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**Assessment Opinion  
on Post-registration Changes Request:  
Correction**

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**Gwangju metropolitan city sanitary landfill  
LFG power plant CDM project (4294)**

**Report No. CDM00450PRC  
Version No. 01**

## **1 INTRODUCTION**

Deloitte-TECO has been performing the fourth verification of “Gwangju metropolitan city sanitary landfill LFG power plant CDM project (4294)” (the monitoring period: 21 February 2011 ~ 31 December 2014). During the verification, Deloitte-TECO found out that the equipment technical specifications and one monitored parameter unit need to be corrected based on the actual implementation. The details of the corrections are in the following section.

Deloitte-TECO assessed the post-registration change after the on-site assessment and prepared this assessment opinion for the approval of post-registration changes based on “CDM Validation and Verification Standard (CDM-VVS: Version 09.0)” and relevant documents.

## **2 TYPES OF CHANGES**

### **2.1 Correction**

- Correction of technical specifications of installed equipment

There are some technical specifications of installed equipment described in the registered PDD was not in accordance with the specification of actual installed equipment.

- Correction of monitored parameter unit

Unit of LFGburnt,y described in the registered PDD was not in accordance with actual monitored data.

- Correction of PP information in the registered PDD

Two of the PP name changed during the monitoring period.

## **3 ASSESSMENT OPINION**

### **3.1 Correction**

- Correction of technical specifications of installed equipment

The verification team confirmed that the difference specification of the equipment due to PDD author’s mistake to refer between specifications of technical description.

## Validation Opinion

According to the registered PDD, it was described technical properties of project gas generator about energy balance as below,

Category	Unit	100% Load operation	Partly operated	
			75%	50%
Fuel gas LHV	Kwh/Nm3	6.4		
Energy input	Kw	2,717	2,110	1,504
Gas volume	Nm3/h	425	330	235
Mechanical output	Kw	1,095	821	548
Electrical output	Kw el.	1,060	794	526
Heat to be dissipated				
~Intercooler 1st stage	Kw	183	86	19
~Intercooler 2nd stage	Kw	34	26	12
~Lube oil	Kw	105	102	90
~Jacket water	Kw	342	300	262
~Surface heat	Kw	74	57	43
~Balance heat	Kw	39	30	21
Spec. fuel consumption of engine	Kwh/km	2.48	2.57	2.74
Lube oil consumption	Kg/h	0.33	-	-

However, the verification team confirmed that the above technical information is not information of generator energy balance but information of container and there was no description about generator energy balance in the documentary evidence of technical description issued by manufacturer. The PP decided to delete this information from the revised PDD.

Technical information of project gas generator was also described in the registered PDD as below

Category	Unit	Description
Manufacturer		JES AG
Engine type		J 320 GS-C81
Working principle		4-Stroke
Configuration		V 70°
No. of cylinders		20
Bore	mm	135
Stroke	mm	170
Piston displacement	lit	48.67
Nominal speed	rpm	1,800
Mean piston speed	m/s	10.20
Filling capacity lube oil	lit	370
Filling capacity water	lit	150
Length	mm	3,320
Width	mm	1,358
Height	mm	2,065
Weight dry	kg	5,000
Weight filled	kg	5,500
Moment of inertia	kgm <sup>2</sup>	8.61
Direction of rotation(from flywheel view)		Left
Flywheel connection		SAE 18"
Radio interference level to VDE 0875		N

## Validation Opinion

Starter motor output	kW	9
Starter motor voltage	V	24

The verification team confirmed by performing on-site inspection and reviewing documentary evidence, issued by the manufacturer, that the above technical information is not information of generator but information of engine. Therefore, the PP revised to correct the technical information of the generator in accordance with technical information on installed generators as below. The difference is occurred due to PDD author's mistake to refer specifications of technical description.

Category	Unit	Description
Manufacturer		STAMFORD
Type		HCI 634 K2
Type rating	kVA	1,438
Driving power	kW	1,095
Ratings at p.f. = 1.0	kW	1,060
Ratings at p.f. = 0.8	kW	1,048
Rated output at p.f. = 0.8	kVA	1,310
Rated current at p.f. = 0.8	A	1,576
Frequency	Hz	60
Voltage	V	480
Speed	rpm	1,800
Permissible overspeed	rpm	2,160
Power factor lagging		0.8-1.0
Efficiency at p.f. = 1.0	%	96.8%
Efficiency at p.f. = 0.8	%	95.7%
Moment of inertia	kgm <sup>2</sup>	22.13
Mass	Kg	2,562
Radio interference level to VDE 0875		N
Construction		B3/B14
Protection Class		IP 23
Insulation class		H
Temperature(rise at driving power)		F
Maximum ambient temperature	°C	40
Total harmonic distortion	%	1.5

## Validation Opinion

In addition to that, the verification team confirmed that the difference specification of the blower as below.

	Before correction		After correction	
Blower	<ul style="list-style-type: none"> <li>· volume : 900Nm<sup>3</sup>/hr</li> <li>60Hz</li> <li>· Max temperature : 90°C</li> </ul>	1set	<ul style="list-style-type: none"> <li>· type : SP 125 IM</li> <li>· No. : 3099418</li> <li>· capacity : 17m<sup>3</sup>/min</li> <li>· speed : 1770RPM</li> <li>· discharge pressure : 0.1kg/cm<sup>2</sup></li> </ul>	2set

The verification team confirmed by performing interview with the PPs that the PPs ordered to adjust its specification of blowers during the installation, before the PDD was preparing, and the difference was occurred due to PDD author's mistake to refer specifications of technical description.

The verification team concluded that the PPs has not changed any main equipment after starting operation in year 2010 before registration of the PDD and those difference between the values of the data and/or variables presented in the MR and the stated data in the registered PDD is not significant and the value difference does not lead to a substantial increment of the ER.

➤ Correction of LFG<sub>burnt,y</sub> unit

The unit of LFG<sub>burnt,y</sub> is described as “m<sup>3</sup>” in the registered PDD. However, the verification team confirmed that according to Section B.7.1 in the registered PDD, the project LFG flow meter automatically measures temperature and pressure, expressing LFG volumes in normalized cubic meters. It is described at parameter “T” and “P” for monitoring. The verification team also confirmed the documentary evidence of “Gwangju LFG electricity generation monthly report” that has flow meter unit of “Nm<sup>3</sup>”, already normalized. The verification team concluded that it is simple typo by the PDD author.

➤ Correction of PP information in the registered PDD

Panax energy Co.,Ltd. Participated into the project as a PP instead of Seohee Construction Co.,Ltd. and one of PP's entity name, Environmental corporation of Gwangju, was changed during the monitoring period, therefore, the PP entity names were changed in the revised PDD accordingly.

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Validation Opinion

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Differ from the corrections as above, there is difference between the form of registered PDD and the revised PDD such as monitoring frequency at table of B.7.1, the new LoA, etc. The PP described the relevant monitoring information for the items in the revised PDD in accordance with the actual monitoring procedure.

The verification team concluded that the corrections do not affect the design of the project activity, therefore, the post-registration change for correction is conducted with the request of issuance without prior approval by the board based on Appendix 1 of CDM PS.

06 October 2015



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## Relevant Documents

Appendix 1: Specification of installed generator

Appendix 2: Specification of installed blower

Appendix 3: Sample of “Gwangju LFG electricity generation monthly report”