

FINAL VALIDATION REPORT

RENEWAL OF THE CREDITING PERIOD

PETRAMAS S.A

HUAYCOLORO LANDFILL GAS CAPTURE AND
COMBUSTION

UNFCCC REF. No. : 0708

CP #2 from 2014-03-05 to 2021-03-04
(incl. both days)

Report No: 8000425868 - 13/157

Date: 2014-05-15

TÜV NORD CERT GmbH
JI/CDM Certification Program
Langemarckstraße, 20
45141 Essen, Germany
Phone: +49-201-825-3335
Fax: +49-201-825-3290
www.tuev-nord.de
www.global-warming.de

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Validation Report:	Report No.	Rev. No.	Date of 1st issue:	Date of this rev.		
	8000425868 - 13/157	0.2	2014-02-26	2014-05-15		
Project:	Title:		Registr. Date:	UNFCCC-No.:		
	Huaycoloro landfill gas capture and combustion		2007-03-05	0708		
	Project Scale:					
	<input checked="" type="checkbox"/> Large Scale <input type="checkbox"/> Small Scale					
Crediting Periods:	Crediting period renewal:					
	<input checked="" type="checkbox"/> 1 st renewal <input type="checkbox"/> 2 nd renewal					
	Crediting periods (actual / planned):		From:	To:		
	First Crediting Period		2007-03-05	2014-03-04		
	Second Crediting Period		2014-03-05	2021-03-04		
	Third Crediting Period		N/A	N/A		
Project Participant(s):	Client:					
	Petramas S.A					
	Non Annex 1 country:		Annex 1 country:			
	Peru		Neherlands Germany United Kingdom of Great Britain and Northern Ireland			
	PP from Non Annex 1 country:		PP from Annex 1 country:			
	Petramas S.A		<ul style="list-style-type: none"> International Bank for Reconstruction and Development (IBRD) as Trustee of the Netherlands CDM Facility (NCDMF). Statkraft Markets GmbH. ICECAP Carbon Portfolio Ltd. 			
Applied methodology/ies:	Title (at registration):		Version No.:	Scope(s) / TA(s)		
	Consolidated methodology for landfill gas project activities Grid connected renewable electricity generation		ACM0001 ver. 4 AMS-I-D ver 9	01 / 1.2 13 / 13.1		
	Title (at renewal of CP)		Version No.:	Scope(s) / TA(s)		
	Flaring or use of landfill gas		ACM0001 ver.15	01 / 1.2 13 / 13.1		
Validation team / Technical Review and Final Approval:	Validation Team:		Technical review:	Final approval:		
	Raul González Mitre (TL) Oliver Quireza Campos		Emilio Martin	(Emilio Martin) Alexandra Nebel		
PDD Versions (for the new CP)	Reg. PDD		Draft RCP PDD		Final RCP PDD	
	Date	Version	Date	Version	Date	Version
	2012-01-05	3	2013-09-02	4	2014-05-13	4.4
Expected Emission reductions: [t CO₂e]	Expected emission reductions over the last crediting period [t CO₂e]:			Expected emission reductions over the new crediting period [t CO₂e]:		
	2,092,970			2,064,322		



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Summary of Validation opinion	<input checked="" type="checkbox"/> Positive validation opinion		<input type="checkbox"/> Negative validation opinion	
	<p>As a result of the validation the validation team confirms that:</p> <p><input checked="" type="checkbox"/> The baseline for the new crediting period is in compliance with the national and/or sectoral policies and circumstances applicable at the time of requesting the renewal of the crediting period and with the latest approved baseline methodology applicable.</p> <p><input checked="" type="checkbox"/> The monitoring plan is in line with the latest monitoring methodology applicable to the project activity.</p> <p><input checked="" type="checkbox"/> The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 2,064,322 t CO₂e are most likely to be achieved in the 2nd CP.</p>			
Document information:	<i>Filename:</i>		<i>Confidential content:</i>	
	2014-05-15_Huaycoloro Renew_FVR_final.docx		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
		<i>No. of pages:</i>		81

Abbreviations

BAU	Business as usual
CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CDM	Clean Development Mechanism
COES	Economic Operational Committee of the National Interconnected System – Comité de Operación Económica del Sistema Interconectado Nacional
CER	Certified Emission Reduction
CL	Clarification Request
CO₂	Carbon dioxide
CO₂e	Carbon dioxide equivalent
CP	Certification Program
DNA	Designated National Authority
EB	CDM Executive Board
EIA	Environmental Impact Assessment
FAR	Forward Action Request
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
MINAM	Environmental Ministry
PDD	Project Design Document
QC/QA	Quality control/Quality assurance
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

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1 OBJECTIVE / SCOPE

Petramas S.A has commissioned the TÜV NORD JI/CDM Certification Program (CP) to carry out validation of the request for renewal of the crediting period (RCP) for the project

“Huaycoloro landfill gas capture and combustion”

with regard to the relevant UNFCCC requirements. The project has been registered on 2007-03-05 under the UNFCCC registration No. 0708 . The PPs have chosen a 7 year crediting period which is now due for renewal. The PPs have thus notified the UNFCCC about their intention to request the renewal of the crediting period.

The objective of this RCP validation is the review by an independent entity whether the project is still compliant with the applicable sections of:

- the CDM project standard,
- the CDM cycle procedure
- the updated applied UNFCCC Methodology ACM0001 ver.15 and
- the methodological tool “Assessment of the validity of the original / current baseline and update of the baseline at the renewal of the crediting period”.

As per the requirements of the CDM Validation and Verification Standard^{/VVS/} (section 11) the validation is based on

- the registered and/or latest updated version of the PDD (including revisions of the monitoring plan)^{/PDD/},
- the updated emission reduction calculation spread sheet ^{/XLS/},
- further supporting documents made available to the validator as well as
- information collected through performing interviews and during the on-site assessment.

Furthermore publicly available information, such as the host country legislation, was considered as far as available and required.

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2 GHG PROJECT DESCRIPTION

2.1 Project Characteristics

Essential data of the project is presented in the following table 2-1.

Table 2-1: Project Characteristics

Item		Data
Project title		Huaycoloro landfill gas capture and combustion
Project size		<input checked="" type="checkbox"/> Large Scale <input type="checkbox"/> Small Scale
Project Scope (according to UNFCCC sectoral scope numbers for CDM)	<input checked="" type="checkbox"/>	1 Energy Industries (renewable- /non-renewable sources)
	<input type="checkbox"/>	2 Energy distribution
	<input type="checkbox"/>	3 Energy demand
	<input type="checkbox"/>	4 Manufacturing industries
	<input type="checkbox"/>	5 Chemical industry
	<input type="checkbox"/>	6 Construction
	<input type="checkbox"/>	7 Transport
	<input type="checkbox"/>	8 Mining/Mineral production
	<input type="checkbox"/>	9 Metal production
	<input type="checkbox"/>	10 Fugitive emissions from fuels (solid, oil and gas)
	<input type="checkbox"/>	11 Fugitive emissions from production and consumption of halocarbons and hexafluoride
	<input type="checkbox"/>	12 Solvents use
	<input checked="" type="checkbox"/>	13 Waste handling and disposal
	<input type="checkbox"/>	14 Afforestation and Reforestation
	<input type="checkbox"/>	15 Agriculture
	<input type="checkbox"/>	16 Carbon Capture and Storage
Applied Methodology	At registration	AMS-I-D ver 9: Grid connected renewable electricity generation ACM0001 ver. 4: Consolidated methodology for landfill gas project activities
	At RCP	ACM0001 ver.15: Flaring or use of landfill gas
Technical Area(s)		
Renewal of crediting period		<input checked="" type="checkbox"/> first renewal <input type="checkbox"/> second renewal
CDM registration No.		0708
Date of registration		2007-03-05

2.2 Involved Parties and Project Participants

The following parties to the Kyoto Protocol and project participants are involved in this project activity (Table 2-2).

Table 2-2: Project Parties and project participants

Characteristic	Party	Project Participant
----------------	-------	---------------------

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Characteristic	Party	Project Participant
Non-Annex 1 Country	Peru	Petramas S.A
Annex 1 Country	United Kingdom of Great Britain and Northern Ireland	
Annex 1 Country	Germany	Statkraft Markets GmbH
Annex 1 Country	United Kingdom of Great Britain and Northern Ireland	ICECAP Carbon Portfolio Ltd.

2.3 Project Location

The details of the project location are given in table 2-3:

Table 2-3: Project Location

No.	Project Location
Host Country	Peru
Region:	Lima/Huachochiri Province
Project location address:	Km 7 of the Huaycoloro Valley, in the San Antonio District, in the City of Chaclla
Latitude:	-11.931761
Longitude:	-76.872065

2.4 Technical Project Description

The project activity consists in the capture of landfill gas to be utilized in the generation of electricity. The biogas that is not utilized by the electricity generator is destroyed by an enclosed flare. The biogas is also treated before this is supplied to the generator by complementary equipments

The technical key data are provided in table 2-4 below.

Table 2-4: Technical data of the project activity

Parameter	Unit	Value
Biogas generator		
Type:	-	UNID
Manufacturer:	-	CATERPILAR
Quantity:	Units	3

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Parameter	Unit	Value
Nominal Power	kVA	2,000
COS	-	0.8
Net Power:	KW	1,600
Frequency	Hz	60

Parameter	Unit	Value
Biogas Flare		
Type	-	Closed
Manufacturer	-	John Zink
Quantity	Units	1
Operation Temperature	F	1400 a 1800
Retention Time	sec	0.7 a 1800 (minimum)
Destruction Efficiency	%	98 (minimum)
Pressure Inlet Chimney	" H2O	5 (maximum)

2.5 Project History

Essential events since the registration of the project are presented in the following Table 2-5.

Table 2-5: Status of previous Monitoring Periods

3	Item	Time	Status
1	Project Registration	2007-03-05	Registered
1	1 st Monitoring period	2007-03-05 to 2008-03-04	Issued
2	2 nd Monitoring period	2008-03-05 to 2009-03-04	Issued
3	3 rd Monitoring period	2009-03-05 to 2009-12-31	Awaiting issuance request
4	4 th Monitoring period	2010-01-01 to 2011-10-31	Awaiting issuance request

An overview of all Post Registration Changes is given in the following table.

Table 2-6: Overview Post Registration Changes

#	Applicable from – to / as of	Type of post registration change ¹⁾	Description	Status ²⁾ / Date
1	As of 2012-01-05	PCfrMP	Revision of monitoring plan	Approved / 2012-01-05

¹⁾ TDfrMP : Temporary deviation from registered monitoring plan
TDfMM : Temporary deviation from the monitoring methodology



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- CrPDD : Corrections to the registered PDD
 - PCfrMP : Permanent changes from registered Monitoring Plan
 - PCfMM : Permanent changes from Monitoring Methodology
 - CoPD : Changes to the project design of a registered project activity
- ²⁾ Approval (by EB) or Acceptance (by DOE)

3 METHODOLOGY AND VALIDATION SEQUENCE

3.1 Validation Steps

The validation of the project consisted of the following steps:

- Contract review
- Appointment of team members and technical reviewers
- Desk review of the PDD and supporting documents
- Validation planning
- On-Site assessment
- Background investigation and follow-up interviews with personnel of the project developer and its contractors
- Draft validation reporting
- Resolution of corrective actions (if any)
- Final validation reporting
- Technical review
- Final approval of the validation

3.2 Contract review

To assure that

- the project falls within the scopes for which accreditation is held,
- the necessary competences to carry out the validation can be provided,
- Impartiality issues are clear and in line with the CDM accreditation requirements

a contract review was carried out before the contract was signed.

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3.3 Appointment of team members and technical reviewers

On the basis of a competence analysis and individual availabilities a validation team, consistent of one team leader, was appointed. Furthermore also the personnel for the technical review and the final approval were determined.

The list of involved personnel, the tasks assigned and the qualification status are summarized in the table 3-2 below.

Table 3-2: Involved Personnel

	Name	Company	Function ¹⁾	Qualification Status ²⁾	Scheme competence ³⁾	Technical competence ⁴⁾	Host country Competence	On-site visit
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Raul González Mitre	BRTUV	TL ^{A)}	SA	<input checked="" type="checkbox"/>	1.2 13.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Oliver Quireza Campos	BRTUV	OT	T	<input type="checkbox"/>	1.2 13.1	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Emilio Martin	TÜV NORD CERT	FA/TR ^{B)}	SA	<input checked="" type="checkbox"/>	1.2 13.1	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Alexnadra Nebel	TÜV NORD CERT	FA ^{B)*}	SA	<input checked="" type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>

¹⁾ TL: Team Leader; TM: Team Member, TR: Technical review; OT: Observer-Team, OR: Observer-TR; FA: Final approval

²⁾ GHG Auditor Status: A: Assessor; LA: Lead Assessor; SA: Senior Assessor; T: Trainee; TE: Technical Expert

³⁾ GHG auditor status (at least Assessor)

⁴⁾ As per S01-MU03 or S01-VA070-A2 (such as 1.1, 1.2, ...)

⁵⁾ In case of verification projects

^{A)} Team Member: GHG auditor (at least Assessor status), Technical Expert (incl. Host Country Expert or Verification Expert), not ETE

^{B)} No team member

* only FA after Incomplete on 2014-05-15

All team members contributed to the review of documents, the assessment of the project activity and to the preparation of this report under the leadership of the team leader.

One team member as indicated in the table above attended in the complete site-visit.

Technical Experts contributed to the assessment of special aspects of the project activity, e.g. technical aspects of landfill gas projects.

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In order to qualify further personnel the project team was accompanied by one person as indicated in the table above. They are usually not considered as team members.

Statements of competence for the above mentioned team members are enclosed in annex 3 of this report.

3.4 Validation Protocol

In order to ensure consideration of all relevant assessment criteria, a validation protocol is used. The protocol shows, in a transparent manner, criteria and requirements, means of validation and the results from pre-validating the identified criteria. The validation protocol reflects the CDM requirements for RCP. The validation protocol serves the following purposes:

- It organizes, details and clarifies the applicable requirements;
- It ensures a transparent validation process where the validating entity will document how a particular requirement has been validated and the result of the determination.

The validation protocol is described in Figure 1.

Validation Protocol Table A-1: Requirement checklist				
Checklist Item	Reference	Validation Team Comments	Draft Conclusion	Final Conclusion
<i>The checklist items in table A-1 are linked to the various requirements the project should meet. The checklist is organized in various sections. Each section is then further sub-divided as per the requirements of the topic and the individual project activity.</i>	<i>Gives reference to the information source on which the assessment is based.</i>	<i>The section is used to elaborate and discuss the checklist item in detail. It includes the assessment of the validation team and how the assessment was carried out. The reporting requirements of the VVS shall be covered in this section.</i>	<i>Assessment based on evidence provided if the criterion is fulfilled (OK), or a CAR, CL or FAR (see below) is raised. The assessment refers to the draft validation stage.</i>	<i>In case a corrective action or a clarification the final assessment at the final validation stage is given.</i>

Figure 1: Validation protocol table

The completed validation protocol is enclosed in Annex 1 to this report.

3.5 Review of Documents

The revised PDD version and supporting background documents related to the RCP were reviewed.

Furthermore, the validation team used additional documentation by third parties like host party legislation, technical reports referring to the project design or to the basic conditions and technical data.

3.6 Follow-up Interviews

The validation team has carried out interviews in order to assess the information included in the project documentation and to gain additional information regarding the compliance of the project with the relevant criteria applicable for RCP.

All sites included in the project activity have been visited.

During validation the validation team has performed interviews to confirm selected information and to resolve issues identified in the document review. The main topics of the interviews are summarized in table 3-3.

Table 3-3: Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
Project proponent representatives / Project consultant	<ul style="list-style-type: none"> - Chronological description of the project activity with documents of key steps of the implementation. - Current status of plant design - Technical details of the project realization, project feasibility, designing, operational life time, monitoring of the project - Monitoring and measurement equipment and system. - Crediting period - Baseline study assumptions - Sustainable development issues - Monitoring - Roles & responsibilities of the project participants w.r.t. project management, monitoring and reporting - National Legislation - Editorial issues of the PDD

A comprehensive list of all interviewed persons is part of section 7 'References'.

3.7 Resolution of Clarification and Corrective Action Requests

3.7.1 Definition

A **Corrective Action Request (CAR)** is established where:

- mistakes have been made in assumptions, application of the methodology or the project documentation which will have a direct influence on the project results,
- the requirements relevant for validation of the renewal of crediting period have not been met or
- omissions or incomplete information might lead to a risk that the renewal of crediting period could not be approved by the UNFCCC or
- Required information has not been provided.

A **Clarification Request (CL)** is issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

A **Forward Action Request (FAR)** will be issued when certain issues related to project implementation should be reviewed during the subsequent verification.

3.7.2 Draft Validation

After reviewing all relevant documents and taken all other relevant information into account, the validation team issues all findings in the course of a draft validation report and hands this report over to the project participant(s) in order to request responses on the issues raised and to revise the project documentation accordingly.

3.7.3 Final Validation

The final validation starts after issuance of the proposed corrective action (CA) of the CARs, CLs and FARs by the project proponent. The validation team has to reply on those and the requests are “closed out” by the validation team in case the response is assessed as sufficient. If applicable, the project proponent has to respond on raised FARs, identifying the necessary actions to ensure that the topics raised in this finding are likely to be resolved at the latest during the subsequent verification. The validation team has to assess whether the proposed action is adequate or not.

In case the findings from CARs and CLs cannot be resolved by the project proponent or the proposed action related to the FARs raised cannot be assessed as adequate, no positive validation opinion can be issued by the validation team.

The CAR(s), CL(s) and FAR(s) are documented in chapter 4.

3.8 Technical review

Before submission of the final validation report a technical review of the whole RCP validation procedure is carried out. The technical reviewer is a competent GHG auditor being appointed for the scope this project falls under. The technical reviewer is not considered to be part of the validation team and thus not involved in the decision making process up to the technical review.

As a result of the technical review process the validation opinion and the topic specific assessments as prepared by the validation team leader may be confirmed or revised. Furthermore reporting improvements might be achieved.

3.9 Final approval

After successful technical review of the final report an overall (esp. procedural) assessment of the complete validation will be carried out by a senior assessor located in the accredited premises of TÜV NORD.

Only after this step the document submission to the UNFCCC can be started (in case of a positive validation opinion).

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4 VALIDATION FINDINGS

In the following table the findings from the desk review of the revised PDD, visits, interviews and supporting documents are summarized:

Table 4-1: Summary of CARs, CLs and FARs issued

Validation topic ¹⁾	No. of CAR	No. of CL	No. of FAR
General description of project activity (A) - Project specification - Technical project description - Participation	1	0	0
Project Baseline, Estimated Emission Reductions and Monitoring Plan (B) - Application of the Methodology - Baseline validity and update - Calculation of GHG emission reductions Project emissions Baseline emissions Leakage - Applicability of data and parameters defined ex-ante - Monitoring Methodology - Monitoring Plan	3	4	0
Duration of the Project / Crediting Period (C)	0	0	0
PDD editorial aspects (D)	0	0	0
SUM	4	4	0

¹⁾ The letters in brackets refer to the validation protocol

The following tables include all raised CARs, CLs and FARs. For an in depth evaluation of all validation items it should be referred to the validation protocols (see Annex 1).

Finding	CAR A1		
Classification	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR

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Finding	CAR A1								
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<div>1. Section A.1: the following information is missing:<div>a) The scenario existing prior to the implementation of the project activity and</div>b) The baseline scenario.</div> <div>2. Section A.4: Name of the PP is not correct (including cover page). According to the MoC and the UNFCCC the PP's name is: <i>International Bank for Reconstruction and Development (IBRD) as Trustee of the Netherlands CDM Facility (NCDMF)</i></div> <div>3. The information in appendix 6 of the PDD is not necessary.</div> <div>Related questions in check list: A.1.1., A.5.1.</div>								
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	<div>The following clarifications have been included in the CDM-PDD:</div> <div>1. Section A.1: the following information has been included Prior to the start of the implementation of the project activity, there was no destruction of CH4 neither through LFG combustion nor energy generation. Therefore, the scenario existing prior to the implementation of the project activity was no methane collection or destruction leading to CH4 release into the atmosphere. The situation before the project implementation coincides with the baseline scenario.</div> <div>2. Section A.4: The name of the PP has been corrected as per the MoC in Section A.4 and in cover page) as <i>International Bank for Reconstruction and Development (IBRD) as Trustee of the Netherlands CDM Facility (NCDMF)</i>.</div> <div>3. The information in appendix 6 of the PDD has been deleted and the following sentence has been incorporated: "<i>No post registration changes have been conducted in the CDM-PDD of the 2nd Crediting Period</i>".</div> <table><tr><td><input checked="" type="checkbox"/> Changes in PDD</td><td>Section(s): A1, A4</td><td>New version No.: 4,1</td></tr><tr><td><input type="checkbox"/> Changes in XLS</td><td>Worksheet(s): N/A</td><td>New version No.: N/A</td></tr></table>			<input checked="" type="checkbox"/> Changes in PDD	Section(s): A1, A4	New version No.: 4,1	<input type="checkbox"/> Changes in XLS	Worksheet(s): N/A	New version No.: N/A
<input checked="" type="checkbox"/> Changes in PDD	Section(s): A1, A4	New version No.: 4,1							
<input type="checkbox"/> Changes in XLS	Worksheet(s): N/A	New version No.: N/A							
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<div>1. The scenario existing prior the implementation and the base line have been included in section A.1.</div> <div>2. The name of the PP has been corrected accordingly the MoC.</div> <div>The sections A1 and A4 now can be considered correct regarding the actual situation and possible changes since the registration. Also it can be considered that the guidelines for completing the PDD form have been followed.</div> <div>3. The appendix 6 of the PDD has been reviewed and as the inormation included was deleted, it is concluded that the PDD is correct.</div>								

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Finding	CAR A1
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	CL A2
Classification	<input type="checkbox"/> CAR <input checked="" type="checkbox"/> CL <input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>Section A.3.: Clarification is required regarding the difference in the installed capacity of 4.8 MW observed at the name plate of the generator and the installed capacity defined in the registered PDD of 5.74 MW.</p> <p>Related question in check list: A.2.1.</p>
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	<p>The following clarification has been included in reference note 4 of section A.4:</p> <p><i>The capacity defined in the registered CDM-PDD of 5.74 MW is considered as the maximum capacity of the project but is limited to the existing auction system for the generation of renewable energy in Peru.</i></p> <p><i>The difference in the installed capacity of 4.8 MW and the capacity defined in the registered CDM-PDD of 5.74 MW is due to the limitation which has Petramas towards the Peruvian Government. In February 2010, PETRAMAS got the contract to supply power for 20 years to the Peruvian Government for a total of 28,294.80 MWh per year, within the framework of the "First Auction for Electric Power Supply with Renewable Energy Resources (RER) Electric System (SEIN)" conducted by OSINERGMIN, in order to use renewable energy to ensure the country's energy security.</i></p> <p><i>Considering the limitation for a total of 28,294.80 MWh per year, the 5.74 MW system would imply a operational time of only 4,929 hours per year (56% of yearly operational time) while the 4.8 MW system implies a operational time of 5,895 hours per year (67% of yearly operational time).</i></p> <p><i>Therefore, considering the limitations of the auction, the expected operational time of the electric generators, the projected LFG generation, the unitary engine capacity used and the financial circumstances, Petramas decided to install a capacity of 4.8 MW instead of the capacity defined in the registered CDM-PDD of 5.74 MW.</i></p>
	<input checked="" type="checkbox"/> Changes in PDD Section(s): A.3 New version No.: 4.1 <input type="checkbox"/> Changes in XLS Worksheet(s): N/A New version No.: N/A

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Finding	CL A2
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The detailed justification provided by the PP regarding the difference between the capacity observed at the name plate of the generator and the installed capacity defined in the registered PDD is considered proper according with the experience of the validation team in the landfill and energy sectors of the host country.
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	CL A3
Classification	<input type="checkbox"/> CAR <input checked="" type="checkbox"/> CL <input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section A.3.: <ol style="list-style-type: none"> 1. Information regarding the age and average time of the equipment based on manufacturer's specifications and industry standards, 2. Information regarding existing and forecast installed capacities. 3. A list of the facilities, systems and equipment installed and/or modified by the project activity is not complete. Related question in check list: A.2.1.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	A new Table has been introduced in Section A.3 of the CDM-PDD with the list of the facilities (LFG Collection System, LFG Combustion System, LFG Pre-treatment System, Electricity generation System and Diesel Backup Generator) and the information regarding the age and operational lifetime of the equipment.
	<input checked="" type="checkbox"/> Changes in PDD Section(s): A.3 New version No.: 4.1
	<input type="checkbox"/> Changes in XLS Worksheet(s): N/A New version No.: N/A

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Finding	CL A3
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>1. The missing information regarding life time of technologies and equipments observed during the site visit has been included. An appropriate reference regarding the lifetime of the equipments have been included too.</p> <p>2. The installed capacities have been included and</p> <p>3. The list of all equipments observed during the site visit has been included too.</p> <p>The PDD is complete according to the Guidelines on completing PDD.</p>
Conclusion <i>Tick the appropriate checkbox</i>	<p><input type="checkbox"/> To be checked during the next periodic verification</p> <p><input type="checkbox"/> Additional action should be taken (finding remains open)</p> <p><input checked="" type="checkbox"/> The finding is closed</p>

Finding	CAR B1
Classification	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>Section B.1 y B3:</p> <ol style="list-style-type: none"> 1. The applied methodology ACM001, version 15.0.0, at the draft PDD is not up to date. 2. Reference to the CDM Project Standard is also not up to date. 3. Exact reference to the UNFCCC web site is missing. 4. In section B.1, the tool for calculating project emissions from fossil fuel consumption is missing, as well as the tool for calculation the remaining lifetime of the equipment. 5. The table indicating emission sources in baseline and project scenario does not include the emissions from flaring in the project scenario as the methodology indicates. <p>Related question in check list: B.1.1</p>

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Finding	CAR B1		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	The following updates have been conducted:		
	<div><div>1. The applied methodology ACM001 has been updated from Version 13.0.0 to Version 15.0.0 (Valid from 08 Nov 13 onwards)</div><div>2. The reference to the CDM Project Standard and its paragraphs have been updated to "Clean Development Mechanism Project Standard", version 05.0</div><div>3. The exact references to the UNFCCC web site of all the methodologies and tools have been included in Section B.1.</div><div>4. In section B.1, the following tool has been included:<div><div>• "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" (version 02)</div><div>• "Tool to determine the remaining lifetime of equipment" (version 01).</div></div><div>Moreover, in section B.2, the following paragraphs have been included:<div><div>• "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" (version 02) is applicable to calculate project and/or leakage CO2 emissions from the combustion of fossil fuels. The type(s) of fossil fuel(s) to be used will depend on the choice of the developer (i.e. natural gas, fuel oil, diesel, etc.) to develop the project activity. For the current project activity, since the quantity of fuel combusted and its properties are monitored, then the tool is applicable.</div><div>• "Tool to determine the remaining lifetime of equipment" (version 01) may be used for project activities which involve the replacement of existing equipment with new equipment. At the renewal of the crediting period, the replacement of existing equipment is not applicable although it might be applicable in due course.</div></div></div></div><div>5. The table indicating emission sources in baseline and project scenario has been amended to include the emissions from flaring in the project scenario as the methodology indicates.</div></div>		
	<input checked="" type="checkbox"/> Changes in PDD	Section(s): B1	New version No.: 4.1
	<input type="checkbox"/> Changes in XLS	Worksheet(s): N/A	New version No.: N/A

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Finding	CAR B1
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<ol style="list-style-type: none"> 1. The latest version applicable of the methodology has been included 2. The reference of the CDM Project Standard has been included and 3. exact references to the UNFCCC web site of all the methodologies and tools have been included in Section B.1. 4. The tools for calculating project emissions from fossil combustion and for calculating the remaining lifetime of the equipment have been included in section B.1 as required by the guideline for completing PDD. 5. The table indicating emissions sources in baseline and project scenario has been completed according to the methodology ACM001 version 15.0.0, including emissions from flaring in the project scenario. <p>The applied methodology(ies) and the tool(s) applied in the registered PDD are listed. It can be confirmed that the latest applicable version at the time of submission of renewal of the crediting period has been applied.</p>
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	CL B2
Classification	<input type="checkbox"/> CAR <input checked="" type="checkbox"/> CL <input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section B.5: Information regarding demonstration of additionality is missing. Related question in check list: A.1.1.

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Finding	CL B2						
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	<p>In the registered CDM-PDD corresponding to the first crediting period, the project's additionality was demonstrated and assessed using tools for the demonstration and assessment of additionality that are not applicable anymore.</p> <p>As per paragraph 230 of the "Clean Development Mechanism Project Standard", version 05.0, for the preparation of a revised PDD "Project participants shall update those sections of the project design document (CDMPDD) relating to the <i>baseline, estimated emission reductions</i> and the <i>monitoring plan</i> using an approved baseline and monitoring methodology"; therefore section B.5 on demonstration of additionality remains to be the same as that for the registered CDM-PDD corresponding to the first crediting period.</p> <p>The PP considers that the information regarding demonstration of additionality should not be included as per the e registered CDM-PDD corresponding to the first crediting period because the tools for the demonstration and assessment of additionality used are not applicable anymore.</p> <p>The CDM project 0008 "Brazil NovaGerar Landfill Gas to Energy Project" (available at http://cdm.unfccc.int/filestorage/S/N/M/SNM7EQ2RUD4IA0JLO3HCZ8BTK1VX5P/PDD_NOVAGERAR_Second_Crediting_Period_3No_v11.pdf?t=QTB8bXczbTI4fDDJlb-52wLwwNLABQ9RqdbD) is an example in which the information regarding demonstration of additionality was not included in the CDM-PDD for the second crediting period.</p> <table border="1"> <tr> <td><input checked="" type="checkbox"/> Changes in PDD</td><td>Section(s): B.5</td><td>New version No.: 4.1</td></tr> <tr> <td><input type="checkbox"/> Changes in XLS</td><td>Worksheet(s): N/A</td><td>New version No.: N/A</td></tr> </table>	<input checked="" type="checkbox"/> Changes in PDD	Section(s): B.5	New version No.: 4.1	<input type="checkbox"/> Changes in XLS	Worksheet(s): N/A	New version No.: N/A
<input checked="" type="checkbox"/> Changes in PDD	Section(s): B.5	New version No.: 4.1					
<input type="checkbox"/> Changes in XLS	Worksheet(s): N/A	New version No.: N/A					
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>The relevant sections of the PDD relating to the <i>baseline, estimated emission reductions</i> and the <i>monitoring plan</i> were included correctly according with the CDM Project Standard. The section regarding the demonstration of additionality remains as per registered PDD.</p> <p>The section B.5 is considered correct by the validation team.</p>						
Conclusion <i>Tick the appropriate checkbox</i>	<table border="1"> <tr> <td><input type="checkbox"/> To be checked during the next periodic verification</td></tr> <tr> <td><input type="checkbox"/> Additional action should be taken (finding remains open)</td></tr> <tr> <td><input checked="" type="checkbox"/> The finding is closed</td></tr> </table>	<input type="checkbox"/> To be checked during the next periodic verification	<input type="checkbox"/> Additional action should be taken (finding remains open)	<input checked="" type="checkbox"/> The finding is closed			
<input type="checkbox"/> To be checked during the next periodic verification							
<input type="checkbox"/> Additional action should be taken (finding remains open)							
<input checked="" type="checkbox"/> The finding is closed							

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Finding	CL B3		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section B.6.1: Clarification is required regarding: <ol style="list-style-type: none"> 1. The selected choice of the MCF value (1). 2. The calculation of the generator efficiency (0.84). 3. Formule 2 for calculating BE_{CH_4} is not written accordingly the applied methodology in the PDD. <p>Related question in check list: B.3.2.2</p>		

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Finding	CL B3										
<p>Corrective Action #1</p> <p><i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i></p>	<p>1. As per the IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (available at http://www.ipcc-nggip.iges.or.jp/public/gp/english/5_Waste.pdf), the methane correction factor (MCF) accounts for the fact that unmanaged SWDS produce less CH₄ from a given amount of waste than managed SWDS, because a larger fraction of waste decomposes aerobically in the top layers of unmanaged SWDS. The MCF in relation to solid waste management is specific to that area and should be interpreted as the 'waste management correction factor' that reflects the management aspect it encompasses. The IPCC Guidelines present default values for MCF, which are presented in Table 5.1 below:</p> <table border="1"> <caption>TABLE 5.1 SWDS CLASSIFICATION AND METHANE CORRECTION FACTORS</caption> <tr> <th>Type of Site</th><th>Methane Correction Factor (MCF) Default Values</th></tr> <tr> <td>Managed ^a</td><td>1.0</td></tr> <tr> <td>Unmanaged – deep (≥5 m waste)</td><td>0.8</td></tr> <tr> <td>Unmanaged – shallow (<5 m waste)</td><td>0.4</td></tr> <tr> <td>Uncategorised SWDS ^b</td><td>0.6</td></tr> </table> <p>^a Managed SWDS must have controlled placement of waste (i.e. waste directed to specific deposition areas, a degree of control of scavenging and a degree of control of fires) and will include some of the following: cover material, mechanical compacting or levelling of waste.</p> <p>^b The default value of 0.6 for uncategorised SWDS may be inappropriate for developing countries with a high percentage of unmanaged shallow sites, as it will probably lead to overestimation of emissions. Therefore, inventory agencies in developing countries are encouraged to use 0.4 as their MCF, unless they have documented data that indicates managed landfill practices in their country.</p> <p>Source: Reference Manual of the IPCC Guidelines.</p> <p>As per footnote a of the above table, "Managed" SWDS must have controlled placement of waste (i.e. waste directed to specific deposition areas, a degree of control of scavenging and a degree of control of fires) and will include some of the following: cover material, mechanical compacting or levelling of waste.</p> <p>Considering the above description, the MCF value of 1 is well applied to the Huaycoloro LFS because it has a controlled placement of waste (i.e. waste directed to specific deposition areas, a degree of control of scavenging and a degree of control of fires) and includes cover material, mechanical compacting and levelling of waste.</p> <p>2. The calculation of the generator efficiency has been updated to 31.98%, which is the average ((32,14%+31,95%+31,85%)/3) of the efficiency of the three generators at 100% of capacity. The study under the name "ESTUDIO DE DETERMINACIÓN DE LA POTENCIA EFECTIVA Y RENDIMIENTO DE LOS GRUPOS CAT 1, 2 Y 3 DE LA CENTRAL TÉRMICA HUAYCOLORO" was conducted on March 2012 and is provided to the DOE under the name "INFO_PTE_CTB_HUAYCOLORO_MAR2012_DH"</p>	Type of Site	Methane Correction Factor (MCF) Default Values	Managed ^a	1.0	Unmanaged – deep (≥5 m waste)	0.8	Unmanaged – shallow (<5 m waste)	0.4	Uncategorised SWDS ^b	0.6
Type of Site	Methane Correction Factor (MCF) Default Values										
Managed ^a	1.0										
Unmanaged – deep (≥5 m waste)	0.8										
Unmanaged – shallow (<5 m waste)	0.4										
Uncategorised SWDS ^b	0.6										

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Finding	CL B3		
	<p>3. Formulae 2 for calculating BECH_{4,y} has been rewritten accordingly with the applied methodology in the PDD as follows:</p> $BE_{CH_4} = \left((1 - OX_{top_layer}) \times F_{CH_4,PJ,y} - F_{CH,BL,y} \right) \times GWP_{CH_4}$		
	<input checked="" type="checkbox"/> Changes in PDD	Section(s): B.6.1	New version No.: 4.2
	<input type="checkbox"/> Changes in XLS	Worksheet(s): N/A	New version No.: N/A
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>1. A valid justification for the MCF selected value has been included in the references.</p> <p>2. An appropriate study has been included to justify the value of efficiency of the electricity generator.</p> <p>3. The formulae included in the PDD was compared with the one established in the applied methodology and it can be considered correct.</p> <p>The applied values are considered correct and up-to-date</p>		
Conclusion <i>Tick the appropriate checkbox</i>	<p><input type="checkbox"/> To be checked during the next periodic verification</p> <p><input type="checkbox"/> Additional action should be taken (finding remains open)</p> <p><input checked="" type="checkbox"/> The finding is closed</p>		

Finding	CAR B4		
Classification	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR

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Finding	CAR B4
<p>Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i></p>	<p>Section B.6.2: correction is necessary:</p> <ol style="list-style-type: none"> 1. Data of electricity consumption of the cooler was not considered in the calculation of EC_{PJ}. 2. Capacity of each generator (1.2 MW) is incorrect (CEG). 3. Calculation of EF is incorrect as according to version 04 of the tool to calculate the emission factor for an electricity system for the dispatch data analysis OM data vintage of the year in which the project activity displaces grid electricity shall be used but data vintage of year 2010 has been used instead. 4. Wrong reference to pages of the applied methodology version 15 are given for n_{PJ} in page 41. 5. The parameter $preg$ reported on page 42 is not reported in the section for "parameters to be monitored (with an annual frequency)". 6. The parameter "management of SWDS" is missing. 7. ,The monitoring of the parameters FCH₄,EG,t and Maintenance are missing in the monitoring section. 8. The purpose of data for ELLFG,y is incorrect as it is not referring to the baseline. 9. Proper justification is missing regarding the consideration of the e ex-ante value of 8000 hours/year for Opengine,h and Opflare,h and Flamem 10. Precise definition of the real applied cross-checking method for determining whether the engine and flame can be considered in operation is missing for Opengine,h and Opflare,h and Flamem 11. Parameter PE_{FC} is incorrectly considered as monitoring parameter. 12. Lambda has not been calculated according to the tool for determining the grid emission factor, as the load curve is not referring to the TOTAL net electricity generated. 13. EGm for the OM has not been calculated according to the tool. The used equation 4 is only for off-grid sources. The most conservative method was not applied. 14. The parameter $preg$ in page 42 is not to be fixed ante according the applied methodology. 15. The formula to calculate the BECH₄ in the excell sheet (Tab ER calculation) cells F82, G82, etc. was not applied according the applied methodology. 16. The parameter GWP-CH₄ (21) used for the ER calculation is incorrect. 17. For the calculation of the build margin, some generation plants which are indeed registered as CDM projects, have been considered as not CDM registered and thus taken in the BM calculation, which is not in accordance with the tool for calculation of the GEF. <p>Related question in check list: B.3.2.2</p>

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Finding	CAR B4
<p>Corrective Action #1</p> <p><i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i></p>	<ol style="list-style-type: none"> 1. The cooler of 3 HP has been considered in the calculation of ECPJ. 2. The capacity of each generator (3) has been corrected to 1.6 MW (CEG). 3. The calculation of EF has been corrected according to version 04 of the "Tool to calculate the emission factor for an electricity system" applying the option (b) Simple adjusted OM as can be seen in Appendix 4. 4. The reference to pages of the applied methodology version 15 given for nPJ in page 37 has been deleted and now it is referenced as follows: -As per ACM0001 / Version 15.0.0 "Flaring or use of landfill gas". 5. The parameter preg,y (fraction of LFG that is required to be flared due to a requirement in year y) has been reported in the section for "parameters to be monitored". 6. The parameter "management of SWDS" has been added in section B.7.1 7. The parameters "FCH4,EG,t" and "Maintenancey" have been included in the monitoring section. The parameter "FCH4,EG,t" has also been included in "Figure 3. Flow diagram of the project boundary" 8. The purpose of data for ELLFG,y has been changed and is now referring to the baseline. 9. The consideration of the e ex-ante value of 8000 hours/year for Opengine,h and Opflare,h and Flamem has been justified in the section "Source of data" of the specific table as follows: "The project participant uses an exante operational time of 8,000 h/year as a conservative assumption considering that the equipment will require maintenance works. The maintenance works would lead to downtimes equating to approximately 760 h/year." 10. Precise definition of the real applied cross-checking method for determining whether the engine and flame can be considered in operation has been included for the parameters: <ol style="list-style-type: none"> a. Opengine,h: b. Opflare,h: c. Flamem: 11. The parameter PE_{FC} has been deleted and is not considered as monitoring parameter anymore.

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Finding	CAR B4
	<p>12. The calculation of Lambda has been updated according to the "Tool to Calculate the Emission Factor for an Electricity System" (Version 4.0). In the updated calculation shown in the file "Calculation Lambda_2011-2012", the load_duration_curve is now referring to the TOTAL net electricity generated as the sum of the Total Net electricity by low-cost/must-run power sources (k) and by other power sources (j). The results of $\lambda_{2012} = \lambda_{2011} = \lambda_{2010} = 0$ has not been changed in comparison with the previous version.</p> <p>13. The net quantity of electricity generated and delivered to the grid by power unit (EGm,y) has been determined as per the guidance for the simple Adjusted OM method using the most recent three historical years for which data is available at the time of submission of the CDM-PDD to the DOE for validation (ex ante option). The determination method can be seen in column M of the sheet "OM" of the file "EF_Peru_2012". After the change in the determination method, the result of $EF_{grid,OM-adj,y}$ has been updated to 0.57546 tCO₂/MWh and consequently, the $EF_{grid,CM,y}$ results in 0.55278 tCO₂/MWh (in comparison with the previous value of 0.56194 tCO₂/MWh). The updated values have been included in the CDM-PDD and the resulting ER calculations have also been updated in the file "ER_Calculation_Huaycoloro_V2_140204"</p> <p>14. The parameter preg in page 42 has been deleted and is not fixed ex-ante anymore. The table of the same parameter in section B.7.2 has been completed with information on the reason for choosing the value of 0 ex-ante.</p> <p>15. The formula to calculate the BECH4 in the excell sheet (Tab ER calculation) cells F82, G82, etc. has been amended to comply with the applied methodology.</p> <p>16. The parameter GWP-CH4 has been updated to 25 as per COP Decision 4/CMP.7, which states <i>"for the second commitment period of the Kyoto Protocol, the global warming potentials used by Parties to calculate the carbon dioxide equivalence of anthropogenic emissions by sources and removals by sinks of the greenhouse gases listed in Annex A to the Kyoto Protocol shall be those listed in the column entitled "Global Warming Potential for Given Time Horizon" in table 2.14 of the errata to the contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, based on the effects of greenhouse gases over a 100-year time horizon, taking into account the inherent and complicated uncertainties involved in global warming potential estimates"</i>. The ER calculation has been updated and the results included in the CDM-PDD.</p>

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Finding	CAR B4		
	17. The following plants have been registered as CDM projects and as such have not been included in the BM calculation as can be seen in the amended file “EF_Peru_2012”:		
	C.H. PÍAS		
	C.H. NUEVA IMPERIAL		
	C.T. KALLPA		
	C.S. REPARTICIÓN		
	C.H. HUASAHUASI I		
	C.H. HUASAHUASI II		
	C.H. PURMACANA		
	C.S. TACNA SOLAR		
	As a result, the BM value has dropped to 0.41322 tCO2/MWh and consequently, the new value of the CM is 0.45377 tCO2/MWh. The ER Calculation and the CDM-PDD have been revised accordingly.		
<input checked="" type="checkbox"/> Changes in PDD	Section(s): B.6.2	New version No.: 4.3	
<input checked="" type="checkbox"/> Changes in XLS	Worksheet(s): ER Calculation	New version No.:	

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Finding	CAR B4
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<ol style="list-style-type: none"> 1. The cooling equipment has been included in the calculation of the parameter EC and the calculation is correct. 2. The capacity of the generators has been corrected in the calculation sheet. 3. The emission factor has been recalculated applying the most appropriate choice of the tool to calculate the emission factor for an electricity system. (option (b) Simple adjusted OM), according to the situation of the project activity. 4. The reference of the applied methodology ACM0001 version 15.0.0 for the parameter η_{PJ} has been referred correctly. 5. The parameter $\rho_{reg,y}$ has been included in the section for parameters to be monitored as required by the methodology ACM0001 version 15.0.0. 6. The parameter management of SWDS has been included in section B.7.1 as required by the methodology ACM0001 version 15.0.0. 7. The parameters $F_{CH_4,EG,t}$ and "Maintenance_y" have been included in the monitoring section as per methodology ACM0001 version 15.0.0. 8. The purpose of parameter for $EL_{LFG,y}$ has been reviewed and the reference to the baseline as per methodology ACM0001 version 15.0.0 is correct. 9. Justification of the consideration of the ex-ante value of 8000 hours/year for $Op_{engine,h}$ and $Op_{flare,h}$ and $Flamem$ has been reviewed by the validation team. <i>The project participant uses an exante operational time of 8,000 h/year as a conservative assumption considering that the equipment will require maintenance works. The maintenance works would lead to downtimes equating to approximately 760 h/year</i> However the justification is not considered complete as the source of the 760 h/year is not mentioned. Reference information is requested.

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Finding	CAR B4
<p>DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i></p>	<ol style="list-style-type: none"> 10. Precise description of the real applied cross-checking method for determining whether the engine and flame can be considered in operation has been revised and it is considered proper and in line with the applied methodology ACM0001 version 15.0.0. 11. The parameter PEFC is correctly not considered a monitoring parameter anymore, nonetheless the parameter FCI,j,y "Mass or volume unit per year" is missing according the methodological tool "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" version 02. 12. The calculation of Lambda which has been updated is correct, conservative and according the "Tool to Calculate the Emission Factor for an Electricity System" (Version 4.0). 13. The net quantity of electricity generated and delivered to the grid by power unit (EGm,y) has been determined as per "Tool to Calculate the Emission Factor for an Electricity System" (Version 4.0). The methodological choice used for the calculation was the simple adjusted OM, which is correct according the available data at the time of submission of the CDM-PDD. The chosen method for the EF calculation give the most conservative value of the EF. 14. The parameter preg has been included only in the correct section (B.7.2) accordingly the applied methodology. 15. The formulae to calculate the parameter BECH4 has been corrected in the excel sheet, therefore the ER calculation has been updated. The calculation has been reviewed by the validation team and it is considered correct. 16. The updated value (25) of the parameter GWP-CH4 was changed in some parts of the PDD, however the value in page 18 is wrong. Also the corrected value (25) was applied for the whole ER calculation, nonetheless the applied value (25) for the calculation related to the first commitment period (before 1/1/2013) is incorrect. 17. The build margin calculation has been reviewed against the tool to calculate an emission factor for an electricity system and it is concluded that is in line with the tool. Also the PDD was reviewed and the generation plants listed for the BM calculation are deemed as correct. <p>The calculation sheet is considered correct and the applied values are up-to-date.</p>

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Finding	CAR B4
<p>Corrective Action #2</p> <p><i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No</i></p>	<p>10. The justification of the consideration of the ex-ante value of 8000 hours/year for Opengine,h can be sourced in the "Guidance for monitoring landfill gas engine emissions", published by the UK Environment Agency, which uses in its page 25 the following sentence in developing a calculation method "assuming the engines operate for 8,000 hours/year". The PP provides the evidence to the DOE in order to justify the value in the document under the name "Guidance for monitoring landfill gas engine emissions", placed in the folder "Annexes". Moreover, the PP also provides as evidences for justification of the consideration of the ex-ante value of 8000 hours/year for Opengine,h and Opflare,h and Flamem, the CDM-PDD of three registered CDM projects:</p> <ul style="list-style-type: none"> • Tijuana Landfill Gas Project. • Cadereyta Landfill Gas Project • Poza Rica Landfill Gas Project. <p>The above three CDM projects have been approved by the EB for registration using the value of 8000 hours/year for the monitoring parameters "Operation of the flare station" and "Operation of the energy (electrical) plant"</p> <p>12. The parameter FCi,j,y "Mass or volume unit per year" has been included according the methological tool "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" version 02.</p> <p>16. The value in page 18 is considered to be appropriate since Step 1.4 is explaining that the value of 21 for the parameter GWP-CH4 was used to estimate emission reductions ex ante in the previous crediting period. At that time, the methodology ACM0001 "Consolidated baseline methodology for landfill gas project activities" version 4, was using GWP as Factor for Converting Methane to Carbon Dioxide Equivalents with the value of 21 tCO2e/tCH4. Therefore, the value in page 18 is considered to be appropriate by the PP. In same Step 1.4, it has been clarified that the GWP of methane has been updated from 21 (1st crediting period) to 25 (2nd crediting period) as per Table 2.14 of the Fourth Assessment Report of the IPCC.</p> <p><i>(continues in next page)</i></p>

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Finding	CAR B4
	<p>The ER Calculations have been corrected: The value (21) of the parameter GWP-CH4 has been applied for the first six years of the project activity (up to 04/03/2013) The corrected value (25) has been applied conservatively from 05/03/2013, which is after the 01/01/2013 as follows:</p> <ul style="list-style-type: none"> In Row 82 of tab ER calculation for the formula: $BECH_{4,y} = ((1 - OX_{top_layer}) \times FCH_{4,PJ,y} - FCH_{4,BL,y}) \times GWPCH_4$ In Row 86 of tab ER calculation for the formula: $FCH_{4,PJ,y} = \eta_{PJ} \cdot BECH_{4,SWDS,y} / GWPCH_4$ <p>Please notice that for conservativeness and simplification of the above applications of parameter GWP-CH4 in the ex ante ER calculation, the value of 21 is applied for the period from 01/01/2013 to 04/03/2013 (both days included). For such period, a value of 25 would need to be applied but it is considered that the application of different values of GWP for the same crediting year (6th) in the ex ante calculation might lead to misunderstandings. The result of the ER Calculations have not changed for the values of the 2nd Crediting Period.</p>
<p>DOE Assessment #2</p> <p><i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i></p>	<p>10. Justification of the references for the operation and maintenance hours of the power generators have been given. The references have reviewed by the validation team and are considered appropriate.</p> <p>12. The parameter $FC_{i,j,y}$ "Mass or volume unit per year" has been included in the monitoring section of the PDD and it is in line with the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" version 02.</p> <p>16. The validation team reviewed the context related to the GWP described in the PDD and as the PP has explained clearly the use of the 2 different GWP 21 and 25, it is considered correct. Also the ER calculation was reviewed and it is concluded that the PP is applying the 2 GWP values correctly. Also the use of the GWP-CH4 of 21 for the period 01/01/2013 to 04/03/2013 is considered conservative and correct.</p>
<p>Conclusion</p> <p><i>Tick the appropriate checkbox</i></p>	<p><input type="checkbox"/> To be checked during the next periodic verification</p> <p><input type="checkbox"/> Additional action should be taken (finding remains open)</p> <p><input checked="" type="checkbox"/> The finding is closed</p>

Finding	CAR B5		
Classification	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR

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Finding	CAR B5
<p>Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i></p>	<p>Section B.7.1:</p> <ol style="list-style-type: none"> 1. Information regarding measurement method and procedures, standards to be applied, accuracy of the measurement equipment, person/entity responsible for the measurement, , intervals and calibration procedures are missing for parameters where data or parameters are to be monitored. 2. Energy consumption (EG_{EC}) from the public grid was not considered. 3. Proper justification is missing regarding the substantial change from 8 million m3 to 21 million m3 reported for the parameters VL_{FG,EL,y,db} and V_{LFG,sent_flare,y,db} from the draft to the final version of the PDD. 4. In the EF calculation sheet (worksheet OM_Cell F12) that EF_{grid,OM-adj, 2010-2012} is not the weight average EF_{grid} of EF_{grid,OM-adj, 2010}, EF_{grid,OM-adj, 2011} and EF_{grid,OM-adj,2012} as required by the "Tool to calculate the emission factor for an electricity system" version 04.0 paragraph 36(a). 5. The parameters NCV i,y (Weighted average net calorific value of fuel type i in year y) and EF CO₂, i,y (Weighted average CO₂ emission factor of fuel type i in year y) are not included in the monitoring section of the PDD in line with the "Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion, version 02". 6. The parameter SPEC_{flare} (Manufacture's flare specifications for temperature, flow rate and maintenance schedule) is missing in B.6.2 section of the PDD in line with the tool "Project emissions from flaring" version 02.0. <p>Related question in check list: B.5.1., B.5.2.</p>

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Finding	CAR B5
<p>Corrective Action #1</p> <p><i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i></p>	<ol style="list-style-type: none"> 1. Information regarding measurement method and procedures, standards to be applied, accuracy of the measurement equipment, person/entity responsible for the measurement, , intervals and calibration procedures have been included in the row "Measurement methods and procedures" of the corresponding monitoring parameters in Section B.7.1. 2. The amount of electricity consumed by the project activity in year y ($EG_{EC,y}$) has been included in Section B.7.1 and in the diagram. 3. The substantial change from 8,284,575 m3 to 21,682,894 m3 reported for the parameter $V_{LFG,EL,y,db}$ from the draft to the final version of the PDD is due to the wrong assumption initially used on the efficiency of the engines (84%, wrongly assessed) in comparison with the real one (31,98%, based on the document "ESTUDIO DE DETERMINACIÓN DE LA POTENCIA EFECTIVA Y RENDIMIENTO DE LOS GRUPOS CAT 1, 2 Y 3 DE LA CENTRAL TÉRMICA HUAYCOLORO". The difference in the efficiency considered resulted in the wrong calculation of the flow required by each generator (from 258.89 Nm3/h per generator in the draft to 903.45 Nm3/h in the final version). When multiplied the flow required by each generator by 8,000 h/year and by the number of units and capacity of each generator (4 units of 1.2 MW considered initially in the draft against the 3 units of 1.6 MW installed by the project activity used in the final version), the substantial change from 8,284,575 m3 to 21,682,894 m3 reported for the parameter $V_{LFG,EL,y,db}$ is justified by a miscalculation in first instance. The difference in the reported values for the parameter $V_{LFG,sent_flare,y,db}$ from the draft to the final version of the PDD is explained by the difference between $V_{LFG,total,y,db}$ and $V_{LFG,EL,y,db}$. 4. The EF calculation sheet has been amended to calculate the $EF_{grid,OM-adj, 2010-2012}$ as the weight average of $EF_{grid,OM-adj, 2010}$, $EF_{grid,OM-adj, 2011}$ and $EF_{grid,OM-adj,2012}$ as required by the "Tool to calculate the emission factor for an electricity system" version 04.0 paragraph 36(a) as follows: $EF_{grid,OM-adj, 2010-2012} = (EF_{grid,OM-adj, 2012} * EG_{2012} + EF_{grid,OM-adj, 2011} * EG_{2011} + EF_{grid,OM-adj, 2010} * EG_{2010}) / (EG_{2012} + EG_{2011} + EG_{2010}) = 0.57388 \text{ t CO}_2/\text{MWh}$ <p>With such change, the $EF_{grid, CM, y}$ results in 0.45338 tCO2/MWh so the Ers have been updated in the CDM-PDD.</p>

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Finding	CAR B5		
	<p>5. The parameters NCV i,y (Weighted average net calorific value of fuel type i in year y) and EF CO₂, i,y (Weighted average CO₂ emission factor of fuel type i in year y) have been included in the monitoring section of the PDD in line with the "Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion" Version 02.</p> <p>6. The parameter SPECflare (Manufacture's flare specifications for temperature, flow rate and maintenance schedule) has been included in B.6.2 section of the PDD in line with the tool "Project emissions from flaring" version 02.0. The following values have been used:</p> <ul style="list-style-type: none"> • Temperature - From 760 to 982°C (1400 °F to 1800 °F)¹ • Flow rate - From 643 to 6,430 Nm³/h (4002 SCFM to 4,000 SCFM³) • Maintenance schedule – Weekly (7 days)⁴ 		
	<input checked="" type="checkbox"/> Changes in PDD	Section(s): B.5	New version No.: 4.1
	<input type="checkbox"/> Changes in XLS	Worksheet(s): N/A	New version No.: N/A

¹ Operating temperature as per manufacturer's flare specifications set in page 12 of the document provided to the DOE under the name "Manual John Zink_ZTOF"

² Considering a 50% methane concentration, all flares designed for flow rates of 1500 SCFM (2411 Nm³/h) or greater must achieve a 10:1 instantaneous turndown minimum as set in point 1.03.A.2 of the manufacturer's flare specifications provided to the DOE under the name "ZTOF_Landfill Gas Enclosed Flare System". Therefore, the minimum inlet flow rate of the flare would be 400 SCFM (643 Nm³/h).

³ The maximum inlet flow rate is 4,000 SCFM as per manufacturer's flare specifications set in page 12 of the document provided to the DOE under the name "Manual John Zink_ZTOF"

⁴ The maintenance program should be developed by the user of the flare as per manufacturer's flare specifications set in page 29 of the document provided to the DOE under the name "Manual John Zink_ZTOF", and that is why a maximum of 7 days between maintenance events are considered appropriate by the project developer.

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Finding	CAR B5
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<ol style="list-style-type: none"> 1. The missing information for the appropriate monitoring of the parameters has been included 2. The parameter "energy consumption from the public grid" has been considered in the calculation of ER. 3. The justification given by the PP has been revised including the calculation included in the justification. The validation team considered the given justification correct. It can be concluded that the applicable parameters are included in the monitoring plan, they are appropriate and in line with the applied methodology ACM0001 version 15.0.0. and the correct choices have been selected with the appropriate parameters justification. 4. The correction of the weighted average EFgrid of EFgrid,OM-adj in the excel sheet has been reviewed against the "Tool to calculate the emission factor for an electricity system" version 04.0 and no discrepancies have been identified in the calculation procedure. The calculation of the EFgrid is considered correct. 5. The inclusion of the parameters NCV i,y (Weighted average net calorific value of fuel type i in year y) and EF CO2, i,y (Weighted average CO2 emission factor of fuel type i in year y) in the PDD has been revised against the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion, version 02" and it is considered in line with the tool. 6. The monitoring information of parameter SPECflare included in section B.6." of the PDD was reviewed against the requirements stated in the tool "Project emissions from flaring" version 02.0, and no discrepancies have been identified.
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

5 VALIDATION ASSESSMENT SUMMARY

5.1 Notification to the UNFCCC

The project has been registered on 2007-03-05 and the first renewable crediting period has been started on the same day. As per the project cycle procedure the PPs shall notify the UNFCCC within a given timeframe from 270 to 180 days prior to the date of expiration of the current crediting period. The respective dates are given in following table

Table 4-1: Notification dates

Event	Date
Date of Registration	2007-03-05
Start of notification window (-270d)	2013-06-08
End of notification window (-180d)	2013-09-06
Actual date of notification	2013-09-04
UNFCCC confirmation date	2013-09-05

¹⁾ The letters in brackets refer to the validation protocol

As the UNFCCC has confirmed the receipt, the formal notification requirements for a directly adjacent 2nd crediting period are considered to be met for this project activity.

5.2 Project description

Basically the project activity did not change since finalization of the registered PDD. Therefore section A of the revised has basically only been migrated from the registered PDD version. Only a few editorial changes have been identified which do not impact the project design or the project's ability to generate emission reductions.

5.3 Participation

The names of the project participants as listed in the revised PDD (sections A.4. and appendix 1) are consistent with those listed on the dedicated UNFCCC project website as well as in the last version of the modalities of communication^{/MOC/}. For the complete list of project participants please refer to table 2-2 of this report.

5.4 Applied Methodologies and tools

The project activity was registered under the following methodology (table 5-2):

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Table 5-2: Applied methodology/ies at registration and RCP stage

At registration stage		At RCP stage	
Name of methodology	Version	Name of methodology	Version
Grid connected renewable electricity generation	ACM0001 ver. 4: Consolidated methodology for landfill gas project activities	Flaring or use of landfill gas	ACM0001 ver.15
Consolidated methodology for landfill gas project activities	ACM0001ver. 4	-	-

This methodology AMS-I-D has been consolidated to the ACM0001 ACM. Furthermore, since registration the methodology has been updated to the version indicated in the above table. This version is applied for the purpose of renewal of crediting period.

Furthermore the methodological tools as listed in the table below have been applied at registration stage and / or have to be considered at this RCP stage.

Table 5-3: Applied methodological tools

At registration stage		At RCP stage	
Name of tool	Version	Name of tool	Version
Tools for demonstration of additionality	01	Emissions from solid waste disposal sites	06.0.1
		Project emissions from flaring	02.0.0
		Tool to calculate baseline, project and/or leakage emissions from electricity consumption	1
		Tool to calculate the emission factor for an	4.0

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At registration stage		At RCP stage	
		electricity system	
		Tool to determine the mass flow of a greenhouse gas in a gaseous stream	02.0.0
		Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period"	03.0.1

By means of checking the UNFCCC website it is confirmed that the selection of the applied methodology and methodological tools has been done correctly in line with the applicable requirements for the RCP.

5.5 Methodology applicability conditions

All applicability conditions of the updated methodology are still met as detailed in annex 2 of this report. Thus the methodology is deemed fully applicable for the new crediting period and no request for deviation with regards to the applicability of the methodology is required.

5.6 Project Boundary

The project boundaries (geographic and also related to GHG sources and gases) are correctly given in the updated PDD, as described in section B.3 and comply with the requirements of the methodology.

There are no other sources which are impacted by the project which are not addressed by the applied methodology.

5.7 Original Baseline validity and update

5.7.1 Baseline scenario

The baseline scenario of the project as per the registered project can be described as follows:

The project will reduce GHG emissions below those that would occur in its absence because there are as of today two sources that are releasing GHG that would be mitigated by the project, these two sources are:

-The landfill gas to be released to the atmosphere in the Huaycoloro landfill under the business as usual scenario and,

-The fossil fuel-based electricity generation that supplies electricity to the SEIN¹⁷.

Taking into account national and/or sectoral policies and circumstances for the first source, ERs would not occur because even when the existent legislation of SWM in Peru, ruled by the national law 27314 on Solid Waste ("General Law of Solid residues") gives the requirement of final solid waste disposal in landfills¹⁸, it does not give a specific requirement for the collection and combustion of LFG. Articles 87 and 88 of this law set minimum installations and operating conditions for landfills, respectively, (including LFG control and LFG evacuation chimneys) but it does not give any regulatory percentage of the LFG to be controlled. Furthermore, venting wells, without any flaring (which would not destroy any CH₄ but avoid explosions) is not directly prohibited in this law.

Taking into account national and/or sectoral policies and circumstances for the second source, ERs due to new renewable energy generation would not occur since national policies are currently fostering the national use of the Camisea natural gas deposits with special emphasis on promoting the gas-fired electricity generation¹⁹ in Peru. The Peruvian Government is also promoting gas exploration in the national territory (i.e. to be used by the Camisea Liquefied Natural Gas project). The aggressive Peruvian governmental intervention in the electricity market in order to secure the success of the Camisea project and the success of the future natural gas-fired electricity generation industry started in 1998, after the exit of Shell, company that discovered the Camisea gas wells in Peru.

As per the project standard this scenario is not subject to re-assessment and is thus deemed to be applicable for the next crediting period.

However the baseline itself i.e. the calculation of baseline emissions has been checked regarding the continued validity of underlying assumptions and parameter values. The assessment steps are described in the following subsections.

5.7.2 Compliance of the baseline with relevant policies

The baseline of the registered PDD has been assessed to be compliant with the national legislation and policies applicable for the project activity at the time of validation. During the first crediting period the PP has frequently reviewed the legal requirements and policies relevant for the baseline of the project. On the basis of this the PP has arrived at the conclusion that the baseline is still in line with all applicable legislations and policies.

The validation team has independently reviewed the host country legislation as well as current policies, such as General Law of Solid Residues Num. 27314 (year 2002) and its modification on 2008-06-28^{aw/} and

Status Report of municipality waste management – “*Informe de la situación Actual de la gestión de residuos sólidos municipales*”, October 2008 by the Environment Ministry. ^{law/}

On the basis of this analysis the validation team confirms that the baseline is still in compliance with the currently applicable national legislation and other national and/or sectoral policies. Therefore the baseline did not need to be adjusted due to changes in this respect.

5.7.3 Impact of circumstances

As the baseline scenario might be affected by changed circumstances, e.g. market conditions, market prices etc. the PP has checked the baseline against such changes that have occurred since validation. This is of special importance if the baseline scenario is the continuation of the pre-project scenario.

In the current case no such changes have been identified by the project participants.

The validation team has independently checked whether there are changes in circumstances which have an impact on the baseline. No such changes have been identified and thus it is deemed appropriate not to revise the baseline due to changes in circumstances.

5.7.4 Likelihood of investments

As the baseline scenario has been identified as the continuation of the pre-project scenario it is necessary to assess whether an investment and/or exchange of the baseline equipment (e.g. due to expiry of the equipment's lifetime) during the upcoming crediting period is to be deemed the most likely scenario. If so the baseline needs to be updated.

According to the operational age and lifetime of the equipments of the project activity there is no baseline equipment which is to be exchanged. Furthermore no other reasons for a possible investment have been identified.

Thus the validation team confirms the conclusion that no changes to the baseline are required due to the likelihood of investments in equipment which impacts the baseline.

5.7.5 Validity of data and parameters determined ex-ante

The parameters which have been determined ex-ante in the registered PDD are basically still valid. Only the following data and parameters required to be changed:

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- Methane density
- Fraction of methane captured at the SWDS and flared, combusted or used in another manner
- The decay rate constant

These changes have been appropriately considered in the updated PDD.

5.8 Additionality

The project's additionality has been demonstrated at registration stage. As per the project standard PPs are not requested to justify the additionality of the project again at RCP stage. Thus the corresponding parts have simply been transferred to the respective section of the applicable PDD template version 4.1.

It is confirmed that the transfer has been done appropriately. No further assessment regarding additionality has been carried out by the validation team.

5.9 Monitoring Plan

The monitoring plan in the PDD has been updated to comply with the latest applicable version of the monitoring methodology (ACM0001 version15). The basic changes from the current crediting period can be summarized as follows:

- Inclusion of the following additional data and parameters:
 - Volumetric flow of total landfill gas which is sent to flare and used for electricity generation in year y on a dry basis
 - Volumetric flow of total landfill gas which is sent to flare and used for electricity generation in year y on a wet basis
 - Temperature of the gaseous stream in time interval t
 - Pressure of the gaseous stream in time interval t
 - Amount of electricity consumed by the project activity in year y
 - Operation of the flare that consumes the LFG

Inclusion of: training of personnel and procedures in case of failure

The validation team has duly assessed all the required changes due to the upgraded methodological requirements and the re-assessment of the baseline. The validation team has concluded that

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- all necessary changes have been appropriately reflected in the updated PDD,
- the monitoring plan in the PDD is in compliance with the applied monitoring methodology,
- the monitoring arrangements described in the PDD can be implemented and are feasible within the project design.

5.10 Calculation of GHG Emission Reductions

The calculation of ERs is done as per the applied methodology. All changes due to the upgraded methodology and the re-assessment of the baseline have been considered appropriately. The calculation in the Excel spreadsheet and the corresponding calculation tables in the PDD have been checked and no mistakes have been identified. The estimation of emission reductions for the 2nd crediting period is deemed plausible and conservative.

5.11 Crediting Period

As the secretariat has been notified within the specified timeframe, as detailed in table 5-1, the project's 2nd crediting period may start immediately after the expiration of the 1st one, given that all other applicable criteria are met.

It is thus confirmed that the start date (StartDate2CP) and the length of the crediting period (7 years) are in compliance with the project standard.

5.12 Environmental impacts

Environmental impacts only need to be re-assessed with regards to their potential influence on the baseline determination. For the current case it is confirmed that the corresponding section has been correctly migrated to the revised version.

5.13 Local stakeholder consultation

In line with the project standard the local stakeholder consultation is not to be repeated at the RCP stage. It is confirmed that the information included in the registered PDD has been correctly transferred to the revised PDD version.

5.14 PDD update

The PDD has been revised on the basis of the latest applicable template version 4.1.

In line with the requirements of the project standard only the sections of the registered PDD relating to the baseline, estimated GHG emission reductions and the monitoring plan have been updated. All other sections have basically only been migrated to version 4.1.

It has further been checked whether the information included in the PDD sections and annexes that have not been part of the registered PDD are correct and in compliance with the project standard.

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6 VALIDATION OPINION

Petramas S.A has commissioned the TÜV NORD JI/CDM Certification Program (CP) to re-validate the project “Huaycoloro landfill gas capture and combustion” for the purpose of renewal of the crediting period. The validation is based on the relevant UNFCCC requirements.

In the course of the validation, 4 Corrective Action Requests (CARs) and 4 Clarification Requests (CLs) were raised and successfully closed. No FAR has been raised.

The review of the updated project design documentation and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews have provided TÜV NORD JI/CDM CP with sufficient evidence to validate the fulfillment of the stated criteria applicable for RCP.

In detail the conclusions can be summarized as follows:

- The current baseline of the project is in line with the national and/or sectoral policies and circumstances at the time of requesting renewal of crediting period.
- The monitoring plan is transparent and adequate and in line with the applicable monitoring methodology (ACM0001 version 15).
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 2,064,322 tCO₂e are most likely to be achieved within the second renewable crediting period of 7 years.

The conclusions of this report show, that the project, as it was described in the project documentation, is in line with all criteria applicable for the renewal of the crediting period.

São Paulo , 2014-05-15



Raul Gonzalez Mitre
TÜV NORD JI/CDM Certification
Program
Validation Team Leader

Essen, 2014-05-15



Alexandra Nebel
TÜV NORD JI/CDM Certification
Program
Final Approval

7 REFERENCES

Table 7-1: Documents provided by the project participant

Reference	Document
/Coord/	Geographical coordinates of the project activity based on google earth.
/LIC/	<p>Operation:</p> <ol style="list-style-type: none"> 1. Operation Licence given by the Municipality of Huachorri through Resolution Num. 158-2001/ALC-MPH-M dated on 2001-09-12. <p>Environment:</p> <ol style="list-style-type: none"> 2. Environmental Approval given by the Health Ministry through Resolution Num. 0431/2003/DIGESA/SA dated on 2003-04-03 and its modification dated on 2004-02-23. <p>Generation:</p> <ol style="list-style-type: none"> 3. Notarial act of electricity supply bid through renewable sources, 2010-02-12. 4. Generation contract signed between Petramas and the Ministry of Energy on 2012-03-22. 5. Letter Num. 412-2011 authorizing the start of commercial operation of Huaycoloro Plant issued on 2011-11-10 by COES 6. Letter Num. 249-2012 authorizing the effective power of Huaycoloro Plant issued on 2012-06-04 by COES.
/PDD/	<ul style="list-style-type: none"> • Version 4: PDD – “Huaycoloro landfill gas capture and combustion”, 2013/02/09. • Version 4.1: PDD – “Huaycoloro landfill gas capture and combustion”, 2013/11/13. • Version 4.3: PDD – “Huaycoloro landfill gas capture and combustion”, 2014/04/07. • Version 4.4: PDD – “Huaycoloro landfill gas capture and combustion”, 2014/05/13.
/REN/	E-mail from the CDM Registration (cdmregistration@unfccc.in) to the IBRD – Carbon Finance Service Word Bank to dated on 2013/09/05, confirming the receipt of the the PDD of the project activity “Huaycoloro landfill gas capture and combustion” (Ref. 0708) for the 2 nd crediting period on 2013/09/04. (Evidence of sending the PDD 6 months before ending of the 1 st crediting period – 2014/03/04).
/single/	<ol style="list-style-type: none"> 1. Single line diagram of Huaycoloro plant 2. Single line diagram from the Operative Study, Rev. B.

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Reference	Document
/TECH/	<ol style="list-style-type: none"> 1. Gas compression system layout Num. PA-001-0659, 2011-12-01 2. Flair Operation and Maintenance Manual by Jonh Zink, September 2006. 3. Process and Instrument Diagram for an enclosed ZTOF flare system Num. B-F-905-1818-150, Rev. 0. 4. Biogas plant layout dated 2010-04-16. 5. Operation and Maintenance Manual of the generators by Caterpillar, august 2009. 6. Photos of the name plates of generators 7. Technical life time of the installed equipment
/XLS/	Emission reduction calculation spreadsheet, version 04, 2014 Emission Factor Peru 2012

Table 7-2: Background investigation and assessment documents

Reference	Document
/ACM0001/	Methodology ACM0001, "Flaring or use of landfill gas", version 15.0.0
/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/GCP/	UNFCCC: Guidelines for completing the Project Design Document Form , (v. 01.0)
/GIRS/	<ul style="list-style-type: none"> • Programa Presupuestal 2013, Ministerio del Ambiente, "Gestión Integral de Residuos Sólidos". • Cifras Ambientales 2013, Sistema Nacional de Información Ambiental, Perú
/GT/	UNFCCC: CDM Glossary of Terms

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No.:

/IPCC/	<ul style="list-style-type: none"> • IPCC Good Practice Guidance & Uncertainty Management in National Greenhouse Gas Inventories, 2000 • Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual • www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html#table-2-14
/KP/	Kyoto Protocol (1997)
/LAW/	<ol style="list-style-type: none"> 1. General Law of Solid Residues Num. 27314 (year 2002) and its modification on 2008-06-28 2. Status Report of municipality waste management – “<i>Informe de la situación Actual de la gestión de residuos sólidos municipales</i>”, October 2008 by the Environment Ministry.
/MA/	Decision 3/CMP. 1 (Marrakesh – Accords & Annex to decision (17/CP.7))
/PDD-R/	Registered Project Design Document for CDM project: “Huaycoloro landfill gas capture and combustion” version 3, 2006/09/17.
/PDD-T/	Project Design Document Form (F-CDM_PDD) - Version 04.0
/Rev_MP/	Revised monitoring plan of the project “Huaycoloro landfill gas capture and combustion”, approved on 2012/01/05.
/TEF/	<ol style="list-style-type: none"> 1. Project emissions from flaring”, version 02.0.0. 2. Emissions from solid waste disposal sites”, version 06.0.1. 3. Tool to calculate the emission factor for an electricity system, version 04.0.0. 4. Tool to calculate baseline, project and/or leakage emissions from electricity consumption”, version 1. 5. Tool to determine the mass flow of a greenhouse gas in a gaseous stream”, version 02.0.0. 6. Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period”, Version 03.0.1.
/VAL/	Validation Report of revised monitoring plan, version 02, dated 2011-09-20
/VVS/	Validation and Verification Standard (Version 05.0, EB 75, Annex 05)

Table 7-3: Websites used

Reference	Link	Organisation
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Reference	Link	Organisation
/coes/	www.coes.org.pe	COES
/ipcc/	www.ipcc-nggip.iges.or.jp	IPCC publications
/minam/	http://www.minam.gob.pe/	Environment Ministry – MINAM
/unfccc/	http://cdm.unfccc.int	UNFCCC

Table 7-4: List of interviewed persons

Reference	Mol ¹		Name	Organisation / Function
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Jorge Luis Espichan Huarcaya	Coordinator – Petramas
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Adamo Melendez	Coordinator – Petramas
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	William Segura	Project Manager – Petramas
/IM02/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Sergi Cuadrat	Consultant – Clima Loop

¹⁾ Means of Interview: (Telephone, E-Mail, Visit)

ANNEX

- A1:** Validation Protocol
- A2:** Assessment of Applicability
Criteria
- A3:** Statements of competence of
involved Personnel

ANNEX 1: VALIDATION PROTOCOL

Table A-1: Requirements Checklist

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
A. Description of Project Activity				
A.1. Purpose and general description of the project activity				
<p>A.1.1. Is the description of the project activity in section A.1 correct ?</p> <p>(EB 66 Annex 8/EB 66 Annex 9)</p> <p><i>Please check whether the information given is correct with regards to the actual situation and possible changes since the registration / last update of the PDD. Please also check whether the guidelines for completing the PDD form have been followed.</i></p>	<p>/PDD-R/ /PDD/ /unfccc/ /GCP/ /PDD-T/ /IM01/</p>	<p>The validation team has checked section A.1 of the updated PDD and confirms that the information provided is complete and correct with regards to the following:</p> <p><input type="checkbox"/> Section A.1 is in compliance with the guidelines for completing the PDD form ^{/GCP/}.</p> <p><input type="checkbox"/> The section A.1 of the revised PDD has been appropriately updated and reflects the actual situation. Relevant information previously included in other sections of the PDD has been considered.</p> <p>In this context the following findings have been identified: CAR A1:</p> <p>1. Section A.1: the following information is missing:</p> <p>a) The scenario existing prior to the implementation of the project activity and</p> <p>b) The baseline scenario.</p> <p>2. Section A.4: Name of the PP is not correct (including cover page). According to the MoC and the UNFCCC the PP's name</p>	<p>CAR A1</p>	<p>OK</p>

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
		is: <i>International Bank for Reconstruction and Development (IBRD) as Trustee of the Netherlands CDM Facility (NCDMF)</i>		
A.2. Location of the project activity				
<p>A.2.1. Has the location of the project activity correctly been correctly described in section A.2? (EB 66 Annex 8/EB66 Annex 9)</p> <p><i>Please check whether the information given is correct with regards to the actual situation and possible changes since the registration / last update of the PDD. Please also check whether the guidelines for completing the PDD form have been followed.</i></p>	<p>/GCP/ /PDD- R/ /PDD- T/</p>	<p>The validation team has checked section A.2 of the updated PDD and confirms esp. on the basis of information gathered during the site visit that the information provided is complete and correct with regards to the following:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Section A.2 is in compliance with the guidelines for completing the PDD form ^{/GCP/}. <input checked="" type="checkbox"/> The section A.2 of the revised PDD has been appropriately updated and reflects the actual situation with regards to the following: <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Host Party <input checked="" type="checkbox"/> Region / State Province <input checked="" type="checkbox"/> City / Town / Community <input checked="" type="checkbox"/> Physical/geographical location incl. Longitude/Latitude <p>In this context the following findings have been identified: N/A</p>	OK	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
A.3. Technology and/or measures				
<p>A.3.1. Is the description of the technology employed in the revised PDD in accordance with the real situation?</p> <p><i>The content of the registered PDD shall be compared to the content of the revised PDD and the situation observed during the site visit. In case of changes of the implemented technology this should be described in detail.</i></p>	<p>/PDD-R/ /PDD/ /IM01/ /TECH/ /IM01//</p>	<p>On the basis of the site visit and the desk review of the updated PDD the validation team confirms the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Section A.3 is in compliance with the guidelines for completing the PDD form ^{/GCP/}. <input type="checkbox"/> The technology of the project has not been changed. <input type="checkbox"/> The description in the PDD reflects the actual situation and the section A.3 of the PDD has been migrated from the registered PDD without significant changes. <p>In this context the following findings have been identified:</p> <p>CL A2: Section A.3.: Clarification is required regarding the difference in the installed capacity of 4.8 MW observed at the name plate of the generator and the installed capacity defined in the registered PDD of 5.74 MW.</p> <p>CL A3: Section A.3:</p> <ol style="list-style-type: none"> 1. Information regarding the age and average time of the equipment based on manufacturer's specifications and industry standards, 2. Information regarding existing and forecast installed capacities. 3. A list of the facilities, systems and equipment installed and/or modified by the project activity is not complete. 	<p>CLA2 CLA3</p>	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
A.4. Parties and project participants				
<p>A.4.1. Are the names of the project participants of the registered project still consistent with the PPs as per this request for renewal of crediting period?</p> <p>(VVS § 305)</p> <p><i>It should be referred to the project specific CDM website. The PPs listed shall be compared to the PPs listed in the revised PDD. Is the description of the technology employed in the revised PDD in accordance with the real situation?</i></p>		Please refer to A.1.	CAR A1	OK
A.5. PDD editorial aspects				
<p>A.5.1. Have relevant sections of the registered PDD been updated?</p> <p>(VVS § 303)</p> <p><i>Please provide explanation whether the sections relevant for the baseline, the estimated emission reductions and the monitoring plan have been updated.</i></p>	<p>/PDD-R/ /PDD/ /unfccc/ /GCP/ /PDD-T/ /IM01/</p>	<p><i>Description:</i></p> <p>Relevant sections (BL, ER and monitoring plan) of the registered PDD have been updated.</p> <p><i>Validator's action:</i></p> <p>The PDD and the relevant documents for the baseline, for the estimated emission reduction and for the monitoring plan have been checked.</p> <p><i>Conclusion:</i></p> <p>The baseline, the estimated emission reductions and the monitoring plan have been clearly described and updated in the PDD for the second crediting period. Nonetheless the following</p>	CAR A1 GL B2	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
		<p>information is missing: CAR A1:</p> <p>3. Section A.1: c) The scenario existing prior to the implementation of the project activity and d) The baseline scenario.</p> <p>4. Section A.4: Name of the PP is not correct (including cover page). According to the MoC and the UNFCCC the PP's name is: <i>International Bank for Reconstruction and Development (IBRD) as Trustee of the Netherlands CDM Facility (NCDMF)</i></p> <p>5. CL B2: Section B.5: Information regarding demonstration of additionality is missing.</p>		
A.5.2. Have other sections been identified in the registered PDD which have been updated?	/PDD- R/ /PDD/ /unfccc/ /GCP/ /PDD- T/ /IM01/	<p><i>Description:</i> Section of A.1, A.2, and A.3 in the PDD has been updated accordingly the methodology ACM0001 version 15.0.0.</p> <p><i>Validator's action:</i> The PDD, the registered PDD and the methodology have been checked.</p> <p><i>Conclusion:</i> Other sections of the PDD have been correctly updated.</p>	OK	OK
B. Project Baseline and Monitoring Plan				

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
B.1. Reference of the Methodology				
<p>B.1.1. Which methodology/ tool has been applied in the registered PDD? Is this the latest applicable version?</p> <p>(PS, § 230 (a))</p> <p><i>The applied methodology(ies) and the tool(s) applied in the registered PDD shall be listed here. It shall be confirmed whether the latest applicable version at the time of submission of renewal of the crediting period has been applied.</i></p>	<p>/ACM001/ /TEF/ /unfccc/ /PDD/ /IM01/</p>	<p><i>Description:</i></p> <p>The proposed project applied the approved methodology ACM0001 version 15.0.0 and the following tools:</p> <ul style="list-style-type: none"> • Project emissions from flaring", version 02.0.0. • Emissions from solid waste disposal sites", version 06.0.1. • Tool to calculate the emission factor for an electricity system, version 04.0.0. • Tool to calculate baseline, project and/or leakage emissions from electricity consumption", version 1. • Tool to determine the mass flow of a greenhouse gas in a gaseous stream", version 02.0.0. • Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period", Version 03.0.1. <p><i>Validator's action:</i></p> <p>The validity of the methodology and the relevant tools were validated by means of cross checking the references (methodology and tool) published on the UNFCCC website.</p> <p><i>Conclusion:</i></p> <p>The following references are incorrect:</p> <p>CARB1:</p> <ol style="list-style-type: none"> 1. The applied methodology ACM001 is not up to date. 2. Reference to the CDM Project Standard is also not up to 	<p>CARB1</p>	<p>OK</p>

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Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
		date. 3. Exact reference to the UNFCCC web site is missing.		
B.2. Applicability of the Methodology				
B.2.1. Have all applicability criteria defined in the methodology been met? (PS, §230; VVS, § 76)		<p><i>Description:</i></p> <p>The section B.2 of the updated PDD described every applicability criteria with the methodology ACM0001 "Flaring or use of landfill gas"(version 15.0.0)</p> <p><i>Validator's action:</i></p> <p>The validation team check all described criteria required by the methodology to verify if those are met according the description given in the PDD.</p> <p><i>Conclusion:</i></p> <p>The verification team can conclude that all applicability criteria defined in the methodology have been met.</p>	OK	OK
B.2.2. In case one or more applicability criteria have not been met, has the PP a) select another applicable methodology, b) requested deviation from the methodology? (PS, § 230 (c))		<p><i>Description:</i></p> <p>All applicability criteria of the applied methodology have been met.</p> <p><i>Validator's action:</i></p> <p>NA</p> <p><i>Conclusion:</i></p> <p>NA</p>	OK	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
B.3. Validity and update of the baseline <i>The assessment of the continued validity and update of the baseline at the renewal of the crediting period is carried out according to the stepwise approach given in the "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period", EB 66/Annex 47.</i>				
B.3.1. Baseline applied				
B.3.1.1. What has been identified as original/current baseline? <i>Describe the chosen BL scenario. Indicate whether it is in line with the applied methodology.</i>	/ACM 001/ /unfccc/ /PDD- R/ /PDD/ /EB66 _47/ /IM01/	<i>Description:</i> The original baseline was determined according to the approved methodology ACM0001 ver. 03. <i>The project's purpose is to reduce greenhouse gases ("GHG") emissions, in particular reduce methane ("CH₄") emissions through combusting Huaycoloro's landfill gas ("LFG") to generate electricity and flaring the remaining LFG that is not fed into the generator; and reduce carbon dioxide ("CO₂") emissions through supplying renewable electricity to the SEIN-National Interconnected Electricity System (thus displacing fossil fuel-based electricity generation that would have emitted CO₂).</i> The new baseline scenario is determined by the approved methodology ACM0001 ver. 15.0.0. and remains the same as the first crediting period. <i>Validator's action:</i> The baseline scenario was reviewed against the applied	OK	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
		methodology by the validation team. <i>Conclusion:</i> The baseline scenario was identified correctly and in line with the methodology. The baseline scenario remains the same as the first crediting period.		
B.3.2. Step 1: Assess the validity of the current baseline for the next crediting period <i>The validity of the current baseline is assessed using the following Sub-steps:</i>				
<p>B.3.2.1. <i>Step 1.1: Assess compliance of the current baseline with relevant mandatory and/or sectoral policies</i></p> <p>Does the current baseline comply with all relevant mandatory national and/or sectoral policies which came into effect after the submission of the project activity for validation or the submission of the previous request for renewal of the crediting period and are applicable at the time of requesting renewal of the crediting period?</p> <p>(VVS, §304, EB 66, Annex 47)</p> <p><i>If yes go to step 1.2, otherwise the baseline needs to be updated.</i></p> <p><i>Describe how this issue was validated.</i></p>	<p>/ACM 001/ /unfccc/ /PDD- R/ /PDD/ /TEF/ /IM01/</p>	<p><i>Description:</i></p> <p>The baseline scenario has not been changed during the second crediting period and is in compliance with all the relevant mandatory national and/or sectoral policies.</p> <p><i>Validator's action:</i></p> <p>By checking the regulations on waste management.</p> <p><i>Conclusion:</i></p> <p>The current baseline complies with all relevant mandatory national and/or sectoral policies.</p>	OK	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
<p>B.3.2.2. Step 1.2: Assess the impact of circumstances</p> <p>Do new circumstances exist at the time of requesting renewal of the crediting period which make the continued validity of the baseline not plausible?</p> <p>(VVS, §304, EB 66, Annex 47)</p> <p><i>Assess the impact of circumstances existing at the time of requesting renewal of the crediting period on the current baseline emissions, without reassessing the baseline scenario. If new circumstances make the continued validity not plausible, then the current baseline needs to be updated for the subsequent crediting period.</i></p> <p><i>Describe how this issue was validated.</i></p>	<p>/ACM 001/ /unfccc/ /PDD- R/ /PDD/ /IM01/</p>	<p><i>Description:</i></p> <p>At the time of requesting renewal of the crediting period, the conditions used to determine the baseline scenario in the previous crediting period are still valid.</p> <p><i>Validator's action:</i></p> <p>The validation team cross checked the PDD against public information contained in the "Programa Presupuestal 2013, Ministerio del Ambiente, "Gestión Integral de Residuos Sólidos". and also it is evident that the installed capacity of electricity generation has not relevant changed regarding the share of renewable and fossil fuels.</p> <p><i>Conclusion:</i></p> <p>New circumstances have not been observed which would harm the validity of the baseline scenario.</p>	OK	OK
<p>B.3.2.3. Step 1.3: Assess whether the continuation of the use of current equipment(s) is technically possible or if rather an investment would be made.</p> <p>Does the remaining lifetime of the current equipment that would continue to be used exceeds the crediting period for which renewal is requested (more 7 years)?</p> <p>(VVS, §304, EB 66, Annex 47)</p> <p><i>The step should only be applied if the identified baseline in the</i></p>	<p>/ACM 001/ /PDD- R/ /TECH/ /IM01/</p>	<p><i>Description:</i></p> <p>The baseline scenario identified at the validation was not the continuation of the use of the current equipment because it requires investment.</p> <p>The equipment won't continue be used further the crediting period for which the renewal is requested.</p> <p><i>Validator's action:</i></p> <p>The applied tool for "Validity of the original/current baseline and to update the baseline at the renewal of a crediting period" was checked.</p>	OK	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
<p><i>previous crediting period was the continuation of the current / pre-project practice.</i></p> <p><i>Describe the steps taken to validate the remaining lifetime.</i></p>		<p><i>Conclusion:</i></p> <p>This sub-step is not applicable.</p>		
<p>B.3.2.4. Step 1.4: Assessment of the validity of the data and parameters</p> <p>Are all data and parameters that were only determined at the start of the (previous) crediting period and not monitored during the (previous) crediting period still valid or should they be updated?</p> <p>(VVS, §304, EB 66, Annex 47)</p> <p><i>Updates should be undertaken:</i></p> <ul style="list-style-type: none"> <i>Where IPCC default values are used, the values should be updated if any default values have been adopted and published by the IPCC;</i> <i>Where emission factors, values or emission benchmarks are used and determined only once for the crediting period, they should be updated, except if the emission factors, values or emission benchmarks are based on the historical situation at the site of the project activity prior to the implementation of the project and cannot be updated because the historical emission does not exist anymore as a result of the CDM project activity</i> <p><i>List the parameters and provide an assessment.</i></p>	<p>/ACM 001/ /IPCC/ /IM01/ /XLS/ /TEF/</p>	<p>The validation team has checked the validity of the ex-ante parameters defined in the original PDD and confirms the following:</p> <p><input type="checkbox"/> All data and parameters determined ex-ante for the 1st crediting period are still valid.</p> <p><input checked="" type="checkbox"/> The following data and/or parameters determined ex-ante for the 1st crediting period are no longer valid and have been updated in accordance with the "Tool to assess the validity of the original/current baseline and to update the baseline at the renewal of a crediting period":</p> <p><i>Assessment from the validation team:</i></p> <p>The parameters determined ex-ante for the 1st crediting period were taken from the feasibility study done by the PP. In the calculation done at the renewal of the crediting period the parameters determined ex-ante were determined in accordance with the latest versions of tools and methodologies. Furthermore there are parameters determined for the 1st crediting period which are not used anymore for the renewal of the crediting period because the models used are different, (these parameters are not described in these section).</p>	OK	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)		Draft Concl.	Final Concl.
		Parameter	D _{CH₄}		
		Description	Methane density		
		Unit	tonsCH ₄ /m ³ CH ₄		
		Value	0.00065437		
		Assessment	The uopdated value is 0.0007168 as per new version of the methodology		
		Parameter	F		
		Description	Fraction of methane captured at the SWDS and flared, combusted or used in another manner		
		Unit	-		
		Value	3.3		
		Assessment	The uopdated value is 0 as per the tool Emissions from solid waste disposal sites" – Version 6		
		Parameter	K		
		Description	The decay rate constant		
		Unit	-		
		Value			

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.																								
		<table><tr><th>Components¹</th><th>Decay Rate (k)</th></tr><tr><td>Food³</td><td>0.1</td></tr><tr><td>Green Waste⁴</td><td>0.1</td></tr><tr><td>Other Organic</td><td>0.1</td></tr><tr><td>Green Waste⁴</td><td>0.02</td></tr><tr><td>Paper</td><td>0.02</td></tr><tr><td>Wood</td><td>0.005</td></tr><tr><td>Rubber, Leather, Textiles</td><td>0.005</td></tr><tr><td>Plastics</td><td>0</td></tr><tr><td>Metals</td><td>0</td></tr><tr><td>Glass</td><td>0</td></tr><tr><td>Other Inorganic</td><td>0</td></tr></table>	Components ¹	Decay Rate (k)	Food ³	0.1	Green Waste ⁴	0.1	Other Organic	0.1	Green Waste ⁴	0.02	Paper	0.02	Wood	0.005	Rubber, Leather, Textiles	0.005	Plastics	0	Metals	0	Glass	0	Other Inorganic	0		
		Components ¹	Decay Rate (k)																									
		Food ³	0.1																									
Green Waste ⁴	0.1																											
Other Organic	0.1																											
Green Waste ⁴	0.02																											
Paper	0.02																											
Wood	0.005																											
Rubber, Leather, Textiles	0.005																											
Plastics	0																											
Metals	0																											
Glass	0																											
Other Inorganic	0																											
Assessment	The uopdated calculation considered the k values as per the tool Emissions from solid waste disposal sites” –Version 6, which refers to the IPCC 2006 Guidelines for Nationall Greenhouse Gas Inventories (adapted from Volume 5, Table 3.3)																											
It ist further confirmed that no other parameters are required to be updated.																												
B.3.3. Step 2: Update of the current baseline and																												

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
the data and parameters <i>This step is only applicable if any of the Steps 1.1, 1.2, 1.3 and/or 1.4 showed that the current baseline needs to be updated.</i>				
<p>B.3.3.1. <i>Step 2.1: Update the current baseline.</i> Has the baseline been updated according to the latest approved version of the methodology?</p> <p>(VVS, §304, EB 66, Annex 47)</p> <p><i>The procedure shall be applied in the context of the sectoral policies and circumstances that are applicable at the time of request for renewal of the crediting period.</i></p>	<p>/PDD/ /ACM 001/ /XLS/ /TEF/</p>	<p><i>Description:</i></p> <p>According to the methodology ACM0001 the updated baseline is still the same, nonetheless it has to be recalculated taking into consideration new parameters and data.</p> <p><i>Validator's action:</i></p> <p>The new baseline calculation was reviewed against the latest approved versions of the applicable methodology and tools.</p> <p><i>Conclusion:</i></p> <p>The current baseline was updated according to the latest version of the methodology ACM0001 version 15.</p>	OK	OK
<p>B.3.3.2. <i>Step 2.2: Update the data and parameters</i></p> <p>Have all data and parameters that were identified in Step 1.4 above as not valid anymore been updated?</p> <p>(VVS, §304, EB 66, Annex 47)</p> <p><i>Guidance in Step 1.4 shall be followed.</i></p>	<p>/PDD/ /ACM 0001/ /TEF/ /IPCC/ /XLS/</p>	<p><i>Description:</i></p> <p>All data and parameters has been included in the updated PDD. It was clearly described the sources of information according the applied methodology ACM0001 version 15.</p> <p>The baseline emission from the project has been calculated as per the "Tool to calculate the emission factor for an electricity system" (version 04.0.0) which is the latest valid available data at the time of requesting for the crediting period renewal.</p> <p><i>Validator's action:</i></p> <p>The data and parameters identified in Step 1.4 were compared</p>	CLB3 CAR B4	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
		<p>against the new information sources.</p> <p><i>Conclusion:</i></p> <p>CL B3: Section B.6.1: Clarification is required regarding:</p> <ol style="list-style-type: none"> 1. The selected choice of the MCF value (1). 2. The calculation of the generator efficiency (0.84). <p>CAR B4: Section B.6.2: correction is necessary:</p> <ol style="list-style-type: none"> 1. The data and parameters identified in Step 1.4 have been updated, nonetheless the parameter GWP of methane (25) used for the ER calculation is incorrect and in Section B.6.1 also the following correction are required: 2. Data of electricity consumption of the cooler was not considered in the calculation of ECPJ. 3. Capacity of each generator (1.2 MW) is incorrect (CEG). 4. Calculation of EF is incorrect as according to version 04 of the tool to calculate the emission factor for an electricity system for the dispatch data analysis OM data vintage of the year in which the project activity displaces grid electricity shall be used but data vintage of year 2010 has been used instead. 		

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
B.4. Algorithms and/or formulae used to determine emissions reductions <i>It is assessed whether the steps taken and the equations and parameters applied in the PDD to calculate project emissions, baseline emissions, leakage and emission reductions comply with the requirements of the selected methodology including applicable tool(s).</i>				
B.4.1. Are the equations applied correctly according to the applied approved methodology? (VVS, §§304 (b), 306) <i>Describe clearly the steps taken to assess whether the methodology has been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions. Further take into consideration that all estimates of the baseline emissions can be replicated using the data and parameter values provided in the PDD.</i>	/PDD/ /ACM 0001/ /TEF/ /XLS/	<i>Description:</i> The PP has included in the updated PDD detailed description of the calculation methods which referred always to the applicable methodology and tools. <i>Validator's action:</i> The formulaes used in the calculation sheets have been compared with the applicable formulaes described in the updated PDD and applicable tools and methodologies. <i>Conclusion:</i> The equations applied for calculation are correctly applied according to the approved methodology.	OK	OK
B.4.2. In case the methodology allows for selection between options for equations or parameters it shall be determined whether adequate justification has been determined and correct equations and parameters have been used. (VVS §§ 97, 98)	/PDD/ /TEF/ /ACM 0001/ /TEF/	<i>Description:</i> The applied methodology and tools does allow for different methodological choices, which depend on the baseline, final utilization of the LFG and the availability of information. The PP has given proper justification in the updated PDD for his choices, taking into consideration the baseline situation, final utilization of methane and the availability of information.	OK	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
<p><i>Assess the correct selection and application of methodological choices. Describe whether proper justification has been provided (based on the choice of the baseline scenario, context of the project activity and other evidence provided) and whether the correct equations and parameters have been used reflecting the relevant methodological choices.</i></p>		<p>Validator's action:</p> <p>The updated PDD and further documentation has been reviewed against the options given in the applied methodology and tools and the PP personnel have been interviewed to confirm their choices.</p> <p>Conclusion:</p> <p>The methodological choices that have been considered in the updated PDD are correct.</p>		
<p>B.4.3. Have conservative assumptions been used when calculating the project emissions? (VVS, §§ 98)</p> <p><i>Describe clearly the steps taken to assess whether all the assumptions and data used by the PP are listed in the PDD including references and sources and are conservatively interpreted in the PDD.</i></p>	<p>/PDD/ /ACM 0001/ /TEF/ /XLS/</p>	<p>Description:</p> <p>The applied methodology and applicable Tools offer different option so that the selection conservative data and methods is possible.</p> <p>Validator's action:</p> <p>The validation team check whether the selection of the data considered conservative assumptions. Also the calculation sheet was reviewed to confirm the selections and conservative calculation. The data and conservative assumptions are listed in the updated PDD, including the references and sources.</p> <p>Conclusion:</p> <p>The validation team can conclude that the conservative assumptions have been used in the updated PDD.</p>	OK	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
B.5. Monitoring of Emission Reductions <i>It is assessed whether the monitoring plan is appropriate for the project activity and in line with the applied methodology.</i>				
B.5.1. Monitoring methodology (VVS, §§ 72 (e), 131, 132 (a) (i)) <i>Assess whether all applicable parameters listed in the methodology applied are included in the monitoring plan.</i> <i>Pl. check further whether the selection of parameters not to be monitored (section B.6.2) is appropriate and in line with the applied methodology.</i> <i>In case of different approaches can be chosen acc. to the methodology assess whether the selection of parameters is justified and correct.</i>	/PDD/ /ACM 001/ /IM01/	<p>The validation team has checked the validity of the monitoring parameters defined in the original PDD and confirms the following:</p> <p><input type="checkbox"/> The monitoring methodology applied for the previous crediting period is still valid and no changes have been carried out.</p> <p><input type="checkbox"/> The monitoring section of the revised PDD has been updated in order to be compliant with the monitoring methodology applied.</p> <p>In this context the following findings have been identified:</p> <p>CAR B5: Section B.7.1:</p> <ol style="list-style-type: none"> 1. Information regarding measurement method and procedures, standards to be applied, accuracy of the measurement equipment, person/entity responsible for the measurement, intervals and calibration procedures are missing for parameters where data or parameters are to be monitored. 2. Energy consumption (EG_{EC}) from the public grid was not considered. 	CAR B5	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)				Draft Concl.	Final Concl.
Only to be assessed if the monitoring sections had to be updated in order to comply with the new methodology applied. Otherwise continue with section C. B.5.2. Monitoring Parameters (VVS, § 132 (a), (ii)) <i>Indicate whether the provided information for the monitoring parameter complies with the approved methodology including applicable tool(s) in the aspects listed.</i> <i>For checking the use of international standards in the nomenclature, consider:</i> a) Standard format (e.g. 1,000 representing one thousand and 1.0 representing one). b) Values shall be directly given in SI units – or additionally to original units transferred to SI. c) Short scale naming system: (Only) million = 10 ⁶ and billion 10 ⁹ shall be used.	/PDD/	Requirement	OK	Not OK	N/A	OK	OK
	/ACM	Label	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	001/	Data Unit	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	/GCP/	Description	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	/IM01/	Source of data	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		Measurement equipment / measure method	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
		Monitoring frequency	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		QA/QC procedures	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
		Purpose of data	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		Standard format	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		SI units	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		Short scale naming	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		See CAR B5.					

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Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
<p>B.5.3. Are the means of monitoring of all parameters contained in the monitoring plan feasible within the project design?</p> <p>(VVS, §§ 132 (b) (i), 133 (b))</p> <p><i>Describe the steps undertaken to assess whether the monitoring arrangements described in the monitoring plan are feasible within the project design.</i></p>	<p>/PDD/ /ACM 001/ /TEF/ /IM01/</p>	<p><i>Description:</i></p> <p>All equations necessary for ex-post emission reduction calculation have been included and are in accordance with the applied methodology.</p> <p><i>Validator's action:</i></p> <p>By means of methodology, methodological tools and PDD checking.</p> <p><i>Conclusion:</i></p> <p>The equations necessary for ex-post emission reduction calculation have been described clearly in the PDD.</p>	OK	OK
<p>B.5.4. Is it likely that the monitoring arrangements described in the PDD can properly be implemented in the context of the project activity?</p> <p>(VVS, § 132 (b) (i))</p> <p><i>Assess whether the described monitoring arrangements are sufficient and realistic to enable a thorough monitoring. Pl. consider also special monitoring conditions, e.g. downtimes of monitoring equipment etc.</i></p>	<p>/PDD/ /ACM 001/ /IM01/</p>	<p><i>Description:</i></p> <p>The project has been put into operation successfully over the last years and emission reduction has been issued which can prove that the monitoring arrangements have been done well by the project owner.</p> <p><i>Validator's action:</i></p> <p>By means of methodology and PDD checking.</p> <p><i>Conclusion:</i></p> <p>The monitoring arrangements described in the PDD can be properly implemented in the context of the project activity</p>	OK	OK
<p>B.5.5. Are the QA/QC procedures appropriate sufficient to ensure the emission reductions achieved from the project activity can be reported ex-post and verified?</p>	<p>/PDD/ /ACM 001/</p>	<p><i>Description:</i></p> <p>The QA/QC procedure has been strictly conducted according to the revised Monitoring Plan described in the updated PDD. The monitoring plan can be implemented with regard to the description</p>	CAR B5	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
(VVS, § 132 (b) (ii)) <i>Please consider the description given in section B.7.2. Describe which QA/QC provisions are considered. Address Quality Management System provisions, calibration and maintenance of equipment. Address further any review procedures.</i>	/IM01/	of QA/QC procedures. <i>Validator's action:</i> By means of methodology and PDD check. <i>Conclusion:</i> QA/QC procedures have been described in the PDD and it is appropriate to ensure the emission reductions achieved from the project activity can be reported ex-post and verified. Nevertheless, some information was not clearly described in the monitoring plan. Please refer to CAR B5 .		
B.5.6. Are procedures identified for data management? (VVS, § 132 (b) (ii)) <i>Check whether appropriate provisions are considered for data management including responsibilities, what records to keep, storage area of records and how to process performance documentation</i> <i>Check further the data archiving provisions for the project activity and ensure that provisions are made to archive data for the whole crediting period + 2 years.</i>	/PDD/ /ACM 001/ /IM01/	<i>Description:</i> All relevant data are to be collected and stored during the whole monitoring period. <i>Validator's action:</i> Updated PDD has been checked. <i>Conclusion:</i> Procedures for data management were included in the PDD.	OK	OK
C. Duration of the Project/ Crediting Period <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>				
C.1. What is the current crediting period?	/REN/	<i>Description:</i>	OK	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
	/PDD/	2014-03-05 to 2021-02-05 <i>Validator's action:</i> Revision of updated PDD <i>Conclusion:</i> According with renewal of crediting period Guidelines		
C.2. Has the PP informed the CDM Secretariat about the intention to request renewal of crediting period 270 to 180 days prior to expiration of the current crediting period? Has an updated PDD been submitted? (PCP, § 244)	/REN/ /PDD/	<i>Description:</i> The PP has notified the UNFCCC Secretariat on the intention to renew the crediting period at least 180 days prior to expiration of the current crediting period <i>Validator's action:</i> Evidence of notification was provided by the PP. <i>Conclusion:</i> the PP informed the CDM Secretariat about the intention to request renewal of crediting period 270 to 180 days prior to expiration of the current crediting period	OK	OK
C.3. Is the start and end date of the renewed crediting period clearly defined and reasonable? <i>Check whether the envisaged starting date of the crediting period is realistic, taking into account the end date of the last crediting period.</i>	/REN/ /PDD/	<i>Description:</i> The date of starting of the second crediting period is 2014-03-05. <i>Validator's action:</i> Evidence of notification with anticipation was provided by the PP and the remainint time after the renewal validation is enough to complete the extention of the crediting period.	OK	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
		<i>Conclusion:</i> The start of the 2 nd crediting period is reasonable and clearly defined.		


ANNEX 2: ASSESSMENT OF APPLICABILITY CRITERIA

Table A-2: Assessment of Applicability Criteria (VVS §§ 70-76)

Applicability Criteria	Evidence used	met	not met	N/A	Assessment of validation team (results and means of assessment)
#1: 2 (b) Make an investment into an existing LFG capture system to increase the recovery rate or change the use of the captured LFG, provided that: The captured LFG was vented or flared and not used prior to the implementation of the project activity;	/GIRS/ /LIC/ /LAW/	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The validation team reviewed the regulation on waste management which is applicable to the project activity but also different information sources not referred in the PDD (Cifras Ambientales 2013, Sistema Nacional de Información Ambiental, Perú) to confirm that the baseline for the renewal crediting period is still the venting of LFG. Additionally no investment was considered prior the project activity as there is no regulation that enforces that.
#2: Flare the LFG and/or use the captured LFG in any (combination) of the following ways: (i) Generating electricity;	/TECH/ /LIC/	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The generation of electricity could be confirmed during the site visit by revision of the information related to the generators and electricity generation and the licences related to the power generation.
#3: (d) Do not reduce the amount of organic waste that would be recycled in the absence of the project activity.	/GIRS/ /TECH/	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No recycling has been performed during the operation of the project activity. This could also be confirmed in the environment report from the Peruvian government (Cifras Ambientales 2013, Sistema Nacional de Información Ambiental, Perú)
#4: 4 The methodology is only applicable if the application of the procedure to identify the baseline scenario confirms that the most plausible baseline scenario is: (a) Atmospheric release of the LFG or capture of LFG and destruction through flaring to comply with regulations or contractual requirements, to address safety and odour concerns, or for other reasons; and	/GIRS/ /LAW/	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	According to the report "Cifras Ambientales 2013, Sistema Nacional de Información Ambiental, Peru" and the applicable regulations, it can be confirmed that the most plausible baseline scenario is the atmospheric release of LFG.

<p>#5: (b) In the case that the LFG is used in the project activity for generating electricity and/or generating heat in a boiler, air heater, glass melting furnace or kiln; (i) For electricity generation: that electricity would be generated in the grid or in captive fossil fuel fired power plants; and/or</p>	/TECH/	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>In absence of the project activity the electricity to the landfill activities is supplied by the local grid. This could be confirmed in the site visit as the infrastructure is operating. This electricity supply from the grid also is described in the PDD.</p>
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ANNEX 3: STATEMENTS OF COMPETENCE OF INVOLVED PERSONNEL



Statement of Competence
Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Oliver Quireza Campos


SCHEME	STATUS	VALID UNTIL
CDM	Trainee	
VCS / ISO 14064-2	Trainee	

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.2	Renewable Energies
13.1	Waste Handling and Disposal
13.2	Animal Waste Management

337 - Rev. 1, Date: 2013-10-09

337_S01-VA060-F20_2013-10-09_rev1 S01-VA060-F20 rev3 / 2012-10-25



Statement of Competence
Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Raul Gonzalez Mitre


SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification)	2015-06-27
VCS / ISO 14064-2	Senior Assessor	2015-06-27

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.2	Renewable Energies
13.1	Waste handling and disposal

082 - Rev. 4, Date: 2012-08-16

082_S01-F003_2012-08-16_rev4.doc S01-F003 rev2 / 2012-04-05



Statement of Competence
Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Ms. Alexandra Nebel

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification) Technical Reviewer	2016-03-03
Ji	Senior Assessor Technical Reviewer	2016-03-03
VCS / ISO 14064-2	Senior Assessor Technical Reviewer	2016-03-03

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
14.1	Forestry

095 - Rev. 4, Date: 2013-03-04

095_S01-VA060-F20_2013-03-04_rev4.doc S01-VA060-F20 rev3 / 2012-10-25



Statement of Competence

Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Emilio Martin

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification) Technical Reviewer	2016-02-04
VCS / ISO 14064-2	Senior Assessor	2016-02-04

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA	TR SUBCATEGORIES
1.2	Renewable Energies	1.2.1 Hydro 1.2.2 Wind 1.2.3 Geothermal 1.2.4 Solar 1.2.5 Tidal
13.1	Waste Handling and Disposal	13.1.1 Waste Management 13.1.2 Waste Water Management

157 – Rev. 3, Date: 2013-02-05