CLEAN DEVELOPMENT MECHANISM
SIMPLIFIED PROJECT DESIGN DOCUMENT
FOR SMALL-SCALE PROJECT ACTIVITIES (SSC-CDM-PDD)
Version 02

CONTENTS

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>.

SECTION A. General description of the small-scale project activity

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

"Biomass based renewable energy project in a Solvent Extraction Plant, India"

Version: 1.6
Date: 11/09/2007

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

The project activity entails use of renewable biomass for thermal and electrical energy generation at Ambika Solvex Ltd. (ASL). ASL operates a solvent extraction plant, extracting crude oil from Soya seeds. Prior to project activity, steam was generated in a boiler based on coal and electricity demand was met from the Madhya Pradesh State Electricity Board (MPSEB), which is part of Western Region (WR) grid in India.

The project activity is taken up in two phases. In first phase, the project activity entails combusting renewable biomass in a newly installed boiler for steam generation and thus doing away with the use of coal. In second phase, one back pressure turbine would be installed to meet the electricity demand in the plant. One additional boiler will be installed to run the turbine at rated capacity. The existing two boilers 3TPH (Regn. no. MP 4267) & 6TPH (Regn no. MP 4528) are kept as stand by units, while one boiler 6TPH (Regn. No. MP 4173) is scrapped.

The project activity would result in emission reductions in following two ways –

- Avoiding coal combustion in steam generation with biomass based steam
- Displacement of Grid Power, which is primarily based on fossil fuel combustion with biomass based power

Pre-project Status:

Steam Generation	Power generation	Boiler data
Coal Based	MPEB grid power	Capacity = 3 TPH- 1 No., 6 TPH- 1 No. 6 TPH- 1 No. Pressure = 17.5 kg/cm2 Temperature = 209 Deg C

Post-project Status:

Phase	Steam Generation	Power generation	Equipments proposed	Timeline
Phase I of project activity	Renewable Biomass Based	MPEB grid power	Boiler No.1 Capacity = 10 TPH (Regn no. MP 4620) Pressure = 45 kg/cm2	Commissioned in April 2006

			Temp. = 450 Deg C	
Phase II of project activity	Renewable Biomass based	Renewable Biomass based	Boiler No. 2 Capacity = 16 TPH Pressure = 45 kg/cm2 Temp. =450 Deg C Turbine Capacity = 1.2 MW Type = Back pressure turbine	Expected to be commissioned by March 2008 Expected to be commissioned by Sep. 2007

The project activity faces a number of investments & operational barriers and project proponent envisage coming up with the project activity despite the barriers and back this up with CDM based revenues.

Sustainable development by project activity:

The project activity helps in the sustainable development on many counts.

1. It helps in reduction in Green House Gases (GHG) emissions in steam and power generation.
2. It also helps in conservation of natural resources i.e. coal
3. The project activity creates employment opportunities during the project stage and operation and maintenance of the plant.
4. Use of biomass residues in the region has provided a distinct source of revenue to the people in the region.
5. This will provide necessary impetus for industries to come up with more such projects in the area.
6. The project will encourage technology providers in putting more R&D efforts and funds towards new technology development.

A.3. Project participants:

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity (ies) Project participants (*) (as applicable)	Kindly indicate if the party involved wishes to be considered as project participant (yes/no)
Government of India (Host)	M/s. Ambika Solvex Ltd. (Private Entity)	No

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

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

A.4.1.1. Host Party (ies):

Host Country: India

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

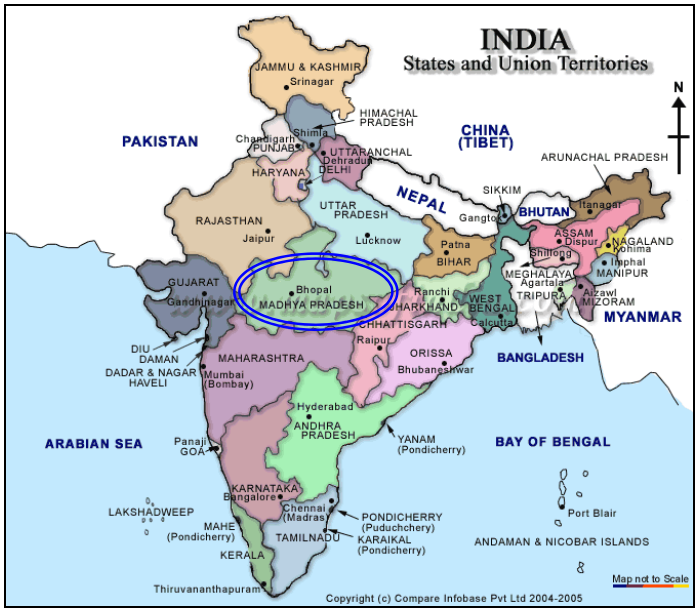
State of Madhya Pradesh

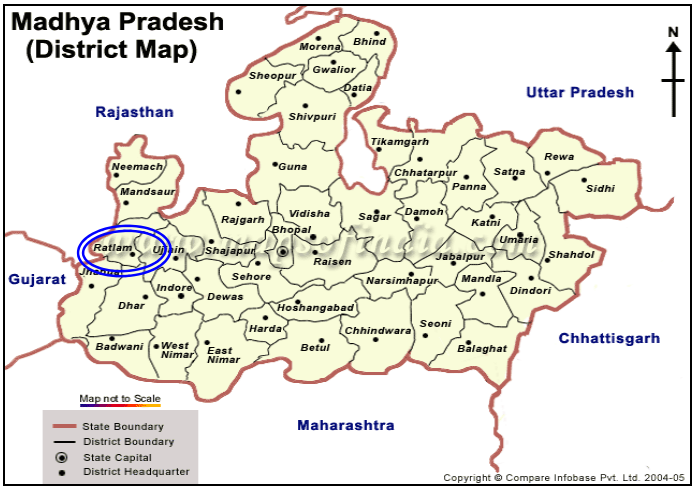
A.4.1.3. City/Town/Community etc:

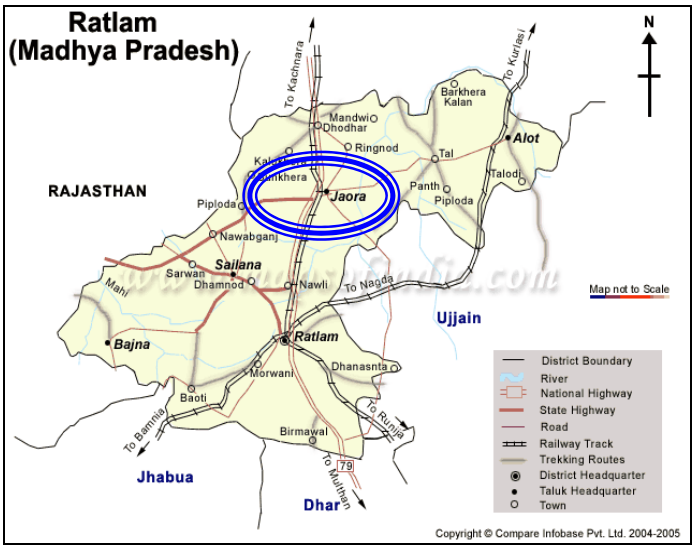
Village : Mhow Neemuch Road, Jaora
Tehsil : Jaora
District: Ratlam

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

The plant is located in New Industrial Area on Mhow-Neemach Road on SH-31 in Jaora district. The nearest railway station is Ratlam and nearest airport is Devi Ahilyabai Airport, Indore in the state of Madhya Pradesh. Jaora is at 75.09E longitude and 23.43N latitude. The location is shown in the maps below:







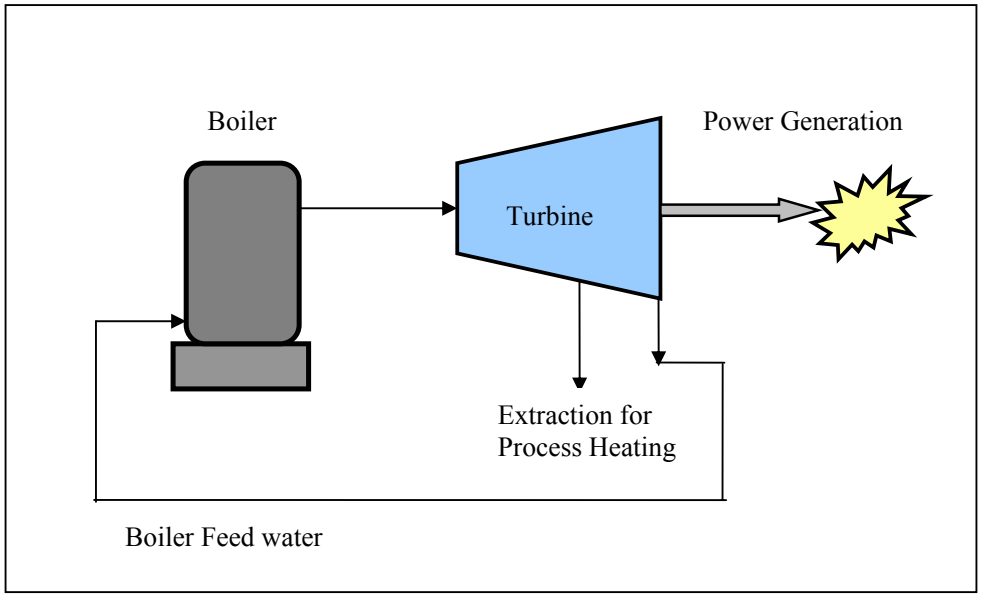
A.4.2. Type and category (ies) and technology of the small-scale project activity:

The project activity is a small scale project activity and confirms to Appendix B of the simplified modalities and procedures for small-scale CDM project activities.

TYPE I: Renewable Energy Projects,
Category **IC: "Thermal energy for the user";** Version 09, Scope (dated 23 December 2006)

Prior to project activity, steam was being generated in a boiler using coal as fuel. Now ASL has installed another boiler which is capable of firing biomass residues such as mustard & Soya husk and completely done away with the use of coal. The boiler being used in the project activity is biomass based pulsating grate boiler. This is indigenous technology and no technology transfer has taken place. However, this kind of technology is new to ASL.

Technology in the project activity:
The scheme of the technology which is being used in the plant is as follows,



Boiler No.1	Capacity = 10 TPH Pressure = 45 kg/cm2 Temperature = 450 Deg C	Pulsating Grate Boiler
Boiler No.2	Capacity = 16 TPH Pressure = 45 kg/cm2 Temperature = 450 Deg C	Pulsating Grate Boiler
Turbine	Capacity = 1.2 MW	Back Pressure turbine

The capacity of the Boiler No.1 is 10 TPH @ 45 kg/cm2 and 450 Deg C. Currently ASL is generating only steam at a reduced pressure @ 17.5 kg/cm2 to meet its process heat requirement . When the turbine will get installed then Boiler No.1 will be operated at rated pressure to generate 600 kW power. Later on during phase II, Boiler No. 2 will be installed and the turbine will run at rated capacity i.e. 1.2 MW. The project follows conventional steam-power route.

A.4.3. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed small-scale project activity, including why the emission reductions would not occur in the absence of the proposed small-scale project activity, taking into account national and/or sectoral policies and circumstances:

The project activity helps in GHG emissions reduction in two ways –

1. Avoidance of fossil fuel burning i.e. coal for steam generation
2. Avoidance of Grid Power use in Soya extraction plant with renewable power from the project activity

In the absence of project activity ASL would have continued generating steam using coal in existing boiler and power demand be met from Grid power which is primarily fossil fuel based. The project would not have happened without CDM registration as it faces barriers such as technical, lack of financial resources for the company, etc.

A.4.3.1 Estimated amount of emission reductions over the chosen crediting period:

Years	Annual estimation of emission reductions in tones of CO2 e
2007-08	22116
2008-09	25476
2009-10	25476
2010-11	25476
2011-12	25476
2012-13	25476
2013-14	25476
2014-15	25476
2015-16	25476
2016-17	25476
Total estimated reductions (tonnes of CO2 e**)**	251396
Total number of crediting years	10 years
Annual average over the crediting period of estimated reductions (tonnes of CO2e**)**	25140

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

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

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

As per Appendix C of the Simplified Modalities and Procedures for Small-Scale CDM project activities- "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"

The project activity is not a de-bundled component of a large project activity as –

There is no small scale CDM project activity or an application registered by ASL, in the same project category in the last two years within 1 km of the project boundary of the proposed small-scale project activity.

SECTION B. Application of a baseline methodology:

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

The project activity is a small scale project activity and conforms to Appendix B of the simplified modalities and procedures for small-scale CDM project activities.

TYPE I: Renewable Energy Projects,
Category **IC: "Thermal energy for the user";** Version 09, Scope (dated 23 December 2006)

B.2 Project category applicable to the small-scale project activity:

Category	Applicability Criteria	Project Status
TYPE IC: Thermal Energy for the user	This category comprises renewable energy technologies that supply individual households or users with thermal energy that displaces fossil fuels. Examples include solar thermal water heaters and dryers, solar cookers, energy derived from renewable biomass for water heating, space heating, or drying, and other technologies that provide thermal energy that displaces fossil fuel. **Biomass-based co-generating systems that produce heat and electricity for use on-site are included in this category.**	The project activity is a renewable biomass based co-generating system that produces heat and electricity for use on-site at ASL's Solvent Extraction Plant
	Where generation capacity is specified by the manufacturer, it shall be less than 15MW.	The power generating capacity is 1.2 MW (< 15 MW)

	For co-generation systems and/or co-fired systems to qualify under this category, the energy output shall not exceed 45 MWthermal. E.g., for a biomass based co-generating system the capacity for all the boilers affected by the project activity combined shall not exceed 45 Mwthermal. In the case of the co-fired system the installed capacity (specified for fossil fuel use) for each boiler affected by the project activity combined shall not exceed 45 MWthermal.	The boilers total output capacity is less than 45 Mwthermal.

Important information for determination of baseline scenario:

Variable	Value	Data Source
Power generation in the project activity	As measured	Plant operation data
Steam consumption in the plant	As measured	Plant operation data
Coal emission factor	96.1 tCO2e/TJ	IPCC default values
Western Grid Emission Factor	0.810 tCO2e/ MWh	Central Electricity Authority data on carbon emission factors for power generation in the western regional grid in India http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver2.pdf
Boiler Efficiency	88.7 %	Recommendations from Central Electricity Authority (CEA) and Expert Committee. http://www.cercind.org/steam.doc

B.3. 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:

Proposed project activity is eligible to use simplified methodologies as it conforms to project category in Appendix B of the simplified modalities & procedures for small scale CDM-project activities under **TYPE IC– "Thermal energy for the user"**

- The project activity is a renewable biomass based co-generating systems that produce heat and electricity for use on-site as required by the methodology.
- The total thermal output from the boilers in the project activity is less than 45 MWth.
- It is not a debundled component[1] of a larger project activity, as it qualifies guidelines in "appendix C to the simplified M&P for the small-scale CDM project activities for guidance on how to determine whether the proposed project activity is not a debundled component of a larger project activity"

[1] Refer section A.4.5

The proposed project activity will reduce anthropogenic GHG emissions by using renewable fuels like biomass instead of fossil fuel.

In the absence of the project activity, ASL would have continued with earlier system of burning coal for its steam requirement and usage of grid power for meeting electricity demand in the plant. Absence of CDM project activity would have led to continuation of the old practice causing GHG emissions. Now it has started using husk for its thermal energy requirement along with some power generation.

Additionality Analysis

This project adheres to all the national/ state statutory requirements. There are no regulations or constraints which can prevent implementation of this project.

Additionality of the project activity is proven through barrier analysis as per Attachment A of Appendix B of the simplified modalities and procedures for small-scale CDM project activities.

Technological barrier

Conventional coal fired, low pressure, shell type and smoke tube boilers were used for steam generation at ASL prior to project activity. The boilers have been replaced with latest technology multi-fuel fired, higher pressure, and water tube bi-drum boiler. In addition to this, a turbine is being put up for power generation purpose. Operating and maintaining low pressure coal fired boilers is simpler as the technology is proven. In the project activity operation of multi-fuel fired, higher pressure boiler need comparatively higher degree of technical expertise in its operation and maintenance. These are summarised as follows -

1. Use of biomass residues such as Mustard and Soya husk in combustion poses serious operational problems. Mustard contains chlorine and alkali which makes it worse for combustion at higher temperature. The fusion temperature of alkali is low and the fusion results at boiler tubes leading to low boiler efficiency due to more resistance to heat transfer in the boiler tubes and erosion of tubes with ultimately failure of the boiler which means higher maintenance cost of the system. To avoid this it requires more frequent cleaning of tube bank and other parts of the boiler.
2. Pre-project activity had low pressure boiler @ 17.5 kg/cm2 which required moderate skills to operate it. As against this, power plant operations require skilled manpower. So in order to have smooth operation of the multi-fuel biomass based boiler, it requires skilled manpower.
3. Water tube boilers are required to be operated with appropriate feed water and boiler water conditions. In order to maintain parameters like pH, iron, copper, TDS, and others it requires treatment before use in boiler. This requires more attention towards water treatment and hence expenses in water treatment plant.
4. Synchronization of boiler, steam demand in the plant and turbine operations require high degree of technical skills.

The above listed problems are specific to use of biomass residue in the project activity and that requires more in terms of maintenance and operational efforts from the project proponent, in the absence of which performance of the project activity may be affected severely.

Other barriers

Lack of Financial Resources

ASL would invest Rs.64 million for this project activity. This amount will be arranged from internal accruals. ASL's performance for last four financial years has not been very good. Cash flows for all these years are in the range of Rs. 5 million to Rs. 33.5 million which is much lesser than the required investment. ASL would have gone for some funding as loan but they don't want to increase financial risk which reflects from reducing D/E ratio over the past years. ASL is investing in this project activity in a phased manner to avoid big investments in one go and support it from CDM backed revenues. Also, Soya oil industry is growing at a rapid pace in India. India imports almost 50% of edible oil requirement. Soya oil in particular saw strong growth. Imports of crude Soya oil are increasing day by day. Following table shows the performance of edible oil market -

Year	Soya crude oil import	Palm oil import
	(Tonnes)	(Tonnes)
Nov 03- April 2004	236,990	911,520
Nov 04- April 2005	735,352	1,010,000
% Growth	210%	10.8%

Source: Solvent Extractor's Association of India[2]

This trend is expected to continue in future also. Supporting this buoyant overall trend, growth rates for individual product categories within the Indian market are expected to be very good. An investment in growing market always reaps good benefits. If ASL goes for an investment in core business of edible oil then it will pay back handsomely. So it does not make a case for the proposed project activity unless is backed by some other benefits like CDM.

Biomass Availability and Price Risk

The project location is surrounded by places like Neemuch, Mandsaur, Ratlam, Jhabua, Ujjain, Dhar, and Indore which are agriculturally rich. As per the data published by "The Soybean Processors Association of India"[3] of position of area and crop in the state of Madhya Pradesh, this region is cultivating lot of Soybean crop. Total soybean production stands at 116,6000 tonnes per season. This quantity is more than sufficient to fulfil husk demand of ASL.

However, there are factors which may impact availability of biomass residue. These are,

- The cultivation and crop yield depends on many factors like monsoon, demand in the market, prices of other crops, etc. This makes an impact on overall production of crops. All these factors are not in control of the project proponent. There is risk involved in using such kind of fuels.
- Lack of proper logistics network for collection and delivery of biomass residues have not created much of its use as fuel in industrial applications. In normal practice it is burnt inefficiently or left to rot in the field. To ensure continuous & economical fuel supply project proponent will have to develop a viable fuel collection mechanism.

[2] http://www.seaofindia.com

[3] http://www.sopa.org

It has also been observed in other parts of the country that biomass prices increased significantly because of supply-demand gap, improper collection mechanism, inconsistency in production, etc. There have been some instances where prices were shooting up from Rs. 1000/ton to Rs. 2200/ton of husk.

Common practice analysis

Not many similar industries generate steam and/ or power based on biomass residues in the area. ASL is the first Solvent Extraction plant in the region to run its plant on biomass residues. Other players have not gone for similar projects due to presence of various barriers as discussed above sections. There are following Soya extraction plants in the radius of 150-200 km from ASL operating their plants with steam generation based on coal:

SN	Plant Name*	Capacity (TPD)	Fuel used
1	Plant No.1	1000	Coal
2	Plant No.2	1500	Coal
3	Plant No.3	750	Coal
4	Plant No.4	800	Coal
5	Plant No.5	500	Coal

*detail of the plants mentioned in the above table is presented as annex to DOE for validation.

It is quite evident from the above paragraph that such technology is not a business-as-usual practice in nearby area. Everybody is using coal fired boilers; ASL is the first one to implement husk fired energy generation and the only player in this area to take risk with new technology without having single installation of such kind in the region.

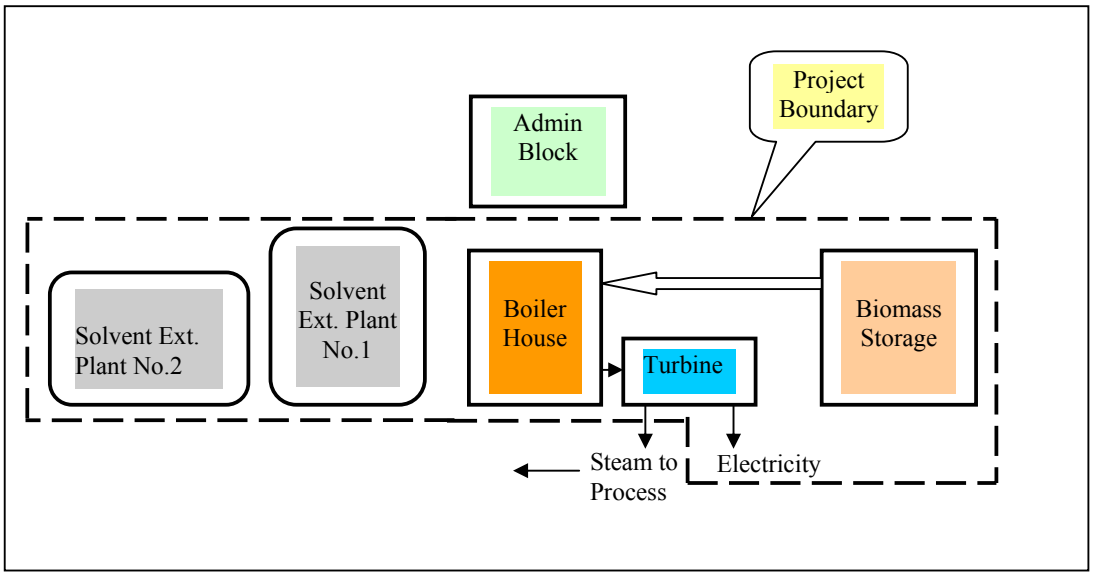
Summary:
The project activity is additional to the baseline scenario as it reduces emissions below baseline level and faces many barriers which prohibit its implementation. Carbon credits will help bridge the profitability gap, as well as provide financial support for investing in development of dedicated biomass residual fuels.

B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the small-scale project activity:

"The project boundary is the physical, geographical site of the industrial facility, processes or equipment that is affected by the project activity".

This project boundary includes the production facility, steam generating boilers, turbine, and fuel storage area, auxiliary equipments & allied systems and Western Region Grid.

Project boundary is illustrated in the following diagram:



B.5. Details of the baseline and its development:

For steam generation:
The simplified baseline is the fuel consumption in the technologies that would have been used in the absence of the project activity times an emission coefficient for the fossil fuel displaced. In the absence of the CDM project activity, ASL would have continued using coal based boiler for steam generation. Hence the baseline for the project activity is continued use of coal for steam generation. To estimate emissions in the baseline scenario, conservative boiler efficiency figures as prescribed by CERC are taken. IPCC default values for coal related emission coefficients are used.

For power generation:
As per AMS-ID, the baseline for power generation through renewable sources is the MWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg tCO2equ/MWh) calculated. WR grid is chosen for estimating grid emission factor.

Estimation of grid emission factor:
The weighted average emission of the current generation mix is being considered for the purpose of grid emission factor as per the guidelines given in Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories.
Source: Central Electricity Authority data on carbon emission factors for power generation in the regional grid in India.
http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver2.pdf
Date: June 2007.

Developed by:
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SECTION C. Duration of the project activity / Crediting period:

C.1. Duration of the small-scale project activity:

C.1.1. Starting date of the small-scale project activity:

06/05/2005

C.1.2. Expected operational lifetime of the small-scale project activity:

25 Years, 0 Months.

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

C.2.1. Renewable crediting period:

-NA-

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

-NA-

C.2.1.2. Length of the first crediting period:

-NA-

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

20/08/2007 (or date of registration whichever is later)

C.2.2.2. Length:

10 years, 0 months.

SECTION D. Application of a monitoring methodology and plan:

D.1. Name and reference of approved monitoring methodology applied to the small-scale project activity:

The project activity is a small scale project activity and conforms to Appendix B of the simplified modalities and procedures for small-scale CDM project activities.

Category **IC: "Thermal energy for the user";** Version 09, Scope (dated 23 December 2006)

Monitoring shall consist of 9(b) of AMS-IC as per indicative simplified baseline and monitoring methodologies for selected small scale CDM project activity categories.

D.2. Justification of the choice of the methodology and why it is applicable to the small-scale project activity:

This project proposed to implement following monitoring methodology, this is inline with monitoring guidelines provided in Appendix B:

Category **IC: "Thermal energy for the user";** Version 09, Scope (dated 23 December 2006)

AMS-IC is the baseline methodology applicable to the project activity as explained in section B.2 and so the monitoring methodology used is also AMS-IC.

D.3 Data to be monitored:

ID number	Data Source	Data variable	Data unit	Measured (m), calculated © or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
1.1	Plant Data	Quantity of Steam to process	Tonnes	M	Daily	100%	Paper and Electronic	
1.2	Plant Data	Enthalpy of steam to process	kcal/kg	C	Daily	100%	Paper and Electronic	Extracted from steam tables based on the steam pressure and temperature
1.3	Plant Data	Pr. of steam to process	kg/cm2	M	Daily	100%	Paper and Electronic	
1.4	Plant Data	Temp. of steam to process	Deg C	M	Daily	100%	Paper and Electronic	
1.5	Plant Data	Power Generation	kWh	M	Continuous	100%	Paper and Electronic	Gross power generation from project activity
1.6	Plant Data	Auxiliary Power Consumption	kWh	M	Continuous	100%	Paper and Electronic	
1.7	Plant Data	Net Electricity Generation	kWh	C	Continuous	100%	Paper and Electronic	
1.8	Plant Data	Quantity of biomass consumed	Tonnes	M	Daily	100%	Paper and Electronic	Can be cross checked with biomass purchase receipts
1.9	Plant data	Quantity of Coal consumed	Tonnes	M	Monthly	100%	Paper and Electronic	Can be cross checked with coal purchase receipts
1.10	IPCC default value	NCV of fossil fuels	kcal/kg	-	Yearly	-	Paper and Electronic	Value would be updated annually based on latest IPCC default
1.11	Plant data	Quantity of HSD consumed	Litres	M	Monthly	100%	Paper and Electronic.	Can be cross checked with fuel receipts
1.12	Published literature, official reports, surveys etc.	Surplus biomass availability in the region	tonnes	E	Yearly	-	Paper	For the purpose of estimation of leakage emissions due to competing use of biomass residues in the project activity.
1.13	Sample	Net calorific	Kcal/ kg	E	Sample	-	Paper	For estimation of leakage in

	biomass test	value of biomass residue			based test			project activity due to use of biomass residue which is not surplus in a given year

D.4. Qualitative explanation of how quality control (QC) and quality assurance (QA) procedures are undertaken:

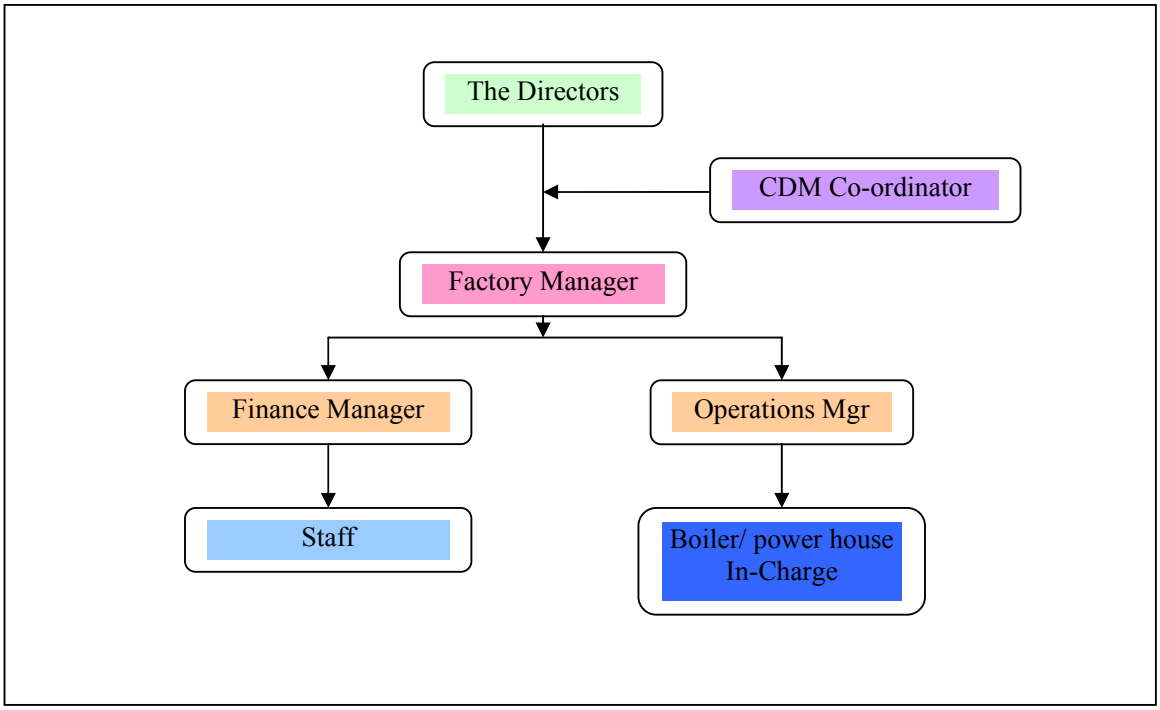
Data *(Indicate table and ID number e.g. 3.-1.; 3.2.)*	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
Table D.3.(ID numbers from 1.1 to 1.6, 1.8,1.9, 1.11)	Low	The data will be collected as part of normal plant level operations. QA/QC requirements consist of periodic checks on data collection and data keeping processes. This shall be done during internal audits which are being done every 3 months period. In addition to this, routine check on monitored data is being done. If any erratic behaviour of meter is observed then the same shall get replaced with new one and faulty meter shall be sent for repair.
Table D.3 (ID number 1.7)	Low	Based on lab test data; samples would be drawn from coal & HSD receipts;
Table D.3 (ID number 1.12)	Low	Based on Published literature, official reports, surveys etc.
Table D.3 (ID number 1.13)	Low	This is based on sample biomass tests conducted for estimation of net calorific value. Test would be conducted every month for each of the biomass residue type consumed.

D.5. Please describe briefly the operational and management structure that the project participant(s) will implement in order to monitor emission reductions and any leakage effects generated by the project activity:

Project Management Planning:

ASL has procedures in place for operation and maintenance of the plant machinery, equipments and instruments. The equipments used for CDM project are part of these procedures. And documents on maintenance and rectification done on all the monitoring equipments are maintained.

Organization structure for CDM project activity is as follows:



Mr. K C Garg is overall responsible for registration, monitoring, measurement and reporting.

A CDM project team is constituted with participation from Operation & Maintenance, Quality, and finance. This team will first be trained on CDM concepts and then they will be given the responsibility of collecting & maintaining data. This team will meet periodically (Proposed period of 3 months) to review CDM project activity and also to check data collected to estimate emissions reduction. One person dedicated to CDM related activity is appointed. This person would be responsible for gathering data from all relevant functions, and to keep records of the same. Responsibilities of all these people are as follows,

- ***Unit Head- Director:*** Overall responsibility of compliance with the CDM monitoring plan.
- ***CDM Co-ordinator:*** Responsibility for completeness of data, reliability of data (calibration of meters), and monthly report generation
- ***Factory Manager:*** He looks after day to day running of the plant. And also looks into activities like finance and operations related to CDM.
- ***Finance Manager:*** He heads finance department and keeps records related to husk, equipment purchase, etc.
- ***Operation Manager:*** He is having overall responsibility of keeping the plant operational in excellent conditions, monitoring of data for CDM purpose in the plant.
- ***Shift In-charge/ Staff:*** Responsibility of daily report generation and assisting their respective heads.

Training of CDM team personnel:
The training of the CDM team and plant personnel has been carried out on CDM principles, CDM activities, monitoring of data and record keeping through a planned schedule made in advance and a record of various training programmes undertaken would be kept for verification.

During commissioning of the boiler system, training was imparted to all the concerned people by the supplier. This was focussed on things related to operation and maintenance. Similar practices shall be adopted for turbine also.

Operation and Maintenance:
Proper operation and preventive maintenance practices have been implemented. A preventive maintenance schedule is prepared and adhered to. All the instruments are checked on regular basis to confirm their compliance with expected results.

Day to day data collection and record keeping:
Plant data shall be collected on operation under the supervision of the respective Shift-in-charge and record would be kept in daily logs.

Reliability of data collected-
The reliability of the meters is checked by testing the meters on yearly basis. Documents pertaining to testing of meters shall be maintained. Third party has been identified which conducts calibration of all such equipments. Calibration of following meters shall be done on yearly basis.

Sr. No.	Equipments	Monitored data
1	Steam Flow Meter	Quantity of steam sent for process heating
2	Steam Pressure Gauge	Pressure of steam sent for process heating
3	Temperature Gauge (process steam)	Temperature of steam sent for process heating
4	Energy Meter	Gross Power Generation in the project activity
5	Energy Meter	Auxiliary Power Consumption
6	Weighing Scale	Measurement of fuels used in the project activity.

Frequency-
The frequency for data monitoring shall be as per the monitoring details in Section D of this document.

Archiving of data-
Data shall be kept for two years after crediting period, total 12 years for the project activity.

Checking data for its correctness and completeness:
The CDM team would have the overall responsibility of checking data for its completeness and correctness. The data collected from daily logs is forwarded to the concern person as well as for electronic record keeping.

Emergency preparedness:
The project activity does not result in any unidentified activity that can result in substantial emissions from the project activity. Following emergency situations are envisaged in this project activity,

1. Non-availability/ shortage of biomass
2. Power requirement during start up

However, due consideration is given to usage of coal during start up firing. In case of non-availability of power from the plant, ASL may use HSD fired DG sets for short time. Emissions due to such activities are also considered in Project Emissions.

Report generation on monitoring:
After verification of the data and due diligence on correctness if required an annual report on monitoring and estimations shall be maintained by the CDM team and record to this effect shall be maintained for verification.

Corrective Action Plan:
All the records shall be checked during internal audits every 3 months. Conformance with the set processes shall be ensured. If any deviation is observed then proper corrective actions shall be taken.

D.6. Name of person/entity determining the monitoring methodology:

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SECTION E.: Estimation of GHG emissions by sources:

E.1. Formulae used:

E.1.1 Selected formulae as provided in appendix B:

Category I C does not provide specific formulae to calculate reduction in GHG emissions by sources due to project activity. Formulae used are given in E.1.2 as below.

E.1.2 Description of formulae when not provided in appendix B:

E.1.2.1 Describe the formulae used to estimate anthropogenic emissions by sources of GHGs due to the project activity within the project boundary:

Project Emissions:

ASL is going to use only husk as a fuel in its plant. In case of shortage, ASL will source it from longer distances by investing more in supply chain of Husk. However, proper and efficient operation of the biomass based plant may require some fossil fuels, e.g. for start-ups or during winter operation. Alongwith this, there may be some usage of HSD for DG sets also so both things have been taken care of in Project Emissions.

A) Project Emissions due to Auxiliary Fuel (Coal) Consumption:

$$PEFF_{yA} = \sum FF_{project\ plant,\ y} \times NCV \times EF_{IPCC} \times OXID \times 4.184 / 10^{6}$$

Where
$PEFF_{yA}$ = Project emissions from on-site fuel combustion in year y, tCO2e
$\sum FF_{project\ plant,\ y}$ = Quantity of fossil fuel combusted in the project plant in year y, tonne
NCV = Net calorific value of fossil fuel, kcal/kg.

EF_{IPCC} = Emission factor as per IPCC default value, tCO2/ TJ.
OXID = Oxidation factor; IPCC default value.

B) Project Emissions due to DG Sets:

$PEFF_{yB} = \sum FF_{project\ plant,\ y}$ X NCV X EF_{IPCC} X OXID X 4.184/ 10^6

Where
$PEFF_{yB}$ = Project emissions from on-site HSD combustion in year y, tCO2e
$\sum FF_{project\ plant,\ y}$ = Quantity of HSD combusted in the project plant in year y, tonne
NCV = Net calorific value of HSD, kcal/kg.
EF_{IPCC} = Emission factor as per IPCC default value, tCO2/ TJ.
OXID = Oxidation factor; IPCC default value.

Total Project Emissions:

$PEFF_{y} = PEFF_{yA} + PEFF_{yB}$

E.1.2.2 Describe the formulae used to estimate leakage due to the project activity, where required, for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities

If the energy generating equipment is transferred from another activity or if the existing equipment is transferred to another activity, leakage is to be considered. There is no equipment transfer from/ to any other activity. Hence there is no leakage from the transfer of the equipment.

Other aspects of leakage are considered as per the **"General guidance on leakage in biomass project activities, Version 02, EB 28"** which has been discussed as below:

The project activity proposes using surplus biomass residues (soya husk) available surplus in the region. The guidance has highlighted three distinct possibilities of leakage in biomass usage.

Biomass type	Activity/source	Shift of pre-project activities	Emission from biomass generation/cultivation	Competing use of biomass
Biomass from forest	Existing forest	-	-	X
	New forest	X	X	-
Biomass from croplands or grasslands (woody or non woody)	In the absence of the project the land would be used as cropland/wasteland	X	X	-
	In the absence of the project activity land would be abandoned	-	X	-

Biomass residues or wastes*	Biomass residues or wastes are collected and used	-	-	X

*Applicable to the project activity.

The project activity involves procurement of biomass residues available in the region. For this as per the guidance, the project participant shall evaluate annually if there is a surplus of the biomass in the region of the project activity, which is not utilized. It will be demonstrated using published literature, official reports, surveys etc. that the quantity of available biomass in the region, is at least 25% larger than the quantity of biomass that is utilized including the project activity, then this source of leakage can be neglected otherwise this leakage shall be estimated and deducted from the emission reductions.

There is enough biomass residue available in the region that goes unutilized and hence leakage emissions on account of competing use of this biomass residue has not been considered. However, this will be monitored annually which will be available during verification.

In case when the biomass residues available in the region is not at least 25% higher than the quantity of biomass that is utilized including the project activity, following procedure would be adopted for estimation of leakage-

$Ly = EF_{CO2,LE} * \sum BF_{k,y} * NCV_k$

Where;

L_y = Leakage emissions during year y, tCO2
$EF_{CO2, LE}$ = CO2 emission factor of the most carbon intensive fuel used in the country, tCO2/ GJ, National Emission Factor Value (0.1062 tCO2/GJ for Lignite)[4]
$BF_{k,y}$ = Quantity of biomass residue k used in project activity not available in surplus in the region in year y
NCV_k = Net calorific value of biomass residue k, GJ/ tonne

E.1.2.3 The sum of E.1.2.1 and E.1.2.2 represents the small-scale project activity emissions:

$PE_y = PEFF_y + L_y$

Where
PE_y = Project emissions in year y, tCO2e
$PEFF_y$ = Emissions due to on-site combustion of fossil fuels in the project plant in year y, tCO2e
L_y = Leakage Emissions in year y, tCO2e

E.1.2.4 Describe the formulae used to estimate the anthropogenic emissions by sources of GHGs in the baseline using the baseline methodology for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities:

[4] http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver2.pdf, page 32

Baseline Emissions:

$BE_y = BE_{y\,(1)} + BE_{y\,(2)}$

Where,
BE_y = Total baseline emissions in year y, tCO2e
$BE_{y\,(1)}$ = Baseline emissions due to combustion of fossil fuel in year y, tCO2e
$BE_{y\,(2)}$ = Baseline emissions due to grid power consumption in year y, tCO2e

Due to combustion of fossil fuels in heat generation in the absence of project activity

$BE_{y\,(1)} = Qty_{Process}$ X Enthalpy/ η_{Boiler} X EF_{IPCC} X OXID X 4.184/ 10^3

Where
$BE_{y\,(1)}$ = Baseline emissions in the year y, tCO2e
$Qty_{Process}$ = Quantity of steam going to the process in year y, tonnes
NCV = Net calorific value of coal, kcal/kg
η_{Boiler} = Efficiency of the boiler, %
EF_{IPCC} = Emission factor as per IPCC default values, tCO2e/ TJ
OXID = Oxidation factor

Due to power consumed from the grid in the absence of project activity.

2) $BE_{y\,(2)} = NET_y$ X GEF

Where
$BE_{y\,(2)}$ = Baseline emissions in the year y, tCO2e
NET_y = Net electricity generated in year y, MWh
GEF = Grid emission factor, tCO2e/ MWh

E.1.2.5 Difference between E.1.2.4 and E.1.2.3 represents the emission reductions due to the project activity during a given period:

$ER_y = BE_y - PE_y$

Where
ER_y = Emissions reduction in year y, tCO2e
BE_y = Baseline emissions in year y, tCO2e
PE_y = Emissions due to project activity in year y, tCO2e

E.2 Table providing values obtained when applying formulae above:

Sr.No.	Years/ Particulars	Baseline Emissions		Total BE's	Project Emissions	Leakage	Total CER's
		Due to Coal	Power Gen.				
1	2007-08	18793	3359	22152	36	0	22116
2	2008-09	18793	6718	25512	36	0	25476

3	2009-10	18793	6718	25512	36	0	25476
4	2010-11	18793	6718	25512	36	0	25476
5	2011-12	18793	6718	25512	36	0	25476
6	2012-13	18793	6718	25512	36	0	25476
7	2013-14	18793	6718	25512	36	0	25476
8	2014-15	18793	6718	25512	36	0	25476
9	2015-16	18793	6718	25512	36	0	25476
10	2016-17	18793	6718	25512	36	0	25476
	Cumulative CER Generation		251396				
	Average CER Generation		25140				

SECTION F.: Environmental impacts:

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

The project activity does not require environment impact study to be undertaken as per regulations for pollution control in India. The project activity envisages the use of biomass residue as fuels in steam and power generation and displacement of fossil fuels. There is no adverse impact by the project activity on the environment (air, water, soil). It has only positive impacts in the form of emission reduction of GHG associated with fossil fuel burning.
Due care is being taken by the project proponent in order to protect environmental conditions. Following measures have been taken towards achievement of this,

1. Transportation of biomass/ash through covered trucks.
2. Proper storage of biomass/coal in a covered shed.
3. Fire fighting arrangement at fuel storage yard.

SECTION G. Stakeholders' comments:

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

Stakeholder consultation for the project activity has been conducted to account for the views of the people being affected either directly or indirectly due to the project activity. This has been carried out at different levels of stakeholders.

Following stakeholders were identified for the project activity:

1. Local populace
2. Biomass residue suppliers
3. Madhya Pradesh Pollution Control Board

Meetings were conducted with various biomass suppliers in the area. Letters were sent to SDM office at Jaora and Gram Panchayat to take their views on the project activity. Later meeting was held with Gram Panchayats of villages around the area on 08/05/2006.

A meeting was held with Sarpanch of Rewas, Neeman and Meematedi villages in Jaora Tehsil. ASL described them about the project activity and the impacts it would make on the people in the area.

In addition to this, ASL invited views of one and all through newspaper advertisement dated 07/05/2006 in a local news paper (Amrit Manthan).

G.2. Summary of the comments received:

Biomass suppliers extended their support to the project activity from ASL and appreciated the efforts of the project proponent.

People from the villages have expressed their satisfaction on the project activity. They told that the project would generate additional revenue for the local people and that it will help in improving the environment in and around the area. They extended their support and agreed to contribute through dialogue and discussion in future also.

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

No adverse comment on the project activity was received from any of the stakeholders.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

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

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