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:

"Methane Avoidance by Municipal Solid Waste Processing in the city of Chandigarh, India"
Document version: Version 1.0
Date of Document: 05.05.2006

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

In the project activity, Jaiprakash Associates Ltd. (JAL) is setting up one Municipal Solid Waste (MSW) processing plant near Chandigarh. The facility entails MSW processing to derive Refuse Derived Fuel (RDF), which shall be used in a thermal power plant of JAL group at Bagheri in Himachal Pradesh. MSW for processing would be received from various collection centres in Chandigarh city. JAL has signed an MOU with Municipal Corporation of Chandigarh (MCC) for establishing the MSW processing facility. MCC would be responsible for collection, transportation to the facility and JAL would be undertaking the processing of MSW on Build, Own, Operate and Transfer (BOOT) basis.

MCC currently disposes the collected MSW directly at designated dump site at Dadu Majra, Chandigarh without any processing. The estimated quantity of MSW currently available for processing in the RDF plant is 350 TPD and is expected to reach up to 500 TPD in coming years. The proposed processing plant has the capacity to treat 500 TPD of MSW.

MSW processed in the proposed facility would be converted into RDF fluff/ pellets. RDF fluff/ pellets would be sent to a captive power plant of the project proponent for its controlled burning in a boiler. The estimated cost of RDF plant is ~Rs.240 million. The technology for the RDF plant is from Andhra Pradesh Technology Development & Promotion Centre, APTDC.

The project activity would result into GHG emission reduction by avoiding methane emission otherwise released due to anaerobic decomposition of MSW in uncontrolled landfill site, which is the current practice of disposal for MSW in the city.

The project is a small scale CDM project activity and is based on Appendix B of "Simplified Baseline and Monitoring Methodologies for Selected Small Scale CDM Project Activity Categories"

Sustainability aspects of the project activity:
The project activity shall contribute to sustainable development in following ways:

1. The project activity shall generate employment in the plant during construction stage and later on in operation & maintenance of plant/ machinery.
2. The project activity shall help in emission reduction of methane, a potent GHG otherwise generated due to anaerobic decomposition of waste in unsecured landfill site.
3. Reserves of fossil fuels are depleting with increasing demand for energy in the country, the project activity shall help in conservation of fossil fuels and in enhancing nation's energy security.
4. Ground water contamination due to leakage of leachate would be avoided by the project activity. Also, current practice of MSW dumping attracts animals, flies and birds over the landfill area. By

avoiding open dumping, the aesthetics of the city would be enhanced and overall hygiene of the area in and around the landfill sites would be appreciably improved.

5. The project activity shall help in enhanced life of landfill site as only inert material would be dumped in landfill site in the project activity.
6. This would help municipal corporations in India in implementing MSW Rules 2000 as such project activities face a number of barriers to their implementation.
7. This shall encourage more industries to adopt this technology not only in the region but also on the national level. This shall encourage more and more municipal corporations to go ahead with similar type of MSW management systems.
8. Adoption of the technology would encourage technology providers to further their efforts in upgrading technology and bring in more investments in this direction.

JAL has always has been proactive towards fulfilling its social responsibilities. It has done a lot of community work in the past and shall continue to do so in the future as well.

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	Jaiprakash Associates Ltd. (JAL)	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.:

RDF Plant: Union Territory of Chandigarh
Power Plant: State of Himachal Pradesh

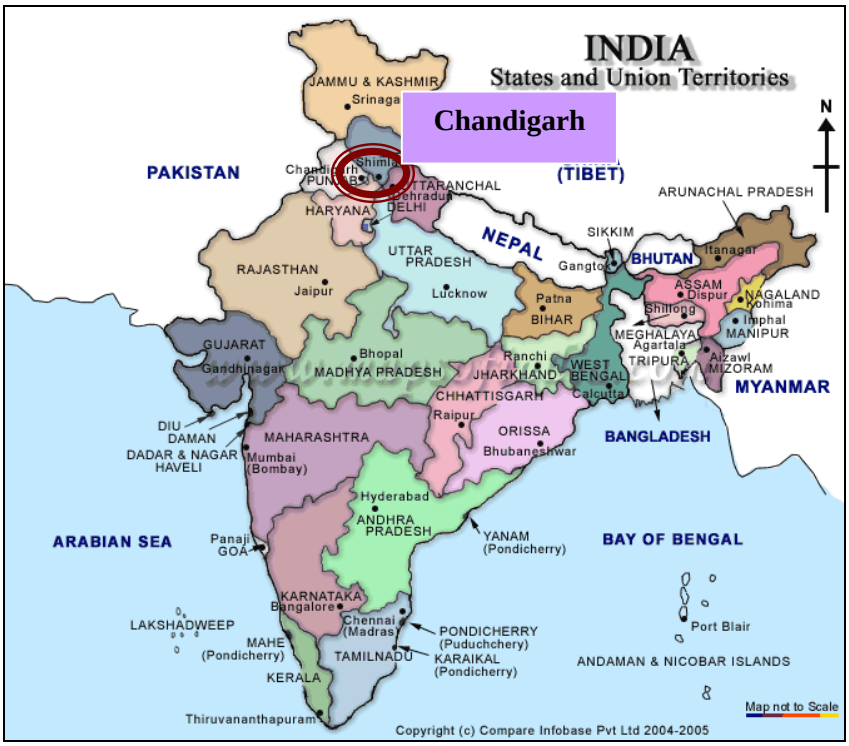
A.4.1.3. City/Town/Community etc:

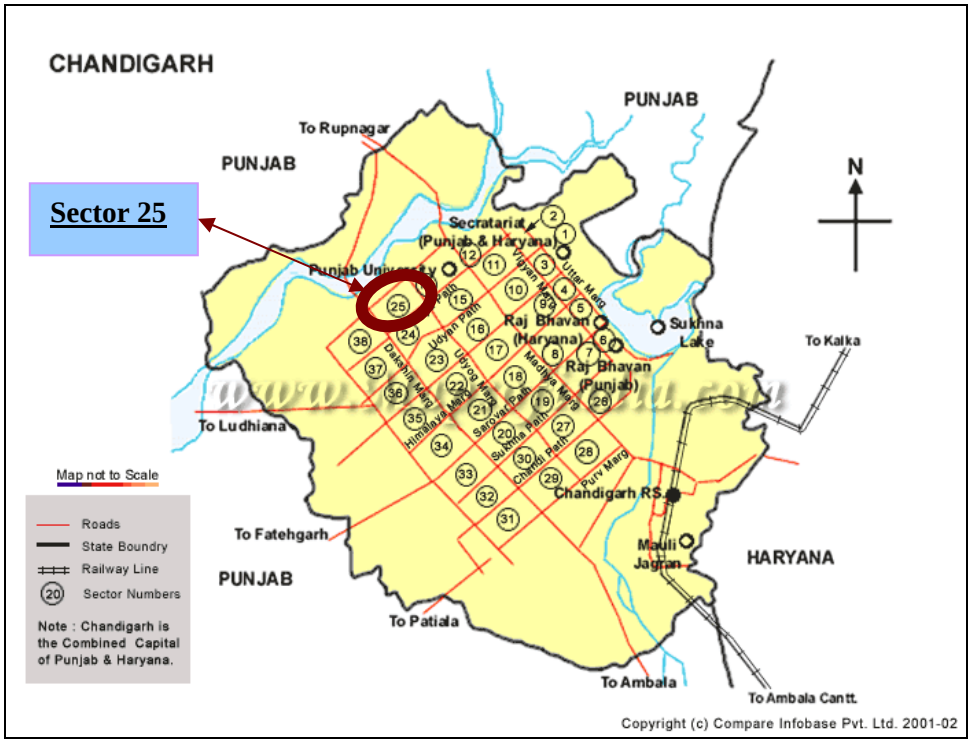
RDF Plant Site:
Village: Dadu Majra Site
Block: Sector 25 –Western Side
District: Chandigarh

Power Plant Site:
Village: Bagheri
District: Solan

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

The project site for RDF plant is located on the western site of in Chandigarh city. Municipal Corporation of Chandigarh is governed by Union Territory of Chandigarh. It is at 30.42N latitude and 76.54E longitude. The project site is on the western side of sector 25 of Chandigarh. The power plant at Bagheri is in the state of Himachal Pradesh and is at a distance of ~80 km from the RDF plant. The site location is depicted in the pictures shown 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 conforms to Appendix B of the simplified modalities and procedures for small-scale CDM project activities.

TYPE III: Other Project Activities

Category IIIE: "Avoidance of methane production from biomass decay through controlled combustion"

Version 08, Scope 13, 15 (dated 03 March 2006)

"This project category comprises measures that avoid the production of methane from biomass or other organic matter that would have otherwise been left to decay as a result of anthropogenic activity. Due to the project activity, decay is prevented through controlled combustion and less methane is produced and emitted to the atmosphere. The project activity does not recover or combust methane (unlike III D). Measures shall both reduce anthropogenic emissions by sources, and directly emit less than 15 kilotonnes of carbon dioxide equivalent annually."

The proposed project activity shall result in avoidance of uncontrolled decay of MSW in landfill sites. The decay is prevented through controlled combustion in a power plant of the project proponent. It does not recover or combust methane and directly emits less than 15 kilotonnes of carbon di-oxide equivalent annually.

Technology details:

Processing of MSW into RDF involves a series of processes –

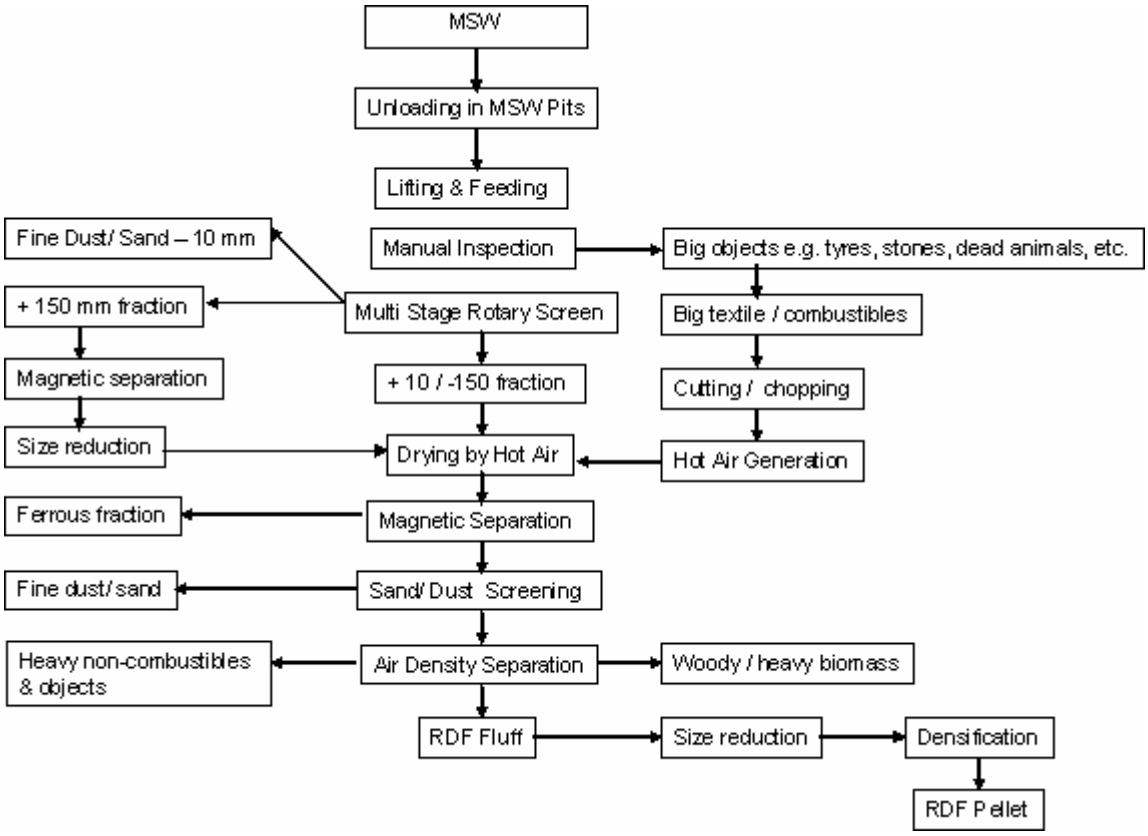
1. Homogenization

2. Size reduction
3. Drying
4. Segregation
5. Densification (for RDF pellets)

MSW is collected, transported to the processing facility by people of Municipal Corporation of Chandigarh (MCC) in tipper trucks. The tipper trucks are weighed at the weighbridge and unloaded at the tipping floor. The MSW received is spread on MSW yard and is inspected for any hazardous and large size parts. MSW then is homogenized and taken to the rotary screen for separating different size particles. Large size fractions are passed through magnetic separators before taking into primary shredder for further size reduction.

MSW in India contains high moisture percentage and requires to be dried up by hot air generated in a hot-air generator is again screened to separate sand/ grit material. The heavy non-combustibles like stones or glass are separated by Air Density Separator. The light combustibles like paper/ textile/ biomass separated in the process are called RDF fluff. RDF fluffs are further processed in secondary shredder and densification unit to produce RDF pellets.

The flow diagram as under summarises the complete treatment process-



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 shall result in CH4 emission reduction, a potent GHG by avoiding anaerobic decomposition of untreated MSW in unsecured landfill sites, which is the current practice of disposal of municipal solid waste in the city of Chandigarh.

In the absence of proposed project activity from JAL, dumping of MSW in open / unsecured landfill site in Chandigarh would have continued at present level and there would be no reduction in GHG emissions.

The total estimated CERs from the project activity in tCO2e over the crediting period of 10 years = 404699

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

Emission Reduction Estimation	
Years	**Annual Estimation of emission reduction in tonnes of CO2e**
2007-08	5626
2008-09	14225
2009-10	23943
2010-11	32769
2011-12	40382
2012-13	47019
2013-14	52867
2014-15	58076
2015-16	62765
2016-17	67028
Total estimated reductions for crediting period (tonnes of CO2e)	404699
Total number of crediting years	10 years
Annual average over the first crediting period of estimated reductions (tonnes of CO2e)	40469

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

No ODA/ public funding envisaged for the project activity.

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 debundled component of a large project activity as There is no small scale CDM project activity or an application registered by JAL, 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 is a small scale CDM project activity and is based on Appendix B (Version No. 07; dated 28 November 2005) of the simplified modalities and procedures for small-scale CDM project activities. The project activity conforms to the following categories-

TYPE III: Other project activities

Category IIIE: Avoidance of methane production from biomass decay through controlled combustion

Version 08, Scope 13, 15; 03 March 2006

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

Category	Applicability Criteria	Project Status
TYPE IIIE: Avoidance of methane production from biomass decay through controlled combustion	This project category comprises measures that avoid the production of methane from biomass or other organic matter that would have otherwise been left to decay anaerobically in a solid waste disposal site without methane recovery. Due to the project activity, decay is prevented through controlled combustion.	Project activity entails processing of MSW in the city of Chandigarh, which otherwise left to decay in unsecured landfill site.
	Due to the project activity, decay is prevented through controlled combustion and less methane is produced and emitted to the atmosphere	Decay is prevented through MSW processing in a treatment plant.
	The project activity does not recover or combust methane (unlike III G).	It avoids methane generation and thus does not capture methane in the process.
	Measures shall both reduce anthropogenic emissions by sources, and directly emit less than 15 kilotonnes of carbon dioxide equivalent annually.	Project activity reduces CH4 emissions and directly emits less than 15 kilotonnes of CO2e annually.

Important information for determination of baseline scenario:

Variable	Value	Data Source
DOC, Degradable organic carbon (by weight)	Estimated based on MSW composition	Lab test reports on MSW samples
Fraction of DOC dissimilated to landfill gas	0.77	IPCC default value
MCF, Methane Correction Factor	0.8	IPCC default value for unmanaged sites
F, Fraction of CH4 in landfill gas	0.5	IPCC default value
Northern Grid Emission Factor	0.712	NRLDC Annual Report 2004-05
GWP for CH_4	21	IPCC default value

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 IIIE– "Avoidance of methane production from biomass decay through controlled combustion"

- This project category comprises measures that avoid the production of methane from biomass or other organic matter that would have otherwise been left to decay anaerobically in a solid waste disposal site without methane recovery. Due to the project activity, decay is prevented through controlled combustion.
- The project activity does not recover or combust methane (unlike III G).
- Measures reduce anthropogenic emissions by sources, and directly emit less than 15 kilotonnes of carbon dioxide equivalent annually.
- 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"

Establishing Baseline & Additionality

Project Alternatives:

1. Project activity without CDM
2. Continuation of current practice of dumping MSW untreated in an unsecured landfill site and its uncontrolled decay

In India management of Municipal Solid Waste is governed in accordance with "Municipal Solid Wastes (Management and Handling) Rules 2000" formulated by Ministry of Environment and Forests (MoEF).

[1] Refer section A.4.5

It makes mandatory for the municipal corporations to implement a scientific solid waste management system. The rules give guidelines on collection, segregation, storage, transportation, processing and disposal of municipal solid wastes in a scientific sanitary landfill site.

Though the dateline for compliance was December 31, 2003 by all the municipal authorities for setting up of waste processing and disposal facilities, however due to a number of constraints only few of them could comply with it. These constraints primarily are lack of infrastructure and poor financial status of municipal authorities, lack of awareness, unavailability of technology, poor enforcement of rules & regulations and the multiplicities of agencies involved etc.

The additionality of the project activity is shown according to Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities.

Investment barrier:
MSW handling and management is both labour and investment intensive. As municipal corporations in India are in poor financial health and lack resources, they need private cooperation for finances, technology and management of such projects[2]. JAL is providing this support to the municipal authority in Chandigarh.

The tangible output from the project activity is the production of renewable fuel RDF which can be used in industrial facilities for energy generation. JAL shall use this RDF in a captive power plant displacing a part of coal utilisation. So, the financial viability of RDF is tested against the gains JAL would have in terms of coal savings.

Summary of Financial analysis of project	
Project Cost	232.8 Million INR
Debt Equity Ratio	2.88
Project life	30 Years (IRR calculated for 30 years)
Interest Rate on term loan	7.5%
RDF generation	52872 TPA
RDF Revenue (based on landed cost of coal pro-rated to CV) Rs./unit	1700
Equity IRR without CERs	2.02%
Equity IRR with CERs	20.2%
Required rate of return	13.0%

2 "It has been observed that local bodies require adequate funds to augment the existing infrastructure. Infrastructure need to be strengthened in terms of tools/equipment and transportation. In mega cities, operation and maintenance costs are high due to quantum of garbage to be handled. There is necessity that large number of companies take part in manufacturing MSW handling equipment which should be available at reasonable cost and having lesser expenditure on operation and maintenance. "; *CPCB Report; Management of Municipal Solid Wastes; 2004-05*

A financially more viable option (using coal instead of RDF) would lead to even higher emissions due to coal burning (this is not part of the project document), however JAL decided to invest in the project primarily due to the following reasons:

- The project was environmentally positive
- The project became viable for investment after accounting for the benefits from carbon credits

Barrier due to prevailing practice:
"Most of the waste disposal sites in the country are uncontrolled dumps[3]." In India cities are categorised as Class I to VI on the basis of population. The MSW generation in cities varies between ~170 gm/c/day and ~700 gm/c/day. As per estimations from Ministry of Urban Development, India, the total generation of MSW in India is at approx. 100,000 TPD. In India, municipal solid waste is generally dumped outside houses or at common collection site, and is left for municipal authorities for taking it to a designated dumping site. It is common to find solid waste dumps near towns and cities. These dumps are mostly either in depression or in open grounds. Wide spread land, air and water pollution is caused from these dumps. The dumping sites are not properly managed nor have been planted with suitable plant species to help in quick degradation of solid waste by way of creating conducive for the growth of micro-organism besides providing greenery. Appropriate post dumping practices are also seldom performed causing perpetual problem of air and water pollution.

The MSW effect specific environment and health impacts including spread of epidemics and so these required to be properly managed and disposed of following precise procedures, arrangements and measures to prevent environment degradation and health hazards. MSW is, however, not being appropriately managed due to inadequate finances, inadequate training of personnel, lack of performance, monitoring, inadequate emphasis on preventive maintenance, etc. At present most of the solid waste is being disposed off in an unscientific manner.

The technology of converting MSW into RDF is still in nascent state in India. There are only two such projects slocated at Vijaywada and Hydrabad in Andhra Pradesh, which also need to prove a history of long, untroubled and uninterrupted operation. Apart from that, JAL has no prior experience on similar projects and this is the first of its kind for them.

So, the project activity is not a business-as-usual case and is additional. It faces barriers against its implementation as shown by above analysis. This is also supported by the fact that there are only a few such projects in place in India and these are yet to establish a long term unhindered operational track record.

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:

As per TYPE IIIE of appendix B "The project boundary are the physical, geographical sites:

a. where the solid waste would have been disposed and the avoided methane emission occurs in absence of the proposed project activity,
b. where the treatment of biomass through controlled combustion takes place,
c. and in the itineraries between them, where the transportation of wastes and combustion residues occurs.".

[3] CPCB Report; Management of Municipal Solid Wastes

In the proposed project the project boundary includes the MSW landfill site, RDF plant, the boiler of the captive power plant, transportation; of MSW from collection centres to RDF plant, of inerts to the disposal site, of RDF to captive power plant, of combustion residues to the disposal site.

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

>>

Baseline for the project activity:

As per the methodology "The baseline scenario is the situation where, in the absence of the project activity, biomass and other organic matter are left to decay within the project boundary and methane is emitted to the atmosphere. **The baseline emissions are the amount of methane from the decay of the biomass content of the waste treated in the project activity**. The Yearly Methane Generation Potential is calculated using the first order decay model based on the discrete time estimate method of the IPCC Guidelines, as described in category AMS III-G. Baseline emissions shall exclude methane emissions that would have to be removed or combusted to comply with national or local safety requirement or legal regulations."

Yearly Methane Generation Potential

Reference: AMS-III.G; version 01 dated 03 March 2006

The method below is used to evaluate the yearly methane generation potential in the landfill. The quantity of methane projected to be formed during a given year is estimated using a first order decay model based on the discrete time estimate method proposed in the IPCC Guidelines

$$MB_y = \frac{16}{12} \cdot F \cdot DOC_f \cdot MCF \cdot \sum_{x=1}^{y} \sum_{j=A}^{D} A_{j,x} \cdot DOC_j \cdot \left(1 - e^{-k_j}\right) \cdot e^{-k_j \cdot (y-x)}$$

where,

F is fraction of methane in the landfill gas (default 0.5)
DOCj is per cent of degradable organic carbon (by weight) in the waste type j
DOCf is fraction of DOC dissimilated to landfill gas (IPCC default 0.77)
MCF is Methane Correction Factor (fraction, IPCC default 1.0)
Aj,x is amount of organic waste type j landfilled in the year x (tonnes/year)
kj is decay rate for the waste stream type j
j is waste type distinguished into the waste categories (from A to D), as illustrated in the table below
x is year since the landfill started receiving wastes: x runs from the first year of landfill operation (x=1) to the year for which emissions are calculated (x=y)
y is year for which LFG emissions are calculated

Table III.G.1. Waste stream decay rates (kj) and associated IPCC default values for DOC

Waste Stream A to E	Per cent DOCj (by weight)	Decay-rate (kj)
A. Paper and textiles	40	0.023
B. Garden and park waste and	17	0.023

other (non-food) putrescibles		
C. Food waste	15	0.231
D. Wood and straw waste (excluding lignin)	30	0.023
E. Inert material	0	0

The amount of organic waste type "j" landfilled in each year "x" (Aj,x) should be known. Alternatively, it can be considered as constant through the years. If the pre-existing amount and composition of the waste in the landfill are unknown, they can be estimated by comparison with other landfills with similar conditions in regional or national levels, using parameters related to the attended population. For projects in which the landfill will be operated during the crediting period, the waste amount and composition shall be monitored.

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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:

21/02/2006

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

30 years

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

C.2.1. Renewable crediting period:

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

C.2.1.2. Length of the first crediting period:

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

01/04/2007

C.2.2.2. Length:

10 years

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 is a small scale CDM project activity and is based on Appendix B (Version No. 07 dated 28 November 2005) of the simplified modalities and procedures for small-scale CDM project activities. The project activity conforms to the following categories-

Category TYPE IIIE: "Avoidance of methane production from biomass decay through controlled combustion"

Version 08, Scope 13, 15; 03 March 2006

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

The project activity conforms to Type III, Category E of small scale CDM project activities. The project activity would follow the monitoring requirement as described in the methodology IIIE.

D.3 Data to be monitored:

ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic / paper)	Comment
1.1	Quantity of MSW processed	Plant Data	Tonnes	M	Monthly	100%	Electronic/ paper	Weighbridge log data
1.2	DOC, Degradable organic	MSW analysis	%	E	Quarterly	Samples of MSW as	Electronic/ paper	Analysis of MSW samples for

	carbon in MSW					received		its composition
1.3	Quantity of RDF produced	Plant Data	Tonnes	M	Monthly	100%	Electronic/ paper	Operation logs
1.4	Calorific value of RDF	Lab analysis report of RDF	kcal/kg	M	Quarterly	Samples of RDF pellets	Electronic/ paper	RDF pellets analysis reports
1.5	Quantity of auxiliary fuel used in combustion facility	Plant data	Mass or volume unit	M	Monthly	100%	Electronic/ paper	Plant operation data at the power plant
1.6	Emission factor of auxiliary fuel	IPCC default	tCO2e/ TJ	E	Yearly	-	Electronic/ paper	
1.7	Quantity of non-biomass fraction in waste combusted	Plant Data	Tonnes	E	Monthly	100%	Electronic/ paper	
1.8	Electrical energy consumption in RDF plant	Plant Data	MWh	M	Monthly	100%	Electronic/ paper	Operation data at the RDF plant
1.9	Emission factor for electricity	NRLDC annual report	tCO2e/ MWh	E	Yearly	-	Electronic / paper	
1.10	Quantity of RDF transported out of the project plant	Plant source	Mass unit	M	Monthly	100%	Electronic/ paper	Weighbridge reports on individual trucks at the RDF plant and at power plant site
1.11	Average return trip distance between RDF plant to combustion site	Plant data/ truckers data	Km	E	Monthly	-	Electronic/ paper	
1.12	Average truck load of the trucks	Plant data/ truckers data	Mass unit	M	Daily	100%	Electronic/ paper	
1.13	Average CO2 emission factor in transportatio	Plant data/ truckers data/ IPCC	tCO2/ km	C/ E	Yearly	100%	Electronic/ paper	

	n	default values						

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 1.2, 1.4)	Low	Lab test on MSW composition would be conducted internally. These would be cross checked by periodic external lab test reports. The more conservative figures would be used in the estimation of baseline emissions.
Table D.3 (ID numbers from 1.1, 1.3, 1.5, 1.7, 1.8)	Low	The data will be collected as part of normal plant level operations. QA/QC requirements consist of cross- checking these with other internal company report.
Table D.3 (ID numbers from 1.6, 1.9)	Low	Based on IPCC default value; NRLDC annual reports respectively. These data are available in public domain.
Table D.3 (ID numbers from 1.10-1.13)	Low	Based on daily reports of RDF outage, trucks loading at the RDF plant.

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 Monitoring Plan

JAL is an ISO-9001 certified company, and maintains all production/purchase/sales records as per audit guidelines. In this project activity too, JAL would have procedures in place for operation and maintenance of the plant machinery, equipments and instruments and maintain data on calibration of the equipments. The equipments used for CDM project would be the part of these procedures and document on maintenance and rectification done on all the monitoring equipments would also be maintained.

In the MSW processing plant there would be departments of operation, maintenance, purchase, stores, finance, accounts and laboratory. Each department would be headed by one Department Head supported by shift-in-charges and support staff i.e. operators and others. The overall responsibility of the department functioning would be with the respective department heads. Maintenance sections would include mechanical, electrical and instrumentation departments. They would be responsible for the overall upkeep of plant machinery and instruments.

The methodology requires monitoring of data as described in section D.3 of this document.

A CDM team will be constituted with participation from Operation, Maintenance, Purchase & Stores, laboratory and accounts. This team will first be trained about 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 will be appointed. This person would be responsible for gathering data from all relevant functions, and to keep records of the same. This person will report to CDM team.

JAL shall adopt the following procedures to assure the completeness and corrective ness of the data needed to be monitored for CDM project.

Formation of CDM Team:
A CDM project team would be constituted with participation from relevant departments. People would be trained on CDM concept and monitoring plan. This team will be responsible for data collection and archiving. This team will meet periodically to review CDM project activity check data collected, emissions reduced etc. On a weekly basis, the monitoring reports are checked and discussed by the seniors CDM team members/managers. In case of any irregularity observed by any of the CDM team member, it is informed to the concerned person for necessary actions. On monthly basis, these reports are forwarded to the management level.

- ***Plant Head:*** Overall responsibility of compliance with the CDM monitoring plan.
- ***Department Head:*** Responsibility for completeness of data, reliability of data (calibration of meters), and monthly report generation
- ***Shift In-charge:*** Responsibility of daily report generation

Training of CDM team personnel:
The training of the CDM team and plant personnel will be carried out on CDM principle, 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.

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.

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

Calibration of instruments:
JAL would have procedures well defined for the calibration of instruments. A log of calibration records would be maintained. Instrumentation department in the company would be responsible for the upkeep of instruments in the plant.

Maintenance of instruments and equipments used in data monitoring:
The operation department shall be responsible for the proper functioning of the equipments/ instruments and shall inform the concerned department for corrective action if found not operating as required. Corrective action shall be taken by the concerned department and a report on corrective action taken shall be maintained as done time to time along with the details of problems rectified.

Checking data for its correctness and completeness:
The CDM team would have the overall responsibility of checking data for its completeness and correctness.

Internal audits of CDM project compliance:
CDM audits shall be carried out to check the correctness of procedures and data monitored by the internal auditing team entrusted for the work. Report on internal audits done, faults found and corrective action taken shall be maintained and kept for external auditing.

Emergency preparedness:
The project activity does not result in any unidentified activity that can result in substantial emissions from the project activity. Therefore there is no need for emergency preparedness in data monitoring is visualized.

Report generation on monitoring:
After verification of the data and due diligence on corrective ness 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.

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

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Date: 05/05/2006

SECTION E.: Estimation of GHG emissions by sources:

E.1. Formulae used:

E.1.1 Selected formulae as provided in appendix B:

A. Baseline Emissions:

The baseline scenario is the situation where, in the absence of the project activity, biomass and other organic matter are left to decay within the project boundary and methane is emitted to the atmosphere. The baseline emissions are the amount of methane from the decay of the biomass content of the waste treated in the project activity. The Yearly Methane Generation Potential is calculated using the first order decay model based on the discrete time estimate method of the IPCC Guidelines, as described in category AMS III-G. Baseline emissions shall exclude methane emissions that would have to be removed or combusted to comply with national or local safety requirement or legal regulations.

BEy = MB,y * GWP_CH4 – MDy,reg* GWP_CH4

where,

MB,y	methane generation potential in the year "y" (tonnes of CH4), estimated as in AMS III-G
MDy,reg	methane that would be destroyed or removed in the year "y" for safety or legal regulation
CH4_GWP	GWP for CH4 (value of 21 is used for the first commitment period)

B. Project Emissions:

Total annual project activity related emissions shall be less than or equal to 15 kilo tonnes of CO2 equivalent. Project activity emissions consist of

a. CO2 emissions related to the combustion of the non-biomass carbon content of the waste (plastics, rubber and fossil derived carbon) and auxiliary fuels used in the combustion facility,

b. Incremental CO2 emissions due to incremental distances between the collection points to the controlled combustion site and to the baseline disposal site as well as transportation of combustion residues and final waste from controlled burning site to disposal site,

c. CO2 emissions related to the power used by the project activity facilities, including the equipments for air pollution control required by regulations. In case the project activity consumes grid-based electricity, the grid emission factor (kgCO2e/kWh) is used, or it is assumed that diesel generators would have provided a similar amount of electric power, calculated as described in category I.D.

$$PE_y = PE_{y,comb} + PE_{y,transp} + PE_{y,power}$$

where:

PEy	project activity direct emissions in the year "y" (tonnes of CO2 equivalent)
PEy,comb	emissions through combustion of non-biomass carbon in the year "y"
PEy,transp	emissions through incremental transportation in the year "y"
PEy,power	emissions through electricity or diesel consumption in the year "y"

The expected annual amount and composition of the waste combusted by the project activity during the crediting period shall be described in the project design document, including the biomass and non-biomass carbon content of the waste. Also the expected consumption of auxiliary fuel for the incineration process should be reported in the project design document.

These data will be used to estimate the annual baseline emissions, and the ex-post project activity emissions. CO2 emissions from the combustion of the non-biomass carbon content of the wastes and from the auxiliary fuel consumed will be estimated assuming the complete oxidation of carbon to CO2 in the combustion.

a.

$$PE_{y,comb} = Q_{y,,non\text{-}biomass} * 44/12 + Q_{y,fuel} * E_{y,fuel}$$

where:

Qy,,non-biomass: Non-biomass carbon of the waste combusted in the year "y" (tonnes of Carbon)
Qy,fuel Quantity of auxiliary fuel used in the year "y" (tonnes)

Ey,fuel CO2 emission factor for the combustion of the auxiliary fuel (tonnes CO2 per tonne fuel, according to IPCC Guidelines)

Project activity emissions from trucks for incremental collection activities will be estimated and considered as project activity emissions.

b.

$$PE_{y,transp} = (Q_y/CT_y) * DAF_w * EF_{CO2} + (Q_{y,ash}/CT_{y,ash}) * DAF_{ash} * EF_{CO2}$$

where:
Qy : Quantity of waste combusted in the year "y" (tonnes)
CTy : Average truck capacity for waste transportation (tonnes/truck)
DAF: Average incremental distance for waste transportation (km/truck)
EFCO2: CO2 emission factor from fuel use due to transportation (kgCO2/km, IPCC default values or local values can be used.
Qy,ash : Quantity of combustion residues produced in the year "y" (tonnes)
CTy,ash : Average truck capacity for combustion residues transportation (tonnes/truck)
DAFash: Average distance for combustion residues transportation (km/truck)

The project site for RDF plant is close to the existing dumping yard of MSW and to the designated yard for inert material and hence there is no significant incremental distance in the project activity. However, RDF would be transported to the power plant site at Bagheri, Himachal Pradesh which is ~80 km from the RDF plant and emissions due to transportation of RDF to power plant have been considered in estimation of project emissions.

C. Leakage Emissions:

As per the methodology "If the controlled combustion technology is equipment transferred from another activity or if the existing equipment is transferred to another activity, leakage effects at the site of the other activity are to be considered" as this is no the case in the project activity, hence leakage emissions are considered as zero.

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:

>>

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

>>

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

>>

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:

>>

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:

>>

The emission reduction achieved by the project activity will be measured as the difference between the baseline emission and the sum of the project emission and leakage.

$$ER_y = BE_y - (PE_y + Leakage_y)$$

where:

ERy Emission reduction in the year "y" (tonnes of CO2 eq)

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

Year	Baseline Emissions	Project Emissions	Leakage	Emission Reduction
2007-08	9206	3580	0	5626
2008-09	18279	4054	0	14225
2009-10	28615	4672	0	23943
2010-11	37441	4672	0	32769
2011-12	45054	4672	0	40382
2012-13	51691	4672	0	47019
2013-14	57539	4672	0	52867
2014-15	62748	4672	0	58076
2015-16	67437	4672	0	62765
2016-17	71700	4672	0	67028

SECTION F.: Environmental impacts:

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

Environment Impact Assessment study is not required for the project activity as per the regulations defined by Central Pollution Control Board in India. However, the plant shall adhere to the guidelines in MSW (Handling & Management) Rules 2000 of MoEF, Government of India and also the norms stipulated by Central Pollution Control Board (CPCB) and Chandigarh Pollution Control Committee (CPCC) for running the process plant.

Following aspects of the project activity and their impacts were taken into account in Environment Management Plan –

Air Pollution	1. Hot air is generated by combustion of biomass in Rotary Dryer. For this chimney height will not be less than 9 m or 2.5 times the height of neighboring building which ever is higher, and discharge from dryer shall passed through cyclone separator for dust removal and clean air will be discharged through chimney. 2. From ADS Cyclone, air will be passed to air-washer system 3. Secondary shredder will be provided with dust bag filters before air is let out to atmosphere 4. Following aspiration points are envisaged for dust collection: a. Rotary trammel – 10 mm discharge chute b. Dryer discharge chute c. Discharge chute of rotary trammel d. Coarse fluff discharge duct e. Secondary cyclone discharge duct 5. Air will be sent to cyclone for primary collection and air washing for final collection
Water Pollution	There is no need of water for process requirement and hence no contaminated water will be discharged from the project. However during monsoon, some amount of the surface moisture of MSW dumped by Municipality might run off, which would be very small (~25 m3 only). This water run off is organic in nature and carry nutrients which are beneficial to plant life. However JAL would install waste water treatment plant for the treatment of this water before releasing for internal use in plantation & gardening.
Solid Rejects	The solid rejects from the processing would be inert containing stone, sand, ceramic and earth. These will be dumped in designated dump yard.
Noise Pollution	Noise level of plant machinery including fans, blowers shall be within norms.
General Protection	All the workmen handling MSW/ RDF would be provided with Personal Protective Equipments (PPEs) like hand gloves, boots, head-gears and masks. Unauthorized entry of rag pickers will not be allowed inside the plant. Street animals will not be allowed inside the plant.
Bird Menace, mosquito and fly nuisance	MSW processed would be kept under cover and there will be no bird menace from the project activity.
Leachate	MSW will not be stored in the processing facility so there will not be any leachate generation in the plant. Surface water will be taken to the effluent treatment plant.

SECTION G. Stakeholders' comments:

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

Stakeholders to the project activity are identified as under –

- Local community
- Municipal Corporation of Chandigarh (MCC)
- Chandigarh Pollution Control Committee (CPCC)

Local Community:
Letters were first sent to the local gram-panchayat of Dadu Majra and Deputy Commissioner-Chandigarh to take their views on the project activity. Mr. R.S. Sahota, Vice President-RDF Plant from JAL then conducted meetings with the Gram –Panchayat of Dadu Majra and with Dy. Commissioner separately. He explained them about the project from JAL and discussed about the impacts it would make on the city's environ and its people.

Municipal Corporation of Chandigarh:
JAL has come in agreement with Municipal Corporation of Chandigarh, MCC for setting up the MSW processing plant on Build, Own, Operate and Transfer basis. The agreement is for 30 years. The agreement is signed by Commissioner, Municipal Corporation of Chandigarh and President, JAL.

Chandigarh Pollution Control Committee:
Air and water consents have been received as required for setting up the plant from Chandigarh Pollution Control Committee, CPCC for the project activity.

G.2. Summary of the comments received:

In the meeting with Mr. R.S. Sahota, Vice president-RDF plant, Dy. Commissioner – Chandigarh told that he already knew about the project activity and expressed his pleasure that MCC and JAL are coming up with this project, which is good for the city of Chandigarh and would help mitigate the problem of MSW mis-management in the city.

Gram panchayat congratulated Mr. Sahota for setting up the processing plant. He also told that with this project, the problems of bad odor would be prevented unlike the current dumping practice in Chandigarh.

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

No adverse comment was received on the project activity from any of the stakeholders consulted. They in general expressed their happiness that Chandigarh would not have problems related to open dumping of MSW due to this project. They said that this project would further add to the aesthetics of the city. All required consents have also been taken from competent authorities for the establishment and operating the process plant.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding in the project activity.