

Project Participants comments regarding the project Terrestre Ambiental landfill Gas Project – 1133.

Dear Members of the CDM Executive Board,

Please find below our responses to the issue raised as part of the review of this project.

Version 3 of the Tool for the demonstration and assessment of additionality should be applied

The version 3 of the “Tool for the demonstration and assessment of additionality” will be applied in the new version of the PDD.

The PDD states that “One reason for the small quantity of landfill power generation is the lack of technical expertise in the country. As there was so far just little research on this subject in Brazil, the companies that decide to use this kind of technology, will preferably buy the equipments from companies based in US or EU, and train the work labor to operate the system”. The DOE shall further clarify how they have verified and then validated the accuracy of this statement against other large scale project activities in Brazil that precisely use the technical expertise that is lacking according to the argument in the paragraph.

This statement was done in the *Sub-step 1a: Define alternatives to the project activity* section, where the PP should:

“Identify realistic and credible alternative(s) available to the project participants or similar project developers that provide outputs or services comparable with the proposed CDM project activity. These alternatives are to include:

- *The proposed project activity undertaken without being registered as a CDM project activity;”*

It is not known any large landfill gas to energy project operational in Brazil nowadays without being registered as a CDM project. By having this in mind, the PP present in the table below the projects that have considered the energy generation in landfill projects registered as a CDM project (source: cd4cdm.org, accessed on 22th November 2007), mentioning the technology used, and the implementation phase.

Project name	Status	Status of the physical project	CER claiming
Brazil NovaGerar landfill gas to energy project	Registered	The EPC service providers for the NovaGerar project are EnerG, a UK based, specialist landfill gas to energy company. EnerG will be responsible for the operation of the engines and flares, as well as the maintenance of the gas collection system.	Not claiming for CERs.
Landfill gas to energy project at Lara landfill, Mauá	Registered	The power generation is not implemented yet.	Claiming only for LFG destruction in flares
Brazil MARCA landfill gas to energy project	Registered	The power generation is not implemented yet. The project implementation is under responsibility of Biogas Technology (UK).	Not claiming for CERs.
Bandeirantes Landfill Gas to Energy Project (BLFGE).	Registered	This project uses Caterpillar (US) engines, associated with a Van der Wiel (Nederlands) LFG extraction	Fully operational.
São João Landfill Gas to Energy Project	Registered	The power generation is not implemented yet, forecasted to be implemented in 2008 (according to the monitoring report). The implemented phase uses Van der Wiel (Nederlands) technology.	Claiming only for LFG destruction in flares
Manaus Landfill Gas Project	At Validation	Not implemented yet.	Not registered

Furthermore, with the data abovementioned, the project participants believe that the statement made in the PDD is accurate and is in accordance with the Brazilian reality.

In order to provide evidence of the additionality of the project activity, the PDD states that “In addition, there is a lack of funding in Brazil. CNI says that “...the bank loans are expensive; the payments are in short terms and not enough to supply the market. The capital market is not very developed, restricting the shares sells and others bonds directly to investors. And external financing, in the last years, has been oscillating in payment terms and costs, also being an unstable resource”. Furthermore, to get the loans, companies underwent through lot of bureaucracy, and the whole process could last months”. However this supporting evidence is a statement by the Confederação Nacional da Indústria dated 2003. Further evidence is requested.

The PP believe that this report done by the Confederação Nacional da Indústria dated of 2003 represents the Brazilian scenario, not only for the industries but it can be expanded to the general brazilian economy.

However, in order to clarify all possible pending issues, two papers produced by well known Brazilian Universities were presented as further supporting evidences.

According to Carvalho¹:

“...If the strategic importance of auto financing could be general establish, in case of economies such as Brazilian economies is even more relevant, given the bank credit and the capital market atrophy caused by the long period of high inflation rate and the oversized paper of the public debts in the financial intermediaries...”

Carvalho also states:

“...Even with the expansion of credit to companies, it does not imply in financing investments, because it is mainly constituted of relatively short term operations, as usual in the banking system, specially at the free segment...”

Also, Costa and Savoia² *apud* Rocca (2001, p.27) states: “... only a small group of large foreign companies and the largest national companies has the access to financing sources in less disadvantage conditions...” and “... the incipient capital market is deficient related to the proper financing mechanisms...”. The authors also state: “... in reference to the private bonds, it represents a small secondary market, which corresponds to around 3% of GDP, in comparison to the 60% of GDP in the United States...”.

¹ Economic growth and financing in Brazil, Perspective, Carvalho, F. J. C. de Carvalho; Paper presented in the 4th Forum of Economics at FGV – 17 and 18 of September 2007

² Long term financing patterns: a study of the Brazilian experience; Costa, C. P. da; Savoia, J. R. F.; paper published in 2003.

To apply the simple cost analysis the PDD merely states that “As already mentioned before, there is a high investment cost related to biogas collection in Brazil. If a project implements only the biogas collection and flaring system, a rough cost estimate is around USD 1,000,000.00 (or about € 775,000.00) for a similar project” and adds a table with equipment costs. Further evidence and substantiation is required.

There is a high investment cost related to biogas collection in Brazil. The cost for biogas collection and flaring system of the **Terrestre Ambiental landfill Gas Project** was € 522.744,00 and the budget is attached. The budget will be translated as soon as possible.

In accordance to the sub-item B.5 of the PDD, it is clearly demonstrated that the activity produces no economic benefits other than CDM related income, as shown below.

"(...) Since the project activity will not deliver commercial goods or services (i.e. electricity generation or thermal energy) and no other incentives will be obtained from the capture and flaring of the methane and taking into account that there is no legislation that obligates the landfill to destroy the methane, the landfill would continue with its core business (final disposal of solid waste) and the methane would continue to be released to the atmosphere, according with the baseline scenario.

(...) As the baseline scenario is in accordance with national laws and regulations and as the project activity will not receive income from the sale of electricity or methane, the implementation of the project activity will have no other benefit than the CDM revenue.

(...) CDM registration will reduce the economic and financial barriers to the project activity. The commercialization of the generated CERs represents the sole benefit of the project. Registration will reduce investment risk and foster the project owners into expanding business activities. (...)"

Therefore, Project Participants (PP) asserts that for the actual proposed project activity, landfill gas capture and flare, there are no economic benefits other than the CDM income.

It is worth mentioning that the CDM income is expected to make feasible future investments on even more environmentally friendly alternatives, such as the use of LFG as energy source.

The evidence provided in the common practice analysis is dated in 2000. Updated information is required.

The National Plan for Basic Sanitation (*Plano Nacional de Saneamento Básico – 2000*) is the most up to date research that comprises all municipalities in Brasil. Others publications were published later, but those use statistic methods and is based on data received from the local authorities, becoming possible to result inaccurate results.

As per the tool to determine project emissions from flaring gases containing methane, the type of flare and the approach to determine its efficiency should be documented and validated.

The “tool to determine project emissions from flaring gases containing methane” determines: *“Project participants should document in the CDM-PDD, which type of flare and which approach to determine the flare efficiency is used. In case of use of the default value for the methane destruction efficiency, the manufacturer’s specifications for the operation of the flare and the required data and procedures to monitor these specifications should be documented in the CDM-PDD.”*

However in the table 6, page 28, it is stated that the type of flare will be the enclosed flare and as presented in section B.7.1 of the PDD, a default value of 90% will be used for flare efficiency

The DOE should confirm how the appropriateness of the 20% adjustment factor being applied in this project activity has been validated.

The methodology used was the same adopted by EPA.

1. Percentage of methane vented through the passive system: the site operator has installed a simple passive venting system. As stated in the Landtec material “The passive systems are not as efficient as the active systems”. The probable reasons for this low efficiency of passive systems are:
 - a. It relies on barometric pressure: according to the Landtec material³, the LFG seeks the equilibrium with the atmospheric pressure. The waste coverage, LFG generation among other factors causes some delays in this pressure stabilization, resulting in higher or lower pressure oscillations compared to the atmospheric. This results in LFG flow through a less resistant ways, becoming favorable the leak of LFG through the coverage;
 - b. The well influence ratio: each well has an influence ratio in active systems. This ratio is estimated mainly by the waste voids in the landfill, the biogas generation, the coverage permeability, and the atmospheric pressure. This ratio, for an active system in Brazil is

³ Project engineering for landfill gas systems – Practical approach (Projetos de Engenharia de sistemas de gás de aterros Sanitarios – Enfoque prático), course material, Landtec.

- estimated to be around 25 meters. However, according to the Landtec material₁, the wells in passive systems have a minimum influence or effect comparing with the active systems.
- c. Preferred pathway: “Methane is lighter than air and carbon dioxide is heavier than air. However, they "... will not separate by their individual density...", but rather move, "... as a mass in accordance with the density of the mixture and other gradients such as temperature and partial pressure" (EPA, April 1992). This usually results in landfill gas moving upward through the landfill surface” through the surface soils into ambient air;

The above mentioned characteristics show that the passive systems are less efficient than active systems. The PP estimate around 65% of collection efficiency for the Terrestre Ambiental, however this number was never tested. The IPCC guidelines 2006 measured in 11 closed landfill sites (where the collection efficiency is greater than in operational landfill site) an average collection efficiency of 37% for active systems.

The active systems avoid the LFG leakage through the surface by creating a negative pressure gradient (suction) in the landfill cells. So, 37% was used and deemed conservative.

2. Current methodologies estimate that the combustion efficiency of open proprietary flaring equipment is 50% (i.e. one half of the recoverable methane is combusted). As the passive vents at Terrestre Ambiental are not optimized for flaring landfill biogas, for instance there is neither automatic ignition nor lambda adjustment, it is unlikely that they reach the 50% combustion efficiency normally attributed to engineered flaring equipment.
3. Percentage of wells ignited: Percentage of passive vents that are burning at any one time

So, the formula used to calculate the Adjustment factor is presented below:

$$AF = (Q_{\text{vents}} \times \eta_{\text{openflare}} \times \eta_{\text{vent}} \times \% \text{ ignited}) \div Q_{\text{baseline}}$$

Where:

AF	Adjustment Factor
Q_{vents}	Average landfill biogas flow rate in the passive vents corrected to 50% methane;
$\eta_{\text{openflares}}$	Combustion efficiency of the passive vents used the same as open flares;
$\%_{\text{ignited}}$	Percentage of passive vents that are burning at any one time;
Q_{baseline}	the estimated collection efficiency multiplied by the flare efficiency.

Thus, the values used are:

$Q_{\text{vents}} = 37\%$, based on 2006 IPCC;

$\eta_{\text{openflare}} = 50\%$;

$\eta_{\text{vent}} = 50\%$;

$\%_{\text{ignited}} = 90\%$;

$Q_{\text{baseline}} =$ a collection efficiency of 65% multiplied by the flare efficiency of 90%;

The resulting value is 14.23%. In order to be conservative, a value of 20% was used.

We hope that the clarifications above have addressed all the issues raised and we are happy to provide any further information as required to facilitate the registration of this project.

Yours sincerely,



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