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green energy

UNFCCC Secretariat
Martin-Luther-King-Strasse 8, D-53153
Bonn - Germany.

Att: CDM Executive Board

Prot. PU 152/07
Torino, 03/12/2007

OBIECT: Request for review for "Quezon City Controlled Disposal Facility Biogas Emission Reduction Project" (1258)

With reference to your communication of Mon, 19 Nov 2007 please find here enclosed the answers to your questions.

Contact person for the review process is: FEDERICO MICHELI (email address: fm@pangeagreen.biz , mobile phone: +393357242420)

1. **Further substantiation is required regarding the choice of a 10 year assessment period for the investment analysis.**

The Quezon City Payatas "Controlled Dumpsite" where the PP is developing the Biogas captation and combustion plant, is receiving municipal solid waste, after the reopening in the end year 2000, since January 2001, and the managers of the "Controlled Dumpsite" intend to end the deposit of municipal solid waste by the end of year 2007. According to the biogas evaluation model ("IPCC 1996") that had been used to forecast the quantity of biogas generated by the landfill that will be captured and flared, the biogas annual quantity will increase until the end of year 2008 and then decrease significantly until year 2017. According to this natural reduction trend (confirmed by the above mentioned model) the PP decided to choose the "Fixed Crediting Period" option (with no possibility of renewal or extension once the project is registered) with a length of 10 years (according to the UNFCCC Modalities and procedures for a clean development mechanism doc. FCCC/KP/CMP/2005/8/Add.1 page 17 point. 49 sub. b) which is in line with the expected duration of the proposed project. In order to be consistent with the lapse of time, 10 years, that represents both the natural length of the project and the crediting period, in the Investment Analysis, the 10 year assessment period was taken in consideration.

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2. **Further explanation should be provided regarding why tax is assumed to be paid in years when there is no net income from the project activity, and the DOE should confirm by what process the input values used in the investment analysis have been validated.**

We understand that further explanation is required regarding the tax value during the project life. Two different scenario are showed in the excel file "Appendix 2 - Appendix 2 - BP PAYATAS IRR calculation" (which is uploaded in the UNFCCC website https://cdm.unfccc.int/Projects/DB/DNV-CUK1185342160.98/view).

a. the first calculation refers to the scenario where the CERs revenues are considered
b. the second calculation refers to the scenario with NO CERs revenues

We hereby provide the requested further explanation of both the scenarios.

a. In the above mentioned file, in the worksheet – "BP with CERs revenues" in the line No. 39 the taxes are estimated year per year. The taxes are calculated on the Taxable Income which is result of the revenues from the sell of CERs and electricity, after subtracting the Operational cost, royalties, Depreciation & Amortization and Interest. As in the entire life of the project (10 years) the Taxable Income is positive, tax will be paid every year (as per line No. 39 of Work sheet named "BP with CERs revenues" of the file excel file Appendix 2 - Appendix 2 - BP PAYATAS IRR calculation), meaning that in every year of the ten years period of the project duration, is expected a positive net income.

b. In the above mentioned file, in the worksheet – "BP without CERs revenues" in the line No. 36 the taxes are estimated year per year. The taxes are calculated on the Taxable Income which is result of the revenues from the sell of electricity, after subtracting the Operational cost, royalties, Depreciation & Amortization and Interest. As in the entire life of the project (10 years) the Taxable Income is negative, also the tax value is negative, meaning that no tax will be due and the negative value will represent a credit of the company that will be compensated in case of positive Taxable Income in a subsequent year. In this scenario no positive tax value is forecasted for the 10 years period without the CERs revenues (as per line No. 39 of Work sheet named "BP without CERs revenues" of the file excel file Appendix 2 - Appendix 2 - BP PAYATAS IRR calculation).

3. **in page 3 of the PDD, the PP states that "The 22-hectare disposal facility was the disposal site for Metro Manila's municipal solid waste (MSW) from 1973 until July 2000 when it was prematurely closed due to a tragic trash slide" and that "...due to lack of alternative disposal sites, it was reopened in November 2000 pursuant to an Executive Order signed by President Joseph Estrada instructing the conversion of this open dump to a controlled dump and making it an exclusive dumpsite of Quezon City". Further clarification is requested of which areas (cells) of the dumping site were affected by the slide, and to which degree they have become inoperative for methane**

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and leachate collection, which parts of the dumping site will be operated by the project with the specification of cells, location in relation to the slide site, etc.

The Payatas site has been used as waste disposal site since 1973, becoming the most important Metro Manila landfill after the Smokey Mountain closure. Until 2000 the site was operated as a open dump, according to the definition given in the Implementing Rules and Regulations (IRR) of Republic Act 9003:

"Open dump" shall refer to a disposal area wherein the solid wastes are indiscriminately thrown or disposed of without due planning and consideration for environmental and health standards.

On July 10th 2000, after a period of heavy rain, a trash slide occurred in the Payatas "Open dump". Due to the trash slide no damage had been caused to methane and leachate collection system because of the fact that no methane and leachate collection system was implemented in Payatas landfill.

Figure 1 indicates the portion of the landfill affected by trash slide and the layout of the proposed biogas collection system and energy recovery plant.

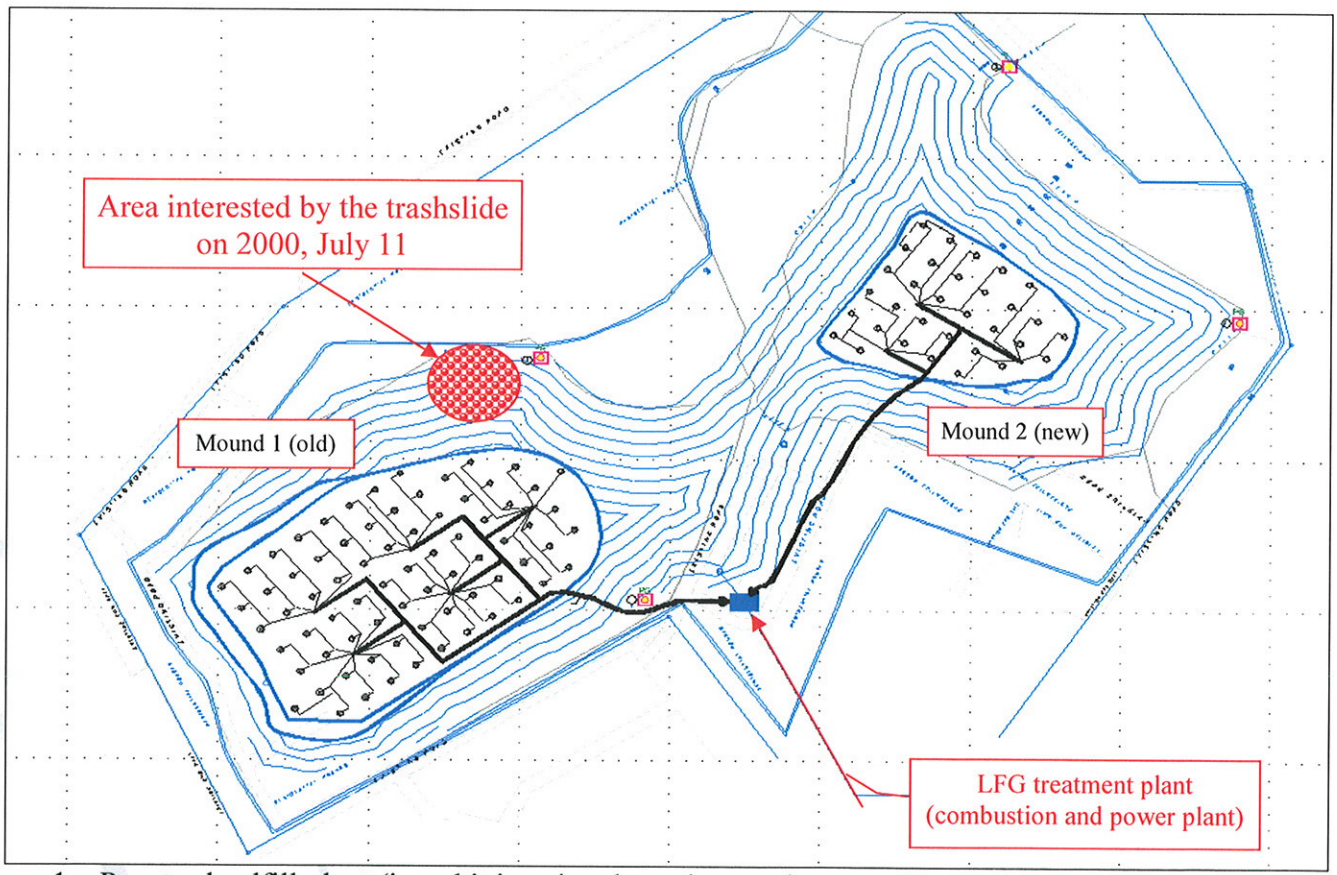

Figure 1 – Payatas landfill plant (in red it is pointed out the area interested by the 2000 trashslide) – the location and the layout of the proposed LFG recovery and treatment plant are showed

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The CDM project activity will interest only the wastes which were disposed after the reopening of the landfill as a "controlled dumpsite", in particular from January 2001, as reported in Table 14 Annex 3 of the PDD, until the cut off date of the landfill at the end of 2007. Please note that for the 2007 it has been foreseen a disposal value equal to 2006. In other words, for the forecasted LFG calculation production, we only considered the waste filled in the two mounds after January 2001 (see B in the cross section showed in figure 2). Since January 2001 the landfill has been filled up with new wastes, which have been disposed on both the existing mounds, as represented in Figure 2:

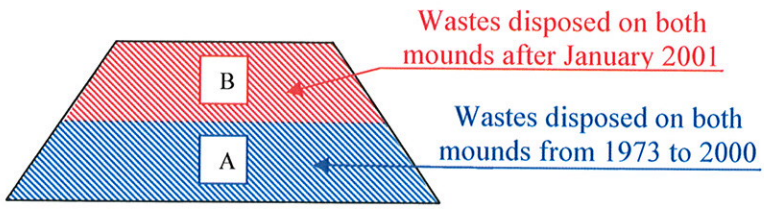

Figure 2 – Schematic section of the Payatas dumpsite in relation to waste disposal before and after 2000 closure

The conversion of the landfill from an open dump to a controlled dumpsite (see Figure 3) was made through the implementation of the following technical operations in order to protect the environment and to ensure the safety of the dumpsite and the communities surrounding the site:

- slope reprofiling → Dumpsite slopes were re-profiled from a 50°-70° steep to a more stable 23°-25° steep range through side cutting and benching;
- soil capping → re-profiled slope is covered with 0,60 m soil (before soil compacting);
- greening of slopes → mongo beans were used to enrich and condition the soil before grass and shrub were planted on the reprofiled slopes;
- perimeter fence → a perimeter fence was installed for the security of the facility.

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Figure 3 – Payatas disposal site before (up) and after (below) the conversion to a controlled dumpsite

4. **Further information and clarification is required on which is the exact technical description of a "controlled dumpsite" in relation to a sanitary landfill, in the framework of the Philippine regulations, and whether the operation of the project activity requires the installation of a biogas collection network, which might not have been in place at the time of utilization of the site as a dumping site. This operation could lead to the emission of methane to the atmosphere, the degree of which should be discounted as emissions from the project activity, and that could eventually be greater than the intended emissions reductions.**

According to the Implementing Rules and Regulations (IRR) of Republic Act 9003 (also known as Philippine Ecological Solid Waste Management Act of 2000), at Rule III are reported the definitions of a controlled dump and of a sanitary landfill:

"Controlled dump" shall refer to a disposal site at which solid waste is deposited in accordance with the minimum prescribed standards of site operation.

"Sanitary landfill" shall refer to a waste disposal site designed, constructed, operated and maintained in a manner that exerts engineering control over significant potential environmental impacts arising from the development and operation of the facility.

In particular, regarding to a controlled dump at Rule XIII - Operations of controlled dumpsites – Section 2 (Minimum Requirements for Operation of Controlled Dumpsites) it is pointed out:

The following minimum requirements shall be applied in siting, designing and operation of controlled dumpsites:
a) Daily cover consisting of inert materials or soil of al least 6 inches in thickness shall be applied at the end of the working day; where there is a lack of onsite soil material, other alternative materials may be used subject to the prior written approval of the enforcement authority and the Department;

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b) Drainage and runoff control shall be designed and managed such that storm water does not come in contact with waste and that discharge of sediments into the receiving body of water is minimized. Appropriate erosion protection shall be installed at storm discharge outfalls;
c) Provision for aerobic and anaerobic decomposition shall be instituted to control odor;
d) Working areas shall be minimized and kept at no more than a ratio of 1.5 square meter (sqm) or less per ton/day (tpd) of waste received on a daily basis, e.g. 30 sqm working area for a 20 tpd facility;
e) Security fencing shall be provided to prevent illegal entries, trespassing and large animal entries. Large animals shall include but not limited to adult domesticated or feral animals such as dogs, cats, cattle, pigs, carabaos and horses. Provisions for litter control including the use of litter fences and daily picking of litter shall be included;
f) Basic record keeping including volume of waste received daily, special occurrences such as fires, accidents, spills, unauthorized loads (maintain record of unauthorized and rejected loads, name and address of hauler and generator of such unauthorized waste), and daily waste inspection logs;
g) Provision of maintained all-weather access roads;
h) Controlled waste picking and trading, if allowed by owner/operator, in order to facilitate daily covering and compliance to Subsections (a) through (e) above;
i) Provision of at least 0.60 m final soil cover at closure, and post-closure maintenance of cover, drainage and vegetation; Post-closure maintenance shall be for a period of ten (10) years;
j) Site shall not be located in flood plains and areas subject to periodic flooding and it shall be hydro-geologically suitable, i.e., adequate separation or clearance between waste and underlying groundwater and any surface body of water shall be provided. Engineering controls shall be provided otherwise.
k) Open dumpsites that do not comply with siting requirements of this Section shall be closed immediately. A replacement facility shall be, at a minimum, a controlled dump and shall meet the requirements of Rule XIII, and other applicable provisions of the Implementing Rules and Regulations (IRR).

Due to the regulations reported in the above mentioned Implementing Rules and Regulations (IRR), the operation of a controlled dumpsite (like Payatas landfill) doesn't require the installation of a biogas collection network, that in absence of the CDM project activity might not have been implemented because it wouldn't be requested by the Philippine regulation. Our project foresees the installation of a biogas collection network. If your question is relevant to the emissions of methane related to the biogas collection network construction activity, please note that the plant will be built to avoid the methane emission in the atmosphere. No leakage will be allowed nor during O&M neither during the construction period. Until the start up of the plant, all our biogas collection network will be kept sealed in order to avoid methane escape.

5. **Due to the operational conditions described above, the project activity might not be applying a proper method for the estimation of baseline emissions. On the first place, the FOD model developed by the US-EPA applies to sanitary landfill conditions which were designed and implemented from the start with its biogas collection system in place, and these conditions might well vary if the site was a dumping site in the first place and a "controlled dumping site", afterwards. No technical explanation is given**

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about the meaning of a "controlled dumping site" in Philippines and what does this mean regarding a biogas collection system. No adjustment factor has also been specified by the PP to take this into account. The FOD models used by the IPCC refer generally to properly constructed sanitary landfills, with a system for compaction and storing in cells of solid waste, and a separation between domestic and commercial waste, on one hand, and hazardous waste, on the other.

It doesn't result that the First Order Decay Model is not applicable to controlled dumpsites: in the Reference Manual of the IPCC 1996 Guidelines (chapter 6), is pointed out that "Recognising that the distinction between landfills and open dumps is not always clear, the Revised 1996 IPCC Guidelines (this chapter) instead characterises all sites at which solid waste is deposited to land as "solid waste disposal sites" (SWDSs). Furthermore, "Landfill gas is known to be produced both in managed "landfill" and "open dump" sites. Both are considered here as solid waste disposal sites (SWDSs)". This means that the model is valid for all solid waste disposal sites.

The biogas model used in the PDD is the First Order Decay Model developed by the IPCC 1996 and in this case it has been applied to a controlled dumpsite (for technical explanation on the meaning of a Controlled Dumpsite in Philippines see point. No. 4). Conservatively it has been assumed k0=0,08 and L0=135, with a collection efficiency equal to 0,54.

As explained at point 4., a biogas collection system is not requested for a controlled dumpsite according to Philippine regulations and so the baseline scenario is the spontaneous emission of biogas in the atmosphere. So the Adjustment Factor (AF) used in MDreg calculation is set to 0 (zero), as reported at page 18 of the PDD.
Regarding to the type of landfill operational conditions (since 2001 classifiable as controlled dumpsite, see point 4.) it has been adopted a Methane Conversion Factor (MCF) equal to 1 (one), relevant to a managed solid waste disposal site, as indicated in the IPCC 1996 Guidelines for National Greenhouse Gas Inventories (see Figure 4):

TABLE 6-2
SWDS CLASSIFICATION AND METHANE CORRECTION FACTORS

Type of site	Methane correction factor (MCF) default values
Managed	1.0
Unmanaged - deep (≥5m waste)	0.8
Unmanaged - shallow (<5m waste)	0.4
Default value - uncategorised SWDSs	0.6

Figure 4 – MCF values
(source: Revised IPCC 1996 Guidelines for National Greenhouse Gas Inventories – Reference Manual)

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According to the IPCC 1996 Guidelines the following solid waste disposal site classification is adopted for the MCF value definition:

- Managed solid waste disposal sites. These must have controlled placement of waste (i.e., waste directed to specific deposition areas and a degree of control of scavenging and a degree of control of fires) and will include at least one of the following:
  - cover material;
  - mechanical compacting; or
  - leveling of the waste.
- Unmanaged-deep solid waste disposal sites. All SWDSs not meeting the criteria of managed SWDSs and which have depths of greater than or equal to 5 meters.
- Unmanaged-shallow solid waste disposal sites. All SWDSs not meeting the criteria of managed SWDSs and which have depths of less than 5 meters.

Due to the operational conditions described at point 4. the Payatas "controlled dump" can be included in the Managed solid waste disposal sites group and so a MCF value equal to 1 (one) has to be adopted.

6. **In page 10 of the PDD, it is stated that "According to this law [Republic Act No. 9003 note of reviewer], only in sanitary landfills with waste in place amounting to more than 500,000 tons should a gas control system be installed". Further clarification is required if this means that a "gas control" system was already installed at the Baragay Payatas site, and the nature of this system (bamboo or PVC pipes).**

Payatas Barangay landfill IS NOT a "Sanitary Landfill" but a "Controlled Dump" (for definition of a Controlled Dumpsite see the above point n° 4), and so, no gas control systems are required by the law.
No gas control system is installed in Payatas landfill.

7. **Further information and description of the project activity, including the appropriate technical descriptions about the operational condition of the project activity which must be included in the PDD, more specifically about conditions for biogas collection in new and old areas (cells?) of the dumpsite, including:**

   i. preliminary lining of the terrain
   ii. nature and layout of the tubing and piping
   iii. compaction procedures and degree
   iv. drainage of leachate and gas, etc

i. The landfill management operations doesn't include the use of HDPE bottom liner on the natural terrain, because the landfill born as an open dump in the '70. At that time HDPE bottom liner was not a specific of landfill design. The landfill will close at the end of 2007. It should be impossible to add now an HDPE bottom liner on the terrain

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ii. The LFG collection system designed in the frame of our project will be composed by 49 wells (drilled in the body of the waste) connected by HDPE pipes (DN 200) to three substations. From these three substation will start three main manifolds transporting LFG to the burning and power plant (the layout is reported in figure No. 1).

iii. The regular dumpsite operations consist of the following phases: waste truck inspection at the site entry; garbage is tipped at designated dumping area; residual waste is pushed and leveled at the final dumping area (see Figure 5): no landfill compactors are used, and so a compaction degree of about 55% is foreseeable.

iv. A leachate drainage system has been implemented on both mounds, through the collection pipes connected to the pump station. Actually no biogas collection system is operating on the landfill.

Figure 5 – Payatas landfill waste disposal operation: pushing and leveling of the wastes by bulldozer

8. The PP state in page 14 of the PDD that "the dumpsites cause serious public health, environmental and social impacts. They have inadequate fencing, signage and security provisions. Unrestricted access is prevalent. The presence of 4,000 waste pickers at the dumpsites is dangerous. They are poorly protected and at severe public health risk". It is not clear to which degree is the project activity affected by these conditions and whether the monitoring plan is adequate for these specific conditions.

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Landfill area is surrounded by poor population living in shanties and working in waste separate collection in waste disposal area.
Our plant is will be composed by a LFG collection system located on the top area of the two mounds and a centralized burning and power plant (see figure 1)
The LFG collection system designed in the frame of our project will be composed by 49 wells (drilled in the body of the waste) connected by HDPE pipes to three substations. From these three substation will start three main manifolds transporting LFG to the burning and power plant.
The landfill closure is expected for the end of the year 2007 and so there is no risk due to pickers activities beside our wells or pipes.
In any case since today the pickers are located in the actual dumping area that is in the middle of the two mounds and so there is no risk for our extraction plant, because the wells, the pipes and all the equipment necessary in order to extract LFG will be located in areas covered by soil and so without the risk represented by pickers that are collecting recoverable wastes (metal, glass, plastic) only in the restricted area where the fresh waste is filled.
The centralized burning and power plant will be located in a safe area and is secured by a 2 meter reinforced concrete fence. The plant counts on a 24 hours security service. All the necessary equipment for the evaluation of the methane captured and flared, the electricity produced (on the basis of the monitoring procedures that lead to the calculation of the produced CERs), are located in the above mentioned secured and fenced area and most of them, in particular, inside of the main container van where is located the suction section.

Best regards,

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