

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

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**Revision history of this document**

<b>Version Number</b>	<b>Date</b>	<b>Description and reason of revision</b>
01	21 January 2003	Initial adoption
02	8 July 2005	<ul style="list-style-type: none"><li>• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document.</li><li>• As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <a href="http://cdm.unfccc.int/Reference/Documents">http://cdm.unfccc.int/Reference/Documents</a>.</li></ul>
03	22 December 2006	<ul style="list-style-type: none"><li>• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.</li></ul>

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**SECTION A. General description of small-scale project activity**
**A.1 Title of the small-scale project activity:**

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Fetty Mina Co-Composting Project  
Version 1  
12 December 2006

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

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The Fetty Mina Co-Composting Project (hereafter, the Project) developed by PT Fetty Mina Jaya (hereafter referred to as the Project Developer) is a co-composting project in the region of Riau Province in Indonesia (hereafter referred to as the “Host Country”)

The project is a waste management project at a palm oil mill that will avoid methane emissions through composting activities. The project will produce organic compost, which will be utilized partly in the project developer’s own oil palm plantation and partly in the plantations of small-holders. The project applies zero discharge and zero waste technology and increases the reuse and regeneration of the residues in the oil palm mills.

PT Fetty Mina Jaya is one of the many palm oil mills operated in Riau Province. The company owns and operates 1 palm oil mill with a capacity to process 30 Tonnes Fresh Fruit Bunches (FFB)/hour. With average operating hours of 22 hours a day and 330 days a year, the palm oil mill will process around 217,800 tonnes of FFB per year. Processed FFB will partly come from its own plantation and partly from the small holder plantations. In the process of producing crude palm oil the empty fruit bunches (EFB) are discharged as waste, which is left to decay in an unmanaged dumpsite closed to the mills. This dumpsite has an average of 10 m depth. EFB accounts for about 22% of the total weight of FFB. This translates to a total EFB of approximately 6.6 Tonnes/hour or a total of 47,916 Tones/year. To avoid methane generation, the EFB will be composted. Composting is a process of controlled biological decomposition of organic materials.

This composting project will also use the Palm Oil Mill Effluent (POME) produced by the plant. POME will be sprayed onto shredded EFB during composting to maintain adequate moisture levels. The subsequent process is aerobic due to mechanical aeration as well as strict control of key parameters – oxygen levels at the bottom of the compost mounds, temperature and humidity – to ensure that the process proceeds optimally. The compost product is ready in 6 - 8 weeks. Subsequently the compost will be used as an organic fertilizer in the plantation. In the baseline, 100% of POME is treated in 11 existing anaerobic lagoons (1. 60 x 31 m; 2. 60 x 41 m; 3. 55 x 30 m; 4. 137 x 40 m; 5. 137 x 40 m; 6. 50 x 31 m; 7. 49 x 31 m; 8. 39 x 21 m; 9. 49 x 21 m; 10. 60 x 52 m; 11. 61 x 25 m; each pond is 6 m depth) before discharge to a river when COD is already at the level allowed by regulations, resulting in the formation of large quantity of methane released in an uncontrolled manner into the atmosphere. The composting process will utilize 100% of the effluent eliminating the need for existing anaerobic lagoons. As the anaerobic process is removed from the POME treatment, methane generation is eliminated.

The project is helping the Host Country fulfil its goals of promoting sustainable development in the following ways:

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- It will reduce the greenhouse gases generated from the decay of EFB and from the anaerobic digestion process of POME
- It will set the example of a zero-waste palm oil mill in the region
- It will promote technological development and capacity building within the Indonesian palm oil sector
- It will create additional jobs during construction and operation of the composting plant

**A.3. Project participants:**

&gt;&gt;

Please list project participants and Party(ies) involved and provide contact information in Annex 1. Information shall be indicated using the following tabular format.

Name of Party involved	Private and/or public entity(ies) project participants (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant
Indonesia (host)	PT Fetty Mina Jaya (Private Company)	No
United Kingdom of Great Britain and Northern Ireland	EcoSecurities Group Plc.	No

(\*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.

**Note:** When the PDD is filled in support of a proposed new methodology (forms CDM-NBM and CDM-NMM), at least the host Party(ies) and any known project participant (e.g. those proposing a new methodology) shall be identified.

EcoSecurities is the official contact for the CDM project activity. Further contact information for the project participants are provided in Annex 1 of this document.

**A.4. Technical description of the small-scale project activity:****A.4.1. Location of the small-scale project activity:**

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**A.4.1.1. Host Party(ies):**

&gt;&gt;

Indonesia

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

&gt;&gt;

Riau Province

**A.4.1.3. City/Town/Community etc:**

&gt;&gt;

Lukud Village, Minas Timur Sub-District, Siak District

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

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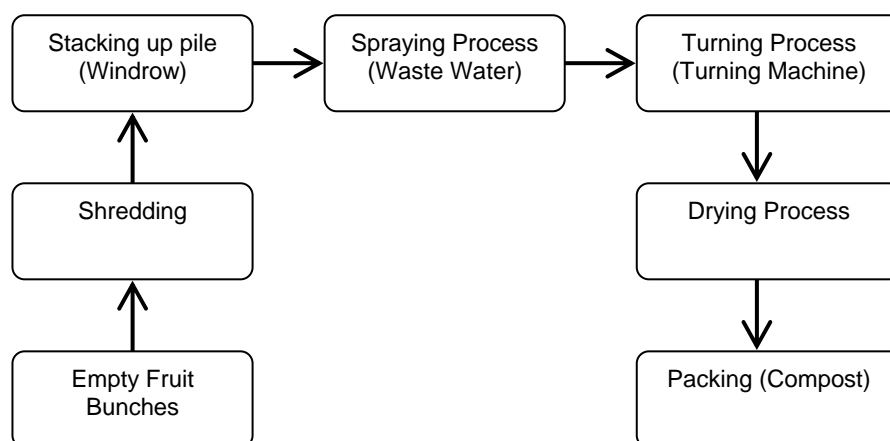
The project is located at N 00 39'06.7'' and E 101 29'23.6''

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

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The methodology applicable for the project activity according to the UNFCCC's published simplified procedures for small-scale activities is AMS III-F *Avoidance of biomass decay through composting*. This project falls under sectoral scope 13, waste handling and disposal. The project conforms to the project category since the annual emission reduction would be less than or equal to 60 kilo-tons of CO<sub>2</sub> equivalent.

Figure 3. Schematic of Fetty Mina Co- Composting Plant process flow



**Technology description:**

The technologies that have a significant role in the composting process are the turning machine and the shredder machine. The shredder machine will be used to press and shred EFB into smaller parts. This process will be required in order to facilitate the composting process. This machine will most probably be imported from Malaysia where the palm oil mill technology is more advanced than in Indonesia. The turning machine will be used to turn the compost (to provide mechanical aeration), which is required to ensure the maintenance of an aerobic process in the windrows<sup>1</sup>. Most probably, this turning machine will be imported from Germany.

Since machinery will be imported from other countries, the project entity is required to organize training for its staff that will operate and maintain the machinery. The training will include preventative maintenance, repair, overhaul, etc. This training will be organized in collaboration with the suppliers of these machines. Additionally, training on compost production management will also be organized. The consultant that has designed this composting system will provide this training. The same consultant will

<sup>1</sup> Free-standing compost mounds can be made up to a size of between two and four cubic metres. In larger heaps, the weight of compost tends to force air out resulting in an anaerobic process. Once a heap has reached 1.5 m or so in height, it is extended lengthways, making what is known as a windrow

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also supervise the composting production during the commissioning of this plant for at least a year to guarantee that the compost is produced and the data gathering, recording and filing required to ensure CER generation will be done properly.

**Table 1 – Project data**

Palm oil mill	30 MT/hour FFB processing capacity
Available EFB for composting	47,916 MT/year
EFB / FFB ratio (by weight)	0.22
POME / FFB ratio (by weight)	0.6
Shredding machine	
Model	Sunle SL-7100
Capacity	8 MT/hour EFB
Motor	AEB 75 kW / 1450 rpm / 415 V / 50 Hz.
Compost turning machine	
Model	Backhus 16-series
Engine	Cummins Turbo Diesel water cooled
Max. capacity	104 HP at 2000 rpm
Composting area	15,000 m <sup>2</sup>
Wastewater channel	Intake and drainage channel, using circulating pump and flow meter system
Storage and handling works	Compact Loader Medium Trucks (5 tons capacity) Manual loading works in compost storage (located adjacent to composting field)
Electricity generation	Electricity consumed by composting equipments is generated by the palm-oil mill steam turbine, using 100% biomass fuel (palm fiber & shell) Composting equipments will not run during palm-oil mill idle period / evening time. The electricity generation equipment is pre-existing

<b>A.4.3 Estimated amount of emission reductions over the chosen <u>crediting period</u>:</b>
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Years	Annual estimation of emission reductions over the chosen crediting period
2008	29,692
2009	37,697
2010	43,064
2011	46,661
2012	49,072
2013	50,688
2014	51,771
2015	52,498
2016	52,984
2017	53,311
<b>Total estimated reductions (tonnes of CO<sub>2</sub>)</b>	<b>467,438</b>
<b>Total number of crediting years</b>	<b>10</b>
<b>Annual average over the crediting period of estimated reductions (tonnes of CO<sub>2</sub>)</b>	<b>46,744</b>

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

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This project has not received and is not seeking public funding.

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

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Based on the information provided in Appendix C, this Project is not a debundled component of a larger project activity since the project participants have not registered or operated another project in the region surrounding the project boundary.

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

&gt;&gt;

Small scale methodology AMS III.F “Avoidance of methane production from decay of biomass through composting”, Version 3 (23 December 2006)

The methodology AMS III.F also refers to AMS III.G, AMS III.H and the “Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site” for baseline calculation of methane generation potential from solid and liquid waste.

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

&gt;&gt;

The proposed project activity meets all the applicability requirements of AMS III-F as follows:

- This project category comprises measures to avoid the production of methane from biomass or other organic matter that would have otherwise been left to decay anaerobically in a waste disposal site without methane recovery. The project entity is currently dumping the EFB in an unmanaged site close to the mill. It does not apply EFB in the field due to the high transportation cost and due to the fact that they only own a small amount of plantation close to the mill. In the project activity, decay is prevented through aerobic treatment by composting and proper soil application of the compost. The project activity does not recover or combust methane (unlike III G) and does not undertake controlled combustion of the waste (unlike AMS III.E).
- This category is also applicable for co-composting wastewater and solid biomass waste, where wastewater would otherwise have been treated in an anaerobic wastewater treatment system without methane recovery. Currently, the waste water is treated in a wastewater treatment system without methane recovery. The wastewater in the project scenario is used as a source of moisture and/or a nutrient to the composting of empty fruit bunches (EFB). In this project, methane generation is prevented through the spraying of the whole waste water in to the shredded EFB.
- The total emissions reductions from the project will be less than 60,000 tCO<sub>2</sub>e/year over its crediting period. "This category is applicable for project activities resulting in average emission reductions lower than 60,000 ton CO<sub>2</sub>e annually over the crediting period".

**B.3. Description of the project boundary:**

&gt;&gt;

The project boundary is defined as the notional margin around a project within which the project's impact (in terms of carbon emission reductions) will be assessed. As referred to in Appendix B for small-scale project activities, for the co-composting component, the project boundary is the physical, geographical site:

- (a) Where the solid waste would have been disposed and the methane emissions occurs in absence of the proposed project activity;
- (b) Where the co-composting waste water would have been treated anaerobically in the absence of the proposed project activity
- (c) Where the treatment of biomass through composting takes place;
- (d) Where the soil application of the produced compost takes place;
- (e) And the itineraries between (a), (b) and (c), where the transportation of the waste or compost occurs.

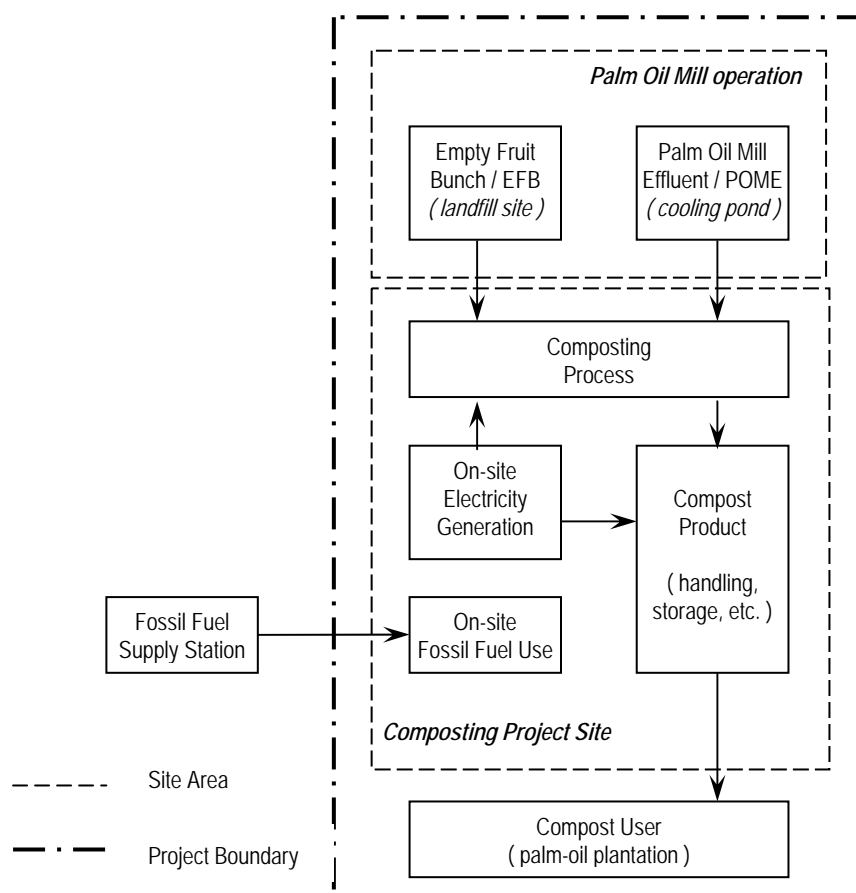


Figure 4 refers to Boundary items described in the Small-scale Methodology III-F

Table 2 – Summary of Gases and Sources included in project boundary

	Source	Gas	Included ?	Justification / Explanation
<b>Baseline</b>	Biomass disposed in unmanaged disposal sites	CO2	No	CO2 emissions from biomass decay in solid waste disposal sites are considered GHG neutral
		CH4	Yes	Methane emission from biomass decay in the solid waste disposal sites
		N2O	No	Not significant. Excluded for simplification and conservativeness
	Open Lagoons	CO2	No	CO2 emissions from biomass decay in solid waste disposal sites are considered GHG neutral
		CH4	Yes	Methane emission from anaerobic digestion
		N2O	No	Not significant. Excluded for simplification and conservativeness.
	Transportation	CO2	Yes	Emission from combustion of fossil fuel in transport vehicles
CH4		No	Not significant. Excluded for simplification and conservativeness	

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	Auxiliary Equipment	N2O	No	Not significant. Excluded for simplification and conservativeness
		CO2	Yes	Emission from Grid Electricity or Fossil fuel
		CH4	No	Not significant. Excluded for simplification and conservativeness
		N2O	No	Not significant. Excluded for simplification and conservativeness
Project Activity	Composting process	CO2	No	CO2 emissions from composting process is considered GHG neutral
		CH4	Yes	Methane emissions from anaerobic pockets during composting process
		N2O	Yes	N2O emissions from loss of N2O-N during composting process and during application of the compost
	Leaked Wastewater	CO2	No	CO2 emission from biomass source and considered GHG neutral.
		CH4	No	Methane emission from anaerobic process of wastewater collected after the project activity and reuse
		N2O	No	Not significant, excluded for simplification
	Additional Transportation due to Project Activity	CO2	Yes	Emission from combustion of fossil fuel in transport vehicles.
		CH4	No	Not significant, excluded for simplification
		N2O	No	Not significant, excluded for simplification
	Auxiliary Equipment	CO2	Yes	Emission from combustion of fossil fuel in the auxiliary equipments or machineries
		CH4	No	Not significant, excluded for simplification
		N2O	No	Not significant, excluded for simplification

**B.4. Description of baseline and its development:**

&gt;&gt;

The baseline for the project activity was developed by EcoSecurities Group PLC, and was completed on 03.05.2007.

Contact:

Paul Butarbutar  
[paul.butarbutar@ecosecurities.com](mailto:paul.butarbutar@ecosecurities.com)

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

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Prior to development of the project activity the project entity has considered CDM as part of it's revenue. This can be proven with the signing of the Emission Reduction Purchase Agreement (ERPA) with EcoSecurities dated in June 2006.

According to Attachment A to Appendix B of the simplified modalities and procedures for CDM small-scale project activities evidence to why the proposed project is additional is offered under the following categories of barriers: (a) investment barriers, (b) technological barriers, and (c) prevailing practice.

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a) Investment Barriers:

The inter-bank interest rate published by the Indonesian central bank (Bank Indonesia)<sup>2</sup> in 2006 is on average 11 %, and typical lending banks charge 4 – 5 % higher than the central bank rate. In 2006, the average investment lending rate was above 15 %. Added to this would be risk premiums for investing in a capital project in the palm-oil sector, which presents numerous risks. 16 % has therefore been conservatively chosen as the benchmark rate of return for comparison.

Disposal of EFB in the unmanaged dumpsite will only involve transportation and human resource costs, whilst the treatment of POME has already been applied using aerobic and anaerobic lagoons. Continuation of this practice will result in minimal ongoing costs for the project host, and will not require any additional capital investment. On the other hand, the construction of a composting plant will require substantial investment costs for equipment, land preparation and construction of the concrete floor.

Aerated composting requires the acquisition of specialized equipment, a large level surface of land taken away from the plantation, and the mobilization of a substantial work force for its operation (at least 8 – 10 additional staff). It is estimated that the investment required to build the composting plant will reach up to around US\$980,000, excluding land procurement of around 1.5 ha. The operational cost of this project would be around US\$12.30 per tonne compost produced per year. Without CDM revenue, the IRR of this project would only be 4.06%. The project entity has tried to get loan from the bank to implement this project. Unfortunately, none of the banks they approached were interested to provide a loan to them, mainly due to this low IRR. This shows that the development of this project will only be feasible if it is developed as CDM project, since as CDM project its IRR would increase to 27.75% (See Table below).

<b>Financial Parameter</b>	<b>With CDM</b>	<b>Without CDM</b>
Capital cost of the project	<b>756,263</b>	<b>756,263</b>
Operational cost per year	<b>245,450</b>	<b>245,450</b>
Non carbon revenues (fertilizer cost saving from compost use)	<b>187,110</b>	<b>187,110</b>
Net Present Value (US\$)	<b>416,947</b>	<b>-347,398</b>
IRR	<b>26.59%</b>	<b>2.60%</b>
Discount rate	<b>16%</b>	

b) Technological Barrier:

Waste dumping is the easiest way to manage the solid waste of the project entity. However, this will lead to methane emissions since this waste will be left to decay in this dumping site. Converting the waste into compost will pose a risk to them since this project entity does not have previous experience with the operation of an aerated composting plant, and therefore will require new skills and know-how for its proper operation. The turning and shredder technology is not available in Indonesia and will be imported from Germany, for the turning machine, and from Malaysia for the shredder. Also, since the machinery will be imported, there is a

<sup>2</sup> See Annex 3: Baseline Information (BI Rate)

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risk that in case of machine breakdown required spare parts would not available in stock, so that the machinery would have to stop operation. The supplier will provide on-the-job training for at least 6 months to the operators, so that the operators can properly produce compost. The training courses will consist of operation and maintenance of the equipment, compost production process, monitoring of compost production, and proper data management.

b) Prevailing Practice:

Around 400 palm oil mills are operated in Indonesia. These mills process fresh fruit bunches (FFB) produced from around 4.9 million ha of oil palm plantation. The waste resulting from the processing of FFB will mainly consist of empty fruit bunches (EFB), fiber, shells, and POME. Whilst fiber and shells will normally be used as fuel for the mill boilers to generate heat and electricity for the whole plant, EFB will normally be spread on the plantation, incinerated or dumped in unmanaged sites, whilst the palm oil mill effluent (POME) will be treated in the anaerobic and aerobic ponds before being discharged into a river or applied in the plantation.

According to a report provided by Dr. Darnoko<sup>3</sup>, a scientist working for Indonesian Oil Palm Research Institute in Medan, North Sumatera, Indonesia, the utilization of EFB and POME to produce compost is relatively new in Indonesia, so to date only 5 companies who have already built such composting plants. These companies are:

1. PT Perkebunan Nusantara IV
2. SMART Group
3. PT Perkebunan Nusantara V
4. PT Tasma Puja
5. PT Asian Agri

Apart from the list in the report, another 2 composting facilities are also exist, namely at PT Tolan Tiga and PTTP London Sumatera.

These existing composting plants were built without having a concrete floor (unlike the proposed project). The absence of the concrete floor poses the risk of infiltration of the leachate into the groundwater, and is a substantially cheaper and less technologically advanced option.

## **B.6. Emission reductions:**

<b>B.6.1. Explanation of methodological choices:</b>
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1. In the baseline scenario, solid waste, which consists of 100% EFB (food waste category) is dumped in an unmanaged site in a Tropical (MAT > 20°C), wet climate (MAP > 1000 m
2. Approved small-scale methodology AMS III.F provides calculation of project emissions from waste / compost transport and power consumption in the composting plant. However, transport emissions of the solid waste will be negligible or zero since the composting plant is located just adjacent to the palm-oil mill. On the other hand, the transport emission of the compost product will need to be accounted since the user of the compost are partly the small holders whose plantations are in different distances from the composting plant;
3. The electricity consumption in the palm-oil mill is considered emission neutral since it is generated from biomass residues. Therefore emissions in the project scenario from the energy consumption of the shredder machine and other equipments using electricity will not be considered;
4. Fossil-fuel consumption for composting machineries such as the turning machine and loader will be considered in the calculations;

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<sup>3</sup> Greenhouse Gas Reduction Potential At Palm Oil Mills in Indonesia, by D. Darnoko, December 2006

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5. No leakage emissions will be considered since none of the composting equipments were transferred from or to another project activity;
6. According to methodology AMS III.H, project activity emissions may also consist of methane emissions from the decay of the sludge generated by the aerobic systems, if the sludge is left to decay anaerobically and disposed in a landfill without methane recovery. However, in the case of the project activity, all sludge is used in the composting process and is therefore treated aerobically;
7. In the baseline and in the project scenario no methane capture is being or will be done
8.  $MD_{y,reg}$  is set at 0%, given that there are no regulations compelling landfill sites in the host country to capture and combust methane, nor does this take place at the project solid waste disposal site, or other nearby dump sites. The common practice in the host country is to dispose of palm-oil EFB in open landfills / dumpsites with no methane capture or flaring;
9. In general, IPCC (2006) default values are used;

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

<b>Data / Parameter :</b>	<b><math>\phi</math></b>
Data unit :	-
Description :	Model correction factor to account for model uncertainties
Source of data used :	-
Value applied :	0.9
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per the “Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site”.
Any comment :	Oonk et al. (1994) have validated several landfill gas models based on 17 realized landfill gas projects. The mean relative error of multi-phase models was assessed to be 18%. Given the uncertainties associated with the model and in order to estimate emission reductions in a conservative manner, a discount of 10% is applied to the model results.

<b>Data / Parameter :</b>	<b>OX</b>
Data unit :	-
Description :	Oxidation factor (reflecting the amount of methane from SWDS that is oxidized in the soil or other material covering the waste)
Source of data used :	IPCC 2006 Guidelines for National Greenhouse Gas Inventories Volume 3 – Chapter 3.2.3
Value applied :	0.0
Justification of the choice of data or description of measurement methods and procedures actually applied :	Unmanaged or uncategorised SWDS
Any comment :	As per the “Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site”.

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<b>Data / Parameter :</b>	<b>F</b>
Data unit :	-
Description :	Fraction of methane in the SWDS gas (volume fraction)
Source of data used :	IPCC 2006 Guidelines for National Greenhouse Gas Inventories Volume 3 – Chapter 3.2.3
Value applied :	0.5
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per the “Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site”.
Any comment :	This factor reflects the fact that some degradable organic carbon does not degrade, or degrades very slowly, under anaerobic conditions in the SWDS. A default value of 0.5 is recommended by IPCC.

<b>Data / Parameter :</b>	<b>DOC<sub>f</sub></b>
Data unit :	-
Description :	Fraction of degradable organic carbon (DOC) that can decompose
Source of data used :	IPCC 2006 Guidelines for National Greenhouse Gas Inventories Volume 3 – Chapter 3.2.3
Value applied :	0.5
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per the “Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site”.
Any comment :	-

<b>Data / Parameter :</b>	<b>MCF</b>
Data unit :	-
Description :	Methane correction factor
Source of data used :	IPCC 2006 Guidelines for National Greenhouse Gas Inventories Volume 3 – Table 3.1
Value applied :	0.8
Justification of the choice of data or description of measurement methods and procedures actually applied :	Unmanaged- deep solid waste disposal sites. This comprises all SWDS not meeting the criteria of managed SWDS and which have depths of less than 5 metres. As per the “Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site”.
Any comment :	The methane correction factor (MCF) accounts for the fact that unmanaged SWDS produce less methane from a given amount of waste than managed SWDS, because a larger fraction of waste decomposes aerobically in the top layers of unmanaged SWDS.

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<b>Data / Parameter :</b>	<b>DOC<sub>i</sub></b>
Data unit :	-
Description :	Fraction of degradable organic carbon (by weight) in the waste type j
Source of data used :	IPCC 2006 Guidelines for National Greenhouse Gas Inventories Volume 5 – Tables 2.4 and 2.5
Value applied :	15 %
Justification of the choice of data or description of measurement methods and procedures actually applied :	The figure is for % of wet waste Processed EFB falls under the category of Food, food waste, beverages and tobacco (other than sludge). As per the “Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site”.
Any comment :	Solid waste : Empty Fruit Bunch (EFB) from palm-oil mill operation Waste type : food <sup>4</sup> See Annex 3 – Baseline Information

<b>Data / Parameter :</b>	<b>k<sub>j</sub></b>
Data unit :	-
Description :	Decay rate for the waste type j
Source of data used :	IPCC 2006 Guidelines for National Greenhouse Gas Inventories Volume 5 – Tables 3.3
Value applied :	0.40
Justification of the choice of data or description of measurement methods and procedures actually applied :	Tropical (MAT > 20°C) Wet climate (MAP > 1000 mm) Rapidly degrading waste – Food, food waste, beverages and tobacco (other than sludge). As per the “Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site”.
Any comment :	Solid waste : Empty Fruit Bunch (EFB) from palm-oil mill operation Waste type : food <sup>5</sup> See Annex 3 – Baseline Information

<b>Data / Parameter:</b>	<b>EF<sub>CO2</sub></b>
Data unit:	kg CO <sub>2</sub> / km
Description:	CO <sub>2</sub> Emission Factor from fuel use due to transportation
Source of data to be used:	IPCC 2006
Value of data	-
Justification of the choice of data or	

<sup>4</sup> Empty Fruit Bunches from palm-oil mill operations are cooked and shredded in the oil extraction process, and have a relatively high decay rate (half-life is about 2 months) – see paper “Decomposition and N&K Release by Oil Palm Empty Fruit Bunches applied under Mature Palms”, Lim K.C, Zaharah A.R, pp.55-62, Journal of Oil Palm Research vol.12 no.2, December 2000. Therefore the closest waste type is food.

See Annex 3 – Baseline Information

<sup>5</sup> idem

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description of measurement methods and procedures actually applied :	
Any comment:	

<b>B.6.3 Ex-ante calculation of emission reductions:</b>
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Project emissions consist of incremental CO<sub>2</sub> emissions due to incremental distances between the collection points to the composting site and to the baseline disposal site as well as transportation of compost from composting site to soil application sites, and CO<sub>2</sub> emissions related to the power used by the project activity facilities.

**Project Activity Direct Emissions**

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

where:

- PE<sub>y</sub>: project activity emissions in the year 'y' (tonnes of CO<sub>2</sub> equivalent)  
 PE<sub>y,transp</sub>: emissions through incremental transportation in the year 'y'  
 PE<sub>y,power</sub>: emissions through electricity or diesel consumption in the year 'y'

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

*Project emissions through incremental transportation*

$$PE_{CO_2,Trans,y} = \sum_i N_{vehicles,y} \cdot Dist_{i,y} \cdot FC_i \cdot NCV_i \cdot EF_{CO_2,i} \quad (23)$$

where :

- N<sub>vehicles,y</sub>: Number of vehicle trips used for transportation, with similar loading capacity  
 Dist<sub>i,y</sub>: Average distance per trip travelled by transportation vehicles type 'i' in the project scenario during the year 'y' (km)  
 FC<sub>i</sub>: vehicle fuel consumption, in volume or mass units per km for vehicle type 'i'  
 NCV<sub>i</sub>: is the net calorific value of fuel type 'i', in TJ per volume or mass units  
 EF<sub>CO<sub>2</sub>,i</sub>: is the CO<sub>2</sub> emission factor of the fossil fuel type 'i' used in transportation vehicles (tCO<sub>2</sub>e / TJ)

*Project emissions from energy consumption at the project plant:*

$$PE_{y,power} = (EL_y \times CEF_{gen,y}) + (FC_y \times EF_{fuel})$$

$$CEF_{gen,y} = (FC_{gen,y} \times EF_{fuel}) / P_{gen,y}$$

where:

- EL<sub>y</sub>: Electricity consumed by the project in year 'y' (MWh)  
 CEF<sub>gen,y</sub>: Carbon emissions factor of electricity supplied to the project by the palm-oil mill in year 'y' (tCO<sub>2</sub>e/MWh)

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$P_{gen,y}$	Total electric power generated by the palm-oil mill (MWh)
$FC_y$	Quantity of fossil fuel consumed by the project in year 'y' (tonnes)
$FC_{gen,y}$	Quantity of fossil fuel consumed by the palm-oil mill auxiliary diesel generator in year 'y' (tonnes)
$EF_{fuel}$	Emissions factor for the diesel fuel used (tCO <sub>2</sub> e/tonne) (IPCC 2006)

$PE_{y,power} = 0$ , since electricity used in the mill is generated using biomass residues.

**Baseline Emissions**

The baseline emissions are the amount of methane emitted from the decay of the degradable organic carbon in the biomass solid waste composted in the project activity. When wastewater is co-composted, baseline emissions include emissions from wastewater co-composted in the project activity. The yearly Methane Generation Potential for the solid waste is calculated using the first order decay model as described in category AMS III.G and the tool for methane avoidance from solid waste. Baseline emissions shall exclude methane emissions that would have to be captured, fuelled or flared to comply with national or local safety requirement or legal regulations.

$$BE_y = BE_{CH_4,SWDS,y} - MD_{y,reg} * GWP_{CH_4} + MEP_{y,ww} * GWP_{CH_4}$$

where:

$BE_{CH_4,SWDS,y}$	yearly methane generation potential of the solid waste composted by the project during the years "x" from the beginning of the project activity (x=1) up to the year 'y' estimated as described in AMS III.G (t CO <sub>2</sub> e)
$MD_{y,reg}$	amount of methane that would have to be captured and combusted in the year 'y' to comply with the prevailing regulations
$MEP_{y,ww}$	methane emission potential in the year 'y' of the wastewater. The value of this term is zero if co-composting of wastewater is not included in the project activity
$CH_4\_GWP$	GWP for CH <sub>4</sub> (value of 21 is used)

The estimation of the methane emission potential of a solid waste disposal site ( $BE_{CH_4,SWDS,y}$ , in tCO<sub>2</sub>e) shall be undertaken using the most updated version of the "Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site".

$$BE_{CH_4,SWDS,y} = \varphi \cdot (1 - f) \cdot GWP_{CH_4} \cdot (1 - OX) \cdot \frac{16}{12} \cdot F \cdot DOC_f \cdot MCF \cdot \sum_{x=1}^y \sum_j W_{j,x} \cdot DOC_j \cdot e^{-k_j(y-x)} \cdot (1 - e^{-k_j})$$

where :

$BE_{CH_4,SWDS,y}$	methane emissions avoided during the year y from preventing waste disposal at the solid waste disposal site (SWDS) during the period from the start of the project activity to the end of the year y (tCO <sub>2</sub> e)
$\varphi$	model correction factor to account for model uncertainties (0.9)
$F$	fraction of methane captured at the SWDS and flared, combusted or used in another manner
$GWP_{CH_4}$	Global Warming Potential (GWP) of methane, valid for the relevant commitment period

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OX	oxidation factor (reflecting the amount of methane from SWDS that is oxidised in the soil or other material covering the waste)
F	fraction of methane in the SWDS gas (volume fraction) (0.5)
DOC <sub>f</sub>	fraction of degradable organic carbon (DOC) that can decompose
MCF	methane correction factor
W <sub>j,x</sub>	amount of organic waste type <i>j</i> prevented from disposal in the SWDS in the year <i>x</i> (tons)
DOC <sub>j</sub>	fraction of degradable organic carbon (by weight) in the waste type <i>j</i>
K <sub>j</sub>	decay rate for the waste type <i>j</i>
J	waste type category (index)
X	year during the crediting period: <i>x</i> runs from the first year of the first crediting period ( <i>x</i> = 1) to the year <i>y</i> for which avoided emissions are calculated ( <i>x</i> = <i>y</i> )
Y	year for which methane emissions are calculated

Methane emission potential of co-composted wastewater is estimated as described in AMS IIIF:

$$MEP_{y,ww} = Q_{y,ww} * COD_{y,ww,untreated} * B_{o,ww} * MCF_{ww,treatment} * GWP_{CH_4}$$

where :

Q <sub>y,ww</sub>	volume of wastewater co-composted in the year “y” (m <sup>3</sup> )
COD <sub>y,ww,untreated</sub>	chemical oxygen demand of the wastewater in the year “y” (tonnes/m <sup>3</sup> )
B <sub>o,ww</sub>	methane producing capacity for the wastewater (kg CH <sub>4</sub> / kg COD)
MCF <sub>ww, treatment</sub>	methane correction factor for the wastewater treatment system in the baseline scenario ‘anaerobic deep lagoon’

The following table shows the amount of organic waste composted from the palm-oil mill operation that would have been dumped in unmanaged site for each waste type for the project activity:

Waste type	Amount composted per year	Proportion of total
Wood and wood products	0	0
Pulp, paper and cardboard (other than sludge)	0	0
Food, food waste, beverages and tobacco (other than sludge)	47,916 tonnes	100 %
Textiles	0	0
Garden, yard and park waste	0	0
Glass, plastic, metal, other inert waste	0	0
TOTAL	47,916 tonnes	100 %

<b>B.6.4 Summary of the ex-ante estimation of emission reductions:</b>
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Years	Estimation of baseline emissions from Solid Waste (tonnes of CO <sub>2</sub> e)	Estimation of baseline emissions from Wastewater (tonnes of CO <sub>2</sub> e)	Estimation of project activity emissions (tonnes of CO <sub>2</sub> e)	Estimation of leakage (tonnes of CO <sub>2</sub> e)	Estimation of Emission Reduction (tonnes of CO <sub>2</sub> e)
2008	11,942	18,105	356	0	29,692
2009	19,948	18,105	356	0	37,697
2010	25,314	18,105	356	0	43,064
2011	28,911	18,105	356	0	46,661
2012	31,322	18,105	356	0	49,072
2013	32,938	18,105	356	0	50,688
2014	34,022	18,105	356	0	51,771
2015	34,748	18,105	356	0	52,498
2016	35,235	18,105	356	0	52,984
2017	35,561	18,105	356	0	53,311
<b>Total (tonnes of CO<sub>2</sub>)</b>	289,941	181,054	3,557	0	467,438

**B.7 Application of a monitoring methodology and description of the monitoring plan:**
**B.7.1 Data and parameters monitored:**

<b>Data / Parameter:</b>	<b>Q<sub>v,comp</sub></b>
Data unit:	Tonnes
Description:	Quantity of final compost produced in year 'y'
Source of data to be used:	Weighbridge
Value of data	16,632 (estimated based on a ratio of EFB: compost of 0.5)
Description of measurement methods and procedures to be applied:	1. Measured 2. Recording frequency : see comment below 3. Proportion of data to be measured : 100 % 4. Archived in electronic form
QA/QC procedures to be applied:	Calibration and maintenance are carried out periodically, according to manufacturer specification
Any comment:	The produced compost will be trucked away from the site. All trucks leaving site will be weighed. Parameter monitored whenever a truck carrying compost crosses the weighbridge,) but aggregated monthly for calculations.

<b>Data / Parameter:</b>	<b>CT<sub>v</sub></b>
Data unit:	Tonnes / truck
Description:	Average truck capacity for final compost product transport in year 'y'
Source of data to be used:	Manual recording
Value of data	5
Description of	1. Calculated

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measurement methods and procedures to be applied:	2. Recording frequency : annually 3. Archived in electronic form
QA/QC procedures to be applied:	
Any comment:	Determined once a year based on the truck fleet in use

<b>Data / Parameter:</b>	<b>DAF<sub>comp</sub></b>
Data unit:	km / truck
Description:	Average distance for final compost product transport
Source of data to be used:	Host facility : local map, expert record of project routine operations
Value of data	25 (round trip)
Description of measurement methods and procedures to be applied:	Recording frequency : annual estimate
QA/QC procedures to be applied:	
Any comment:	Determined once a year based on the locations of the plantations the compost is delivered to.

<b>Data / Parameter:</b>	<b>FC<sub>y</sub></b>
Data unit:	tonnes
Description:	Quantity of fossil fuel consumed by the project in year 'y'
Source of data to be used:	Plant record from bunker fuel flow meter
Value of data	105
Description of measurement methods and procedures to be applied:	1. Measured 2. Recording frequency : continuous 3. Proportion of data to be measured : 100 % 4. Archived in electronic form
QA/QC procedures to be applied:	Calibration and maintenance are subject to procedures established by instrument manufacturer.
Any comment:	Parameter monitored continuously but aggregated monthly for calculations

<b>Data / Parameter :</b>	<b>W<sub>x</sub></b>
Data unit :	Tons
Description :	Total amount of organic waste prevented from disposal in year 'x'
Source of data to be used :	Host facility: Weighbridge
Value of data :	47,916
Description of measurement methods and procedures to be applied :	Recording frequency: each time a truck passes the weighbridge Proportion of data to be measured : 100 %
QA/QC procedures to	Calibration and maintenance are subject to procedures established by instrument

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be applied :	manufacturer.
Any comment :	Parameter monitored continuously (whenever a truck carrying compost crosses the weighbridge) but aggregated monthly for calculations. The solid waste will be trucked into the composting site.

<b>Data / Parameter :</b>	$Q_{y,ww}$
Data unit :	$m^3 / year$
Description :	Flow rate of organic wastewater into the composting facility
Source of data to be used :	Host facility: flow meter
Value of data :	141,570
Description of measurement methods and procedures to be applied :	Recording frequency : continuous
QA/QC procedures to be applied :	The maintenance and frequency of calibration are established by the plant QA / QC department. Flow meters undergo maintenance / calibration subject to appropriate industry standards
Any comment :	

<b>Data / Parameter :</b>	$COD_{y,ww,untreated}$
Data unit :	$kg / m^3$
Description :	Concentration of organic material in wastewater into the composting facility
Source of data to be used :	Lab analysis or a continuous analyser will be used
Value of data :	35
Description of measurement methods and procedures to be applied :	
QA/QC procedures to be applied :	If COD continuous flow meter is used, data uncertainty is very low. Calibration and maintenance are subject to procedures established by instrument manufacturer. If laboratory sampling is used, the Uncertainty level of data is low. Sampling will be carried out adhering to internationally recognized procedures.
Any comment :	

<b>Data / Parameter :</b>	$S_{OD}$
Data unit :	Number
Description :	Number of samples with Oxygen deficiency (number of samples with Oxygen content < 10%)
Source of data to be used :	Host facility
Value of data :	0
Description of measurement methods and procedures to be applied :	Measurements will be taken using a standardised mobile gas detection instrument.

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applied :	
QA/QC procedures to be applied :	O <sub>2</sub> measurement instrument will be subjected to periodic calibration (in accordance with stipulation of instrument supplier). A statistically significant sampling procedure will be setup that consists of multiple measurements throughout different stages of the composting process according to a predetermined pattern (depths and scatter).
Any comment :	Estimated value is 0 (zero). The compost windrow has a triangular cross-section, with a height of approx. 1.5 meter, and width of 3.6 m. (height limited by the size of the compost turning machine)

<b>Data / Parameter :</b>	<b>S<sub>total</sub></b>
Data unit :	Number
Description :	Total number of samples
Source of data to be used :	Host facility
Value of data :	20 x 2
Description of measurement methods and procedures to be applied :	Measurement to be done using a standardised mobile as detection instrument. S <sub>total</sub> should be chosen in a manner that ensures estimation of S <sub>a</sub> with 20% uncertainty at 95% confidence level
QA/QC procedures to be applied :	O <sub>2</sub> measurement instrument will be subjected to periodic calibration (in accordance with the stipulations of the instrument supplier). A statistically significant sampling procedure will be setup that consists of multiple measurements throughout different stages of the composting process according to a predetermined pattern (depths and scatter).
Any comment :	Monitoring will be detailed in a written procedure.

### **B.7.2 Description of the monitoring plan:**

&gt;&gt;

The monitoring plan details the actions necessary to record all the variables and factors required by the methodology AM0039 – version 1, 29 September 2006 as detailed in section B.7.1 above. All data will be archived electronically, and backed up regularly. Moreover, it will be kept for the full crediting period, plus two years after the end of the crediting period or the last issuance of CERs for this project activity (whichever occurs later).

The Monitoring Plan for this project has been developed to ensure that from the start, the project is well organised in terms of the collection and archiving of complete and reliable data.

#### 1. Monitoring organisation

Prior to the start of the crediting period, the organisation of the monitoring team will be established. Clear roles and responsibilities will be assigned to all staff involved in the CDM project and a single CDM Manager will be nominated. The CDM Manager will have the overall responsibility for the monitoring system on this project.

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All other CDM monitoring staff will have clearly defined roles and responsibilities. The CDM Manager will manage the process of training new staff, ensuring trained staff performs the monitoring duties and that where trained monitoring staff are absent, the integrity of the monitoring system is maintained by other trained staff.

A formal set of monitoring procedures will be established prior to the start of the project. These procedures will detail the organisation, control and steps required for certain key monitoring system features, including:

- a) CDM staff training
- b) CDM data and record keeping arrangements
- c) Data collection
- d) CDM data quality control and quality assurance
- e) Equipment maintenance
- f) Equipment calibration
- g) Equipment failure

The procedures will be agreed and signed off by the project developer and EcoSecurities. Any changes to procedures will need to be agreed by both parties. The CDM Manager will be responsible for ensuring that the procedures are followed on site and for continuously improving the procedures to ensure a reliable monitoring system is established.

All staff involved in the CDM project will receive relevant training from the technology provider laid down in training procedures agreed on by the project developer and EcoSecurities. Records of trained CDM staff will be retained by the Project Developer. The CDM Manager will ensure that only trained staff being involved in the operation of the monitoring system.

## 2. Monitoring equipment and installation

### Metering of EFB using weighbridge

The main weighbridge for establishing the amount of EFB delivered to the composting facility is installed with the operation of the palm-oil mill. This weighbridge for palm-oil Fresh Fruit Bunch (FFB) measures the quantity of raw material input to the palm-oil mill, installed just after the main gate.

To ensure maximum availability of CDM data and to introduce quality controls of the CDM data, a cross-check weighbridge will be installed adjacent to the main weighbridge.

The weighbridge should meet the relevant local standards at the time of installation. Before the installation of the meters, it should be factory calibrated by the manufacturer. For the purpose of the project activity, before commissioning of the project the weighbridge will be calibrated. Records of the meter (type, make, model and calibration documentation) will be retained in the quality control system.

### QA

Periodic checks should be conducted according to manufacturer specification.

### Metering of POME using wastewater flowmeter

From the existing wastewater treatment plant in the palm-oil mill, instead of flowing into the first anaerobic lagoon, a pipe will be connected with a wastewater pump and flowmeter to take POME into the

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composting facility. The flowmeter will measure continuous and total flow, with data records available for reference.

The flowmeter should meet the relevant local standards at the time of installation. Before the installation of the meters, it should be factory calibrated by the manufacturer. Records of the meter (type, make, model and calibration documentation) will be retained in the quality control system.

### QA

Periodic checks should be conducted according to manufacturer specification.

### Metering fuel consumption of facilities used in the composting plant

Turning machine, loader, and dump truck are composting machineries that will consume diesel fuel during the operation of composting plant. A continuous fuel meter will be used to measure the fuelling of these machineries. Every fuelling of each facility will be recorded.

The fuel meter used should meet relevant standard at the time of installation. Before the installation of the meters, it should be factory calibrated by the manufacturer. Records of the meter (type, make, model and calibration documentation) will be retained in the quality control system.

### QA

Periodic checks should be conducted according to manufacturer specification.

## Monitoring Oxygen Deficiency in Compost Using a Handheld Device

Compost piles will be monitored twice a year (once throughout the rainy season and once throughout the dry season) periodically throughout the eight week composting cycle. Samples will be taken from three different windrows immediately after the first turning of the compost, then after the first, second, fourth and eighth week. If initial sampling reveals that oxygen samples are not oxygen deficient (above 10%), then the subsequent sampling schedule may be shortened. This is based on the assumption that the composting turning machines are in working order.

### 3. Data recording procedure

#### Main weighbridge failure – use of cross-check weighbridge reading

If the main weighbridge is found to be faulty during its reading, a second reading from the cross-check weighbridge will be used in its place.

In the event of either weighbridge failing, it will be repaired or replaced by an accredited equipment manufacturer, where appropriate. Maintenance records and any calibration documents will be retained by the project.

### 4. Data and records management

In order to make it easy for the verifier to retrieve the documentation and information in relation to the project emission reduction verification, the project developer should provide a document register. The document management system will be developed to ensure adequate document control for CDM purposes.

The dedicated CDM Manager of the project developer is responsible for checking the data (according to a formal procedure) and the CDM Manager will be responsible for managing the collection, storage and

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archiving of all data and records. A procedure will be developed to manage the CDM record keeping arrangements. All the data shall be kept until two years after the end of credit period.

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

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The baseline study was concluded in May 3, 2007. The entity determining the baseline and participating in the project as the Carbon Advisor is EcoSecurities Group Plc., listed in Annex 1 of this document.

**SECTION C. Duration of the project activity / crediting period**

**C.1 Duration of the project activity:**

**C.1.1. Starting date of the project activity:**

>>

October 1, 2007 (start of construction)

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

>>

15 years

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

**C.2.1. Renewable crediting period**

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

>>

N/A

**C.2.1.2. Length of the first crediting period:**

>>

N/A

**C.2.2. Fixed crediting period:**

**C.2.2.1. Starting date:**

>>

January 1, 2008

**C.2.2.2. Length:**

>>

10 years

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**SECTION D. Environmental impacts**

&gt;&gt;

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

&gt;&gt;

According to Environmental Ministry Decision No. 17/2001, construction and operation of the composting plant will not require an Environmental Impact Assessment. Instead, it will require an Environmental Management and Monitoring Plan, which has already been available for the palm oil mill, and only needs to be amended due to the change in the treatment of solid waste and waste water. The amendment of this document is now being initiated. No other license will be required to operate the project activity.

**D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:**

&gt;&gt;

The implementation of this project activity will not have any significant negative environmental impacts. On the contrary, the implementation of this project activity will improve local environmental conditions, since with this composting activity no methane gas will be released. Since all POME will be used in the composting plant, no wastewater will be discharged to the plantation irrigation system. To avoid infiltration of the wastewater into the ground water, this composting plant will have a concrete floor, complete with a drainage system to re-circulate excess wastewater back into the composting process.

The only environmental impact due to the project activity is the increase in local air pollution due to the combustion of diesel fuel to operate the turning machine, loader and dump truck. However, this fuel consumption is minimal, equipment will be new and therefore clean-burning, and since the project is located in its own premises, this local air pollution will not have any impact on the people living close to the composting plant. To reduce the exhaust emissions, proper maintenance will be implemented on these machineries.

**SECTION E. Stakeholders' comments**

&gt;&gt;

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

&gt;&gt;

The Stakeholder Consultation was conducted in the meeting room of the Fetty Mina Jaya mill on May 30, 2007 in Minas, Riau Province, Indonesia. It commenced with the brief introduction of PT. Fetty Mina Jaya, EcoSecurities Indonesia, and Indonesian Designed National Authority (DNA) by Mr. Bintang Siahaan of PT. Fetty Mina Jaya. Mr. Bintang also introduced the participants from representative of Siak District, Minas Sub-District and other stakeholders. After the brief introduction, he explained the proposed composting project for PT. Fetty Mina Jaya. Mr. Prasetio Utomo of Indonesian Designed National Authority (DNA) presented an overview of the Clean Development Mechanism, the Kyoto Protocol, and its connection with the Ministry of Environment. Afterwards, Mr. Henricus Hutabarat of EcoSecurities Indonesia presented the Kyoto Protocol, the Clean Development Mechanism (CDM) concept, and the objective of the project. After the presentation, an open forum was carried out to elicit comments and issues from the various stakeholders.

**E.2. Summary of the comments received:**

&gt;&gt;

**The following are the main issues raised by the participants during the consultation:**

1. The concern about the compost quality compared to chemical fertilizer and it's potential impact on the plantation, included it's mitigation if negative impact of compost utilization occurred;
2. Demand of the palm oil grower on the access to the compost at a comparable selling price with chemical fertilizer;
3. Working opportunities in the project
4. Suggestion to conduct open discussion related to the progress of the composting activities

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

&gt;&gt;

The project developer promise to do the following to respond to the concern of stakeholders:

1. The project developer ensure that compost does not have negative impacts on plantation since is based on organic matter. However, the project developer promise to conduct a periodical testing on the quality of compost;
2. The project developer ensures that palm oil grower will have access to the compost at a price lower than chemical fertilizer. The project developer will provide a guidance how to get access to the compost;
3. the project developer promise to provide working opportunities during construction and operation of the project. However, that person to be hired has to pass the test. Prior to start the construction project developer promises to announce the recruitment process;
4. Project developer promise to hold similar event every year;

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**Annex 1****CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY**

Organization:	PT Fetty Mina Jaya
Street/P.O.Box:	Jalan Rajawali No.45, Sukajadi
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Represented by:	
Title:	President Director
Salutation:	
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Middle Name:	
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Organization:	EcoSecurities Group Plc.
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## CDM – Executive Board

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Represented by:	
Title:	COO & President
Salutation:	Dr.
Last Name:	Moura Costa
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**Annex 2**

**INFORMATION REGARDING PUBLIC FUNDING**

This project will not receive any public funding from Annex 1 parties.

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**Annex 3**

**BASELINE INFORMATION**

Palm oil mill processing capacity	30 Tones FFB / hour
Average FFB processed	217,800 tones/year
Annual EFB for composting	47,916 Tones/year
EFB/FFB ratio	0.22
POME available	141,570 m3
POME/FFB ratio	0.65 m3/ton
COD	29,000 mg/l
Compost production	19,166 tones/year
Shredding machine	
Model	SL-7100
Capacity	8 – 10 tones EFB/hour
Motor	75 HP/1450 rpm
Country of Origin	Malaysia
Compost turner	
Model	Backhus 16.43
Engine	Cummins Turbo Diesel water cooled
Max. capacity	104 HP at 2000 rpm
Country of Origin	Germany
Composting area	Around 1.5 ha

**Financial Analysis**

	B	C	D	E	F	G	H	I	J	K	L	M	N
3	<b>CASH FLOW WITHOUT CDM</b>		0	1	2	3	4	5	6	7	8	9	10
4			2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
5	Projected Emission Reductions (tCO <sub>2</sub> )		0	4,516	31,694	39,039	43,963	47,263	49,476	50,959	51,953	52,619	53,066
6													
7	<b>REVENUE</b>												
8	<b>j) Compost production</b>												
9	Saving on chemical fertilizer (US\$/tonne)	15											
10	Recovered CPO (US\$/tonne)	300											
11	Rate of increase and evolution of compost price(US\$)	0.0%	\$15.0	\$15.0	\$15.0	\$15.0	\$15.0	\$15.0	\$15.0	\$15.0	\$15.0	\$15.0	\$15.0
12	Annual compost production (tonne)	0	6,930	16,632	16,632	16,632	16,632	16,632	16,632	16,632	16,632	16,632	16,632
13	Gross saving on chemical fertilizer (US\$)	\$0	\$103,950	\$249,480	\$249,480	\$249,480	\$249,480	\$249,480	\$249,480	\$249,480	\$249,480	\$249,480	\$249,480
14	Recovered CPO		198	436	436	436	436	436	436	436	436	436	436
15	Gross revenue from recovered CPO (US\$/ton)		\$59,400	\$130,680	\$130,680	\$130,680	\$130,680	\$130,680	\$130,680	\$130,680	\$130,680	\$130,680	\$130,680
16	VAT (US\$)	10%	\$0	\$5,940	\$13,068	\$13,068	\$13,068	\$13,068	\$13,068	\$13,068	\$13,068	\$13,068	\$13,068
17	<b>Net Revenue and saving (US\$)</b>		\$0	\$157,410	\$367,092	\$367,092	\$367,092	\$367,092	\$367,092	\$367,092	\$367,092	\$367,092	\$367,092
18													
19	<b>COSTS &amp; INVESTMENT</b>												
20	<b>a) Investment</b>												
21	Pre-operational Costs (US\$)	50,000	\$50,000										
22	Investment (US\$)	822,621	\$822,621										
23	<b>TOTAL INVESTMENT (US\$)</b>		\$872,621	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
24													
25	<b>b) Operational costs</b>												
26													
27	Operating Costs - composting plant (US\$/tonne)	11.29	\$0	\$78,259	\$187,823	\$187,823	\$187,823	\$187,823	\$187,823	\$187,823	\$187,823	\$187,823	\$187,823
28	Wheeling and backup costs (US\$/tonne)	0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
29	Insurance (US\$)	3%	\$0	\$24,679	\$24,679	\$24,679	\$24,679	\$24,679	\$24,679	\$24,679	\$24,679	\$24,679	\$24,679
30	Contingencies	5%	\$0	\$43,631	\$43,631	\$43,631	\$43,631	\$43,631	\$43,631	\$43,631	\$43,631	\$43,631	\$43,631
31	<b>Total Costs (US\$)</b>		\$872,621	\$146,569	\$256,132	\$256,132	\$256,132	\$256,132	\$256,132	\$256,132	\$256,132	\$256,132	\$256,132
32													
33	<b>CASH FLOW without CDM</b>												
34	Depreciation	10.00%	0	\$82,262	\$82,262	\$82,262	\$82,262	\$82,262	\$82,262	\$82,262	\$82,262	\$82,262	\$82,262
35	Gross profit before tax		0	-\$71,421	\$28,698	\$28,698	\$28,698	\$28,698	\$28,698	\$28,698	\$28,698	\$28,698	\$28,698
36	Cummulative (for carryforward tax)		0	-\$71,421	-\$42,724	-\$14,026	\$14,672	\$43,369	\$72,067	\$100,765	\$129,462	\$158,160	\$186,858
37	Income Tax	0%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
38													
39													
40	<b>Cashflow without CDM</b>		-\$872,621	\$10,841	\$110,960	\$110,960	\$110,960	\$110,960	\$110,960	\$110,960	\$110,960	\$110,960	\$110,960
41	Cummulative (for carryforward tax)		-\$872,621	-\$861,780	-\$750,820	-\$639,860	-\$528,901	-\$417,941	-\$306,981	-\$196,022	-\$85,062	\$25,898	\$136,858

## BI Rate

(Berdasarkan keputusan Rapat Dewan Gubernur)

Periode	BI Rate	Siaran Pers
7 Juni 2007	8.50%	<a href="#">Link Siaran Pers</a>
8 Mei 2007	8.75%	<a href="#">Link Siaran Pers</a>
5 April 2007	9.00%	<a href="#">Link Siaran Pers</a>
6 Maret 2007	9.00%	<a href="#">Link Siaran Pers</a>
6 Feb 2007	9.25%	<a href="#">Link Siaran Pers</a>
4 Jan 2007	9.50%	<a href="#">Link Siaran Pers</a>
7 Des 2006	9.75%	<a href="#">Link Siaran Pers</a>
7 Nov 2006	10.25%	<a href="#">Link Siaran Pers</a>
5 Okt 2006	10.75%	<a href="#">Link Siaran Pers</a>
5 Sept 2006	11.25%	<a href="#">Link Siaran Pers</a>
8 Agust 2006	11.75%	<a href="#">Link Siaran Pers</a>
6 Juli 2006	12.25%	<a href="#">Link Siaran Pers</a>
6 Juni 2006	12.50%	<a href="#">Link Siaran Pers</a>
9 Mei 2006	12.50%	<a href="#">Link Siaran Pers</a>
5 April 2006	12.75%	<a href="#">Link Siaran Pers</a>
7 Maret 2006	12.75%	<a href="#">Link Siaran Pers</a>
7 Feb 2006	12.75%	<a href="#">Link Siaran Pers</a>
9 Jan 2006	12.75%	<a href="#">Link Siaran Pers</a>
6 Des 2005	12.75%	<a href="#">Link Siaran Pers</a>
1 Nov 2005	12.25%	<a href="#">Link Siaran Pers</a>
4 Okt 2005	11.00%	<a href="#">Link Siaran Pers</a>
6 Sept 2005	10.00%	<a href="#">Link Siaran Pers</a>
9 Agust 2005	8.75%	<a href="#">Link Siaran Pers</a>
5 Juli 2005	8.50%	<a href="#">Link Siaran Pers</a>

Source: <http://www.bi.go.id/web/id/Indikator+Moneter+dan+Perbankan/birate/>; accessed June 15, 2007

## MINUTES OF STAKEHOLDER CONSULTATION

### FETTYMINA JAYA CO-COMPOSTING PROJECT PT. FETTYMINA JAYA (MONRAD GROUP)

MINAS, RIAU, INDONESIA  
MAY 30, 2007

The Stakeholder Consultation was conducted in the meeting room of the Fetty Mina Jaya mill on May 30, 2007 in Minas, Riau Province, Indonesia. It commenced with the brief introduction of PT. Fetty Mina Jaya, EcoSecurities Indonesia, and Indonesian Designed National Authority (DNA) by Mr. Bintang Siahaan of PT. Fetty Mina Jaya. Mr. Bintang also introduced the participants from representative of Siak District, Minas Sub-District and other stakeholders. After the brief introduction, he explained the proposed composting project for PT. Fetty Mina Jaya. Mr. Prasetyo Utomo of Indonesian Designed National Authority (DNA) presented an overview of the Clean Development Mechanism, the Kyoto Protocol, and its connection with the Ministry of Environment. Afterwards, Mr. Henricus Hutabarat of EcoSecurities Indonesia presented the Kyoto Protocol, the Clean Development Mechanism (CDM) concept, and the objective of the project. After the presentation, an open forum was carried out to elicit comments and issues from the various stakeholders.

#### OPEN FORUM

##### **Sumaryono, Oil Palm Grower :**

Any kinds of negative impact would arise by applying this compost to the plantation?

##### *Henricus Hutabarat (EcoSecurities) :*

*Compost is a material rich in organic matter. The addition of compost to soil can enrich the water retention and enhance soil structure as well. This compost is also very good if applied to other plantations. For instance, if it applied to the tomato plantation hence the productivity will increase. There is no chemical substances will be added during the process. Both EFB and POME are utilized and will be turned every three days using Backhus turning machine.*

##### *Prasetyo (Kementerian Lingkungan Hidup) :*

*It could be happen. I suggest the project developer analyze the compost for its content to know any dangerous matter harming the plant before distributed to the society. It can be done by coordinating with local agriculture department.*

##### *Ir. Yuzak Siahaan (Manajer Perkebunan) :*

*I do not think there will be any negative impact arosen from applying this compost to the plant. This compost have element of K with value of 3.45%. In general, when oil palm is lacking of K, the palm will be easy to break. With addition of compost about 4-5 tons per hectare, oil palm will be better.*

##### *Chaerul, Chairman of Community organization:*

Could the community use this compost for their plantation? Will this compost be cheaper than other chemical fertilizer such as Urea? Is this compost better than other anorganic fertilizer?

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CDM – Executive Board

Henricus Hutabarat (EcoSecurities):

*It will be cheaper than other anorganic fertilizer. This compost have elements differing from other anorganic fertilizer, in consequence we cannot replacing 100% of usage of anorganic fertilizer such as Urea.*

Ir. Yuzak Siahaan (Plantation Manajer):

*Compost has ability to improve properties of the soils. Besides that compost provides nutrients to fertilize the palm.*

Bintang Siahaan (General Manager PT. Fetty Mina Jaya) :

*We will distribute part of this compost to the community. Prior to that, we will ask laboratory to analyze whether the compost is containing any dangerous matter harming the plant growth. Of course, we expect that this compost will be cheaper than other chemical fertilizer.*

**Palm Grower:**

We will support this project anyway as long as it gives benefits for us. Is there any possibility for us working on this project? Could we use this product?

Henricus Hutabarat (EcoSecurities) :

*It was explained that this project will give benefits to the community such as; elimination or reduction of odors and job opportunities for the community. Additionally, part of the products will be distributed to the community at a cheaper price than chemical fertilizer.*

**Siman, Society Leader:**

*Can this company hire workers from our community to work in the factory?*

*When you built this plant, you promised that you would hire 80% of local people to work in this plant, but it turns out that you only hire 20%. We ask for a written promise and not just oral agreement. We also expect that the company can cooperate well with the community and hopefully the community can be helped with this project.*

Bintang Siahaan (General Manager PT. Fettymina Jaya):

*We hold some admission tests when selecting people working for the project. We will only accept people who passes the test. Honestly, we prefer hiring local people to work on this project, because for example we do not need to build housing for them, since it is costly.*

**Jumari, Palm Grower :**

Will there be any feasibility study of this composting project? if the use of this compost is harming the plantation, to whom should we report it? Please provide us information in advance.

Prasetyo (Kementerian Lingkungan Hidup):

*All participants expect company to give more information relating to project activities.*

*Every project has it's risk. If something happen, communities could ask related department to analyze the problem. Which means company and community as users will be sure and do not have to worry on the utilization of compost in their plantation.*

Bintang Siahaan (General Manager PT. Fettymina Jaya):

*It is not about research for the availability of project to be built but more to analyze the content of the compost, if there is any hazardous matter that could harming the plant*

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CDM – Executive Board

Henricus Hutabarat (EcoSecurities):

*In fact, this composting project is a simple one. Currently, all the EFB will be dumped and left to decay in unmanaged site or sprayed to the plantation as a fertilizer. POME is disposed of via a series of anaerobic lagoons and discharged to the river or sprayed as land application. In composting technology, both EFB and POME are utilized and will be turned every three days using turning machine. There is no other chemical matter will be added during the process.*

**Rasman Simanjuntak, Palm Plantation Supplier:**

For Mr. Prasetyo, it was explained that emission can damage the environment. If the EFB is spread and piled in the open field, will it create emission and pollute the environment?

For Mr. Henricus, has a factory like this been built before and has it operated now?

For Mr. Bintang, when the composting project is operated, please prevent it from polluting the environment. If that happens, what can the society do? If the compost will be distributed to the community, please do not supply it through the head office in Pekanbaru since it is too far.

Prasetyo (DNA) :

*The current practice of piling the EFB in open field will create a CH<sub>4</sub> emission which will pollute the environment. But when it is processed into compost, if the methane still exist, then the composting process has failed.*

*During the composting process, there should be no methane emission since the process will be an aerobic process which involves oxygen. When anaerobic processes occur, it will release methane, which means the process is failed.*

*When this project was proposed to our office, it is guaranteed that the project will not cause any negative impact to the community or the environment. In Indonesia, there is Amdal or UKL/UPL (EIA), where it is a kind of SOP (Standard Operating Procedure) that has to be legalized by the Environmental Office. Before it is legalized, we can not approve the project to be a CDM project. So the filter for this project to be realized is quite heavy. If there is any negative impact later on, it can be reported to our office on the Amdal department. Since in the Amdal document is stated what has to be done then if it is not done according to the Amdal, the project can be sued.*

Henricus Hutabarat (EcoSecurities) :

*The technology we will use is from Germany. They have experiences in this composting technology for more than 20 years. In Indonesia, the composting project has been applied at PTPN III and the project has been operated.*

Bintang Siahaan (General Manager PT. Fettymina Jaya) :

*For the environment impact, we are using Amdal. So we still refer to that, such as in the amount of waste (ppm), COD, and BOD. Later when we are building a good building, closed. We will follow the rules from the government.*

**Slamet Rahardjo, RT. 01, Palm Plantation Farmer :**

We really hope that there will not be negative impacts from this composting project. Therefore it is necessary for the company to hold this kind of event in a routine every 3 or 6 months to give information to the community.

Bintang Siahaan (General Manager PT. Fettymina Jaya) :

*We will try to prevent any negative impact from this project, such as bad odour, etc.*

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CDM – Executive Board

Prasetyo (DNA):

*I hope that the community can support this project and also gain the advantages. This is a revision from the previous waste treatment. The company is suggested to hold this kind of event every 3 or 6 months. This event, however simple, gives extraordinary inputs.*

The meeting is closed with comments and remarks from Bintang Siahaan as General Manager PT. Fettymina Jaya.

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CDM – Executive Board

**Annex 4**

**MONITORING INFORMATION**

Please see section B.