Appendix A[1] to the simplified modalities and procedures for small-scale CDM project activities

CLEAN DEVELOPMENT MECHANISM
SIMPLIFIED PROJECT DESIGN DOCUMENT
FOR SMALL–SCALE PROJECT ACTIVITIES (SSC-PDD)
Version 01 (21 January, 2003)

Introductory Note

1. This document contains the clean development mechanism project design document for small-scale project activities (SSC-PDD). It elaborates on the outline of information in appendix B 'Project Design Document' to the CDM modalities and procedures (annex to decision 17/CP.7 contained in document FCCC/CP/2001/13/Add.2) and reflects the simplified modalities and procedures (herewith referred as simplified M&P) for small-scale CDM project activities (annex II to decision 21/CP.8 contained in document FCCC/CP/2002/7/Add.3).

2. The SSC-PDD can be obtained electronically through the UNFCCC CDM web site (http://unfccc.int/cdm/ssc.htm), by e-mail (cdm-info@unfccc.int) or in print from the UNFCCC secretariat (Fax: +49-228-8151999).

3. Explanations for project participants are in italicized font *(e.g. explanation).*

4. The Executive Board may revise the SSC-PDD if necessary. Revisions shall not affect small-scale CDM project activities validated prior to the date at which a revised version of the SSC-PDD enters into effect. Versions of the SSC-PDD shall be consecutively numbered and dated. The SSC-PDD will be available on the UNFCCC CDM web site in all six official languages of the United Nations.

5. In accordance with the CDM modalities and procedures, the working language of the Board is English. The completed SSC-PDD shall therefore be submitted to the Executive Board in English.

6. Small-scale activities submitted as a bundle, in accordance with paragraphs 9 (a) and 19 of the simplified M&P for small-scale CDM project activities, may complete a single SSC-PDD provided that information regarding A.3 (*Project participants*) and A.4.1 *(Location of the project activity)* is completed for each project activity and that an overall monitoring plan is provided in section D.

7. A small-scale project activity with different components eligible to be proposed[2] as a small-scale CDM project activity may submit one SSC-PDD, provided that information regarding

[1] This appendix has been developed in accordance with the simplified modalities and procedures for small-scale CDM project activities (contained in annex II to decision 21/CP.8, see document FCCC/CP/2002/7/Add.3) and it constitutes appendix A to that document. For the full text of the annex II to decision 21/CP.8 please see http://unfccc.int/cdm/ssc.htm).

subsections A.4.2 (*Type and category(ies) and technology of project activity*), and A.4.3 (*brief statement on how anthropogenic emissions of GHGs (greenhouse gases) by sources are to be reduced by the proposed CDM project activity)* and sections B *(Baseline methodology)*, D *(Monitoring methodology and plan)* and E *(Calculation of GHG emission reductions by sources)* is provided separately for each of the components of the project activity.

8. If the project activity does not fit any of the project categories in appendix B of the simplified M&P for small-scale CDM project activities, project proponents may propose additional project categories for consideration by the Executive Board, in accordance to paragraphs 15 and 16 of the simplified M&P for small-scale CDM project activities. The project design document should, however, only be submitted to the Executive Board for consideration after it has amended appendix B as necessary.

9. A glossary of terms may be found on the UNFCCC CDM web site or from the UNFCCC secretariat by e-mail (cdm-info@unfccc.int) or in print (Fax: +49-228-8151999).

[2] In paragraph 7 of simplified M&P for small-scale CDM project activities, on clarifications by the Executive Board on small-scale CDM project activities, the Board agreed that in a project activity with more than one component that will benefit from simplified CDM modalities and procedures, each component shall meet the threshold criterion of each applicable type, e.g. for a project with both a renewable energy and an energy efficiency component, the renewable energy component shall meet the criterion for 'renewable energy' and the energy efficiency component that for 'energy efficiency'.

CONTENTS

A. General description of project activity

A.1 Title of the project activity:

Conversion of Municipal Solid Waste (500 TPD) into RDF pellets (Refuse Derived Fuel) at Okhla, New Delhi, India

A.2 Description of the project activity:

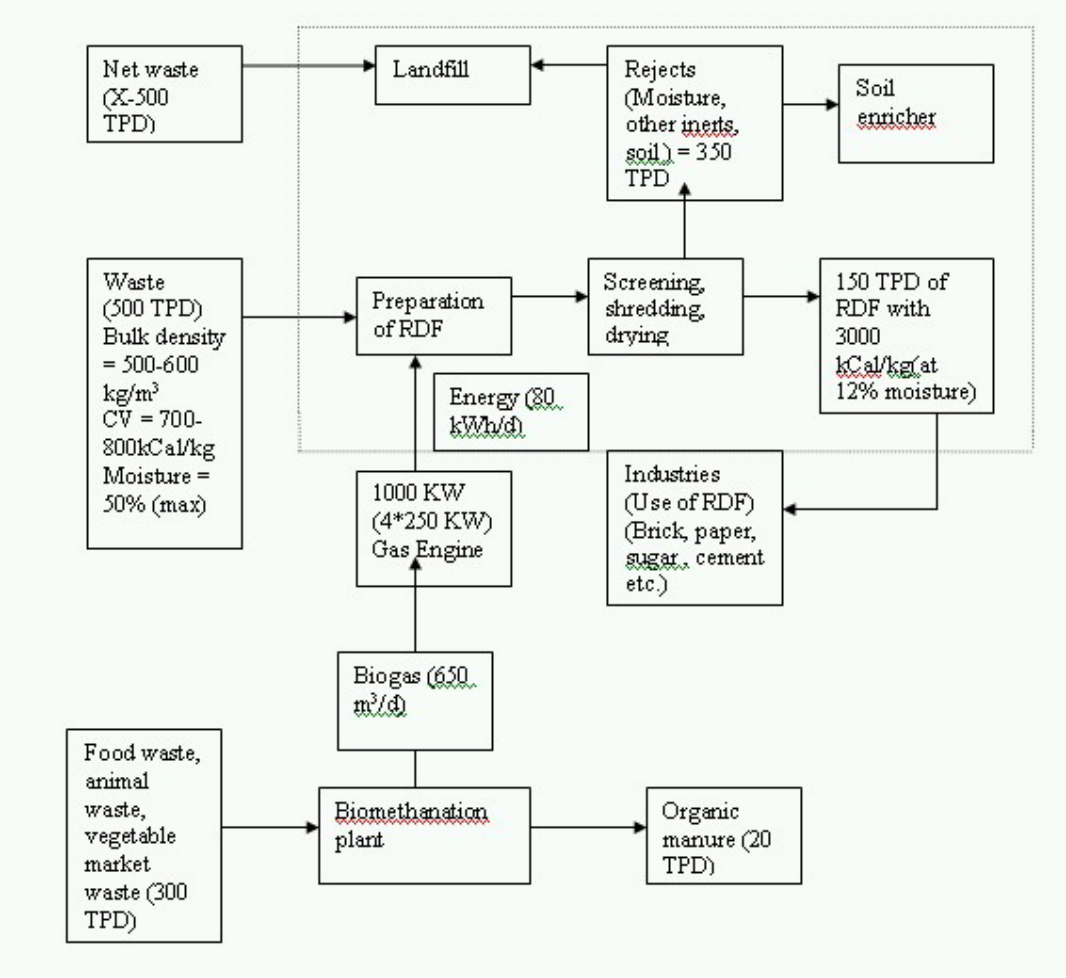
(Please include in the description
- the purpose of the project activity
- the view of the project participants on the contribution of the project activity to sustainable development (max. one page).)

Purpose of Activity:

About 6000 – 6500 MT of Municipal Solid Waste gets generated in New Delhi, the country capital on daily basis, which is dumped in open landfills unscientifically, leading to acute shortage of land fill site near the city. The objective of the project is to process Municipal Solid Waste into RDF pellets. Municipal Corporation of Delhi has already earmarked a site for MSW to RDF Plant for M/s Renovo Energy Limited in Okhla Industrial Area, New Delhi, India. The project envisages conversion of Municipal Solid Waste into Refuse Derived Fuel to be used as replacement of fossil liquid and solid fuels in process industries. It is proposed to set up a 500 MT per day Municipal Solid Waste processing unit to produce 150 MT per day of Refuse Derived Fuel Pellets. The RDF pellets will meet the requirements of the industries for thermal energy needs such as hot water, chilled water and steam. Thus the project will result in reduction of GHG (Green house gases) reduction by methane emissions from the landfill which would have occurred under the present conditions. However the project does not consider the GHG reduction from industries using RDF pellets in place of fossil fuels.

Contribution to Sustainable Development:

The project would result in significant improvement in the local and national environment. The project would result in the methane avoidance from the landfills and also use of the RDF for industrial applications resulting in the reduced emissions that would occur as a result of use of fossil fuels. The project would also streamline the collection and segregation process before further treatment and increase the chances of recovery of products that can be reused and recycled. In addition to the overall improvement in the environment of the city, the project would generate employment for running of the plant. The project would result in improved hygienic working condition for the locals engaged in waste collection and segregation from the dumping site. Hence the project would contribute to the sustainable development by improving the economic, social and environment conditions.



Schematic of project activity

A.3 Project participants:

(Please list Party(ies) and private and/or public entities involved in the project activity and provide contact information in annex 1 of this document.)

(Please designate one of the above as the official contact for the CDM project activity.)

Parties to the Project: The project will be executed by Renova Energy Ltd.

Contact person:
Shri Y. Prasad
Director
Renova Energy Ltd.
123/124, 3rd Floor, Satya Niketan,
New Delhi – 110021
India
Tel. 91-11 26117000,26880152,26881325
Fax: 91 11 -26117000,26880152
E mail : renovo_energy@yahoo.com

About the project proposer and project sponsors
Renova Energy Ltd. was involved in manufacturing, erection, commissioning and operation of municipal solid waste processing into refused derived fuel projects in Southern India for M/s Selco International Ltd.

M/s Amrit NCES Ltd. is a Consultant & Project Developer and Engineering of the turnkey projects. Investigation of R & D projects entitled 'Commercialisation of Pelletising Technology for Agro & Municipal Solid Wastes' funded by TIFAC, HGT PROGRAMME, GOVERNMENT OF INDIA, New Delhi.

M/s Hi-Tech Agro Projects P. Ltd. is a pioneer organization in the field of manufacturing Biomass Briquetting/Pelletising Plant & Machinery. This group had supplied more than 200 nos. of Briquetting plants in the market with a capacity varying from 500 to 750 kg/hr. Recently 3 nos. Briquetting plants have also been exported to Uganda, Rwanda (South Africa) and Bhutan (Asia). The company has also supplied total plant & machinery for municipal solid waste processing units for M/s Selco International Ltd, Hyderabad, A.P. and M/s Shriram Energy Systems Ltd., Guntur, A.P.

Other parties include:
Municipal Corporation of Delhi (Government) for supply of waste to the plant and for providing the land for setting up of the plant.

Official contact for the CDM project activity:
The Energy and Resources Institute
Habitat Place, Lodhi Road,
New Delhi – 110003
Tel. 91-11-24682100/11
Fax: 91-11-24682144/45

A.4 Technical description of the project activity:

A.4.1 Location of the project activity:

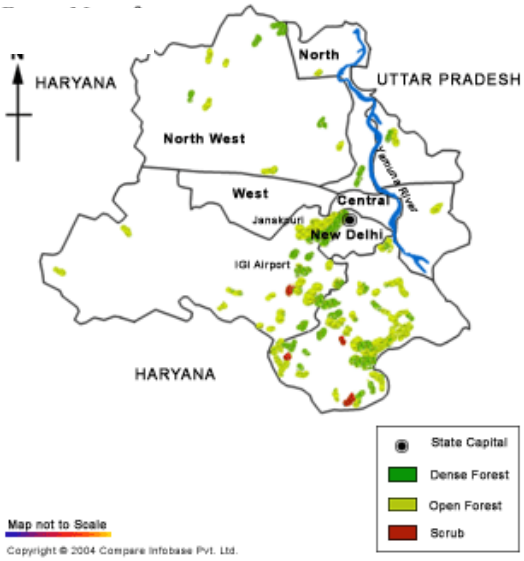
A.4.1.1 Host country Party(ies): India

A.4.1.2 Region/State/Province etc.: National Capital Territory of Delhi

A.4.1.3 City/Town/Community etc: New Delhi

A.4.1.4 Detailed description of the physical location, including information allowing the unique identification of this project activity *(max one page)*:

Delhi is one of the fastest growing metropolises in the country. Delhi sprawls over an area of 1,483 sq. kms between 28°24'17" and 28°53'24" North latitude and 76°50'24" and 77°20'37" East longitude. It is flanked by district Ghaziabad (Uttar Pradesh) in the east, district Rohtak (Haryana) in the west, district Sonepat (Haryana) in the North and district Gurgaon (Haryana) in the South (MCD, 1995).



The density of population has grown from 273 to 6319 per sq. km due to the increase in the migration from rural and other surrounding areas for employment.
The basic services are primarily the responsibility of the three local bodies in the NCT (National Capital Territory) of Delhi- NDMC (New Delhi Municipal Committee), the MCD (Municipal Corporation of Delhi), and the Delhi Cantonment Board. Among the three, the MCD is the largest local body with the responsibility of providing the basic amenities to both rural and urban areas encompassing 1397.3 sq. kms or 95% of the whole NCT area.
Daily waste generation from New Delhi is about 6500 metric tonnes which is projected to be more than 7200 MT/day by the year 2010. The Garbage pressure is about 4 tonnes/sq.km and the number of labours employed for handling this is recorded as 40483. Since the 1950s, over 12 large landfill sites have been packed with all sorts of non-biodegradable and toxic wastes. Wastes are currently dumped at the three landfill sites in Bhalaswa, Ghazipur, Okhla which is already filled. These sites are spread over an area of about 150 hectares. The first garbage composting unit in Delhi was set up in 1981 at Okhla but it had to be closed down in 1992 due to high operation costs.
The proposed project site is located at the Okhla Landfill Yard, South east zone of the city.The site at Okhla is favourable for pelletisation technology as the MSW being dumped at this site

has better combustible component and the composition of RDF pellets produced from this waste is given in Table 1

Table 1 Composition of RDF pellets

Parameter	**Concentration (%)**
Carbon	40.12
Hydrogen	3.31
Sulphur	0.41
Nitrogen	0.3
Oxygen	25.06
Moisture	14.7
Ash	16.1

High bulk density and regular size makes its transport, storage, conveying and combustion easier as compared to other fuels.

A.4.2 Type and category(ies) and technology of project activity

(Please specify the type and category of the project activity using the categorization of appendix B to the simplified M&P for small-scale CDM project activities, hereafter referred to as appendix B. Note that appendix B may be revised over time and that the most recent version will be available on the UNFCCC CDM web site.

The municipal solid waste to energy project will fall under Type III, category III. E . i.e Other Project Activities, Avoidance of methane production from biomass decay through controlled combustion.(The Baseline and monitoring methodology approved in the fourteenth meeting of the UNFCCC CDM Executive Board)

In this section you shall justify how the proposed project activity conforms with the project type and category selected (for simplicity, the rest of this document refers to 'project category' rather than 'project type and category').

The project will result in avoidance of methane from the decay of organic matter in the MSW due to the prevailing practice of open dumping. The emissions from the project activity of pelletisation of MSW to pellets result in emissions less than 15 kilotonnes. Further its use in industries for thermal applications result in controlled combustion of the MSW, thus making it eligible under the category of III.E

If your project activity does not fit any of the project categories in appendix B, you may propose additional project categories for consideration by the Executive Board, in accordance with paragraphs 15 and 16 of the simplified M&P for small-scale CDM project

activities. The final SSC-PDD project design document shall, however, only be submitted to the Executive Board for consideration after the Board has amended appendix B as necessary.)

(This section should include a description of how environmentally safe and sound technology and know-how is transferred to the host Party, if such a transfer is part of the project.)

Technology of project activity:
The project proposes to use the indigenous technology and design developed by M/S Amrit NCES Ltd., New Delhi, India. The processing involves the following steps:

1. Incoming MSW is unloaded on tipping floor. Before shredding, the incoming MSW is inspected on the horizontal conveyor and odd objects like big inert pieces, wooden pieces, long iron pieces etc. are hand picked and removed. After inspection, it is pushed on the slat conveyor for primary shredding.
2. In primary shredding, MSW is delumped into 25-40 mm size to enable easy drying and separation. Delumped MSW is dried from 50% moisture to 25% moisture, either on a paved sun drying yard or in a mechanical dryer.
3. Dried MSW is passed through a rotary sieve for separation of fine dirt and sand; fine material is sent as soil conditioner for further processing. The quality of the soil conditioner has been tested and approved by the Indian Agriculture Research Institute.
4. Screened MSW is passed through density separation phase in air density separator. Heavy particles are rejected and sent for dumping.
5. Light fraction is passed through a cage mill for further size reduction with hot air for faster drying and moisture is reduced from 25% – 15%. Dried combustible material having 25-40 mm size is RDF (Refuse Derived Fuel) and its calorific value is about 3000 kCal/kg.
6. RDF can be ground further in a secondary shredder for making it suitable for pelletisation
7. A pelletising machine can convert RDF fluff into pellets of different diameters i.e. 10 mm to 25 mm, suitable for different uses.

A.4.3 Brief statement on how anthropogenic emissions of GHGs (greenhouse gases) by sources are to be reduced by the proposed CDM project activity:

(Please state briefly how anthropogenic GHG (greenhouse gas) emission reductions are to be achieved (detail to be provided in section B.) and provide the estimate of total anticipated reductions in tonnes of CO_2 equivalent as determined in section E. below.)

Law and regulations related to solid waste management
Solid waste Management and Handling Rules, 2000, of the Ministry of Environment and Forests, applies to all municipalities and the local bodies responsible for the management of solid waste starting from collection to disposal. As per this rule, the authorities shall adopt appropriate technologies such as biological treatment or pelletisation for waste treatment after separation of the inerts and recyclables. This rule restricts landfilling to non biodegradable, inerts and other wastes that cannot be recycled or processed through biological processing.

MSW quantity generation and origin
Increase in waste generation with urbanisation is a well known fact. The scenario is similar in the proposed work area. The rate of waste generation is 0.5 kg/capita/day which accounts for a cumulative waste generation of 6500 tonnes per day. The major source of waste generation in Delhi is from households and institutions, commercial establishments including organised markets, wholesale establishments, weekly markets, retail markets, healthcare facilities and slaughterhouses. Delhi has 1600 organised markets, 24 600 establishments, 100 weekly markets, 6000 makeshift shops, 1 40 000 informal retail units. It has been estimated that about 56% of the total waste collected is from residential areas.

Present MSW handling and practice

In Delhi, the municipal solid wastes comprising various components such as paper, plastic, glass, sand and earth, and organic matter (Annexure 3) is normally disposed in the unmanaged landfill sites. This results in the emission of methane and carbon dioxide into the atmosphere. Municipal Corporation of Delhi has nearly 800 waste collection bins known as Dalaos in 12 zones. Waste is transported to the three landfill sites by 600 vehicles including refuse removal trucks, loaders, mini dumpers, tractor trailers and buffalo carts. Improper management of this waste contributes significantly to environmental hazards, deterioration of ambient air and ground water quality, human health etc. As per the present scenario, waste is being dumped in various disposal areas which are responsible for an annual emissions of approximately 70 000 tonnes of methane per day. (estimated as per IPCC methodology)

Municipal corporation of Delhi is already making efforts to streamline the collection and transportation of solid waste and the disposal as specified in the management and handling rules. The privatisation of collection and transportation of garbage is being planned and is to begin for six of the twelve zones in the next six months. MCD is entering into a contract with the companies who will be responsible for the collection and transportation with the necessary infrastructure, including the maintenance of workshops and recyclable centres. As per the national plan, MCD is also planning to set up a biomethanation plant, a construction waste recycling unit and a fuel from refuse plant by December 2006. Installation of a pelletisation plant for the treatment of this waste will capture these emissions which, in the absence of the project would have been emitted into the atmosphere. The RDF pellets will be efficiently used for various thermal applications replacing fossil fuels.

The efforts being taken by MCD for complying with the municipal waste management guidelines issued in 2000 would result in gradual reduction in the quantum of waste reaching the landfill. This in turn will result in reduction in methane emission from the landfill sites. Hence the methane avoidance due to setting up of the pelletisation plant would vary each year, depending on the amount of waste being managed as per the solid waste management rules. So it can be concluded that approximately 113 943 metric tonnes CO_2-equivalent can be abated in the first year, due to 100% of waste being disposed in the unmanaged landfill sites. This will be reduced to 102 529 metric tones of CO_2 equivalent in 2-5 years, due to the assumption that 10% of waste will be processed by the technology specified in the rules and will further reduce to about 79 699 metric tonnes CO_2 equivalent in 6-10 years, due to the assumption that 30% of waste will be processed as per the rules and will not contribute to methane emissions.

A.4.4 Public funding of the project activity:

(Indicate whether public funding from Parties included in Annex I is involved in the proposed project activity. If public funding from one or more Annex I Parties is involved, please provide information on sources of public funding for the project activity in annex 2, including an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of those Parties.)

No funding from Annexe I countries is involved in the project. It is to be funded through equity from the promoter and commercial loans from the Indian financial institutions.

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

(Please refer to 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.)

The proposed project activity is not a debundled component of any large project activity.

B. Baseline methodology

B.1 Title and reference of the project category applicable to the project activity:

(Please refer to the UNFCCC CDM web site for the most recent list of the small-scale CDM project activity categories contained in appendix B of the simplified M&P for small-scale CDM project activities.)

Type III Other project activities and III.E. Avoidance of methane production from biomass decay through controlled combustion

B.2 Project category applicable to the project activity:

(Justify the choice of the applicable baseline calculation for the project category as provided for in appendix B of the simplified M&P for small-scale CDM project activities.)

The project category includes measures that would result in methane avoidance from biomass or other organic matter, which would result in anthropogenic emissions under conditions of natural decay. The project activity of production of RDF pellets would prevent the natural decay of organic matter in the waste, thus avoiding methane emissions from the landfill. The use of pellets in industries results in controlled combustion. Hence the project activity does not recover or combust methane. The project activity of production of pellets does not result in CO_2 emissions exceeding 15 kilotonnes. The power requirement of the plant for drying and other operations is met by the energy generated from biomethanation plant treating organic wastes from biogenic sources such as vegetable market and food processing industries which is CO_2 neutral. The transportation of RDF over a distance of 100 km would result in 0.2 kilotonnes of CO_2. Hence the activity results in CO_2 generation that does not exceed 15 kilotonnes of annual emissions.
The emissions from combustion of RDF, which are around 60 kilotonnes per annum, have not been considered as the utilisation in industries is outside the project boundary.

B.3 Description of how the anthropogenic GHG emissions by sources are reduced below those that would have occurred in the absence of the proposed CDM project activity *(i.e. explanation of how and why this project is additional and therefore not identical with the baseline scenario)*

(Justify that the proposed project activity qualifies to use simplified methodologies and is additional using attachment A to appendix B of the simplified M&P for small-scale CDM project activities.)
(National policies and circumstances relevant to the baseline of the proposed project activity shall be summarized here as well.)

Delhi, the focus of the present CDM project is generating 6500 tonnes of waste per day which in the absence of treatment technology is dumped in an open site. In light of the Management and handling rules, 2000, Municipal Corporation would identify a whole range of acceptable technologies for treatment and disposal of generated MSW. But due to insufficient technical backup, scarcity of adequate funds and many other barriers, the current practice will keep continuing for years ahead with a decreasing trend. A few of the barriers in the way ahead for waste management guidelines implementation by municipal bodies are listed below:

Feasibility of pelletisation for MSW treatment has been tried and used for 3 different municipalities in India. Though the technology is supplied by an indigenous manufacturer and is relatively a simple technology, there are several barriers that make the project additional and the emissions would continue to occur in the absence of the CDM project activity.

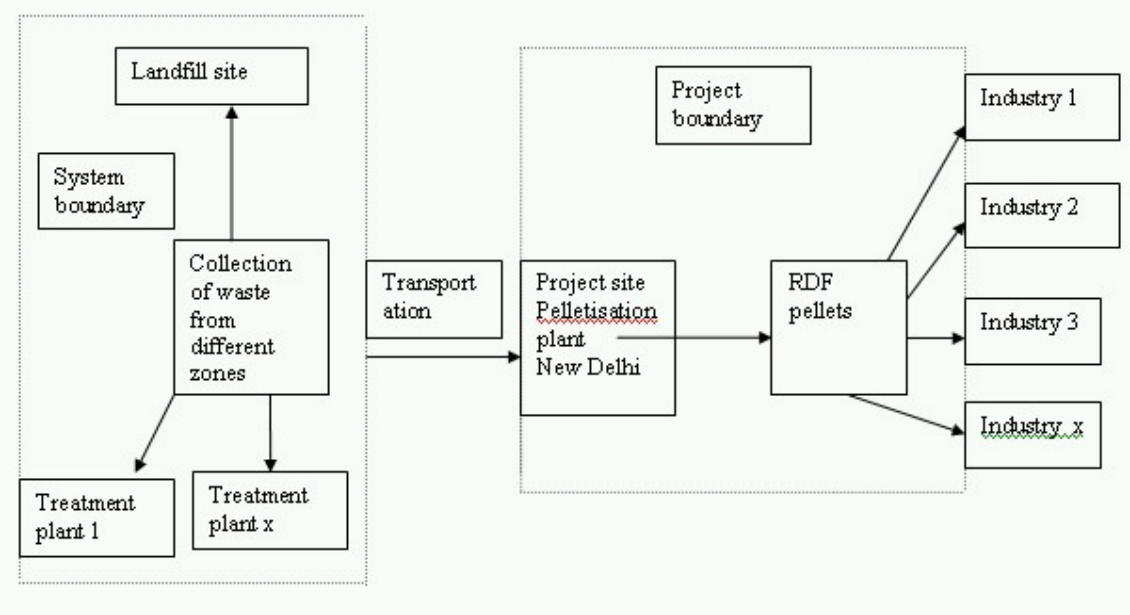
Financial Barrier: Municipal corporations have budget allocated for waste management. However the additional cost for the waste treatment plant cannot be met under this budget. In the absence of any separate fund allocation for the activity, implementation of waste management and handling rules would go through very slow progress due to incurring additional cost on treatment as compared to the baseline cost of collection, transportation and dumping. Hence, setting up of a treatment system is always an additional cost which a municipal authority will not be able to invest on without additional financial support. Private investors are also not investing in waste treatment projects, as the financial risk is high.

Existing practice:
The major barrier would be continuation of the existing practice of open dumping. Implementation of a technology for disposal of the waste is going to be a slow process. Although the need for proper waste management has been realised, the activity is taking lot of time, as solid waste management is a complete activity starting from collection to disposal and involves the support of both community and local body. This is evident from the fact that in spite of being the capital city, except for unmanaged landfills and setting up of few composting plants, there have been no treatment plants based on advanced technologies. In addition, there is also lack of awareness about different types of technologies that can mislead the community in supporting implementation of appropriate technology.

B.4 Description of the project boundary for the project activity:

(Define the project boundary for the project activity using the guidance specified in the applicable project category for small-scale CDM project activities contained in appendix B of the simplified M&P for small-scale CDM project activities.)

The project site in Delhi and the industrial areas within 100 km from Delhi has been taken as the project boundary for calculating methane emissions from the project activity, as the RDF pellets from the project site will be transported to these industries. Waste collected from different areas of Delhi will reach the project site at Okhla. The detailed composition of the waste of Delhi will be used for estimating emissions from the amount of waste to be processed. As the waste reaching the project site will be from different localities, hence an average composition will be used. The urban waste management system in the national capital territory of Delhi is the system boundary to determine the waste reaching the landfill sites and the waste being managed as per the rules. The MSW processing plant is the boundary for determining the amount of MSW processed for producing RDF.



Schematic showing the project boundary and system boundary

B.5 Details of the baseline and its development:

B.5.1 Specify the baseline for the proposed project activity using a methodology specified in the applicable project category for small-scale CDM project activities contained in appendix B of the simplified M&P for small-scale CDM project activities:

The methane emissions from the organic matter in the waste for the baseline scenario would be calculated using IPCC theoretical gas yield methodology (approved under Avoidance of methane production from biomass decay through controlled combustion). In this project, RDF is produced from MSW, and RDF is further combusted for heat energy.

$$CH_4\_IPCC\ decay = MCF \times DOC \times DOC_F \times F \times 16/12$$

Where :
CH_4_IPCC decay = IPCC CH_4 emission factor for decaying biomass in the region of project activity (tonnes of CH_4/tonne of biomass or organic waste)
DOC = Degradable organic fraction of the MSW
DOC_F = Fraction of the organic fraction that actually degrades (0.77 Default value)
MCF = Methane correction factor (default for India 0.6)
F = Fraction of methane in landfill gas (0.5 default value)

DOC = 0.4 (A)+0.17(B)+0.15 (C)+0.3(D)
A – 4.14% (Paper and textiles)
B - 21.85%(garden waste, yard waste etc.)

C – 25.22%(Food waste)
D – 1.72% (Wood)
(A-D as per Composition of MSW for Delhi Annexure 3)
DOC = 1.656+ 3.714+ 3.783+ 0.516 = 9.67%
CH_4_IPCC decay = 0.6 × 0.0967× 0.77× 0.5× 16/12 =0.0298

$BE_y = Q_{biomass} \times$CH4_IPCC decay×GWP_CH4
BEy = Baseline methane emissions from biomass decay (tonnes of CO_2 equivalent)
$Q_{biomass}$ = Quantity of biomass treated under the project activity (tonnes)
GWP_CH_4 = GWP for CH_4 (tonnes of CO_2 equivalent/tonne of CH_4) = 21

GHG emission reduction is = 500×0.0298×21 = 312.72 tonnes of CO_2 equivalent per day or 1,14,145 tonnes per annum

Since the methane correction factor for the specific project site is not known, the IPCC default value for India will be used for the purpose.

Baseline emissions shall exclude methane emissions that would have to be removed to comply with national or local safety requirement or legal regulations. Hence the emissions would be modified depending on the compliance status of MCD based on monitoring data.

Methodology for estimation of fraction of waste processed as per legislation
As per the MOEF solid waste management and handling rules, all municipalities were expected to set up the waste processing and disposal facilities by December 2003. (http://envfor.nic.in/legis/hsm/mswmhr.html). However the current scenario indicates that although municipalities are planning to implement the facilities in the coming years, the process is slow and there is expected to be a gradual increase in the disposal facilities. Some initiatives are being taken by the municipal corporation of Delhi to streamline the waste collection, segregation and recovery of resources, through privatisation. The implementation of disposal techniques are still in a primitive stage, due to the high cost and specific requirements of various processing technologies. The MCD has planned for setting up of waste processing units for recycling, generation of RDF and a biomethanation based organic waste treatment plant by 2006. However, to dispose effectively the entire amount of waste generated in Delhi, a large investment and infrastructure will be needed. Hence it is expected that the existing disposal practices would continue with gradual increase in the implementation of processing plants based on various technologies and the compliance of the municipality would increase slowly. To account for the above factor in the baseline emissions, the net baseline emissions will be a product of BEy and factor *f.* This would exclude methane emissions, due to the compliance with national or local safety requirement or legal regulations.

Fraction of waste processed in the state can be given as:

$$f = \sum_{i=1}^{i=n} Ci / Qw$$

where C is the capacity of treatment plants (TPD)
n is the no. of treatment plants in the state
Qw is the total waste generation in the state (TPD)

The fraction of waste treated by the prescribed technology to comply with the standards will be assumed for each year for the estimations and will be updated with the report from the pollution control board.

B.5.2 Date of completing the final draft of this baseline section *(31/10/2004)*:

B.5.3 Name of person/entity determining the baseline:

(Please provide contact information and indicate if the person/entity is also a project participant listed in annex 1 of this document.)

The Energy and Resources Institute
Darbari Seth Block, Habitat Place
Lodi Road, New Delhi - 110 003
India
Tel. 91-11-24682100
Fax: 91-11-24682145

C. Duration of the project activity and crediting period

C.1 Duration of the project activity:

C.1.1 Starting date of the project activity: *July 2006*
(For a definition of the term 'starting date', please refer to the UNFCCC CDM web site).

C.1.2 Expected operational lifetime of the project activity: *(in years and months, e.g. two years and four months would be shown as: 2y-4m.):* 15 years

C.2 Choice of the crediting period and related information: *(Please underline the selected option (C.2.1 or C.2.2) and provide the necessary information for that option.)*

(Note that the crediting period may only start after the date of registration of the proposed activity as a CDM project activity. In exceptional cases, the starting date of the crediting period can be prior to the date of registration of the project activity as provided for in paragraphs 12 and 13 of decision 17/CP.7 and in any guidance by the Executive Board, available on the UNFCCC CDM web site.)

C.2.1 Renewable crediting period *(at most seven (7) years per crediting period):*
Not Applicable

C.2.1.1 Starting date of the first crediting period *(DD/MM/YYYY)*:

C.2.1.2 Length of the first crediting period *(in years and months, e.g. two years and four months would be shown as: 2y-4m.)*:

C.2.2 Fixed crediting period *(at most ten (10) years)*:

C.2.2.1 Starting date *(DD/MM/YYYY*): July 2006

C.2.2.2 Length (max 10 years): *(in years and months, e.g. two years and four months would be shown as: 2y-4m.):* 10 years

D. Monitoring methodology and plan

(The monitoring plan shall incorporate a monitoring methodology specified for the applicable project category for small-scale CDM project activities contained in appendix B of the simplified M&P for small-scale CDM project activities and represent good monitoring practice appropriate to the type of project activity.

The monitoring plan shall also provide information on the collection and archiving of the data specified in appendix B of the simplified M&P for small-scale CDM project activities to:
- Estimate or measure emissions occurring within the project boundary;
- Determine the baseline, as applicable;
- Estimate leakage, where this needs to be considered.

Project participants shall implement the registered monitoring plan and provide data, in accordance with the plan, through their monitoring reports.

Operational entities will verify that the monitoring methodology and plan have been implemented correctly and check the information in accordance with the provisions on verification. This section shall provide a detailed description of the monitoring plan, including an identification of the data to be collected, its quality with regard to accuracy, comparability, completeness and validity, taking into consideration any guidance contained in the methodology, and archiving of the data collected.

Please note that monitoring data required for verification and issuance are to be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

An overall monitoring plan that monitors performance of the constituent project activities on a sample basis may be proposed for bundled project activities. If bundled project activities are registered with an overall monitoring plan, this monitoring plan shall be implemented and each verification/certification of the emission reductions achieved shall cover all of the bundled project activities.)

D.1 Name and reference of approved methodology applied to the project activity:

(Please refer to the UNFCCC CDM web site for the most recent version of the indicative list of small-scale CDM project activities contained in appendix B of the simplified M&P for small-scale CDM project activities.)

(If a national or international monitoring standard has to be applied to monitor certain aspects of the project activity, please identify this standard and provide a reference to the source where a detailed description of the standard can be found.)

The project activity will use following methodology for monitoring

Type III: Other project activities – III E Avoidance of methane production from biomass decay through controlled combustion

The proposed methodology is based on the monitoring of

- Waste generated in the National Capital Territory of Delhi
- Number of treatment plants set up along with the capacity
- Amount of organic matter processed (Q biomass) by the project activity in a year
- Waste composition
- Amount of RDF produced
- Quantity of RDF sold per year

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

(Justify the choice of the monitoring methodology applicable to the project category as provided for in appendix B.)

The monitoring methodology for III E takes into account the quantity of waste processed and the amount of fuel pellets produced. The composition of waste being processed by the treatment facility is important monitoring parameter for estimation of the baseline emission. Fraction of waste treated as per the MSW rules is also essential to estimate the amount of waste reaching the landfill during the project life time to account for compliance level in estimating the baseline emissions.

Waste generated from the state and treatment facilities of the NCT will be monitored based on the available report from MCD and Pollution Control Board on annual basis.

D.3 Data to be monitored:

(The table below specifies the minimum information to be provided for monitored data. Please complete the table for the monitoring methodology chosen for the proposed project activity from the simplified monitoring methodologies for the applicable small-scale CDM project activity category contained in appendix B of the simplified M&P for small-scale CDM project activities.

Please note that for some project categories it may be necessary to monitor the implementation of the project activity and/or activity levels for the calculation of emission reductions achieved.

Please add rows or columns to the table below, as needed)

ID number	Data type	Data variable	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)	For how long is archived data to be kept?	Comment
1	Sample analysis for baseline emissions	DOC of MSW	%	c	Bi annual	Sample	Both paper and electronic	10 years	Analysed through sample analysis
2	Baseline emissions	Amount of MSW processed	TPD	m	Daily	100%	Both paper and electronic	10 years	Based on no. of truck loads and capacity of each truck
3	Baseline emissions	Amount of RDF produced	M^3	m	Daily	100%	Both paper and electronic	10 years	Weighed
4	Fraction for baseline emissions	Waste generated	TPD	From reports of MCD	Annual	1 year	Paper	10 years	Data from MCD will be recorded for each year

5	Fraction of waste processed as per rules	Treatment plants	No.	From reports of pollution control board	Annual	1 year	Paper	10 years	Data from pollution control board will be collected at the end of each year

D.4 Name of person/entity determining the monitoring methodology:

(Please provide contact information and indicate if the person/entity is also a project participant listed in annex 1 of this document.)

The Energy and Resources Institute
Darbari Seth Block, Habitat Place
Lodi Road, New Delhi - 110 003
India
Tel. 91-11-24682100
Fax: 91-11-24682145

E. Calculation of GHG emission reductions by sources

E.1 Formulae used:

(In E.1.1 please provide the formula used to calculate the GHG emission reductions by sources in accordance with the applicable project category of small-scale CDM project activities contained in appendix B of the simplified M&P for small-scale CDM project activities.

In case the applicable project category from appendix B does not indicate a specific formula to calculate the GHG emission reductions by sources, please complete E.1.2 below.)

E.1.1 Selected formulae as provided in appendix B:

(Describe the calculation of GHG emission reductions in accordance with the formula specified for the applicable project category of small-scale CDM project activities contained in appendix B of the simplified M&P for small-scale CDM project activities.)

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: *(for each gas, source, formulae/algorithm, emissions in units of CO_2 equivalent)*

Emission due to transportation of the RDF to industries within a radius of 100 km of Delhi

Maximum capacity of trucks to transport RDF is 10 tonnes
To transport 150 T of RDF produced daily, 15 trips or trucks will be required
Total distance covered for transportation of 150 TPD will be 3000 km both ways
CO_2 emissions from CNG is 225.3 g/km (Source: Third assessment report, IPCC mitigations, Table 3.9, Page 196)
This amounts to 0.6 tonnes of CO_2 equivalent per day or 202 tonnes per annum.

Emissions due to the energy use for the project activity is not considered as the source of power generation is biogenic source and hence is CO_2 neutral

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 *(for each gas, source, formulae/algorithm, emissions in units of CO_2 equivalent)*

Not applicable.

Emissions due to burning of pellets in industries is not considered as it is outside project boundary

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

Project activity emissions is 202 tonnes of CO_2

E.1.2.4 Describe the formulae used to estimate the anthropogenic emissions by sources of GHG's 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: *(for each gas, source, formulae/algorithm, emissions in units of CO_2 equivalent)*

The methane emissions from the organic matter in the waste for the baseline scenario would be calculated using IPCC theoretical gas yield methodology (approved under Avoidance of methane production from biomass decay through controlled combustion)

$$CH_4\_IPCC\ decay = MCF \times DOC \times DOC_F \times F \times 16/12$$

Where :

CH_4_IPCC decay = IPCC CH_4 emission factor for decaying biomass in the region of project activity (tonnes of CH_4/tonne of biomass or organic waste)

DOC = Degradable organic fraction of the MSW

DOC_F = Fraction of the organic fraction that actually degrades (0.77 Default value)

MCF = Methane correction factor (default for India 0.6)

F = Fraction of methane in landfill gas (0.5 default value)

DOC = 0.4 (A)+0.17(B)+0.15 (C)+0.3(D)
A – 4.14 (Paper and textiles)
B - 21.85 (garden waste, yard waste etc.)
C – 25.22 (Food waste)
D – 1.72 (Wood)

DOC = 1.656+ 3.714+ 3.783+ 0.516 = 9.67 %

CH_4_IPCC decay = 0.6× 0.0967× 0.77× 0.5× 16/12 = 0.029

$BE_y = Q_{biomass} \times CH_4\_IPCC\ decay \times GWP\_CH_4$

BEy = Baseline methane emissions from biomass decay (tonnes of CO_2 equivalent)

$Q_{biomass}$ = Quantity of biomass treated under the project activity (tonnes)

GWP_CH_4 = GWP for CH_4 (tonnes of CO_2 equivalent/tonne of CH_4)

GHG emission reduction is = 500× 0.0298× 21 = 312.72 tonnes of CO_2 equivalent per day or 1,14,145 tonnes per annum

The waste characteristics of the state and site characteristics have been studied in detail for variables in the above function. Since the methane correction factor for the specific project site is not known, the IPCC default value for India will be used for the purpose.

The MCD has planned for setting up of waste processing units for recycling, generation of RDF and a biomethanation based organic waste treatment plant by 2006. However to dispose effectively the entire amount of waste generated in Delhi, a large investment and infrastructure will be needed. Hence it is expected that the existing disposal practices would continue with gradual increase in the implementation of processing plants based on various technologies, and the compliance of the municipality would increase slowly.

To account for the above factor, in the baseline emissions that should exclude methane emissions due to the compliance with national or local safety requirement or legal regulations, the fraction of waste treated by the prescribed technology to comply with the standards has been taken, which will be assumed and will be updated with the report from the pollution control board.

Fraction of waste processed in the state can be given as:

$$F = \sum_{i=1}^{i=n} Ci / Qw$$

where C is the capacity of treatment plants (TPD)
n is the no. of treatment plants in the state
Qw is the total waste generation in the state (TPD)

Assumptions :
1) The segregation of the organic and inorganic matter occurs in the processing and no organic matter enters the landfill due to the project activity.
2) Waste treated by specified technologies is 10% for 2-5 years and 30% for 6-10 years

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:

Emissions reduction due to the project activity is 113 943.6 tonnes of CO_2 per annum for the first year.

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

Years	Year	To be monitored			Methane	CO_2 equivalent	Compliance (%)	BAU (%)	compliance adjusted	Emissions due to transportation	Net emissions
		MSW (TPD)	DOC (9.67%) (TPD)	DOC_F (0.77) (TPD)	(TPA)				(TPA)		
1	2005	500	48.35	37.2295	5435.507	114145.65	0	100	114145.647	202	113943.6
2	2006	500	48.35	37.2295	5435.507	114145.65	10	90	102731.082	202	102529.1
3	2007	500	48.35	37.2295	5435.507	114145.65	10	90	102731.082	202	102529.1
4	2008	500	48.35	37.2295	5435.507	114145.65	10	90	102731.082	202	102529.1
5	2009	500	48.35	37.2295	5435.507	114145.65	10	90	102731.082	202	102529.1
6	2010	500	48.35	37.2295	5435.507	114145.65	30	70	79901.9529	202	79699.95
7	2011	500	48.35	37.2295	5435.507	114145.65	30	70	79901.9529	202	79699.95
8	2012	500	48.35	37.2295	5435.507	114145.65	30	70	79901.9529	202	79699.95
9	2013	500	48.35	37.2295	5435.507	114145.65	30	70	79901.9529	202	79699.95
10	2014	500	48.35	37.2295	5435.507	114145.65	30	70	79901.9529	202	79699.95
				Total emissions during project life					**924579.74**		922559.7

F.1 If required by the host Party, documentation on the analysis of the environmental impacts of the project activity: *(if applicable, please provide a short summary and attach documentation)*

Not applicable

G. Stakeholders comments

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

As this project follows the specified technology for the management of solid wastes as per the Solid Wastes Management and Handling rules by the Government of India, there is no objection to the project activity. Rather it is beneficial for the community, as it improves the environmental conditions and provides fuel that can replace coal and other fossil fuels in the industries. The response to the project has been highlighted in articles published by popular news dailies. (http://www.hindu.com/2004/06/13/stories/2004061309430400.htm)

G.2 Summary of the comments received:

Solid waste management through ecofriendly technology is viewed positively by both the corporation and the community. Any initiative in this direction is supported by both community and NGO's. This technology is particularly favourable as it does not require any segregation at source and also there is no direct burning of the waste. However the local community, due to lack of awareness about the technologies, is concerned that the fate of project should not be similar to incineration plant set up earlier for municipal waste (The Hindu, July 18, 2004). The odour problem due to the stacking of waste for more than 2 days is another concern. The burning of RDF is not allowed in NCT region as per DPCC (Delhi Pollution Control Committee).

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

Successful operating plants based on the proposed technology at different sites and the difference between RDF and incineration plants are discussed in various forums held on waste to energy to remove the misconception about the technical viability. The problem regarding the odour is taken care of by avoiding stacking of wastes and the treatment of the entire waste on the same day. To avoid burning of RDF pellets, so as to comply with the DPCC norms, pellets produced will be transported to industries in neighbouring regions of Haryana and Uttar Pradesh.

Annex 1

CONTACT INFORMATION FOR PARTICIPANTS IN THE PROJECT ACTIVITY

(Please repeat table as needed)

Organization:	RENOVO ENERGY LIMITED
Street/P.O.Box:	Satya Niketan
Building:	123/124, 3rd Floor
City:	New Delhi
State/Region:	New Delhi
Postcode/ZIP:	110021
Country:	India
Telephone:	91-11-26880152, 91-11-26117000, 91-11-26881325
FAX:	91-11-26880152,91-11-26117000
E-Mail:	renovo_energy@yahoo.com
URL:	
Represented by:	
Title:	Director
Salutation:	Mr.
Last Name:	Prasad
Middle Name:	Y.
First Name:	
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The project involves no public funding from any Annex I party

Annexure 3

Composition of MSW

MUNICIPAL SOLID WASTE (MSW) IN DELHI (Year 2000)

S. No.	Components	Percentage (By Weight)	Weight (T/Month)
1	Food Waste	25.22	39966.03
2	Paper	3.62	5736.60
3	Card board	3.08	4880.86
4	Plastics	4.17	6608.18
5	Textiles	0.52	824.04
6	Rubber	1.83	2899.99
7	leather	0.37	586.34
8	Yard Waste	21.85	34625.61
9	Wood	1.72	2725.68
10	Glass	0.49	776.50
11	Tin	0.20	316.94
12	Aluminium	0.00	0
13	Other metals	0.25	396.17
14	Dirt, Ash	36.56	57936.48
Total		**99.88**	**158279.42**

http://mospi.nic.in/compenv2000_ch7.htm

Recyclable components of MSW IN DELHI (Year 2000)

S. No.	Components	Percentage (By Weight)
1	Paper	3.62
2	Cardboard	3.08
3	Plastics	4.17
4	Glass	0.49
5	Tin	0.20
6	Aluminium	0.00
7	Other Metals	0.25
Total		**11.81**

COMBUSTIBLE COMPONENTS OF MSW IN DELHI (Year 2000)

S. No.	Components	Percentage (By Weight)	Weight (T/Month)
1	Paper	3.62	5736.6
2	Cardboard	3.08	4880.86
3	Plastics	4.17	6608.18
4	Textiles	0.52	824.04
5	Rubber	1.83	2899.99
6	Leather	0.37	586.34
7	Wood	1.72	2725.68
Total		**15.31**	**24261.69**