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

CONTENTS

Annexes

Revision history of this document

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

SECTION A. General description of small-scale project activity

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

>>
Shree Chhatrapati Shahu RE Project
Version 4
16/08/2007

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

>>
The project activity is undertaken by Shree Chhatrapati Shahu Co-operative Sugar Factory Ltd., Kagal, Kolhapur, India. The project seeks to generate renewable electricity from bagasse, a renewable biomass material, that is produced from the milling of the sugar cane. The electricity generated will be exported to the state electricity grid which in the absence of project activity would be generated primarily through the combustion of fossil fuels leading to emissions of greenhouse gas. The factory will also make significant contribution to the sustainable development of the area surrounding the plant.

The project activity involves the installation of a new boiler and turbine generator at the sugar factory. This will enable the export of 7.43MW of electricity to the grid in the season and 10.69MW in the off-season.

New	Boiler	Turbine
Capacity	70TPH	12.5MW
Operating Temperature	485°C	480°C
Operating pressure	67kg/cm^2	64kg/cm^2
Manufacturer	KCP	Siemens
Type	Water Tube	Condensing cum extraction

The existing power demand at the factory is satisfied by the following boilers and turbines.

Existing	Boiler	Turbine
Capacity	2 X 27TPH ,40TPH and 20TPH	1.5MW and 2.5MW
Operating Temperature	340°C	310-320°C
Operating pressure	21kg/cm^2	18-20kg/cm^2
Manufacturer	Backan/Wolf and KCP	BHEL & Triveni
Type	Water Tube	Back pressure

In the existing system, two boilers with capacities of 27TPH and one with a 20TPH capacity will be decommissioned. The 40TPH boiler will produce steam for the mills of sugar plant. All the existing turbines will be decommissioned after stabilization of the new power plant.

Contribution to Sustainable development

The factory makes a significant contribution to sustainable development not just indirectly through its co-operative structure but also directly. The co-operative structure of the sugar factory results in all the profits of the factory being returned to the members (who are all farmers supplying cane to the factory) in the form of a higher cane price. Therefore any improvements carried out at the factory will filter back to the farmers. The factory is also directly involved in a number of extension activities with the farmers and provides educational and health facilities to its workers. The project itself is expected to increase employment opportunities for the local population.

The extension work carried out by the factory is wide ranging – from the guaranteeing of loans provided to farmers by banks through to the provision of seed and fertilizer at nominal rates. The factory serves about 25,000 farmers from 91 villages located in the surrounding areas.

The project will contribute to the sustainability of the factory and thus foster further economic development in the surrounding area through the strengthening of agricultural activities. The generation of renewable electricity will also reduce the dependence on existing and planned grid based fossil fuel based generation. This will have a positive impact not only through the reduction in emissions of greenhouse gases associated with such generation, which is predominantly coal based (see section on determination of the baseline), but also through a reduction in the emissions of other harmful gases (NOx and SOx) that arise from the combustion of coal.

The proposed CDM project is undertaken in the co-operative sugar sector in Maharashtra and will act as a catalyst to others wishing to install grid based generation. This is of significant importance in the state given that there are over 150 co-operative factories that contribute to the livelihoods of the rural population.

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)	If Party wishes to be considered as a project participant
India (host)	Cooperative entity: Shree Chhatrapati Shahu Co-operative Sugar Factory Ltd	No
UK	Private entity: Agrinergy Ltd	No

The official contact for the project activity will be Shree Chhatrapati Shahu Co-operative Sugar Factory Ltd as listed in Annex I.

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

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

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A.4.1.1. Host Party(ies):

>>
India

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

>>
Maharashtra state

A.4.1.3. City/Town/Community etc:

>>
Kolhapur district, Kagal town

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

>>
The complete postal address of the sugar factory is:
Shree Chhatrapati Shahu Co-operative Sugar Factory Ltd
Shrimant Jayashingrao Ghatge Bhavan
Kagal – 416 216
District Kolhapur
Maharashtra, India

The geographical location of Kolhapur[1] is Latitude: 16.42°N and Longitude: 74.16°E. The sugar factory is located at a distance of 20km from Kolhapur.

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

>>
Type I – Renewable Energy Projects
I D – Grid connected renewable electricity generation

All the required guidelines will be met for compliance with local safety and environment legislation. Consents from state pollution board in the past demonstrate that the project proponents have followed these guidelines and all future consents will be based on any new guidelines specified by the pollution control board. The technology is available in India and the technical support/training will be provided at commissioning.

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

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A 7 year renewable crediting period has been chosen.

Year	Estimation of annual emission reductions in tonnes of CO_2e
Year 2007-2008	39,202
Year 2008-2009	39,202
Year 2009-2010	39,202
Year 2010-2011	39,202
Year 2011-2012	39,202
Year 2012-2013	39,202

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

Year 2013-2014	39,202
Total estimated reductions (tonnes of CO_2e)	274,414
Total number of crediting years	7
Annual average of the estimated reductions over the crediting period (tCO_2)	39,202

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

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No public funds will be invested in the project activity.

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

Appendix C, paragraph 2 of the Simplified Modalities and Procedures for Small-Scale CDM project activities states:

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

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

As there is currently no registered CDM project at the site either large scale or small scale, the project will meet the criteria on debundling.

SECTION B. Application of a baseline and monitoring methodology

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

>>
I D – Grid connected renewable electricity generation
Version 10, 23 December 2006[2]

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

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Grid connected renewable electricity generation
The project activity will establish a grid connection and the electricity supplied from the project activity, through the combustion of bagasse (a renewable biomass material), would be expected to supplement

[2] http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html

existing and planned electricity generation from the grid, the majority of which is fossil fuel based. The project activity therefore satisfies the applicability condition relating to renewable biomass and supply of electricity to a distribution system that is currently operating on fossil fuel.

In the project activity, the new turbine generator has a capacity of 12.5MW, which therefore qualifies under the small scale rules as this is below the eligibility limit of 15MW. No emission reductions are being claimed for heat generation from the new boiler, therefore we do not need to account for the thermal capacity of the boiler.

The new renewable electricity generating unit is physically distinct and the existing units will not be operated once the new unit starts generating.

B.3. Description of the project boundary:

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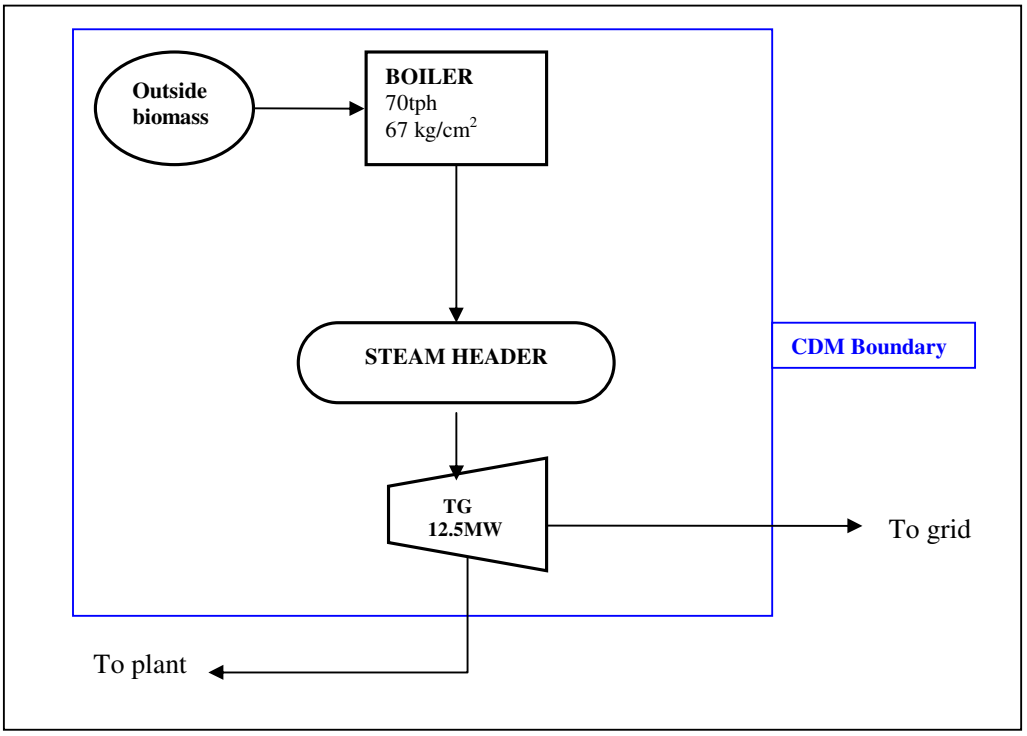
In line with the guidance in "Appendix B of the simplified modalities and procedures for small-scale CDM project activities" the boundary for category I.D. projects "encompasses the physical, geographical site of the renewable generation source". The project boundary includes the equipment installed for the operation of the power plant, the main elements of which are the boiler, turbine generator, condenser, water treatment plant, effluent treatment plant, electrostatic precipitator, step up plant/transformers, transmission lines and the Western grid. The emissions from the transport of outside biomass have been included as project emissions and are therefore included in the boundary.



For the purposes of the project activity the relevant grid is defined by the power generating units serving the same grid as the project activity. In the case of India there are regional grids which facilitate the

transfer of electricity between states and which are supplied by central sector power stations operating in the region. Maharashtra is part of the Western Region (along with Gujarat, Madhya Pradesh, Chhattisgarh and Goa) and we have therefore undertaken an analysis of the Western grid to determine the carbon emission factor. This provides a complete analysis of the power plants that the project will affect. We do not believe that the national grid is appropriate given the limited interconnectivity of the regional grids and the size of the project relative to national power generation capacity.

B.4. Description of baseline and its development:

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Referring to Appendix B of the Simplified Baseline and Monitoring Methodologies the baseline for the project activity is the MWh exported to the gird multiplied by the grid emission coefficient (tCO_2/MWh) calculated using approach 9 (a)[3] - A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the approved methodology ACM0002. We do not include power to the factory as our baseline assumes that sugar factories are power independent. In the specific case of the project activity, the baseline scenario is that the sugar factory remains self sufficient in power. That this is the case and that the project activity is not the baseline has been demonstrated in section B.5

Data used to determine the baseline scenario

Baseline data	Key information	Source
Grid generation	Generation data of grid based generating units	Central Electricity Authority
Grid emissions	Fossil fuel consumption of grid based generating units	Central Electricity Authority
Capacity expansions	Timing of expansions to determine build margin	State electricity boards and generating companies
Net calorific value of fossil fuel used in grid plants		India's National Communication to UNFCCC or IPCC
Emissions factor of fossil fuel used in grid plants		India's National Communication to UNFCCC or IPCC
Oxidation factor of fossil fuel used in grid plants		IPCC

The baseline emission reductions would be from the electricity exported by the project activity to the grid and the same has been detailed in section B.6.1.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

In line with attachment A to appendix B of the simplified M&P for small-scale CDM project activities demonstration of additionality focuses on the barriers facing the project - technological barriers, investment barriers and a brief analysis of prevailing practice in the state. In showing that the project is

[3] AMS-1.D - http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html

additional we demonstrate that it is not part of the baseline scenario, which in the case of Shree Chhatrapati Shahu RE Project is that the grid continues to operate and expand based on predominantly fossil fuel generation.

The main barrier in undertaking bagasse based grid supply using a high-pressure configuration (which is more capital intensive as compared to low pressure configuration) is the financial returns associated with the project and access to finance. In the case of co-operative sugar factories relative to other private mills, the access to finance is more of a barrier. The reasons for this are that co-operative sugar mills distribute their entire profits through the cane price to their members (the farmers). This therefore limits access to equity which is required to undertake investments. Co-operative sugar mills therefore find it extremely difficult to invest due to their underlying structure and their resultant access to capital. The situation is compounded by the fact that members typically prefer short term returns over longer term returns which investments in bagasse based grid supply entail.

All assumptions inherent in the financial analysis will be made available to the validator but the following is a summary of the main points and results. The electricity price is set at Rs 3.05/kWh,[4] escalated at a compounded rate of 2% per annum, which relates to the current terms in the power purchase agreement (PPA) with the Maharashtra State Electricity Board. The costs relate to maintenance, salaries and administrative expenses. A further expense is the cost of bagasse bought from outside and bagasse that is consumed for the auxiliaries.[5]. Analysing the project IRR in the light of these revenues and costs we arrive at an IRR of 7.89% without the inclusion of CER revenue and 12.47% when CER[6] revenues are included[7].

Furthermore the risks in the pricing and supply of bagasse are a substantial barrier to the project activity. The factory is planning to purchase some bagasse on the open market, an amount equivalent to 36 days of operation. Not only have bagasse prices exhibited volatility in the recent past there are also risks to outright supply. We have assumed a bagasse price going forward of Rs 1,000/mt, but in 2004/05 the average price was much higher Rs 1400/mt. High opportunity costs for bagasse will make the project activity unviable and in order for the project to achieve an acceptable rate of return the price of bagasse would have to fall to Rs 750/tonne[8].

The project activity is assumed to operate for 245 days to achieve the financial results indicated above, any reduction in the days of operation will have an impact on the project's viability. The following table shows the impact of adjusting the days of operation and the bagasse price. It should be noted that the assumptions on prices of bagasse and operating days are already quite aggressive and it is unlikely that the days will be increased beyond the estimate.

[4] The EPA (energy purchase agreement) between Maharashtra State Electricity Distribution Co Ltd and M/s Shahu is based on the MERC order dated 16/8/2002, the EPA was signed on 5/4/2006. The price in the EPA is Rs 3.05/unit for the first year and escalated at the rate of 2% per annum from the second year.

[5] Costs: Salaries - 5% of revenues, Admin - 1% of revenues, Maintenance -2% of capital cost, Bagasse cost - Rs 1000/mt.

[6] CER price- 10$/$tCO_2$, 1$ = Rs 41.

[7] The benchmark against which these returns should be judged has been taken as the PLR in India, the rates at which banks extend loans, national newspapers detail these rates, and at the time of determining the investment decision was 11.5%.

[8] Operating on a price of Rs 750/mt would yield a project IRR without CER revenues of 12.1%, an acceptable rate based on the current Prevailing Lending Rate of India banks.

		Days of operation		
		180	220	250
Bagasse price, Rs/mt	800	-1.98%	5.79%	11.03%
	1000	-5.17%	3.14%	8.59%
	1200	-7.99%	0.72%	6.38%

In relation to the access to finance barrier the project has approached a government buyer of certified emission reductions and the project has been accepted into their programme. As part of the terms of the sale agreement the project is expecting to receive 30% of the value of certified emission reductions as an up-front payment. This will be used by the project activity as quasi equity to overcome the barriers it faces to accessing capital.

The CER revenues (which can be priced forward and is euro or dollar denominated) will act as a buffer to, at least partially mitigate, the risks and barriers facing the project.

The alternative to the project activity is to continue to operate low pressure cogeneration system. The project activity will use high pressure boiler and this presents a new set of operational challenges for the management. Normally sugar factories generate power through low pressure configurations, which are technically easier to operate. The factory has not historically exported to the grid and further operational barriers facing the project relate to supply of power to the grid. Whilst synchronization, variations in the grid voltage and frequency and grid failure affect all power plants the relative impact on the project is higher given that the primary activity of the factory is the manufacture of sugar and not electricity.

In line with the small scale guidance the national policies relevant to the project have been included and revolve around the power tariff. These have been incorporated into the financial analysis and are therefore explicitly presented.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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Emission Reductions

The emission reductions from the project activity are calculated by the application of the following equation:

$$ER_y = ER_{electricity,y} - PE_y - L_y$$

Where:

ER_y	emission reductions of the project activity during the year y in tons of CO_2
$ER_{electricity, y}$	emission reductions due to the displacement of electricity during the year y in tons of CO_2
PE_y	project emissions during the year y in tons of CO_2
L_y	leakage caused due to project activity in tons of CO_2

$ER_{electricity,y}$

In terms of emission reduction due to electricity ($ER_{electricity,y}$), the only source in the project activity is through the generation of electricity. The calculation of these emission reductions is as follows:

$$ER_{electricity} = EG_y.EF_y$$

Where:

EG_y	quantity of electricity exported to the grid (MWh)
EF_y	grid based emission factor, determined through the combined margin approach as set out in ACM0002 tCO_2e/MWh

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) 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 weights of 50:50.

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 Western 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 Western Region

	2002-3 Generation,GWh	2003-4 Generation,GWh	2004-5 Generation,Gwh	2005-6 Generation,Gwh
Thermal	116701	140,296	141,678	164959
Nuclear	8642	5,673	6,203	6081.57
Hydro	30221	9,393	8,061	15830.95
Total	155564	155,362	155,942	186871.5
Hydro/nuclear as % of total	33%	9.70%	9.15%	11.75%

Source: CEA Generation report, http://www.cea.nic.in/newweb/opt2_mon_gena.htm

The following equations are used for the calculation of the Simple OM:

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

Where:

$F_{i,j}$	amount of fuel *i* (in mass or volume) consumed by relevant power sources *j* in year(s) *y*
j	power sources delivering electricity to the grid, not including low operating cost and must run power plants, and including imports to the grid

$COEF_{i,j}$	CO2 emission coefficient of fuel *i* (tCO2/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 of oxidation of the fuel in year(s) *y*
$GEN_{j,y}$	electricity (MWh) delivered to the grid by source *j*

And

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

Where:

NCV_i	net calorific value (energy content) per mass or volume unit of fuel *i*
$EF_{CO2,i}$	CO_2 emission factor per unit of energy of the fuel *i*
$OXID_i$	oxidation factor of the fuel

The following equations are used for the calculation of the Build Margin:

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

Where:

$F_{i,m,j}$, $COEF_{i,m}$, $GEN_{m,y}$ are analogous to the variables described for the Simple OM.

The combined margin is calculated from the following equation:

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

Where the weights w_{OM} and w_{BM} are by default 50%.

Project Emissions

The factory plans to purchase biomass residues from outside and therefore emissions related to transport are considered as follows:

$$PET_y = N_y \cdot AVD_y \cdot EF_{km,CO2,y}$$

where:

PET_y	CO_2 emissions during the year y due to transport of the biomass residues to the project plant (tCO_2/yr)
N_y	Number of truck trips during the year y
$EF_{km,CO2,y}$	Average CO_2 emissions factor for the trucks measured during the year y (tCO_2/km)

There is no provision to fire fossil fuels in the boilers and therefore emissions from the use of fossil fuels are not accounted.

Therefore, $PE_y = PET_y$

Leakage
As the energy generating equipments are not transferred from another activity leakage is assumed to be zero.

Therefore, the emission reduction equation reduces to:

$$ER_y = ER_{electricity,y} - PE_y$$

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

(Copy this table for each data and parameter)

Data / Parameter:	**$EF_{km,CO2}$**
Data unit:	tCO_2/km
Description:	Emissions factor for transport of biomass
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 3: Mobile combustion, Section 3.2.1.2
Value applied:	0.001108
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data from the plausible options in Table 1-32 has been chosen most conservatively, i.e. we have chosen data that results in the highest emission factor which will result in the largest transport emissions.
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

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From section B.6.1 the emission reductions are given as:

$$ER_y = ER_{electricity,y} - PE_y$$

$$ER_{electricity} = EG_y.EF_y$$

Where:

EG_y	quantity of electricity exported to the grid annually (MWh)
EF_y	grid based emission factor, determined through the combined margin approach as set out in ACM0002 tCO_2e/MWh

EG_y = 48,774 MWh
EF_y has been set at 0.81 tCO_2e/MWh [9]

The emissions due to transport of the biomass residue to the project plant are estimated as:

[9] EF_y will be determined *ex-post* but for the purposes of the calculation we have taken the CEA published data. At the time of verification this factor will be re-calculated.

$$PET_y = N_y \cdot AVD_y \cdot EF_{Km,CO2}$$

Where

PET_y CO_2 emissions during the year y due to transport of the outside biomass to the project plant (tCO_2/yr)

N_y Number of truck trips during the period y.

AVD_y Average round trip distance (from and to) between the outside biomass fuel supply sites and the site of the project plant during the year y (km),

$EF_{km, CO2}$ Average CO_2 emission factor for the trucks measured during the year y (tCO_2/km)

N_y = 2,752
AVD_y = 100 km
$EF_{km,CO2}$ = 0.00110799 tCO2/km

This gives emissions from transportation of biomass as:

PET_y = 305 tCO_2e

$PE_y = PET_y$ = 305 tCO_2e

Therefore, $ER_y = ER_{electricity,y} - PE_y$
= 39,507 - 305
= 39,202 tCO_2

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

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Year	Estimation of project activity emissions (tonnes of CO_2e)	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
Year 2007-2008	305	39,507	0	39,202
Year 2008-2009	305	39,507	0	39,202
Year 2009-2010	305	39,507	0	39,202
Year 2010-2011	305	39,507	0	39,202
Year 2011-2012	305	39,507	0	39,202
Year 2012-2013	305	39,507	0	39,202
Year 2013-2014	305	39,507	0	39,202
Total tonnes of CO_2e	2,134	276,549	0	274,414

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

B.7.1 Data and parameters monitored:

(Copy this table for each data and parameter)	
Data / Parameter:	**EG_y**
Data unit:	MWh
Description:	MWh exported to the grid
Source of data:	Plant records maintained by the power plant manager and sales to MSEB
Value of data	48,774 MWh
Description of measurement methods and procedures to be applied:	Data from the turbine generator will be continuously recorded by the turbine operator. This will be collated at the end of each day and reported to the head of power plant. This will form the basis for calculations and will be tallied against the data record by the MSEB which will be taken monthly by the factory and officials from MSEB. In case there is a difference between the factory records and the MSEB record, the MSEB record will prevail.
QA/QC procedures to be applied:	The invoices generated for the sale of power to the grid will form a QA/QC check.
Any comment:	Data will be kept for the crediting period and two years thereafter.

Data / Parameter:	**N_y**
Data unit:	Integer
Description:	Number of trips undertaken to transport biomass to the project site
Source of data to be used:	Transporter receipts
Value of data applied for the purpose of calculating expected emission reductions in section B.5	2,752
Description of measurement methods and procedures to be applied:	Each truck that enters the factory will be recorded at the weighbridge from which the number of trucks and will be established. The data will be kept for the later of, two years after the end of the crediting period or the last issuance of CERs for the project activity. 100% of the data will be monitored.
QA/QC procedures to be applied:	Procedures to cross check this with financial statements may be provided.
Any comment:	

Data / Parameter:	**AVD_y**
Data unit:	Km
Description:	Average return distance
Source of data to be used:	Transporter receipts
Value of data applied for the purpose of calculating expected emission reductions in section B.5	100

Description of measurement methods and procedures to be applied:	The average return distance will be recorded for each truck on entry to the factory. The data will be kept for the later of, two years after the end of the crediting period or the last issuance of CERs for the project activity. 100% of the data will be monitored.
QA/QC procedures to be applied:	This data may be cross checked with payments for transportation of the material.
Any comment:	

Data / Parameter:	**EF_y**
Data unit:	tCO_2/MWh
Description:	Emission factor
Source of data to be used:	Calculated from the weighted average of the Simple Operating Margin and Build 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, 0.81 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:	**$EF_{OM,y}$**
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:	**$EF_{BM,y}$**
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 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:	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:	Left blank on purpose
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 be applied:	Check against IPCC values
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:	Left blank on purpose
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	See EF_y

for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Determined from all plants operating on regional grid
QA/QC procedures to be applied:	Left blank on purpose
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:	Left blank on purpose
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	Reported by Central Electricity Authority

applied:	
QA/QC procedures to be applied:	Left blank on purpose
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 and procedures to be applied:	Measured by relevant Indian ministries or agency on their behalf.
QA/QC procedures to be applied:	Left blank on purpose
Any comment:	Data will be held throughout the crediting period and 2 years thereafter.

B.7.2 Description of the monitoring plan:

>>

The CDM data will be collected monthly and be kept in the plant records. A detailed monitoring and verification report will be produced by the plant and this will form the basis of the roles and responsibilities and collection frequency of the data required to monitor the project activity.

More generally the generation data from the turbine will however be continuously recorded by current transformers and a manual hourly record will be made by the turbine operator. This data will be collated at the end of each day and reported in the daily operating report to the factory management, the responsibility for which will be with the Power Plant Manager. This data will form the basis of the ongoing calculation which will then be tallied against the monthly recordings taken by the MSEB and a representative of the factory.

The sugar factory has a Quality Management System certificate ISO: 9001-2000 and this will make sure that the factory has well defined procedures for the collection of data in general.

The organization has trained the staff to ensure that the monitoring process is appropriate and effective and the evidence for the same has been provided to the DOE during validation.

The calculation of the ex-post EF will be carried out annually in line with the guidance in the monitoring section. This will be performed by Agrinergy and all data sources used for the calculation will be kept for the period of the crediting period and two years thereafter.

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

>>
27/12/2006
Ben Atkinson, Agrinergy Ltd - Project Participant
Ajit Kulkarni, Shree Chhatrapati Shahu Co-operative Sugar Factory – Project Participant
Contact information as listed in Annex 1.

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>>
09/01/2006 – Letter of Intent for the purchase of 12.5MW turbine generator.

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

>>
20years 0 months

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

A seven year renewable crediting period has been chosen.

C.2.1. Renewable crediting period

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

>>
15/08/2007 or the date of registration whichever is later.

C.2.1.2. Length of the first crediting period:

>>
7 years 0 months

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
Not applicable.

C.2.2.2. Length:

>>
Not applicable.

SECTION D. Environmental impacts

>>

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

>>

In relation to the baseline scenario no negative environmental impacts will arise as a result of the project activity.

The positive environmental impacts arising from the project activity are:

- A reduction in carbon dioxide emissions from the replacement of fossil fuels which would be generated under the baseline scenario
- A reduction in the emissions of other harmful gases (NOx and SOx) that arise from the combustion of coal in power generation

The factory will meet all local and national environmental legislation and this will be verified by the continuous monitoring by the Maharashtra Pollution Control Board. The factory has also conducted an EIA.

A "Consent to Establish" has been obtained by the factory. The "Consent to Operate" has been provided to Shree Chhatrapati Shahu Co-operative Sugar Factory Ltd in previous years when they operated a bagasse based captive power plant and thus shows that the factory complied with existing environmental legislation. The consent is given on the basis that the factory operates within the prescribed limits of the Air and Water Act. In the case of the factory these are air emissions of less than 150 mg/Nm^3 for particulate matter and trade effluent not exceeding 30 m^3/day and limits on BOD and COD will not exceed 100mg/l and 250mg/l respectively.

The "Consent to Operate" will be obtained annually from the MPCB and this will be provided at the time of each 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:

>>

The environmental impacts are not considered significant.

SECTION E. Stakeholders' comments

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

>>

The stakeholder review has been conducted on three levels:

- A local stakeholder review
- A national stakeholder review which will be undertaken through the approval by the Ministry of Environment and Forests and consent to operate from the Maharashtra Pollution Control Board
- An international stakeholder review which will be conducted at the time of validation

The institutions are already in place for the national and international stakeholder review and any comments arising from these processes will be incorporated prior to registration. The project has received approvals from the Indian designated national authority (the Ministry of Environment and Forests) and the UK designated national authority (DEFRA).

The local stakeholder review has been conducted by the publication of notice on 1st February, 2007 in Indian Express (Pune Edition) and on 30th January, 2007 in Daily Sakal (local marathi newspaper). A no objection certificate has been obtained from the local municipality.

E.2. Summary of the comments received:

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The comments received mainly revolved around the benefits to the local community and availability of electricity in the local areas. Further, the stakeholders asked about any adverse effect from the project activity to the local community or to the surrounding environment.

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

>>

The project proponent answered all the comments in detail and explained the benefits of running a power plant from a renewable source like bagasse as compared to using fossil fuels. The concept of CDM was also explained and the resulting benefits to the sugar factory and its shareholders. Further, it was made clear that the project activity does not lead to any impact on environment as it uses bagasse a renewable fuel and the power plant will adhere to the regulations from the pollution control board. Further, the sugar factory is a cooperative and the benefits from CDM will ultimately reflect in the returns to the farmers who are the shareholders.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Shree Chhatrapati Shahu Co-operative Sugar Factory Ltd
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Direct tel:	+44 1425 206345
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The project has not received any public funding.

Annex 3

BASELINE INFORMATION

This section has been left blank on purpose.

Annex 4

MONITORING INFORMATION

Please refer to section B.7.1 and B.7.2.

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