Validation opinion for post registration changes

Title of project activity:		
Gianyar Waste Recovery Project		
CDM reference number:	DNV project No.:	
1885	PRJC-442243-2013-CCS-MYS	
Date:	Validation of the changes were conducted:	
9 July 2013	☐ Prior to the commencement of a verification of the project activity ☒ When performing a verification of the project activity	
Work carried out by (name & signature):	Work verified by (name & signature):	Approved by (name & signature):
Lim Yap Hong	Simon Wong Yon-Sing	Michael Lehmann

Overview of post registration changes

Type of post registration change		**Are the changes of a type specified in Appendix 1 of the CDM Project Standard?** Note: In case of "No", prior approval by the EB is required
A: Temporary deviations from the registered monitoring plan and/or monitoring methodology (refer to section A)		☐ Yes ☐ No ☒ No post registration change of this type
Applicable period for proposed deviations (inclusive):	Not applicable	
B: Corrections (refer to section B)		☐ Yes ☐ No ☒ No post registration change of this type
C: Changes to the start date of the crediting period (refer to section C) *Prior approval by the CDM EB is not required in case of (a) bringing forward the start date up to one year earlier or (b) postponing the start date by up to one year (by up to two years for project activities in LDCs).*		☐ Yes ☐ No ☒ No post registration change of this type
Proposed start date of the crediting period:	Not applicable	
D: Permanent changes from the registered monitoring plan or applied methodology (refer to section D)		☐ Yes ☒ No ☐ No post registration change of this type

E a): Changes to the project design of a registered project activity (refer to section E)	☐ Yes ☒ No ☐ No post registration change of this type
E b): Changes to the programme design of a registered PoA (refer to section E)	Note: All changes to the programme design of a registered PoA require prior approval by the EB. ☒ No post registration change of this type
F. Changes specific to afforestation or reforestation project activities (refer to section F)	☐ Yes ☐ No ☒ No post registration change of this type

A. Temporary deviations from the registered monitoring plan and/or monitoring methodology

Not applicable.

B. Corrections

Not applicable.

C. Changes to the start date of the crediting period

Not applicable.

D. Permanent changes from the registered monitoring plan or applied methodology

D.1 Description of the revision of the monitoring plan

In the Section 7.1 and 7.2 of initial registered PDD (version 3 dated 8 April 2008), the organic waste and waste fraction were monitored using weighbridge. During verification, it was identified that the monitoring equipment used to monitor the organic waste and waste fraction were weighing scales. This is because the waste separation was done by individual workers and these workers were paid by the kilogramme of separated organic waste. Moreover, the determination of waste types sometimes encounters fractions as small as 0.1 kg, which is not suitable to be monitored by a weighbridge. Therefore, a change in the monitoring plan in the PDD has been proposed to include an additional measurement method which is weighing scale to monitor the organic waste and waste fraction as small weighing scale is more suitable and more accurate than weighbridge in low weights. The parameters which were affected by this change are;

1. Total organic waste prevented from disposal in year y ($W_y = TWCOM_y$);
2. Weight fraction of waste type j in the sample n collected during year y ($p_{n,j,y}$);
3. Total waste delivered to the composting facility in year y ($W_{total,y}$);
4. Waste fraction processed for recycling in year y ($W_{recyled,y}$); and
5. Waste fraction diverted to landfill in year y ($W_{landfill,y}$).

D.2 Assessment of the revision of the monitoring plan

The proposed revision of the monitoring plan ensures that the level of accuracy or completeness in the monitoring and verification process is not reduced as a result of the revisions

As both the weighbridge and weighing scales operates on the same concept of measurement (i.e. gravimetric analysis) thus the completeness of the monitoring and verification process is not affected. During the site visit, DNV has observed that the weighing scale has the measurement range from 6 kg to 300 kg with the accuracy of 0.1 kg[1]. Hence, the weighing scales are more suitable for monitoring small fractions of organic wastes.

Therefore, the proposed revision to the monitoring plan does not affect the level of accuracy or completeness in the monitoring and verification process and hence this satisfies the methodology of AMS-III.F (version 5) for composting solid waste.

The proposed revision of the monitoring plan is in accordance with the approved monitoring methodology applicable to the project activity whilst ensuring the conservativeness of the emission reductions calculation

The proposed revision is to include weighing scales which are more suitable for monitoring small fractions of organic wastes. The proposed revision of the monitoring plan does not affect the conservativeness of the emission reduction calculations and hence this satisfies the requirements of methodology AMS-III.F (version 5) for monitoring composting solid waste.

The findings of previous verification reports, if any, have been taken into account

Not applicable as there was no issue raised in regards to monitoring equipment of waste and waste fraction.

E. Changes to the project or programme design of a registered project activity or PoA

E.1 Description of the changes as compared to the description in the registered PDD and description of the changes to the monitoring plan

The project applies the approved small scale methodologies AMS-III.F (version 5) – Avoidance methane production from biomass decay through composting.

According to the registered PDD, the existing 400 m^2 building will be used to accommodate project equipment of 2 additional shredders, blowers to aerate the compost piles and the existing baler. A new covered 5 000 m^2 area will be implemented to house waste sorting facility, composting table piles, compost curing, and compost storage, as well as addition compost sieve and compost mixer (i.e. total area of 5 400 m^2 including existing building). A list of equipment and technical requirements of the project equipment was tabulated in Annex 5 of the PDD.

The changes to the PDD are as follow;

1. The initial registered PDD envisaged that existing 400 m^2 building is used for accommodate project equipment which include 2 additional shredders, blowers to aerate the compost piles and the existing baler. This has been changed where the existing 400 m^2 building was used to house an indoor section of an educational centre. In addition, the actual size of the new covered area[2][3] is 4 740 m^2 instead of 5 000 m^2 as envisaged in the registered PDD thus the actual size of the project activity is 4 740

[1] Pertin: *Name Plate of the Weighing Scales*, date taken 18 March 2013
[2] CV. Chitra Udayana and Yayasan Gus, *Construction Contract for Phase 1 Project Site*, dated 13 August 2007
[3] CV. Chitra Udayana, *Construction Site Drawing for Phase 2 Project Site*, dated 27 February 2008

m^2. The project equipment (shredders, blowers, and baler) have been implemented in the project area (within the 4 740 m^2 project area).

2. The initial registered PDD envisaged that 3 units of shredders with 120 horsepower diesel engines to be used to shred organic waste. This has been changed to adequate number of shredders with diesel engine for organic waste to be composted. Currently the project is operating with 2 units of shredders.
3. The initial registered PDD envisaged that 2 units of electric compost sieves (8 m^3 per hour) will be installed. This has been changed to adequate number of electric compost sieves. Currently the project is operating with 3 units of electric compost sieves.
4. The initial registered PDD envisaged that 1 front loader is used for piling and loading the compost on site. This has been changed to include the excavator (in addition of front loader) for piling, turning, and loading compost on site.
5. The initial registered PDD envisaged that 1 unit of transport vehicle for transporting organic waste and compost inside the facility. This has been changed to transport vehicles for transporting organic waste and compost inside the facility as needed. Currently the project has two trucks.

E.2 Assessment of the changes to the project design (*applicable to project activities only*)

Assessment of when the changes occurred

1. The use of the existing building as an educational centre was implemented starting from 1 June 2008. The project equipment was moved from the existing building to the project site since 26 November 2007. The actual size of the project of 4 740 m^2 was implemented on 27 February 2008 based on the finalisation of the second phase of the project size and dimension[3].
2. The number of diesel-powered shredders has been changed since 30 January 2011.
3. The number of electric compost sieves has been changed since 29 April 2012.
4. The inclusion of excavator for piling, turning, and loading compost on site has been implemented since 1 May 2008.
5. The decision to use two transport vehicles (trucks) was decided on 1 May 2008.

Assessment of the reasons for these changes taking place

1. The project activity has attracted up to 5 000 visitors per year, hence it was decided to dedicate the existing building as indoor section of the educational centre. The new 4 740 m^2 building has sufficient space to accommodate the project equipment and operation.
2. During the project operation, it was realised that the one shredder would be sufficient even if all organic waste is shredded. However, two shredders are necessary to warrant redundancy in case of maintenance. Due to this overcapacity, the third smallest capacity shredder was decommissioned on 30 January 2011. The project activity needs the flexibility to increase or decrease the number of shredders to adjust to evolving technical aspects like changes of the fraction that is shredded or procurement of shredders that reduce operating cost.
3. The PDD specified the use of two compost sieves but at that time, specific customer demands could not be anticipated. For the projects operation and most standard compost application, a mesh size of 9 mm is ideal. However, the main customer for compost required the compost to be sieved into a smaller mesh size of 5 mm for its

pellet production. Therefore, the project activity has included a third compost sieve with 5 mm mesh size. The project activity needs the flexibility to increase or decrease the number of sieves to adjust to the evolving market demand.

4. The project activity has included the excavators as an option for handling composting material and finished compost. This is because excavators are technically more suitable than front loader. The project needs the flexibility to use either equipment as part of the project operation.
5. The registered PDD has foreseen only one transport vehicle is required. However, since 15 March 2005, the pilot project already had two trucks. After commissioning the 1st phase building on 1 May 2008, it was decided to keep both trucks to have a choice between a large and a small truck therefore the project requires the flexibility on the number of vehicles it uses for the project operation.

Assessment of whether the changes would have been known to the project participants prior to registration of the project activity

The project activity was registered with UNFCCC on 4 November 2008. The numbers of diesel-powered shredders and electric compost sieves have been changed since 30 January 2011 and 29 April 2012 respectively. These were changed after the project has been registered.

The following changes were made prior to the registration of the project activity (refer to E.3 for further assessment);

1. The change of use of existing building, the location of the project equipment, and the actual size of the project activity was made on 1 June 2008.
2. The inclusion of the excavator and the change of the number of trucks for compost handling were made on 1 May 2008.

Nevertheless, as evaluated in this validation opinion, the changes do not raise concerns with respect to aspects mentioned under paragraph 279 of CDM Validation and Verification Standard.

Assessment of how the changes may impact the overall operation/ability of the project activity to deliver emission reductions as stated in the PDD

The following changes are not expected to have an impact on the overall ability of the project activity to deliver emission reductions as stated in the PDD. Although these changes will have improvement on the operation aspect of the project activity, nevertheless it will not have an impact on the rate and capacity of the compost production. This is due to the compost production is determined and limited by the availability of the raw material, which is the municipal wastes from Gianyar town, which is not affected by the changes made in the project activity. Thus the rate and capacity of the compost production are not affected by the operational changes in the project.

1. The change of existing building use, the location of the project equipment, and the actual size of the project activity is based on actual implementation. The actual size of the project activity has decreased by 12.2% (from 5 400 m^2 to 4 740 m^2), it is still sufficient for the project operation as the project has been operating within the capacity since the composting plant is commissioned as shown in the table below:

	Value in the registered PDD	Actual monitored values				
		2008	2009	2010	2011	2012
Organic waste processed	14 875 t	1 569.5 t	7 529.4 t	10 312.3 t	13 861.7 t	9 917.5 t

2. The change of the number of shredders is due to overcapacity for shredding.
3. The change of the number of sieve is to have different sieve sizes to meet customers' requirement and market demand.
4. The inclusion of excavator as an option for compost handling is to improve the project operation.
5. The change of the number of the transport vehicle compost handling is to improve the project operation.

The proposed changes do not affect the level of accuracy or completeness in the monitoring. Moreover, the integrity of the verification process is not reduced as a result of the changes.

E.3 Assessment of the impact of the changes to the project design (*applicable to project activities only*)

In the case of a project activity, do the changes adversely impact any of the following?

☐ The applicability and application of the applied methodology under which the project activity has been registered
☐ The additionality of the project activity
☐ The scale of the project activity
☒ None of the above

Assessment of impacts of the changes on the applicability and application of the applied methodology under which the project activity has been registered

The applicability criteria of the applied methodology remain unaffected as there is no change in technology and the validated baseline scenario remains valid. Furthermore the change in the monitoring plan does not affect the applicability of the methodology applied in the project activity.

The project as verified on-site as composting project which composts the organic municipal waste via aerobic treatment and has proper soil application of the compost. The project activity does not recover or combust methane and does not undertake controlled combustion of the waste. The total emission reduction of the project activity is 7 671 tCO_2e per year which is less than 60 000 tCO_2e per year as stipulated in the AMS-III.F (version 5). Hence it is verified that the applicability of AMS-III.F (version 5) was not affected due to the reasons above.

Assessment of impacts of the changes on the additionality of the project activity

The additionality argument presented in the registered PDD is based on the financial and market analysis. The changed made would not have an impact to the additionality of the project activity

Initially, the project activity has 3 units of shredder. Due to project design change, 1 of the shredder has been dismantled and sold as scrap metals. Nevertheless, due to lack of information of the revenue from the sales of scrap metals (from the decommissioned shredder), DNV has made conservative assumption in order to assess the impact of this change to the additionality of the project activity. The registered PDD estimates the cost of all the equipment for the project activity is USD 197 470. DNV assumed this is for all three units of shredders thus revenue from the decommissioned shredder would be USD 65 165 (by

dividing with 3 and costs of other equipment are excluded). Based on this assumption, the profit without CER credits would increase to -3.8% which is still financially unattractive. Thus, it can be concluded that the income from the scrap metal would be small and has no impact to the additionality of the project activity.

The change of the project size is not expected to have increased compost production. This is due to the availability of the raw material (i.e. organic waste) is based on the municipal waste is beyond project proponent's control. Moreover, the actual size of the project is 12.2% smaller than PDD estimation and this would result in less composting area. The PDD anticipated that the project would be able to compost 14 875 tonnes of organic waste per year. In average, the project has composted 10 405.3 tonnes of organic waste per year (from year 2009 to year 2012) and the highest organic waste composted in a year is 13 861.7 tonnes (year 2012). Therefore, it can be concluded that the project activity has been operating within the capacity as stipulated in the registered PDD. Furthermore, the implementation of the smaller area is not expected to have an impact on the additionality. Based on the financial spreadsheet[4], even if cost of the building is assumed as zero, the profit of the project without CER credits is -3.3% which is still financially unattractive.

	2009	2010	2011	2012	Average	Capacity in PDD
Organic waste composted	7 529.5 t	10 312.3 t	13 861.7 t	9 917.5 t	10 405.3 t	14 875 t

The data for the year 2008 is not included as it is not a complete year (57 days)

The changes of the project are not expected to have diesel saving to the project. DNV has checked on the historical diesel consumption and no decrease in diesel was observed since the change occurred.

	2008*	2009	2010	2011	2012
Diesel consumption	1 125 l	8 211 l	9 346 l	13 092 l	16 870 l
Organic waste composted	1 569.6 t	7 529.5 t	10 312.3 t	13 861.7 t	9 917.5 t
Diesel per waste composted	0.72 l/t	1.09 l/t	0.91 l/t	0.94 l/t	1.70 l/t

**The crediting period started on 4 November 2008 thus the values are based on the period from 4 November 2008 to 31 December 2008*

The diesel consumption trend has been consistent since year 2009 to 2011 (within ±10% of 1.0 l/t). However, the diesel consumption has increased for the year 2012, due to in the late 2011; the project proponent has increased the compost turning frequency to achieve higher water content for the composting operation and this led to higher diesel consumption. Nevertheless, the increased diesel consumption will increase the project operational cost thus there is no saving due to the changes.

DNV has further assessed on the overall revenue from compost sales. Although the compost selling price estimated in PDD (35 USD per tonnes) is lower than the actual compost selling price (averaged at USD 39 USD per tonnes for year 2011 and USD 36 USD per tonnes for year 2012), due to the lower amount of compost sold, the overall revenue is still lower than the PDD estimation. By replacing the estimated income from compost sold in the PDD with

[4] Yayasan Pemilahan Sampah Temesi: *Appendix 1 – Financial Spreadsheet*, dated 14 August 2007 (http://cdm.unfccc.int/Projects/DB/SGS-UKL1214472977.27/view)

the actual income from compost sold into the financial spreadsheet used at validation, the overall profit is lower than the estimate given in the PDD. Thus, it is still financially unattractive. Hence, the process improvement of the project activity does not impact the additionality of the project.

	Total compost sold	Total revenues	USD/t	Profits without CER credits
Estimation in PDD	5 250 t	USD 183 750	35	-6.8%
Year 2011	1 291 t	USD 50 392	39	-69.9%
Year 2012	1 530 t	USD 54 868	36	-67.8%

Thus, it is concluded that there is no impact towards the existing additionality argument (for both financial and market barriers) and no change is necessary to the wording in the approved PDD relating to the demonstration of additionality of the project activity.

Assessment of impacts of the changes on the scale of the project activity

The physical capacity of the project did not change as the estimated amount of the municipal waste remains unaffected (pre and post project implementation) and not within the control of the project proponent, but rather operational changes. The project has composted on average 10 405.3 tonnes of organic waste per year (from year 2009 to year 2012) and the highest organic waste composted in a year is 13 861.7 tonnes (year 2012). Hence, the project activity has been operating within the capacity as stipulated in the registered PDD, and there is thus no change of scale of the project activity. The registered PDD had estimated an annual emission reductions of 7 671 tCO_2e. There is no change to the scale of the CDM project activity, as the estimated annual emission reductions of the project activity is not expected to increase and does not exceed 60 000 tCO_2e in any year of the crediting period as stipulated by AMS-III.F (version 5). Thus, the scale of the CDM project activity still conforms to the small scale methodology of AMS-III.F (version 5).

E.4 Assessment of the change to a PoA (*applicable to PoAs only*)

Not applicable.

F. Changes specific to afforestation or reforestation project activities

Not applicable.

Validation opinion

The verification team assigned by DNV to perform verification of the emission reduction reported for the third monitoring period of the CDM project activity "Gianyar Waste Recovery Project" (UNFCCC Reference: 1885) in Indonesia has identified that the project implementation and monitoring plan do not conform to the description in the registered PDD (version 3 dated 8 April 2013).

Consequently the team has carried out a validation due to the permanent change in project design. The validation confirms that the identified changes have no impact on the scale, the applicability of the baseline/monitoring methodology, AMS-III.F (version 5). DNV therefore concludes and notifies that the changes do not raise any concern with respect to aspects outlined in paragraph 279 (c) of CDM Validation and Verification Standard.

In addition, it is DNV's opinion that the proposed revision of the monitoring plan does not affect the completeness of the monitoring plan. Hence, DNV recommends the approval of the request for revision of the project design document (version 4 dated 12 June 2013) and monitoring plan due to the justification above.

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