal is at an approximate distance of 14 km from the project site.

The technology of biomass based high steam pressure power generation is known and in use in India. However, the specific technology employed would be used for first time in bagasse based cogeneration system.

The individual suppliers of the equipments will train the staff in charge at DSM-Asmoli after commissioning to operate the equipments efficiently and to maintain the equipments. Apart from this, the equipment supplier will provide a complete manual giving details for the maintenance schedule and the required activities associated with it. The DSM management is implementing Quality Management System (QMS) at the cogeneration unit. Presently the systems and procedures are being established. The detailed QMS procedures will be available on its implementation. This will take care of the provisions for meeting training and maintenance needs.

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

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Year	Annual estimation of emission reduction in tonnes of CO_2e from power export
2007	103,133
2008	103,133
2009	103,133
2010	103,133
2011	103,133
2012	103,133
2013	103,133
2014	103,133
2015	103,133
2016	103,133
Total estimated reductions (tonnes CO_2e)	**1,031,330**
Total number of crediting years	10 years
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	103,133

A.4.5. Public funding of the project activity:

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The project has received no public funding.

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:

>>
Approved consolidated baseline methodology ACM0006, Version 04, 2 Nov 2006
"Consolidated baseline methodology for grid-connected electricity generation from biomass residues" is applied to the project activity

Additionality is determined by the use of "Tool for the demonstration and assessment of additionality", version 03.

"Consolidated baseline methodology for grid-connected electricity generation from renewable sources" ACM0002 version 06, 19 May 2006 is used to determine the baseline grid emission factor.

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

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The consolidated baseline methodology ACM0006 is applicable to grid connected and biomass residue fired electricity generation project activities, including cogeneration. As per the methodology, it 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)*"

The proposed project activity is the expansion of electricity generation capacity at the DSM-Asmoli sugar mill through the installation of high-pressure boiler and turbine configuration. This system will use bagasse as fuel and will be operated along with the existing cogeneration configuration. The new power generation scheme will generate electricity to meet the captive demand and the surplus electricity will be exported to the Uttar Pradesh electricity grid.

The applicability conditions of ACM0006 and their compliance with the project activity are stated below:

- **No other biomass types than *biomass residues*, as defined above, 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 is the power plant capacity expansion project and will utilise bagasse generated in the sugar mill. Bagasse is a by-product in sugar cane processing and hence, a biomass residue as defined in the consolidated baseline methodology ACM0006.

- **The implementation of project will not result in an increase of the processing capacity of biomass in the sugar factory.**
  DSM-Asmoli plant is planning to expand its cane crushing capacity, thereby increasing captive steam and power requirement. The installation of new configuration has no direct or indirect influence on the processing capacity of the Sugar mill.

- **The biomass residues at the project facility will not be stored for more than one year.**
  The project activity is designed to use all the bagasse generated in the sugar mill by operating both in season as well as off-season. Hence, the biomass residue will not be stored at the project facility for more than one year.

- **No significant energy quantities are required to prepare the biomass residues for fuel combustion**.
  Bagasse is burnt in boilers as generated from the sugar mill and does not require any specific technology for its preparation before combustion. No fuel preparation equipment has been installed at site for preparation of bagasse. Hence no significant energy quantities are required to prepare the biomass residues for fuel combustion.

Thus, the project activity covers all the applicability conditions for the methodology.

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

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Under the proposed methodology the, project boundary is drawn around the point of fuel supply to the electricity system (grid system) that the CDM project power plant is connected to.

The Indian power grid system is split into five regions. The regional grids facilitate the transfer of electricity between states, which is supplied by state-owned and central sector power generating stations. Uttar Pradesh state falls within the Northern Region, hence grid based plants supplying electricity to the Northern Grid are chosen as the sample for the analysis of the grid emission coefficient.

For the purpose of determining the baseline emissions only CO_2 emissions from fossil fuel fired power plants connected to the electricity system are included.

No GHG emissions from the project activity are included in the project boundary.

The project activity also does not include any GHG emissions related to the decomposition or burning of biomass nor does it claim for emission reductions from heat. The baseline heat emissions for the proposed project activity are not included in the project boundary as permitted in the consolidated methodology ACM0006 Version 04, 2 Nov 2006. (Details provided in section B.6.1).

The table below summarizes the gases included in the project boundary for the purpose of calculating project emissions and baseline emissions.

	Source	Gas	Included?	Justification / Explanation
Baseline	Grid electricity generation	CO_2	Yes	Main emission source
		CH_4	No	Excluded for simplification. This is conservative.
		N_2O	No	Excluded for simplification. This is conservative.
	Heat Generation	CO_2	No	The heat requirement of heat will be met through combustion of same type of biomass residue as before the project activity and it is demonstrated that the heat generated per unit of biomass in the project activity is greater than or equal to the heat generated per unit of biomass in the baseline scenario.
		CH_4	No	Excluded for simplification. This is conservative.
		N_2O	No	Excluded for simplification. This is conservative.
	Uncontrolled	CO_2	No	As per ACM0006 version 04

	burning or decay of surplus biomass residue.	CH_4	No	Not applicable under the selected baseline scenario
		N_2O	No	Excluded for simplification. This is conservative.
Project activity	On-site fossil fuel and electricity consumption due to the project activity (stationary or mobile)	CO_2	No	No fossil fuel will be consumed at the project site
		CH_4	No	No fossil fuel will be consumed at the project site
		N_2O	No	No fossil fuel will be consumed at the project site
	Off-site transportation of biomass residue	CO_2	No	Not included
		CH_4	No	Not included
		N_2O	No	Not included
	Combustion of biomass residue for electricity and / or heat generation	CO_2	No	As per ACM0006 version 04.
		CH_4	No	Not included in the baseline scenario.
		N_2O	No	Excluded for simplification. This emission source is assumed to be very small.
	Storage of Biomass residue	CO_2	No	As per ACM0006 version 04.
		CH_4	No	As per ACM0006 version 04.
		N_2O	No	As per ACM0006 version 04.

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

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The baseline scenario applicable to the proposed project activity is identified by analyzing the following alternatives with reference to the power plant:

- **Power:** How power would be generated in the absence of the CDM project activity;
- **Biomass:** What would happen to the biomass residue in the absence of the project activity; and
- **Heat:** In case of cogeneration projects: how the heat would be generated in the absence of the project activity.

Given below is the assessment for different alternatives and baseline option for the project activity.

- **Baseline scenario for power generation:**
  Without the project activity the existing boilers and turbines would have continued to operate and also meet the increased steam and power demand. Hence, the baseline scenario is the continuation of the present operations at the plant which results in a power baseline of **P4** "*The generation of power in existing and/or new grid-connected power plants*" is applicable to the project activity.

- **Baseline scenario for Biomass utilisation:**
  The bagasse generated in the sugar mill will be used to generated steam and electricity required for sugar processing. Hence alternative **B4 "***The biomass residues is used for heat and/or electricity generation at the project site"* is the applicable baseline scenario in the project case.

- **Baseline scenario for heat generation:**

The additional heat requirement of the sugar mill would have been met by burning bagasse in the present boilers. Hence, alternative **H4** ***"****The generation of heat in boilers using the same type of biomass residues"* is chosen as the baseline scenario for the project activity.

On the basis of the analysis done above, it can be deduced that alternatives **P4, B4** and **H4** are the baseline scenarios for the project activity. This specific combination of alternatives is defined under **baseline scenario 12** as per ACM0006 Version 04, 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 unit(s) are only fired with biomass residue 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 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): >>

That the project is not part of the baseline is demonstrated using the latest version (version 03) "Tool for the demonstration and assessment of additionality".

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

Sub-step 1a. Define alternatives to the project activity

The present setup at DSM Asmoli sugar unit is sufficient to meet the captive steam and power requirement of the sugar mill with increased cane crushing capacity. The power generated will only be sufficient to meet the captive requirement of the plant, leading to no electricity exports to the grid. The proposed project activity is the power plant capacity expansion project involving installation of a new high pressure (105 kg/cm^2) and high capacity (170 TPH) boilers, along with a 30 MW turbine, which will be operating next to existing biomass power generation unit and will be fired with the same biomass residue.

In the absence of the project activity DSM management would have decided to continue with the present system and generate electricity to meet the mill's captive demand with no export to grid.

Hence, the alternative options to the project activity are

- To continue operating the present power generation setup at the sugar unit.
- The proposed project activity not undertaken as a CDM project activity.

Sub-step 1b. Enforcement of applicable laws and regulations

There are no national policies relevant to the baseline and the sugar factories in India are not required to install high pressure boilers for grid based electricity generation. The alternatives presented above are plausible, credible and realistic. The alternative, which is to continue with the present situation before the decision of implementing this CDM project activity is consistent with the applicable laws and regulations. There is no policy in India that mandates the generation of electricity for grid supply from bagasse. The

policy frameworks for bagasse based grid electricity supply are governed by the state electricity regulatory commissions which detail the terms of power purchase agreements for such investments.

Step 2. Investment Analysis

Barrier analysis will be followed to determine project additionality.

Step 3. Barrier Analysis

Step 3a. Identify barriers that would prevent the implementation of type of the proposed project activity.
The project activity faces a number of risks and barriers, which the CDM helps to overcome

Technical barriers
The proposed project activity involves the installation of a boiler with 105 kg/cm^2 pressure and 540 deg C temperature rating, which is the first of its kind to be installed adjacent to a sugar unit in India. Generally the capacity of boilers used for sugar units, even at lower pressure and temperature ratings, is in the range of 60 TPH to 90 TPH, while the maximum presently installed capacity is 120 TPH. A boiler of such a large size, 170 TPH, 105 kg/cm^2 and 540 deg C, as the project activity has its own set of technical barriers, namely:

1. Bagasse handling and feeding system

The project activity involves handling of large volume of bagasse as compared to a presently installed systems and conventional fossil fuel based power generation system in particular. This is because the bagasse density if almost 1/6th of the fossil fuel. Handling and feeding six times the volume, without any buffer storage inline (which is possible in fossil and most biomasses) has its own technical limitations. Although care has been taken in the design of bagasse handling and feeding system but problems are anticipated. This is likely to prevent in achieving the rated output from the boiler on a continuous basis.

2. Attainment of high super heat steam temperature of 540 deg C

In bagasse fired boilers the maximum temperature achieved till date is 510 deg C. Due to inherent high moisture content in bagasse, around 50%, the attainment of temperature above 510 deg C is debated by experts. There are several super heater design issues that have been addressed in this boiler to achieve 540 deg C steam temperature, which is required for achieving high efficiency in the turbine but experts still have second opinion on this.

3. Design and Metallurgy of equipments

The silica solubility in steam increases with increase of pressure. The water treatment facility as well as steam drum internals required more demanding design approach to prevent silica carry over with steam, which can cause failure of super heater, turbine etc.
Metallurgy required for design critical components of plant, namely boiler steam drum, super heater, steam piping and turbine hot section had to be carefully selected particularly considering operational fluctuation encountered in firing biomass (bagasse) compared to the more compatible fossil fuel.

4. Electrical protection & safety system

Despite improvement in the stability of grid difficulties are still being encountered due to fluctuation in voltage & frequency. Such fluctuations often result in tripping of system. Frequent tripping of the system is extremely harmful to the material, particularly in high pressure & high temperature region due to fluctuating stress level. The protection system has been designed to avoid the tripping of turbine even

though the electrical load may be thrown off during grid fluctuation. This helps in avoidance of cyclical stress.

5. The condenser water treatment system

The stability of operational efficiency of system also depends on maintenance of quality of circulating water through condenser. Stricter cooling water conditioning system is installed to maintain vacuum under steady load and fluctuating conditions. This also helps reduce the stress.

The technology adopted for the project activity has low market penetration. Hence it has other inherent barriers associated with it:

- Availability of skilled manpower to operate plant continuously and efficiently: Since this project activity is being taken for first time in India, there are no trained operators and as such the project is heavily dependent on job training of the manpower and a risk is seen in equipment safety and achieving the rated output besides the question of efficiently operating the plant on continuous basis.

Availability of spare parts: since the critical components are long delivery and costly, the project risk includes the availability in case the need arises and a loss of production can happen.

Bagasse availability

The cropping pattern by farmers in Uttar Pradesh has shown significant fluctuations from cane planting to the cultivation of other commercially lucrative crops. This has resulted from the significant price fluctuations[4] in agriculture markets over the recent years in the state and due to this the continuous availability of cane for the sugar industry is a risk that the project will face. Any shortfall in the availability of cane will have an immediate impact on the export of electricity and hence the returns of the project. It is evident from the table given below that any shortfall in the availability of cane effects the number of working days that will have an immediate impact on the export of electricity and hence the returns of the project

	2001-02	2002-03	2003-04	2004-05	2005-06	Mean
Cane Production in the Region (T)	922000	1169700	1123900	1276000	1606900	1219700
Crushing in plant (T)	617700	658400	660000	641300	717700	659020
No. of working days	149	151	132	143	149	144.8

There is often diversion of cane from sugar mill to khandsaris and ghur manufactures. These manufacturers offer higher prices as they operate in unorganised sector and have no quality assurance plans. These diversions put a constraint on cane availability and hence bagasse which again may impact the viability of the project activity.

The uncertainty in weather conditions also plays an important role in determining the cane availability in the region. With less than 50% of the land under irrigation in Moradabad District area[5], there is weather related risk for cane under rain fed cultivation conditions. DSM is in the process of extending the irrigation facilities in the region and educating farmers on water harvesting but these investments will take time and hence weather related factors may impact the project.

[4] http://agricoop.nic.in/farmprices/MSP.pdf

[5] http://irrigation.up.nic.in/canals_tubewells.htm

Institutional risks and barriers
Frequently changing policy, reduction in the energy purchase rate and no policy framework for third party sale of electricity are the major threats to the project activity. The viability of non-conventional power projects exporting to grid depends mainly on the purchase tariff of the distribution company (UPPCL). UPCCL will be the primary off taker of the electric energy generated from the project activity but that too has led to constraint because of the uncertainty of the Power Purchase Agreement (PPA) with UPPCL. The power tariff rate defined by UPCCL is Rs 2.86 per kWh for base year 2006-07 and is expected to increase up to a level of 3.02 Rs/kWh in 2010-11 but the rate effective after 2010-11 is not as yet undefined.

Although the Government's emphasis on biomass-based power generation has led to increased awareness of the potential for biomass residue based power, the push to exploit these underutilized energy resources is complicated by the complex array of policies and regulations found in the Indian power sector. Although the national Government makes recommendations on power sector restructuring and pricing policies; the exact details of the application of these regulations and policies must be implemented at the state level. While some state governments have advanced policies, including buyback, wheeling and banking of electricity generated by the State Electricity Boards, others including UP have yet to adopt them.

These aspects have created a negative impact for bagasse based electricity generation project in the region. However, DSM-Asmoli has implemented this project activity considering that the additional CDM revenue will offset these risks.

Step 3 b. Show that the identified barriers would not prevent the implementation of at least one of the alternatives
Technical barriers as described in section 3a will not affect the alternative of continuing the operation of the present power generation setup at the sugar unit. Similarly, with no electricity export possible with this alternative, the project activity will be not face the institutional barriers associated with the high pressure and high capacity export configuration.

Step 4. Common practice.

Sub-step 4a. Analyze other activities similar to the proposed project activity.
Sugar factories in India historically have used low pressure and capacity configurations for the generation of process steam and electricity. The conventional technology employed among sugar mills in India is the use of low pressure rating. Generally the capacity of boilers in a sugar unit is 60 TPH to 90 TPH while the maximum installed capacity presently is 120 TPH. Although several sugar mills within UP and other parts of country have been involved in bagasse based cogeneration with the sale of electricity to regional grid, these have all been proposed as CDM activities. The installation of the high pressure (105kg/cm^2) and high capacity (170 TPH) boiler and turbine configuration under the project activity is first of its kind in India.

Sub-step 4b. Discuss any similar options that are occurring.
In Uttar Pradesh, the latest data available on bagasse cogeneration from the Sugar Technologists' Association of India lists that of the total 111 mills only 16 are exporting electricity to regional grid[6] and

[6] "List of Cane Sugar Factories and Distilleries, Season 2004-05", Published by The Sugar Technologists' Association of India, New Delhi.

of these 4 are of capacity greater than 15 MW. Furthermore, all the projects with a capacity of more than 15 MW are proposed as CDM.

The DSM-Asmoli cogeneration project should therefore not be considered as common practice in India and the successful registration of the proposed project activity as a CDM will provide an incentive for the replication of higher pressure (105 kg/cm^2) cogeneration technology in other sugar industries in the region.

B.6 Emission reductions:

B.6.1. Explanation of methodological choices:

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Scenario 12, from ACM0006 version 04, 2 Nov 2006, is the identified baseline scenario for the proposed project activity. The justification of their applicability has already been demonstrated in section B.4.

The following equation is used to calculate the net emissions reductions from the project activity:

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

Where:

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

A. Project emissions

As per ACM0006 version 04 2 Nov 2006, the project emissions (PE_y) include CO_2 emissions from transportation of biomass residue to the project site, CO_2 emissions from on-site consumption of fossil fuels due to project activity, CO_2 emissions from electricity consumption at the project site that is attributable to the project activity and CH_4 emissions from combustion of biomass.

$$PE_y = PET_y + PEFF_{CO2,y} + GWP_{CH4}.PE_{Biomass,CH4,y} + PE_{EC,y}$$

Where:

PET_y	are the CO_2 emissions during the year y due to transport of the biomass to the project plant in tons of CO_2,
$PEFF_{CO2, y}$	are the CO_2 emissions during the year y due to fossil fuels co-fired by the generation facility in tons of CO_2,
GWP_{CH4}	is the Global Warming Potential for methane valid for the relevant commitment period and,

$PE_{Biomass,CH4,y}$	are the CH_4 emissions from the combustion of biomass during the year y.
$PE_{EC,y}$	CO2 emissions during the year *y* due to electricity consumption at the project site that is attributable to the project activity.

The proposed project activity doesn't include the CO_2 emissions from off-site transportation of biomass, the CO_2 emissions from fossil fuel co-firing, the CO2 emissions from the consumption of electricity at the project site attributable to the project activity and the CH_4 emissions from the combustion of biomass. Hence,

PET_y = *0,*
$PEFF_{CO2,\,y}$ = *0,*
$PE_{EC,\,y}$ = *0* and,
$PE_{Biomass,CH4,y}$ = *0.*

Therefore,
PE_y = *0.*

B. Baseline emissions

$ER_{heat,\,y}$, $ER_{electricity,y}$ and $BE_{biomass,\,y}$ constitute the baseline emissions of the project activity.

1. Emission reductions due to displacement of heat

The baseline heat emissions for the proposed project activity are not included in the project boundary. Under baseline scenario 12 the heat emissions for the project activity are assumed to be zero. As per the ACM0006 version 04 2 Nov 2006, it is demonstrated that the heat generated per unit of biomass residue in the project activity is greater than or equal to the heat generated per unit of biomass residue in the baseline scenario (for details see Annex 3). Hence,

$ER_{heat,\,y} = 0$

2. Emission reductions due to displacement of electricity

The baseline emissions due to displacement of electricity are determined by the following equation,

$$ER_{electricity,y} = EG_y . EF_{electricity,y}$$

Where:

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

Determination of CO_2 emission factor

The calculation of EF_y is carried out through the application of relevant sections of methodology ACM0002 version 6. The sources of data for the combined margin, EF_y, are presented in the monitoring

plan and this variable will be calculated *ex post* from the average of the Simple Operating Margin (OM)[7] and the Build Margin (BM). The application of the methodology does require the use of default values for the weightings applied to the Simple OM and BM and we have applied the standard weightings of 50:50.

Calculation of operating margin

$$EF_{OM,simple,y} = \frac{\sum_{i,j} F_{i,j,y}.COEF_{i,j}}{\sum_{j} GEN_{j,y}}$$

Where:

$F_{i,j,y}$	is the amount of fuel *i* (in a mass or volume unit) consumed by relevant power sources *j* in year(s) *y*,
j	refers to the power sources delivering electricity to the grid, not including low-operating cost and must-run power plants, and including imports[8] to the grid,
$COEF_{i,j}$	is the CO_2 emission coefficient of fuel *i* (tCO_2 / mass or volume unit of the fuel), taking into account the carbon content of the fuels used by relevant power sources j and the percent oxidation of the fuel in year(s) y, and
$GEN_{j,y}$	is the electricity (MWh) delivered to the grid by source *j*.

The CO_2 emission coefficient $COEF_i$ is obtained as

$$COEF_i = NCV_i.EF_{CO2,i}.OXID_i$$

Where:

[7] The use of the Simple OM requires us to show that the proportion of low-cost/must run resources are less than 50% of total generation in the average of the last 5 years of data. Low cost/must-run resources typically include hydro, geothermal, wind/ low cost biomass nuclear and solar generation. Low-cost/must run resources identified are identified as hydro and nuclear (the CEA does not provide any generation data from low-cost biomass and wind resources in the Northern Region). The following table demonstrates the low percentage that low-cost/must run sources constitute of total generation and therefore confirms the choice of Simple OM, however this may change over the life of the project.

Units operating in the Northern Region

	2005-6 Generation, GWh	2004-5 Generation, GWh	2003-4 Generation, GWh	2002-3 Generation, GWh
Thermal	131,504	131,482	123,737	118,337
Nuclear	41,713	7,338	37,288	30,221
Hydro	6,444	36,105	7,364	8,642
Hydro/nuclear as % of total	26.80%	24.84%	26.52%	24.72%

Source: CEA Generation report, http://www.cea.nic.in/god/opm/Monthly_Generation_Report/18col_05_03.pdf#sear

[8] As described above, an import from a connected electricity system should be considered as one power source j.

NCV_i	is the net calorific value (energy content) per mass or volume unit of a fuel *i*,
$OXID_i$	is the oxidation factor of the fuel (see page 1.29 in the 1996 Revised IPCC Guidelines for default values),
$EF_{CO2,i}$	is the CO2 emission factor per unit of energy of the fuel *i*.

Where available, local values of NCV_i and $EF_{CO2,i}$ should be used. If no such values are available, country-specific values (see e.g. IPCC Good Practice Guidance) are preferable to IPCC world-wide default values.

Calculation of build margin

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y}.COEF_{i,m}}{\sum_{m} GEN_{m,y}}$$

Where $F_{i,m,y}$, $COEF_{i,m}$ and $GEN_{m,y}$ are analogous to the variables described for the simple OM method above for plants *m*.

Calculation of emission factor

$$EF_{electricity,y} = w_{OM}.EF_{OM,y} + w_{BM}.EF_{BM,y}$$

Where the weights w_{OM} and w_{BM}, as per ACM0002 version 06 19 May 2006, are 50%.

Determination of net quantity of electricity generation

Under baseline scenario 12, EG_y corresponds to 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 ($EG_{project\ plant,y}$) and (b) the difference between the total net electricity generation from firing the same type(s) of biomass residue at the project site ($EG_{total,y}$) and the historical generation of the existing power unit(s) ($EG_{historic,3yr}$), based on the three most recent years, as follows:

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

Where,

EG_y	is the net quantity of increased electricity generation as a result of the project activity (incremental to baseline generation) during the year *y* in MWh, is the net quantity of electricity generated in the project plant during the year *y* in MWh,
$EG_{total,y}$	is the net quantity of electricity generated in all power units at the project site, generated from firing the same type(s) of biomass residue 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,

$EG_{project\ plant,\ y}$	is the net quantity of electricity generated in the project plant during the year *y* in MWh,
$EG_{historic,3yr}$	is the 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 residue as used in the project plant, in MWh.

3. Baseline emissions due to natural decay or uncontrolled burning of anthropogenic sources of biomass
Under baseline scenario 12, $BE_{Biomass,y} = 0$. Also, the project participants propose to exclude the CH_4 emissions (both baseline emissions and project emissions) from the project boundary, as permitted in the consolidated methodology ACM0006 Version 04, 2 Nov 2006.

C. Leakage emissions
Under baseline scenario 12 the diversion of biomass to the project activity is already considered in the calculation of the baseline reductions in ACM0006 Version 04 and hence as per methodology leakage issues need not be addressed.

D. Emission reductions
The emission reductions equation converges to,
$ER_y = ER_{electricity,y}$

Since,
$PE_y = 0$, $ER_{heat,y} = 0$, $BE_{biomass,y} = 0$ and $L_y = 0$.

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

Data / Parameter:	$EG_{historic,3yr}$
Data unit:	MWh
Description:	Historic 3 year average net generation of existing power plant
Source of data used:	Plant records
Value applied:	25,644
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data for generation has been historically measured by energy meters situated on the site along with the power plant auxiliaries. The net generation has been determined by subtracting auxiliary consumption from total generation. Historically this data has been collected daily and has been held at the plant.
Any comment:	The time series data is provided in Annex 3

B.6.3 Ex-ante calculation of emission reductions:

As discussed in section B.6.1 emissions from the project activity and the leakages are considered to be zero in the project case. Therefore,

$ER_y = ER_{electricity,y}$

Now,

$$ER_{electricity,y} = EG_y.EF_{electricity,y}$$

In the project activity the EG_y is likely to be equal to $\left(EG_{total,y} - \frac{EG_{historic,3yr}}{3}\right)$, So, the baseline emissions are based on this value. $EG_{historic, 3yr}$ is 25,644 MWh as set out in section 6.2. Assuming that the total generation of the plant is 163,154 MWh per year this results in EG_y = 137,510 MWh. Based on annual net incremental electricity generation[9] of 137,510 MWh and a grid emission factor of 0.75 tCO_2/MWh, the total annual baseline emissions of the project activity due to displacement of electricity are estimated as 103,133 tCO_2.

Based on the values of $ER_{electricity,y}$, the annual overall emission reductions amount to 103,133 tonnes of CO_2. There are no uncertainties related to the GHG emissions since data from reliable sources is used.

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

Year	Estimation of project activity emission reductions (tonnes of CO_2 e)	Estimation of baseline emission reductions (tonnes of CO_2 e)	Estimation of leakage (tonnes of CO_2 e)	Estimation of emission reductions (tonnes of CO_2 e)
2007	0	103,133	0	103,133
2008	0	103,133	0	103,133
2009	0	103,133	0	103,133
2010	0	103,133	0	103,133
2011	0	103,133	0	103,133
2012	0	103,133	0	103,133
2013	0	103,133	0	103,133
2014	0	103,133	0	103,133
2015	0	103,133	0	103,133
2016	0	103,133	0	103,133
Total	**0**	**1,031,330**	**0**	**1,031,330**

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

B.7.1 Data and parameters monitored:

Data / Parameter:	**EF_y**
Data unit:	tCO_2/MWh
Description:	Emission factor
Source of data to be	Calculated from the weighted average of the Simple Operating Margin and Build

9 In the actual project scenario both the $EG_{projectplant,y}$ and $EG_{total,y}$ will be monitored and the minimum value of $EG_{projectplant,y}$ and the difference between $EG_{total,y}$ & the average of 3 most recent years net electricity generation will be used to determine the baseline emissions. This is as per the procedures outlined in ACM0006 ver04.

used:	Margin
Value of data applied for the purpose of calculating expected emission reductions in section B.5	As this will be determined *ex-post* we have used for the purposes of our calculations an EF value published by the CEA, 0.75 tCO_2e/MWh
Description of measurement methods and procedures to be applied:	Calculated variable.
QA/QC procedures to be applied:	Left blank on purpose
Any comment:	This variable will be calculated from the $EF_{OM,y}$ and $EF_{BM,y}$. Whilst the basis of the calculations have used the CEA published CEF we believe there are issues with the determination of this in terms of the transparency of its calculation, therefore calculated factors at the time of verification may differ from this and cause variations in the actual CERs relative to the expected CERs presented in the PDD. Data will be held throughout the crediting period and 2 years thereafter.

Data / Parameter:	$\mathbf{EF_{OM,y}}$
Data unit:	tCO_2/MWh
Description:	Simple Operating Margin
Source of data to be used:	Calculated variable but may be taken from government or reputed published data for EFs in India if these are available and calculated on the most up to date data.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See EF_y
Description of measurement methods and procedures to be applied:	This is calculated from the equations provided in ACM0002
QA/QC procedures to be applied:	Left blank on purpose
Any comment:	Given the data available in India it is expected that this will be a Simple Operating Margin. If data is not available for the year in which exports have occurred this variable will be calculated from the most recent data available. Data will be held throughout the crediting period and 2 years thereafter.

Data / Parameter:	$\mathbf{EF_{BM,y}}$
Data unit:	tCO_2/MWh
Description:	Build Margin
Source of data to be used:	Calculated variable but may be taken from government or reputed published data for EFs in India if these are available and calculated on the most up to date data.
Value of data applied for the purpose of calculating expected	See EF_y

emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	This is calculated from the equations provided in ACM0002
QA/QC procedures to be applied:	Left blank on purpose
Any comment:	If data is not available for the year in which exports have occurred this variable will be calculated from the most recent data available. Data will be held throughout the crediting period and 2 years thereafter.

Data / Parameter:	**$F_{i,y}$**
Data unit:	Mass or volume
Description:	Amount of each fossil fuel consumed by each power source/plant
Source of data to be used:	Central Electricity Authority, most recent General Review or other publication that contains fossil fuel consumption by power plants.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See EF_y
Description of measurement methods and procedures to be applied:	Measured by individual plants and reported to the CEA.
QA/QC procedures to be applied:	The external data will be rechecked to ensure correctness
Any comment:	Currently the most recent General Review published is for 2006, http://www.cea.nic.in/power_sec_reports/general_review/index_general_Review.html

Data / Parameter:	**$COEF_i$**
Data unit:	tCO_2/mass or volume unit
Description:	Emission factor
Source of data to be used:	India's Initial National Communication to the UNFCCC, http://natcomindia.org/pdfs/chapter2.pdf for the NCV and EF and IPCC data for OXID
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See EF_y
Description of measurement methods and procedures to be applied:	Measured by relevant Indian ministries or agency on their behalf.
QA/QC procedures to	Check against IPCC values

be applied:	
Any comment:	Data will be held throughout the crediting period and 2 years thereafter.

Data / Parameter:	**$GEN_{j/k/n,y}$**
Data unit:	MWh
Description:	Electricity generation of each power source/plant j, k n
Source of data to be used:	Central Electricity Authority, most recent data is from the Monthly Generation Report
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See EF_y
Description of measurement methods and procedures to be applied:	Measured by power plants and reported to CEA
QA/QC procedures to be applied:	The external data will be rechecked to ensure correctness
Any comment:	Currently the most recent generation data is published by the CEA on the following url http://www.cea.nic.in/god/opm/Monthly_Generation_Report/index_Monthly_Generation_Report.html Data will be held throughout the crediting period and 2 years thereafter.

Data / Parameter:	**Plant name**
Data unit:	Text
Description:	Identification of power source/plant for the calculation of the OM
Source of data to be used:	Central Electricity Authority, monthly generation reports
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See EF_y
Description of measurement methods and procedures to be applied:	Determined from all plants operating on regional grid
QA/QC procedures to be applied:	The external data will be rechecked to ensure correctness
Any comment:	Currently the most recent generation data is published by the CEA on the following url http://www.cea.nic.in/god/opm/Monthly_Generation_Report/index_Monthly_Generation_Report.html Data will be held throughout the crediting period and 2 years thereafter.

Data / Parameter:	**Plant name**
Data unit:	Text

Description:	Identification of power source/plant for the calculation of the BM
Source of data to be used:	Central Electricity Authority, state electricity boards and NTPC websites.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See EF_y
Description of measurement methods and procedures to be applied:	Determined from all plants operating on regional grid
QA/QC procedures to be applied:	The external data will be rechecked to ensure correctness
Any comment:	Data will be held during the crediting period and two years thereafter.

Data / Parameter:	**$GEN_{j/k/ll, y, IMPORTS}$**
Data unit:	kWh
Description:	Electricity imports to the project electricity system
Source of data to be used:	Central Electricity Authority
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See EF_y
Description of measurement methods and procedures to be applied:	Reported by Central Electricity Authority
QA/QC procedures to be applied:	The external data will be rechecked to ensure correctness
Any comment:	http://cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm Data will be held throughout the crediting period and 2 years thereafter.

Data / Parameter:	**$COEF_{i,j, y, IMPORTS}$**
Data unit:	tCO_2/mass or volume unit
Description:	CO_2 emission coefficient of fuels used in connected electricity systems
Source of data to be used:	India's Initial National Communication to the UNFCCC, http://natcomindia.org/pdfs/chapter2.pdf for the NCV and EF and IPCC data for OXID
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See EF_y
Description of measurement methods	Measured by relevant Indian ministries or agency on their behalf.

and procedures to be applied:	
QA/QC procedures to be applied:	The external data will be rechecked to ensure correctness
Any comment:	Data will be held throughout the crediting period and 2 years thereafter.

Data / Parameter:	$EG_{project\ plant,\ y}$
Data unit:	MWh
Description:	Net quantity of electricity generated in the project plant during the year *y*
Source of data to be used:	DSM-Asmoli Sugar factory records
Value of data applied for the purpose of calculating expected emission reductions in section B.5	This value will be determined annually from the records maintained at the factory. However, for estimation of emission reductions this value has been estimated as 146,419 MWh.
Description of measurement methods and procedures to be applied:	The hourly recordings of data will be taken from energy meters located at the project activity site. This data will be recorded hourly by the shift attendant and entered into logbooks on site. This hourly data will be signed off at the end of every shift by an engineer in charge of the shift and again at the end of each day and signed off by the power plant manager. The energy meters will be calibrated annually by an independent third party.
QA/QC procedures to be applied:	This parameter may be checked with the quantity of biomass fired, i.e. show that the electricity generation divided by the quantity of biomass fired results in a reasonable efficiency as compared with the previous year.
Any comment:	Data will be held for a period of 2 years after the end of the crediting period.

Data / Parameter:	$EG_{total,y}$
Data unit:	MWh
Description:	Net quantity of electricity generated in all power units at the project site, generated from firing the same type(s) of biomass residue 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:	DSM-Asmoli Sugar factory records
Value of data applied for the purpose of calculating expected emission reductions in section B.5	This value will be determined annually from the records maintained at the factory. However, for estimation of emission reductions this value has been estimated as 163,154 MWh.
Description of measurement methods and procedures to be applied:	The data from the project activity will be monitored as set out above, for the existing power plant hourly recordings of data will be taken from energy meters located at the site.

QA/QC procedures to be applied:	This parameter may be checked with the quantity of biomass fired, i.e. show that the electricity generation divided by the quantity of biomass fired results in a reasonable efficiency as compared with the previous year.
Any comment:	Data will be held for a period of 2 years after the end of the crediting period.

B.7.2 Description of the monitoring plan:

The monitoring of electricity data revolves around the power generation from the turbine generators and the auxiliary consumption of the power plant. All auxiliary units at the power plant will be metered and there will also be main meters attached to each turbine generator to determine their total generation.

The management of the plant will designate one person to be responsible for the collation of data as per the monitoring methodology. The designated person will collect all data to be monitored as mentioned in this project design document (PDD) and will report to the head of the plant. The overall CDM project management responsibility will remain with the Plant Head.

The electricity generation from turbines and auxiliary consumption will be recorded continuously on an hourly basis by the operators in the shift. At the end of the day this data will be collated by the engineer in charge and signed off by the power plant manager. The data will be recorded in logbooks by the operators and the engineer in charge will collate the data from these log books and store them electronically. The data will also be monitored on a continuous basis through a DCS system (for the new power plant) and be used as a back up and also as a cross check for the meter readings. This data will be used by engineer in charge to prepare a monthly report and send it to plant GM for verification. The monthly reports will become a part of the Management Information System (MIS) and will be reviewed by the management during the quarterly review meeting. The monthly reports will be sent to consultants for estimation of monthly emission reductions, which will also be included in the MIS. The monitoring personnel are familiar with the process of monitoring and documentation. They have been maintaining and reviewing the factory records pertaining to the sugar manufacturing; however, their training needs will be identified and attended. All the meters will be checked and calibrated each year by an independent agency and they will be maintained as per the instructions provided by their suppliers. Hence there will be no uncertainties or adjustments associated with data to be monitored.

An internal audit team, comprising of personnel from the factory but from a department other than utility, will review the daily reports, monthly reports, procedure for data recording and maintenance reports of the meters. This team will check whether all records are being maintained as per the details provided in the PDD. The audit team will also enlist the modifications/corrective actions required, if any, in more accurate monitoring and reporting. All the data and reports will be kept at the offices of the sugar mill until 2 years after the end of the crediting period or the last issuance of CERs for the project activity, whichever occurs later.

The DSM management is implementing Quality Management System (QMS) in the power plant for process standardisation. The CDM monitoring process will also be covered under the QMS (Details provided in Annex 4.

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 baseline study completed: 09/04/2007

Persons completing baseline study: Ben Atkinson, contact details as per Annex 1.
Charu Gupta, contact details as per Annex 1.
Gautam Goel, Contact details as listed in Annex I.

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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:

>>
08/12/2005

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

>>
20 years 00 months

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

>>
A fixed ten-year crediting period has been chosen.

C.2.1. Renewable crediting period

>>
Not applicable.

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:

>>
Chosen crediting period.

C.2.2.1. Starting date:

>>
01/08/2007 or the project registration date whichever is later.

C.2.2.2. Length:

>>
10 years 00 months

SECTION D. Environmental impacts

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

>>
There are no negative environmental impacts arising as a result of the project activity. The positive environmental impacts arising from the project activity are:

- Reduced carbon dioxide emissions because of displacement of fossil fuel dominated grid electricity by biomass residue based renewable electricity.
- Reduced NOx and SOx emissions that arise from the combustion of coal in power generation
- Reduced generation of ash as the biomass residue used has a lower ash content than that of Indian coal, coal typically has an ash content of 30 to 40% whilst bagasse has an ash content ranging from 1% to 2%.

The project has received the required clearances from the Uttar Pradesh Pollution Control Board (UPPCB). These approvals have been provided to the DOE at the time of validation.

Every year the plant gets consent from the Uttar Pradesh Pollution Control Board (UPPCB) for air and water pollution. That the project meets the stipulated limits will be monitored as part of the overall CDM process their compliance will be reported at annual verification.

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:

>>
Not applicable.

SECTION E. Stakeholders' comments

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

>>
The local population and the cane growers/farmers are considered the major stakeholders with respect to the project activity. The consent of the local stakeholders has been sought for by:

1. Publishing a notification of the project activity in a local news paper.
2. Organising a stakeholder meeting at the sugar mill, which was attended by 25 to 30 people. This included village sarpanch, leaders/members of local bodies and local residents.

The other stakeholders consulted are Uttar Pradesh Pollution Control Board and Uttar Pradesh Power Corporation Ltd.

A national stakeholder review has been done by getting the approval form Ministry of Environment and Forests, the Designated National Authority. An international stakeholder review was done by web hosting the PDD at the time of validation.

E.2. Summary of the comments received:

>>
To date no adverse comments have been received.

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

>>
Not applicable.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	The Dhampur Sugar Mills Limited
Street/P.O.Box:	Okhla Industrial Estate
Building:	221,
City:	New Delhi
State/Region:	New Delhi
Postfix/ZIP:	110020
Country:	India
Telephone:	+91 11 41612456, 32881805, 32881806
FAX:	+91 11 26935697
E-Mail:	dsugar@vsnl.com
URL:	www.dhampur.com
Represented by:	
Title:	Managing Director
Salutation:	Mr.
Last Name:	Goel
Middle Name:	-
First Name:	Gautam
Department:	-
Mobile:	-
Direct FAX:	+91 11 30881762
Direct tel:	+91 11 30881825
Personal E-Mail:	gautam@dhampur.com

Organization:	Agrinergy Ltd.
Street/P.O.Box:	-
Building:	Eagle Tower
City:	Cheltenham
State/Region:	-
Postfix/ZIP:	GL50 1TA
Country:	UK
Telephone:	+44 1242 506315
FAX:	+44 1242 506327
E-Mail:	-
URL:	www.agrinergy.com
Represented by:	
Title:	Director
Salutation:	Mr.
Last Name:	Atkinson
Middle Name:	-
First Name:	Ben
Department:	-
Mobile:	07960 970974
Direct FAX:	+44 1242 506327
Direct tel:	+44 1242 506315
Personal E-Mail:	ben.atkinson@agrinergy.com

Organization:	DSCL Energy Services Company Limited
Street/P.O.Box:	18, Barakhamba Road
Building:	2nd Floor, Kanchenjunga Building
City:	New Delhi
State/Region:	-
Postfix/ZIP:	110001
Country:	India
Telephone:	+91 11 23316801
FAX:	+91 11 23319062
E-Mail:	-
URL:	www.dscl.com
Represented by:	
Title:	Associate Consultant
Salutation:	Mr.
Last Name:	Gupta
Middle Name:	-
First Name:	Charu
Department:	ESCO
Mobile:	-
Direct FAX:	+91 11 23319062
Direct tel:	+91 11 23316801
Personal E-Mail:	charugupta@dscl.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The project has received no public funding.

Annex 3

BASELINE INFORMATION

The following table shows the net generation data for the last 3 years and thus permits us to arrive at a 3-year average for the determination of EG_y.

Year	MWh
2004	49,618
2005	64,778
2006	61,877
3 yr average	58,758

Emission reduction by displacement of heat:

Under baseline scenario 12, during the period of electricity generation through bagasse consumption, the additional heat demand is met by the combustion of the bagasse to generate steam. We are required to show for scenario 12 that the heat generated per unit of biomass in the project activity is greater than or equal to the heat generated per unit of biomass in the reference plant. This may be demonstrated by showing that thermal efficiency is higher in the project activity and we have provided this information in the following table where we have considered the tonnes of steam generated in the baseline per unit of biomass as compared to the tonnes of steam generated in the project per unit of biomass. We have considered the same efficiencies of the two boilers and this is conservative as the higher pressure boiler would realistically have a higher efficiency.

Consideration of heat emissions

Baseline configuration (64 kg/cm^2)			***Project configuration (105 kg/cm^2)***		
Capacity	kg/hr	1	Capacity	kg/hr	1
Enthalpy out	kCal	808	Enthalpy out	kCal	830
Enthalpy in	kCal	105	Enthalpy in	kCal	183
Calorific value fuel	kCal/kg	2,272	Calorific value fuel	kCal/kg	2,272
Efficiency	%	70%	Efficiency	%	70%
Bagasse	kg/hr	0.4421	Bagasse	kg/hr	0.4066
Steam/bagasse	mt/mt	2.26	Steam/bagasse	mt/mt	2.46

The above table therefore highlights that the project has a higher thermal efficiency than the baseline. Therefore,

$ER_{heat,y} = 0$

Annex 4

MONITORING PLAN

QMS Over view

This is a write up presenting the intended structure and coverage of the Quality Management System being planned to be implemented.

1. The Features : -
   → The QMS planned for DSM shall cover the operations of the Co-Gen Plant at Dhampur
   → The QMS is being structured in line with the requirements of the International Standard ISO 9001 : 2000
   → The QMS is being structured with a built in expandability with an idea to expand to an Integrated Management System addressing the requirements of a full fledged EMS and OHSMS, at a later stage.
2. QMS Overview :-
   → The QMS , being structured , shall be headed and governed by a Quality Manual which contains the Quality Policy, the Quality Objectives, the route map for monitoring continual improvement, the Organizational structure and the responsibility, authority and accountability .
   → The Quality Manual shall also refer and lead to the other documented Procedures under the QMS, as necessary.
   → The Quality Manual shall lead to the other vital documents and records, directly or indirectly, essential for meeting the Quality Objectives, as necessary.
   → The QMS shall implement and maintain the Internal Audit and Management Review Cycles with out fail as prescribed within the QMS.
   → The style and design of the contents of the QMS shall be bearing in the importance and relevance of the QMS with respect to the co- generation plants, particularly with respect to the CDM.
3. Highlights of QMS Implementation :-
   → The Operational processes are identified as sub processes of the main business process in line with the Process model approach for describing any operating system.
   → Quality Manual and other level documents jointly describe the QMS unambiguously to the extent that the intent of the quality policy is clearly visible and understood at all levels.
   → The Quality Objectives and the targets fixed for operation are after due consideration of practicability and the CDM requirements.
   → The operational data emerging out of records are compiled and analyzed at frequency suitable both for the QMS and the CDM.
   → The system for Records Control shall ensure the necessary records are available for CDM evaluation and validation purposes as prescribed.
   → The Training need identification shall be effectively carried out with due focus on the level of awareness on QMS as well as CDM.
   → Overall, it is ensured that the QMS established shall not, in any way, hinder the achieving of the committed CDM results. It is also taken care of that both theoretical documentation and the practical implementation are done in a way so as to augment the CDM goals.
   → The Communication (internal and external) channels shall be defined with due clarity under the QSM so that the data flow up and down is smooth, timely and accurate enough to evaluate CDM results at specified periodicity.

→ The Internal Auditors shall be appraised of the importance and relationship of QSM / CDM and their role as auditors.
→ The MRM (Management Review) system shall also have the CDM status and Data as one of the essential agenda points in addition to the standardized requirements.
→ The QMS shall contain the fundamental requirements of an emergency preparedness System in line with the EMS (ISO 14001), with an idea to mature into a formal EMS later. (Even though, the ISO 9001 does not warrant this, this shall be aimed in view of the Organizational safety status.