Crucial Shortcomings of the UNFCCC Methodology for Composting

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1. Introduction

The small-scale CDM Methodology Category III.F. “avoidance of methane production from biomass decay through composting” is flawed. This observation most likely also applies for large scale projects.

The methodology requires very detailed monitoring and calculations of insignificant parameters, while very significant parameters with a strong influence on the resulting CERs are treated with unacceptable imprecision. This is very unfair to composting projects.

The price for generated CERs has fallen to a degree that they barely cover the cost of the periodic verifications of small scale projects. Therefore the whole CDM process from PDD to verifications must be simplified and become cheaper.

2. Significant parameters that are treated with imprecision

Below three problematic parameters are described, because they have no or only two extremely different IPCC default values. About 340 % more CERs could be received if the favorable default value of the three parameters would apply. This is simply not acceptable.

2.1. Decay rate (k) by waste type

For k, ICPP provides only two default values, one for dry climate and one for wet climate. The k value for garden, yard and park waste is 0.065 when dry and 0.170 when wet. So wet climate garden waste receives 124 % more CERs than a dry one. Likewise the k value for food, food waste, beverages and tobacco is 0.085 when dry and 0.400 when wet. So wet climate food waste receives 370 % more CERs than a dry one. There is an urgent need for intermediate default values between the two extremes.

In the Gianyar Waste Recovery Project garden, yard and park waste account for about 82 % of the organic waste and food, food waste, beverages and tobacco account for 8 %. Thus this imprecision has a huge impact on 90 % of our organic waste. The same applies for Section 2.2. below.

2.2. Fraction of degradable organic carbon (DOC) by waste type

Here again for DOC, ICPP provides only two default values, one for wet waste and one for dry waste. The DOC value for garden, yard and park waste is 20 % when wet and 49 % when dry. So dry garden waste receives 145 % more CERs than a wet one. Likewise the DOC value for food, food waste, beverages and tobacco is 15 % when wet and 38 % when dry. So dry food waste receives 153 % more CERs than a wet one. There is an urgent need for intermediate default values between the two extremes.

DOC values are higher for dry waste and the k values are higher for wet waste. It could be said that this balances the impact of having only two default values for DOC and k. However, this argument does not withstand logic, let alone scientific scrutiny.

2.3. Weight of waste that will be composted

The methodology does not take into account whether the organic waste is delivered rain soaked or sun dried. Waste can easily weigh 50 % more when soaked and accordingly receives 50 % more CERs. This shortcoming could be addressed by incorporating the average wetness of the waste into a more differentiating DOC as demanded in Section 2.2.

3. Simplifying the methodology for insignificant parameters

In the case of the Gianyar Waste Recovery Project, only 1.36 % project emissions need to be deducted from the 100 % total baseline emission. This is probably representative for most composting projects unless (contrary to Gianyar), all the incoming waste is shredded. In this case the project emissions would increase to about 2.00 %. Therefore the calculation of the project emission should be simplified

These 2.00 % are insignificant in view of all the uncertainties and imprecisions related to the baseline emission calculation. They would are already be covered 5-fold by the parameter φ of 0.9 for "Model corrections factor to account for model uncertainties", which reduces the CERs by 10 %.

4. Immediate crediting of the all prevented emission

For each Monitoring Period, the present CDM composting methodology grants Carbon Credits only at the rate at which methane emissions have been generated in a landfill during the respective Monitoring Period. The reductions beyond each Monitoring Period are not yet eligible for Carbon Credits and reductions beyond the Crediting Period inappropriately never become eligible.

This is highly unfair because when the composting process is finished after about four months, any methane generation is irreversibly prevented. Therefore, future composting methodologies must grant for each Monitoring Period the Carbon Credits for the methane that has been irreversibly prevented for the whole decay period (of up to 60 years).

This would about double the eligible CERs and would also result in more Carbon Credits in the first years, when projects need them most. This proposal has the biggest impact of all points raised in this document and needs to be addressed urgently.

5. Conclusions

The following three points are crucial for CDM composting projects:

- The parameters used to calculate the very significant baseline emission are flawed. Undiscerning default values result in an unfair and imprecise calculation of the baseline.
- The parameters used to calculate the rather insignificant project emission (which are deducted from the baseline emissions) are fair and precise. However, they should be simplified by using more default values and consolidating parameters. (Is it necessary to know the emission factor of the Java/Madura/Bali electrical grid that affects the project's electrical energy emissions, which amount only to 0.47 % of the base line emission?)
- Due to the low price of CERs, many projects receive too little carbon credits to even pay for the periodic verifications. With this being the case, existing projects are no longer viable and new ones are no longer considered which is contrary to the CDM objective. This applies especially to small scale projects that depend heavily on CDM Carbon Credits.

The conclusions are the following:

1. The UNFCCC authorities must take drastic steps to simplify the whole CDM registration process from the PDD to the validation and verifications in order to reduce cost.
2. The UNFCCC authorities must also reduce the qualification demands it imposes on DOEs, which are reflected on the price they charge.
3. The composting process of about four months irreversibly prevents the generation of methane. New composting methodologies must immediately grant Carbon Credits for the emission reduction achieved over the whole decay period, not only for the Monitoring Period.
4. More tolerance instead of apparent arrogance is indicated for minor imperfections. Why need processes be repeated when the result does not change? Would not an amendment without loss of time be sufficient?

Data and parameters used in Gianyar Waste Recovery Project (Project 1885)

The appropriateness of the parameters below is discussed in a separate word file: "Crucial Shortcoming of the UNFCCC Methodology for Composting"

<table>
<tr><th>Table</th><th colspan="2">Parameter</th><th>Applied in Gianyar</th><th>Source</th><th>Comment</th></tr>
<tr><td colspan="6">D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors</td></tr>
<tr><td>1</td><td>φ</td><td>Model corrections factor to account for model uncertainties</td><td>0.9</td><td>UNFCCC default value</td><td>Unjustified reduction as uncertainties can go both ways</td></tr>
<tr><td>2</td><td>OX</td><td>Oxidation value</td><td>0</td><td>UNFCCC default value</td><td>Minor unnecessary correction as there is only a choice between 0.0 and 0.1</td></tr>
<tr><td>3</td><td>F</td><td>Fraction of methane in the SWDS gas (volume fraction)</td><td>0.5</td><td>IPCC default values</td><td></td></tr>
<tr><td>4</td><td>DOC_f</td><td>Fraction of degradable organic carbon that can decompose</td><td>0.5</td><td>IPCC default values</td><td></td></tr>
<tr><td>5</td><td>MFC</td><td>Methane correction factor. Depends on solid waste disposal site</td><td>0.8</td><td>IPCC default values: 0.4/0.5/0.6/0.8/1.0</td><td>Are these potentially massive reductions sufficiently researched?</td></tr>
<tr><td>6</td><td>DOC_i</td><td>Fraction of degradable organic carbon (by weight) in the waste type</td><td>% DOC wet waste
43
40
15

24
20</td><td>IPCC default values</td><td>
<table>
<tr><th>Waste type j</th><th>% DOC wet waste</th><th>% DOC dry waste</th></tr>
<tr><td>Wood and wood products</td><td>43</td><td>50</td></tr>
<tr><td>Pulp, paper and cardboard (no sludge)</td><td>40</td><td>44</td></tr>
<tr><td>Food, food waste, beverages and tobacco (no sludge)</td><td>15</td><td>38</td></tr>
<tr><td>Textiles</td><td>24</td><td>30</td></tr>
<tr><td>Garden, yard and park waste</td><td>20</td><td>49</td></tr>
</table>
The Gianyar waste is 8% food, food waste, beverages and tobacco and 82% garden, yard and park waste. There is only a choice between DOC for wet or dry waste conditions and no choice in between.
Gianyar was classified as wet. Thus Gianyar receives only 39 % for food waste respectively only 41 % for garden waste of the CERs that a project with dry conditions would receive. <u>It is incomprehensible that no conditions in between are available.</u></td></tr>
</table>

"Table" refers to table number in Monitoring Report

7	k_j	Decay rate for the waste type j	Wet (MAP > 1000mm) 0.07 0.035 0.17 0.4	IPCC default values	Waste type j (Values for tropical conditions MAT > 20°C) / Dry (MAP < 1000mm) / **Wet (MAP > 1000mm)** Pulp. Paper, cardboard, textiles / 0.045 / **0.07** Wood, wood products, straw / 0.025 / **0.035** Garden and park waste / 0.065 / **0.17** Food, food waste, beverages, tobacco / 0.085 / **0.4** MAT: mean annual temperature MAP: mean annual precipitation Bali is located in tropical area with MAP of around 1700 mm per year and an average annual temperature (MAT) of 27°C. Therefore the proposed k values for wet conditions can be used. There is only a choice between MAP for wet or dry climate with no choice in between. Gianyar was classified as wet. Thus Gianyar receives 162 % more for garden waste respectively 370 % more for food waste of the CERs that a project with dry tropical climate would receive. **It is incomprehensible that no conditions in between are available.**
8	EF_{diesel}	Diesel CO_2 emission factor	74.07 t CO_2 per TJ	calculated from IPCC default NCV value for diesel and density of diesel	Why not publish IPCC default value?
9	EF_{grid}	Emission factor for electrical grid	0.728 CO_2 per MWh	Specific for Java/Madura/Bali grid (by Chevron)	Why not publish a worldwide default values for each coal, gas and oil fired power plants?
10	$EF_{transport}$	Emission factor for transport	0.2664 kg/km	IPCC default values	Do four decimals for an estimate make sense? (This applies also for Table 8 and 9)
11	$TWCOM_{BAU}$	Total waste composted before baseline calculation (in pilot plant)	tons	established by project	none

D.2. Data and parameters monitored

12	f	Fraction of methane captured at the solid waste disposal site and used	0	monitored by project	no comment, is OK
13	GWP	Global warming potential (GWP) of methane, valid for the relevant commitment period	21	UNFCCC	too low by today's standard
14	W_y	Total organic waste prevented from disposal in period y	tons	monitored by project	There is a major weakness in weighing the waste, because it does not take account of the water content, which can vary widely due to rain or dryness
15	p_j	Weight fraction of waste type j in the sample n collected during period y	%	monitored by project	no comment, is OK
16	W_{total}	Total waste delivered to the composting facility in period y	-	Not monitored as we weigh of the organic fraction directly	If this parameter would be monitored, the comment would be the same as in Table 14
17	$W_{recycled}$	Waste fraction processed for recycling in period y	-	Not monitored as we weigh of the organic fraction directly	none
18	$W_{landfill}$	Waste fraction diverted to landfill in period y	-	Not monitored as we weigh of the organic fraction directly	If this parameter would be monitored, the comment would be the same as in Table 14
19	F_{diesel}	Total consumption of diesel composting facility in period y	liter	monitored by project	no comment, is OK
20	EL	Total power consumption of composting facility in period y	MWh	monitored by project	no comment, is OK
21	Q_{comp}	Amount of compost sold in period y	tons	monitored by project	no comment, is OK
22	S_{comp}	Share of compost bought and transported by customers in period y	share (fraction)	monitored by project	no comment, is OK
23	CT_{comp}	Average capacity of vehicles used by customers	tons	monitored by project	no comment, is OK
24	DAF_{comp}	Average return distance for compost transportation	km per vehicle	monitored by project	no comment, is OK

E. **CER Calculation** (for 2nd monitoring period01/05/2010 to 31/12/2011)

E.1. Baseline emissions calculation

	Total baseline emissions	t CO2	Table 27	Total monitoring period	6,408.437	100.00%

E.2. Project emissions calculation

PE_{power}	Total power emission	t CO2e	Table 28/29	Emission from power consumption	30.339	0.47%
PE_{diesel}	Total facility diesel emissions	t CO2e	Table 30/31	Emission from facility diesel consumption	53.395	0.83%
$PE_{transport}$	Total transport diesel emissions	t CO2e	Table 32/33	Emission from compost transportation (by customer)	3.416	0.05%
	Total project emissions				87.15	1.36%

E.3. Leakage calculation

	none					

E.4. Emission reductions calculation / table

r	Adjustment factor r (= 991.667 / 20,889.347) for prior activity	Factor 0.04747	Table 35	Factor 0.04747 x baseline reduction This is a questionable reduction as the only purpose of the pilot plant was to develop the CDM project. = 0.04747 x 6,408.437	304.224	4.75%

E.4.2. Calculation of total emission reductions during monitoring period

Total baseline emission		**Table 27**		**6,408.437**	**100.00%**
- Total project emission		**Table 34**		**87.150**	**1.36%**
- Total leakage		**E.3**		**0.000**	**0.00%**
- Adjustment for prior activity:		**Table 27/35**		**304.224**	**4.75%**
= Total emissions reduction		**Table 36**		**6,017.063**	**93.89%**