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# VALIDATION REPORT RENEWAL OF CREDITING PERIOD

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Biogas de Juarez S.A de C.V  
CIUDAD JUAREZ LANDFILL GAS TO  
ENERGY PROJECT

CDM Registration Number:  
1123

REPORT NO: 1  
REVISION NO: 03.1



## VALIDATION OPINION:RENEWAL OF CREDITING PERIOD

Date of first issue:	Project No:		
02 October 2014	1123		
Approved by and date:	Organisational unit:		
Bilal Anwar (21 April 2015)	Perry Johnson Registrars Carbon Emissions Services, INC		
Client:	Client ref.:		
Biogas de Juarez S.A de C.V.	Hector Rangel		
<p><b>Project Name:</b> Ciudad Juarez Landfill Gas to Energy Project</p> <p><b>Country:</b> Mexico</p> <p><b>Methodology:</b> ACM0001: Flaring or use of landfill gas and ACM0002: Grid-connected electricity generation from renewable sources</p> <p><b>Version:</b> Version 15.0 and Version 16.0</p> <p><b>Sectoral Scope:</b> 13 and 1</p> <p><b>Project Type and Technology:</b></p> <p><b>ER estimate:</b> 123,208 tCO<sub>2e</sub> per year</p> <p><b>Size</b></p> <p><input checked="" type="checkbox"/> Large Scale</p> <p><input type="checkbox"/> Small Scale</p> <p><b>Validation Status</b></p> <p><input type="checkbox"/> Corrective Actions Requested</p> <p><input type="checkbox"/> Clarifications Requested</p> <p><input checked="" type="checkbox"/> Full Approval and submission for registration</p> <p><input type="checkbox"/> Rejected</p> <p>In summary, it is PJRCES's opinion that the renewal of crediting period (second period) of Ciudad Juarez Landfill Gas to Energy Project in Mexico, as described in the PDD, version 4.1 dated of 21 May 2015 meets all relevant UNFCCC requirements for the renewal of the crediting period and correctly applies the baseline and monitoring methodology ACM0001: Flaring or use of landfill gas version 15 and ACM0002: Grid-connected electricity generation from renewable sources version 16. PJRCES thus requests the renewal of the crediting period of the project.</p>			
UNFCCC Reg No.	Date of this revision:	Rev.	Key words:
1123	21 May 2015	03.1	Climate Change Kyoto Protocol Validation opinion Renewal of crediting period Clean Development Mechanism
Report title:			<input checked="" type="checkbox"/> No distribution without permission from the Client or responsible organisational unit <input type="checkbox"/> Limited distribution <input type="checkbox"/> Unrestricted distribution
Validation Report of Renewal of Crediting Period for Ciudad Juarez Landfill Gas to Energy Project			
Work carried out by:			
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### ABBREVIATIONS

BAU	Business as usual
BM	Building Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CL	Clarification request
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalent
CM	Combined Margin
DNA	Designated National Authority
EB	Executive Board
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LFG	Landfill Gas
LFGE	Landfill Gas to Energy
MP	Monitoring Plan
NDRC	National Development Reform Commission
NGO	Non-governmental Organisation
NCPG	North China Power Grid
OM	Operational Margin
PDD	Project Design Document
PJRCS	Perry Johnson Registrars Carbon Emissions Services, INC
PO	Project Owner
tCO <sub>2</sub> e	Tonnes of CO <sub>2</sub> equivalents
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard
WECM	Waste Energy Carrying Medium



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## 1 INTRODUCTION

Biogas de Juarez S.A de C.V has commissioned Perry Johnson Registrars Carbon Emissions Services, INC (PJRCES) to perform a validation of a registered project activity (registered No.1123) for a second renewal of crediting period of Ciudad Juarez Landfill Gas to Energy Project in Mexico (hereafter called “the project”). This report summarises the findings of the validation of the project, performed based on and in accordance with the CLEAN DEVELOPMENT MECHANISM PROJECT STANDARD, version 7 /08/.

### 1.1 OBJECTIVE

The PP has submitted a request for renewal of crediting period to UNFCCC CDM secretariat team on 28 May 2014 /18/ and selected PJRCES to carry out the validation of the crediting period renewal.

Purpose of this validation for second renewal of crediting period is to have an independent third party assessment of the whether the project participants have updated sections of the PDD version 4.1 dated 21 May 2015 relating to the baseline, estimated emission reductions and the monitoring plan using the most recent version of baseline and monitoring methodology applicable for the project activity.

### 1.2 SCOPE

Following the requirements of the CDM validation and verification standard, version 7, the validation scope for renewal of crediting period is to assess the validity of the original baseline or its update through an assessment of the following issues:

- (a) The impact of new relevant national and/or sectoral policies and circumstances on the baseline taking into account relevant guidance from the CDM Executive Board with regard to renewal of the crediting period at the time of requesting renewal of crediting period;
- (b) The correctness of the application of an approved baseline methodology for the determination of the continued validity of the baseline or its update, and the estimation of emission reductions for the applicable crediting period.



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### 2 VALIDATION TEAM AND QUALITY CONTROL

The validation of the project activity has been carried out by qualified personnel in line with the procedures defined in PJRCES's quality manual for validation and team definition. The validation report has undergone a technical review before requesting renewal of crediting of the project activity. An independent technical reviewer performed the technical review.

**Validation team:**

Name	Country	Role	Type of work carried out
Ricardo Costa	Brazil	Lead Validator	Desk review, site visit, resolution of issues, preparation of draft and final validation report, supervision of entire validation activity. Site visit, identification of CARs and CLs and its resolution.
Carlos Casco	Ecuador	Financial Expert	Project financial analysis, discussion of financial issues and inputs.
Bilal Anwar	United States	Technical Reviewer and Approver	Independent Technical review and final approval of the report



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### 3 METHODOLOGY OF VALIDATION

The validation of the project activity is carried out in the following phases:

- Desktop review of PDD/revised PDD and other relevant documents
- Follow up interviews (site visits) with the relevant stakeholders
- Resolution of the identified corrective action requests (CARs), clarification requests (CL) and forward action requests (FARs) if any, followed by the issuance of the final validation opinion and final validation report.

#### 3.1 DESK REVIEW

The desktop review includes:

- A review of the PDD (including annexes)/revised PDD and the relevant supporting documents. The detailed list of documents reviewed through out the validation process, are included in the section 6, under references.
- Preparation of project specific validation protocol in line with the requirements of the Validation and Verification Standard.
- Mandatory national and/or sectoral policies. Background investigation and follow-up interviews with personnel of the project proponent, the consultant, legal authorities and other stakeholders.
- Reporting of validation findings taking into account changes accrued from renewal of crediting period.

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

- It organizes, details and clarifies the requirements that a CDM project is expected to meet;
- It ensures a transparent validation process where the independent entity will document how a particular requirement has been validated and the result of the determination.

The validation protocol consists of two tables: Table 1 (Requirement checklist); and table 2 (Resolution of corrective Action and clarification request) as described in figure below.

The completed validation protocol is enclosed in Annex A to this report identifying Corrective Action Requests and clarification Requests.



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**Validation Protocol Table 1: Requirement checklist**

<b>CDM Validation requirement</b>	<b>Remarks / comments</b>	<b>Evidence</b>	<b>Conclusion</b>
<p>The various requirements as per para 37 of the CDM modalities and procedures, in line with the validation and verification standard</p> <p>The various requirements in Table 2 are linked to checklist questions the project should meet.</p>	<p>The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.</p>	<p>Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable</p>	<p>Final conclusion on the checklist question</p>

**Validation Protocol Table 2: Resolution of issues identified in Table 1**

<b>Draft report clarifications, corrective action requests and forward action requests</b>	<b>Ref. to checklist question in table 2</b>	<b>Summary of project owner response</b>	<b>Validation conclusion</b>
<p>If the conclusions from the draft Validation are either a CAR, FAR or a CL, these should be listed in this section.</p>	<p>Reference to the checklist question number in Table 2 where the CAR, FAR or CL is explained.</p>	<p>The responses given by the project participants during the communications with the validation team should be summarised in this section.</p>	<p>This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".</p>



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### 3.2 FOLLOW-UP INTERVIEWS

Between 28 and 29 of August 2014, Ricardo Costa from PJRCES visited the project site and interviewed project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of MGM Innova Group and Biogas de Juarez S.A de C.V were interviewed.

The main topics of the interviews are summarised in the table below.

#	Date	Name	Organization	Topic
1	28 - 29 August 2014	Ana Maria Zapata Velez	MGM Innova	<ul style="list-style-type: none"> <li>• Updation of PDD in accordance with section I of the Project standard /08/</li> <li>• Validity of the original baseline or any update due to impact of new relevant national and/or sectoral policies and circumstances on the baseline</li> <li>• Applicability of selected methodology</li> <li>• Emission reductions calculation</li> <li>• Monitoring plan and project management</li> </ul>
2	28 - 29 August 2014	Nancy Herrada	Biogas de Juarez S.A de C.V	<ul style="list-style-type: none"> <li>• Information of project participants, comparison with those in the registered project</li> <li>• New relevant national and/or sectoral policies and circumstances</li> <li>• Information of project operation</li> <li>• Project management</li> <li>• Emission reduction monitoring plan</li> </ul>

### 3.3 RESOLUTION OF CLARIFICATION AND CORRECTIVE ACTION REQUESTS

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified prior to PJRCES's positive conclusion on the renewal of the crediting period.

Corrective action requests (CAR) are issued, where:

- i) The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- ii) CDM and/or methodology specific requirements have not been met; or
- iii) There is a risk that emission reductions cannot be monitored or calculated.

A request for clarification (CL) may be used where additional information is needed to fully clarify an issue.

The Clarifications (CLs) and Corrective Action Requests (CARs) are raised, wherever applicable, during the validation and are further documented in Appendix A. The validation of the Project resulted in five CARs and one CL.

Following the satisfactory review of the response from the PP, the CARs, and CLs were closed before issuing the validation opinion.



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### 4 VALIDATION FINDINGS

The details of the assessment and the main results have been described below in accordance with the VVS reporting requirements. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

#### 4.1 PARTICIPANTS CONSISTENCY WITH THE NAMES OF REGISTERED PROJECT PARTICIPANTS

The PJRCES has checked that the names of the project participants included in the request for renewal of crediting period are consistent with the names of the registered project participants for the project activity.

#### Description of project activity for 1<sup>st</sup> crediting period and 2<sup>nd</sup> crediting period

Crediting Period	First crediting period	Second crediting period
UNFCCC Registration No.	1123	1123
Registration Date	30 November 2007	NA
Project's crediting period	30 November 2007 - 29 November 2014	30 November 2014 to 29 November 2021
Participating Parties	Mexico	Mexico
Project Participants	Biogas de Juarez S.A de C.V	Biogas de Juarez S.A de C.V
Baseline and Monitoring methodology & version:	ACM0001 Version 05: Consolidated baseline methodology for landfill gas project activities and ACM0002 Version 6: Consolidated baseline methodology for grid-connected electricity generation from renewable sources	ACM0001: Flaring or use of landfill gas version 15 and ACM0002: Grid-connected electricity generation from renewable sources, version 16
Annual emission reduction, in registered PDD	170,499 tCO <sub>2e</sub>	NA



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### 4.2 COMPLIANCE WITH REQUIREMENTS FOR RENEWAL OF CREDITING PERIOD

The project participant notified the CDM Secretariat by e-mail message on 28 May 2014 /18/ of their intention to renew the crediting period. It was also informed that PJRCES was the selected DOE and the updated CDM-PDD was sent to the Secretariat.

PJRCES visited the project activity installations, assessed the PDD and the applied baseline and monitoring methodology ACM0001: Flaring or use of landfill gas version 15 /01/ and ACM0002: Grid-connected electricity generation from renewable sources, version 16 /02/ and concluded that the project activity is applicable under the methodology requirements.

### 4.3 UPDATION OF SECTIONS OF PDD AS PER MOST RECENT VERSION OF BASELINE AND MONITORING METHODOLOGY

The project activity involves the implementation of landfill gas to energy with a flare as background at the Ciudad Juarez Municipal Landfill in Mexico.

The information presented in the PDD on the technical design has been assessed for accuracy and completeness using standard auditing techniques including:

Document review including

- 1) A review of data and information;
  - a. Crosscheck between information provided in the PDD and information from sources other than those used. The DOE's sectoral expert inputs were considered.
  - b. Follow-up actions including interviews and interviewing croschecks with plant operators and managers; personnel with knowledge of the project design, implementation and operation to ensure that no relevant information has been omitted.
- 2) Reference to available information relating to projects or technologies similar to the proposed project activity under validation or operation;

The names of the project participants included in the request for renewal of crediting period are consistent with the names stated already at UNFCCC website:

(<https://cdm.unfccc.int/Projects/DB/TUEV-SUED1179241731.11>)

#### **Project activity description:**

The Municipal Landfill of Ciudad Juarez started its operations in 1994. The landfill is designed in 3 cells: A, B and C. Waste landfilling and project activity started in area A. Landfilling ceased operations on April 2008 and on April 2013 the cell A was reopened and ceased operation on December 2014.

The Project Activity includes a landfill gas (LFG) collection system with active LFG extraction wells, a mounted skid blower system and a flare. The flare shall be used in cases when electricity generation system does not operate.

The Project Activity also includes an electricity generation system which uses LFG as fuel. The electricity generation system has 6.4MW of installed capacity. There are 4 Caterpillar generators (model G3520C /15/) of 1.6MW each.

According to the personnel interviewed during the site visit, the electricity generation system shall be



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increased and it is expected to be installed up to 20.8MW. However, no chronograms were presented.

The project design and engineering reflects good practice and is significantly better than the common practice of landfill gas use in Mexico as well in Latin America.

The project applies the approved baseline methodology ACM0001: Flaring or use of landfill gas, version 15.0 /01/. The compliance of applicability conditions were confirmed during the site visit and through the supported project documentation.

According to UNFCCC website, the estimated amount of emission reductions for the first crediting period was 170,499 metric tonnes CO<sub>2</sub> equivalent per annum. A new PDD 06 September 2013 a new PDD was approved due to a Request for post-registration changes. That PDD stated 160,361 metric tonnes CO<sub>2</sub> equivalent per annum.

The current PDD estimated the second crediting period (7 years) an amount of GHG emission reductions of 985,667 tCO<sub>2</sub>e from 30 November 2014 to 29 November 2021, resulting in estimated average annual emission reductions of 123,208 tCO<sub>2</sub>e.

The discrepancies between the periods are due to several factors as such over estimation to formulae uncertainties, waste age and low efficiency of the landfill gas collection system.

For an assessment of the ex-ante emission reductions estimates, please refer to paragraph 4.7.6 below.

### Opinion

PJRCES considers the project description to be complete and accurate. PJRCES also confirms that the final PDD, version 4.1 dated 21 May 2015 for the proposed project has been prepared using the CDM PDD Form – Project Design Document form, version 5 and filled in line with the Guidelines for completing the Project Design Document (CDM-PDD).

## 4.4 VALIDITY OF SELECTED BASELINE AND MONITORING METHODOLOGY

The project activity was originally registered based on ACM0001 Version 05: Consolidated baseline methodology for landfill gas project activities and on ACM0002 Version 06: Consolidated baseline methodology for grid-connected electricity generation from renewable sources. The CDM-PDD of the 2<sup>nd</sup> crediting period applies ACM0001 Version 15: Consolidated baseline methodology for landfill gas project activities /01/ and ACM0002 Version 16: Grid-connected electricity generation from renewable sources /02/. Those are the most recent versions at the time of submission of the revised PDD for the renewal of the crediting period as per the “CDM Project Standard” Version 07 /08/.

### Opinion

PJRCES considers the project description to be complete and accurate. PJRCES also confirms that the final PDD, version 4.1 dated 21 May 2015 for the proposed project has been prepared using the CDM PDD Form – Project Design Document form, version 5 and filled in line with the Guidelines for completing the Project Design Document (CDM-PDD), version 5.

## 4.5 APPLICABILITY OF THE SELECTED BASELINE METHODOLOGY



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The project correctly applies the approved baseline methodologies. The CDM-PDD of the 2<sup>nd</sup> crediting period applies ACM0001 Version 15: Consolidated baseline methodology for landfill gas project activities.

The validation team confirms that the baseline and monitoring methodologies selected by the project participants are the valid versions of those approved by the Board.

The assessment of applicability conditions of the methodology was carried out for each applicability criteria and included among others the compliance check of the local project setting with the applicability conditions concerning baseline setting and eligible project measures. PJRCES was able to verify that the project activity meets all applicability criteria of the baseline methodologies and the applicability of the methodology is justified since:

Methodology applicability criteria	Applicable or N/A	Justification / Explanation of Proposed Project Activity
a) Install a new LFG capture system in a new or existing SWDS where no LFG capture system was installed prior to the implementation of the project activity; or	Applicable	The Ciudad Juarez Landfill project installed a new LFG capture system in an existing SWSD where no LFG capture system was installed prior to the implementation of the project activity as started its operations in 1994 /13/.
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; and  - In the case of an existing active LFG capture system for which the amount of LFG cannot be collected separately from the project system after the implementation of the project activity and its efficiency is not impacted on by the project system: historical data on the amount of LFG capture and flared is available;	Not Applicable	The project activity is the installation of a new LFG capture system in an existing SWSD. Juarez Municipal Landfill started its operations in 1994 /13/. There are no evidences of an existing LFG capture system was installed prior to the implementation of the current project activity.
c) Flare the LFG and/or use the captured LFG in any (combination) of the following ways:  - Generating electricity;	Applicable	The project activity includes LFG capturing and electricity generation /14//15/.



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<ul style="list-style-type: none"> <li>- Generating heat in a boiler, air heater or kiln (brick firing only) or glass melting furnace; and/or</li> <li>- Supplying the LFG to consumers through a natural gas distribution network;</li> <li>- Supplying compressed/liquefied LFG to consumers using trucks;</li> </ul>		
Do not reduce the amount of organic waste that would be recycled in the absence of the project activity.	Not Applicable	As per the waste disposal evidences /13//16//17/ the project activity does not reduce the amount of organic waste disposed.

The analysis above substantiate that the project activity meets all applicability conditions of the Methodology ACM0001 Version 15: Consolidated baseline methodology for landfill gas project activities /01/. Therefore, the applied methodology ACM0001 Version 15: Consolidated baseline methodology for landfill gas project activities /01/ continues to be applicable to the project activity.

### 4.6 ASSESSMENT OF CORRECTNESS OF APPLICATION OF THE BASELINE METHODOLOGY FOR DETERMINATION OF THE CONTINUED VALIDITY OF THE BASELINE OR ITS UPDATE

According to the Methodological Tool “Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period”, /03/ it has been assessed the continued validity of the baseline scenario and to update the baseline at the renewal of a crediting period.

As demonstrated in the registered PDD, it has been confirmed that “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” is the most attractive course of action and the prevailing practice in Mexico as well in all Latin Americaa, and therefore remains the baseline scenario for the renewal of the crediting period. Project activity adopted the same baseline scenario as per the guidance of para 277 of Project Standard version 07.0 /08/.

PJRCES confirms, after the assessment of legal constraints that the current baseline scenario fulfils with National Policies and Laws /21/. In addition, according to the operation data log and LFGE plant visited there has not been noticed any differences among the registered PDD, Project Activity implementation and the new PDD /09/. Additionally, the project boundary are defined and verified to be in accordance with the ACM0001 Version 15: Consolidated baseline methodology for landfill gas project activities /01/, the project boundary is the site of the project activity where the gas will be captured and destroyed and/or used. Methodology ACM0002 states, the project boundary should encompass the physical and geographical site of the renewable generation source, as well as all power plants physically connected to the electricity system to which the CDM project is connected. Finally, during the validation of renewal of the crediting period, the possible baseline scenarios were considered as follow:

1. Implementing the project activity without CDM assistance, i.e. the landfill operator would invest in a LFG collection system, a high efficiency flaring system, as well as a LFG power generation equipment and necessary equipment to supply electricity to the grid;
2. Capturing the LFG and encapsulating it for sale;



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3. Building a fossil fuel-fired electricity generation plant (most likely a natural gas-fired turbine); or,
4. Continuing the business-as-usual scenario, i.e. using a passive simple venting system, and not implementing the project activity or any other alternative activities. This is, in fact, considered to be the most likely alternative to the project.

All scenarios are still in compliance with all applicable legal and regulatory requirements. Although the four scenarios are considered to be possible, the scenario "4" is considered to be the most plausible scenario.

The validity of the baseline is confirmed through following steps:

### Step 1.b - Consistency with mandatory laws and regulations

PJRCES confirms that during the site visit to Ciudad Juarez Municipal Landfill the current situation witnessed is the capture of the landfill gas which is used to produce electricity at the site. No requirements to destroy LFG were found for landfills that were already constructed before the issuance of

NOM-SEMARNAT-083-2003, which defines the specifications of environmental protection related to the selection, design, construction, operation, monitoring and closure of final disposal sites for municipal and hazardous solid waste. In addition, Municipalities in Mexico do not need to make any investments on LFG capturing and destruction, once it is not demanded by any regulation.

On Sub-step 1b (Consistency with mandatory laws and regulations) of the PPD, PPs have indicated a list of Mexican regulation related to environmental and waste issues. PJR technical expert through the review of documentation and government's websites visit confirmed the Municipal landfill and the project activity is in line of Mexican regulation.

### Opinion

The current baseline scenario of the project activity, passive release of methane to atmosphere, is still applicable in the host country. There are no policies, regulations or laws of any level that could have affected the baseline making it invalid. Hence, it can be concluded that the current baseline still complies with relevant mandatory national and sectoral policies.

### Step 1.2: Assess the impact of circumstances

The baseline scenario identified at the validation of the project activity was the continuation of the current practice without any investment.

Therefore, according to the "Procedures for Renewal of the Crediting Period of a Registered CDM Project Activity" (version 06.0), paragraph B.3:

*"The demonstration of the validity of the original baseline or its update does not require a reassessment of the baseline scenario, but rather **an assessment of the emissions which would have resulted from that scenario**".*

For the second crediting period, PPs have estimated emissions as per the "Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site" (version 6.0.1) and detailed the calculation on section B.6.3 of the PDD. The emissions estimates were calculated based on the same raw data (for instance, historic waste quantity) that were used in the original PDD, were approved by the DOE during validation, and were approved by the CDM EB at registration.





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The estimates used properly data as PJR technical experts understands the composition of the waste and landfilling conditions are the same as there are no new technologies employed on the waste treatment by the Municipality of Juarez. Therefore, PPs have demonstrated the assessment of the emissions in a correct and clear manner.

### Opinion

The current baseline scenario of the project activity, passive release of methane to atmosphere, is still applicable in the host country. No national policies regulations and laws have affected the baseline to make it invalid. Hence, it can be concluded that the current baseline still complies with relevant mandatory national and/sectoral policies.

### **Step 1.3: Assess whether the continuation of the use of current baseline equipment(s) is technically possible**

Not applicable as no equipment was installed prior to the project activity.

### **Step 1.4: Assessment of the validity of the data and parameters**

PPs have presented further information of this step on sub-step 2.2 of the PDD.

The data and parameters used in the equations, including references to data sources used in the formulae are discussed in the section 4.7 of this report, which are considered to be in traceable and correct. For the second crediting period the ex-ante data and fixed ex-ante parameters were updated as per the latest version of the methodological tools used for baseline calculation. Those are described on section B.6.2 of the PDD and are considered to be correct. Also, formulae applied in the calculation are in accordance with methodology, tools and guidance.

### **Step 2.-Update the current baseline and the data and parameters**

#### **Step 2.1: Update the current baseline**

The baseline scenario identified at the validation of the project activity was the continuation of the current practice without any investment.

Therefore, according to the "Procedures for Renewal of the Crediting Period of a Registered CDM Project Activity" (version 06.0), paragraph B.3:

*"The demonstration of the validity of the original baseline or its update does not require a reassessment of the baseline scenario, but rather **an assessment of the emissions which would have resulted from that scenario**".*

### Opinion

The current baseline scenario of the project activity, passive release of methane to atmosphere, is still applicable in the host country. No national policies regulations and laws have affected the baseline to make it invalid. Hence, it can be concluded that the current baseline still complies with relevant mandatory national and/sectoral policies.





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### Step 2.2: Update the data and parameters

The data and parameters used in the equations, including references to data sources used in the formulae are discussed in the section 4.7 of this report, which are considered to be in traceable and correct. Formulae applied in the calculation are in accordance with methodology, tools and guidance.

For the second crediting period the ex-ante data and fixed ex-ante parameters were updated as per the latest version of the methodological tools used for baseline calculation and are described on section B.6.2 of the PDD.

In addition, PPs have updated operating margin and build margin in accordance with the Tool to calculate the emission factor for an electricity system and the most recent data is applied for the relevant parameters PPs have presented those on section 6.2 and on Annex03.

### 4.7 VALIDITY OF MONITORING PLAN

PPs have described the monitoring plan in section “B.7. Monitoring plan” and Annex 04. The Information is in line with the approved monitoring methodology ACM0001: Flaring or use of landfill gas version 15 /01/, ACM0002: Grid-connected electricity generation from renewable sources version 16 /02/ and as per the tool “Emissions from solid waste disposal sites” v. 06.0.1. Those were confirmed during the on-site interviews with the project operators and representatives and by PJRCES Technical Expert investigation. The monitoring plan is confirmed to be able to record real measurements of emission.

#### 4.7.1 PARAMETERS DETERMINED EX-ANTE

PJRCES has assessed the assumptions and data sources of the parameters that will remain fixed throughout the crediting period. PJRCES staff has reviewed calculation spreadsheet and reproduced the calculation using the equipment specifications for comparison, which were found correct and complying with the methodology and VVS /07/.

The detailed calculations of the emission factor of the dedicated captive power plant are described in the following section 4.7. The following parameters are determined ex-ante and verified by PJRCES.

#### As per the methodology ACM0001 v.15

Data and parameters	Unit	Ex-ante determined value	Data Sources and Validation Opinion
Global Warming Potential of CH <sub>4</sub> (GWP <sub>CH4</sub> )	tCO <sub>2e</sub> /tCH <sub>4</sub>	21	PPs have used the COP/MOP decision for the first commitment period, which is considered to be in accordance with best practices and conservative.
Efficiency of the LFG capture system that will be installed in the project activity ( $h_{p,j}$ )	%	50	PPs applied the default value of 50%, which is considered to be in accordance with best practices and conservative.



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As per the methodology ACM0002 v.16

Data and parameters	Unit	Ex-ante determined value	Data sources						
Operating Margin Emission Factor (EF <sub>OM,y</sub> )	Tons of CO <sub>2</sub> /MWh	0.6484 (2010/2011/2012 average value)	PPs have determined OMEF and BMEF in accordance to (ACM0002) /02/						
Build Margin Emission Factor (EF <sub>BM,y</sub> )	Tons of CO <sub>2</sub> /MWh	0.3157	Data source and values used to calculate the OMEF and BMEF were based on public information provided by Mexican Official Statistics website /19/. In addition, PPs have provided details on Annex 3 of the PDD. Grid EF Mexico_Second crediting period spreadsheet /20/ demonstrates calculation, which is clearly and found correct.						
Amount of each fossil fuel consumed by each power source / plant (F <sub>i,y</sub> )	Tera Joules	288,522	Data source and values used are public information provided by Department of Energy of Mexico /19/. In addition, PPs have provided details on Annex 3 of the PDD. Grid EF Mexico_Second crediting period spreadsheet /20/ demonstrates calculation, which is clearly and found correct.						
Emission Factor Coefficient (COEF <sub>i</sub> )	tC/TJ	<table><tr><td>Oil - based</td><td>20.2</td></tr><tr><td>Natural gas</td><td>15.3</td></tr><tr><td>Coal</td><td>25.8</td></tr></table>	Oil - based	20.2	Natural gas	15.3	Coal	25.8	Values are IPCC Default Values applied on the calculations as per ACM0002. It is considered to be in accordance and conservative.
Oil - based	20.2								
Natural gas	15.3								
Coal	25.8								
Electricity Quantity (GEN <sub>i</sub> )	MWh	255,582 (average from 2000 to 2012)	Data source and values used was based on public information provided by Mexican Official Statistics website /19/.						



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			In addition, PPs have provided details on Annex 3 of the PDD. Grid EF Mexico_Second crediting period spreadsheet /20/ demonstrates calculation, which is clearly and found correct.
Carbon Emission Intensity Factor ( $CEF_{\text{electricity},y}$ )	Tons of $CO_2/MWh$	0.3989	<p>PPs have determined the <math>CEF_{\text{electricity},y}</math> in accordance to (ACM0002).</p> <p>Data source and values used to calculate the <math>CEF_{\text{electricity},y}</math> were based on public information provided by Mexican Official Statistics website.</p> <p>In addition, PPs have provided details on Annex 3 of the PDD. Grid EF Mexico_Second crediting period spreadsheet /20/ demonstrates calculation, which is clearly and found correct.</p>

### As per tool “Emissions from solid waste disposal sites” v. 06.0.1

Data and parameters	Unit	Ex-ante determined value	Data Sources and Validation Opinion
Regulatory requirements relating to landfill gas projects	Dimensionless	NA	There are no policies, regulations or laws of any level that could have affected the baseline to make it invalid. This shall be assessed on the beginning of each crediting period.
Default value for the model correction factor to account for model uncertainties ( $\Phi_{\text{default}}$ )	Dimensionless	0.75	PPs have applied a default value as per indicated on the tool “Emissions from solid waste disposal sites”. It is considered to be in accordance and conservative.



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Oxidation factor (OX)	Dimensionless	0.1	Values are IPCC Default Values applied on the calculations as per ACM0001. It is considered to be in accordance and conservative.										
Methane correction factor (MCF <sub>default</sub> )	Dimensionless	1.0	Values are IPCC Default values as per ACM0001. It is considered to be in accordance and conservative. The Municipal Landfill is an anaerobic and well-managed solid waste disposal site, which was witnessed during the site visit.										
Decay rate for the waste type j (K <sub>j</sub> )	1/yr	<table> <tr> <th>Waste type</th> <th>K<sub>j</sub></th> </tr> <tr> <td>Pulp, paper and cardboard</td> <td>0.040</td> </tr> <tr> <td>Wood &amp; Straw (excl. lignin)</td> <td>0.020</td> </tr> <tr> <td>Garden/Park Waste (organic putrescibles)</td> <td>0.050</td> </tr> <tr> <td>Food, food waste, beverages and tobacco</td> <td>0.060</td> </tr> </table>	Waste type	K <sub>j</sub>	Pulp, paper and cardboard	0.040	Wood & Straw (excl. lignin)	0.020	Garden/Park Waste (organic putrescibles)	0.050	Food, food waste, beverages and tobacco	0.060	Values are IPCC Default Values applied on the calculations as per ACM0001 /01/. They are considered to be in accordance and conservative.
Waste type	K <sub>j</sub>												
Pulp, paper and cardboard	0.040												
Wood & Straw (excl. lignin)	0.020												
Garden/Park Waste (organic putrescibles)	0.050												
Food, food waste, beverages and tobacco	0.060												
Fraction of methane in the SWDS gas (volume fraction) (F)	Dimensionless	0.5	Value is an IPCC Default Value applied on the calculations as per ACM0001/20/. It is considered to be in accordance and conservative.										
Default value for the fraction of degradable organic carbon (DOC) in MSW that decomposes in the SWDS (DOC <sub>f, default</sub> )	Weight fraction	0.5	Value is an IPCC Default Value applied on the calculations as per ACM0001/20/. It is considered to be in accordance and conservative.										



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### 4.7.2 PARAMETERS MONITORED EX-POST

The monitoring plan is in accordance with the applicable methodologies and tool. The following data and parameters will be monitored:

As per the methodology ACM0001 v.15

Data and parameters	Unit	Ex-Post	Data Sources and Validation Opinion
Management of SWDS	Dimensionless	NA	Use different sources of data: (a) Original design of the landfill; (b) Technical specifications for the management of the SWDS; (c) Local or national regulations Municipal Landfill has a regular standard design. There are no signs that the Municipal Landfill includes any practice or equipment that could increase methane generation. Municipal Landfill design is considered to be in accordance to best practices.
Operating hours of the equipment that consumes the LFG (energy plant) ( $OP_{j,h}$ )	hours	NA	Data is continuously measured and recorded by a recording device installed on the motogenerator (ID# 10231961). Information is electronic reported and displayed in the control room of the energy plant. Equipment is considered to be in accordance and works properly and can be clearly checked. The process is considered to be in accordance to best practices.
Amount of electricity generated using LFG by the project activity in year $y$ ( $EGP_{j,y}$ )	MWh	47,142 (Average Value)	Data is continuously measured and recorded by electrical meters (ID# PT-0812A448-01) installed at the plant and the data will be archived electronically. Electricity meter shall be maintained and calibrated as per equipment specifications. The readings are checked by the electricity distribution company, which shall issue invoices with the correct amount of produced electricity. The process is considered to be in accordance to best practices.
Amount of electricity	MWh	1.23	Data is continuously measured and recorded by electrical meters (ID# PT-0812A448-01) installed at



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consumed by the project activity in year $y$ ( $EG_{EC,y}$ )			<p>the plant and the data will be archived electronically. Electricity meter shall be maintained and calibrated as per equipment specifications. The readings are checked by the electricity distribution company, which shall issue invoices with the correct amount of produced electricity.</p> <p>The process is considered to be in accordance to best practices.</p>
Net quantity of electricity exported during year $y$ , in megawatt hours ( $EL_y$ )	MWh	47,142 (Average Value)	<p>Data is continuously measured and recorded by electrical meters installed at the plant and the data will be archived electronically. Electricity meter (ID# PT-0812A448-01) shall be maintained and calibrated as per equipment specifications. The readings are checked by the electricity distribution company which shall issue invoices with the correct amount of produced electricity.</p> <p>The process is considered to be in accordance to best practices.</p>

### As per tool "Project emissions from flaring" v.02.0.0

Data and parameters	Unit	Ex-Post	Data Sources and Validation Opinion
Temperature in the exhaust gas of the enclosed flare in minute $m$ . ( $T_{EG,m}$ )	°C	NA	<p>Data is continuously measured and by Type N thermocouples (a) 038-80-TT-3032 / 9B0BBE231C1; b) 038-80-TT-3034 / 9B0BC0231C1) installed at the plant and the data will be recorded and archived electronically. Type N thermocouple shall be maintained and calibrated as per equipment specifications.</p> <p>The process is considered to be in accordance to best practices.</p>
Volumetric fraction of component $i$ in the residual gas in the hour $h$	NA	NA	<p>Data is continuously measured and at least hourly averaged by an analyser installed (ID# 038-</p>



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where $i = \text{CH}_4, \text{N}_2$ ( $V_{i,\text{RG},m}$ )			01-ANAL-5201–0739666-1) at the plant. Data will be archived electronically. Analyser shall be maintained and calibrated as per equipment specifications. The process is considered to be in accordance to best practices.
Volumetric fraction of $\text{O}_2$ in the exhaust gas on a dry basis at reference conditions in the minute $m$ ( $V_{\text{O}_2,\text{EG},m}$ )	NA	NA	
Volumetric flow rate of the residual gas on a dry basis at reference conditions in the minute $m$ ( $V_{\text{RG},m}$ )	$\text{m}^3/\text{h}$	NA	Data is continuously measured and minute averaged by a flow meter (ID# 07210815 Model: 83F-T08S1SST) installed at the plant. Data will be archived electronically. Flow meter shall be maintained and calibrated as per equipment specifications. The process is considered to be in accordance to best practices.
Amount of LFG flared ( $\text{LFG}_{\text{flared},y}$ )	$\text{Nm}^3$	742,369	Data is continuously measured by a flow meter (ID# 07210815 Model: 83F-T08S1SST) installed at the plant. Data will be archived electronically. Flow meter shall be maintained and calibrated as per equipment specifications. The process is considered to be in accordance to best practices.
Amount of LFG flared ( $\text{LFG}_{\text{total},y}$ )	$\text{Nm}^3$	7,423,693	
Amount of LFG flared ( $\text{LFG}_{\text{electricity},y}$ )	$\text{Nm}^3$	6,681,324	
Methane fraction in the Landfill Gas ( $w_{\text{CH}_4}$ )	%	50	Data is continuously measured by an analyser installed at the plant. Data will be archived electronically. Analysers shall be maintained and calibrated as per equipment specifications. The process is considered to be in accordance to best practices.



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Flare/combustion efficiency (FE)	%	97	<p>Data is measured every minute by an analyser installed at the plant or in case exhaust gas is not analysed a default efficiency of 90% will be used. Data will be archived electronically. Analysers shall be maintained and calibrated as per equipment specifications.</p> <p>The process is considered to be in accordance to best practices.</p>
Amount of waste type I (Ai)	t/year	0	<p>Waste is weighted on scales on the entrance of the landfill. The Municipaplity who controls and operates the landfill issues weight tickets /17/.</p> <p>Scales shall be maintained and calibrated as per equipment specifications.</p> <p>The process is considered to be in accordance to best practices.</p>
Methane destroyed due to regulatory or other requirements (MD <sub>reg</sub> or AF)	%	0	<p>There are no policies, regulations or laws of any level that could have impacted the baseline to make it invalid.</p> <p>This shall be assessed on the begginig of each crediting period.</p> <p>The process is considered to be in accordance to best practices.</p>
Project emissions from flaring of the residual gas stream in year y (PE <sub>flare,y</sub> )	tCO <sub>2e</sub>	314	<p>Project emissions from flaring of the residual gas shall be monitored as per Tool “<i>Project emissions from flaring</i>” version 2.0.</p>





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Concentration of methane in the exhaust gas of the flare in dry basis at normal conditions in the hour $h$ ( $fV_{CH_4,FG,h}$ )	$m^3/h$	NA	Data is continuously measured and at least hourly averaged by an analyser installed at the plant. Data will be archived electronically. Analyser shall be maintained and calibrated as per equipment specifications.  The process is considered to be in accordance to best practices.
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### **Opinion:**

PJRCES confirms that the description of the monitoring plan contains all necessary parameters, that they are described and that the means of monitoring described in the PDD /09/ plan complies with the requirements of ACM0001, ACM0002 and including applicable tools.

The monitoring and recording of the required parameters will be carried out by trained personnel who will be managed by Biogas de Juarez, S.A. de C.V.

Details of the data to be collected, the frequency of data recording and its format, responsibilities and authorities for project management, procedures for monitoring and reporting, QA/QC procedures, procedures for calibration of metering equipment and procedures for training and maintenance have been elaborated in the monitoring plan described in the Section B.7.1 and B.7.3 of the PDD /09/. Relevant project management procedures are established and implemented.

All monitoring data will be archived for the crediting period plus 2 years beyond as per the approved monitoring methodology. All these elements will also be further verified during verification.

The project participant has been interviewed and it has been observed during the site visit that the monitoring arrangements described in the monitoring plan are feasible within the project design. From the above discussion, it has been concluded that PP has sufficient ability to implement the monitoring plan.

### **Conclusion**

Following the requirements of the paragraph 132 of the CDM-VVS /07/, after reviewing the evidences provided by PPs and crosschecking with public literature, interviewing stakeholders during on site visit and based on the validation team sectoral expertise, PJRCES is able to confirm that:

- The monitoring plan is fully in compliance with the requirements of the applied monitoring ACM0001, ACM0002 and including applicable tools;
- The monitoring arrangements described in the PDD are feasible and adequate with the project design, and;
- The PPs are able to implement the monitoring plan.



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### 4.8 ESTIMATION OF GHG EMISSIONS

The identified baseline scenario is the release of landfill gas to atmosphere. This scenario is still valid as per Mexican regulations and as per latest version of ACM0001

The emission reductions (ER<sub>y</sub>) by the project activity during the crediting period is the difference between baseline emissions (BE<sub>y</sub>), project emissions (PE<sub>y</sub>) and emissions due to leakage (LE<sub>y</sub>).

#### Baseline emissions

The baseline emissions were calculated according to the following formulas from the methodology ACM0001 version 15 ACM0002 version 16 and applicable tools:

$$BE_y = BE_{CH_4,y} + BE_{EC,y} + BE_{HG,y} + BE_{NG,y}$$

Where:

$BE_y$	= Baseline emissions in year y (t CO <sub>2</sub> e/yr) = 123,523
$BE_{CH_4,y}$	= Baseline emissions of methane from the SWDS in year y (t CO <sub>2</sub> e/yr) = 104,718
$BE_{EC,y}$	= Baseline emissions associated with electricity generation in year y (t CO <sub>2</sub> /yr) = 18,805
$BE_{HG,y}$	= Baseline emissions associated with heat generation in year y (t CO <sub>2</sub> /yr) = 0
$BE_{NG,y}$	= Baseline emissions associated with natural gas use in year y (t CO <sub>2</sub> /yr) = 0

#### **Step 1: Baseline emissions of methane from the SWDS (BE<sub>CH<sub>4</sub>,y</sub>)**

Baseline emissions of methane from the SWDS are determined based on the amount of methane that is captured under the project activity and the amount that would be captured and destroyed in the baseline (such as due to regulations). In addition, the effect of methane oxidation that is present in the baseline and absent in the project is taken into account.

$$BE_{CH_4} = (1 - OX_{top\_layer}) * (F_{CH_4,PJ,y} - F_{CH_4,BL,y}) * GWP_{CH_4}$$

Where:

$BE_{CH_4,y}$	= Baseline emissions of methane from the SWDS in year y (t CO <sub>2</sub> e/yr) = 0
$OX_{top\_layer}$	= Fraction of methane in the LFG that would be oxidized in the top layer of the SWDS in the baseline (dimensionless) = 0
$F_{CH_4,PJ,y}$	= Amount of methane in the LFG which is flared and/or used in the project activity in year y (t CH <sub>4</sub> /yr) = ex-post
$F_{CH_4,BL,y}$	= Amount of methane in the LFG that would be flared in the baseline in year y (t CH <sub>4</sub> /yr) = 0
$GWP_{CH_4}$	= Global warming potential of CH <sub>4</sub> (t CO <sub>2</sub> e/t CH <sub>4</sub> ) = 21

#### **Step A.1: Ex post determination of F<sub>CH<sub>4</sub>,PJ,y</sub>**



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During the crediting period,  $F_{CH_4,PJ,y}$  is determined as the sum of the quantities of methane flared and used in power plant(s), boiler(s), air heater(s), glass melting furnace(s), kiln(s) and natural gas distribution network, as follows:

$$F_{CH_4,PJ,y} = F_{CH_4,flared,y} + F_{CH_4,EL,y} + F_{CH_4,HG,y} + F_{CH_4,NG,y}$$

Where:

- $F_{CH_4,PJ,y}$  = Amount of methane in the LFG which is flared and/or used in the project activity in year y (t CH<sub>4</sub>/yr) = ex-post
- $F_{CH_4,flared,y}$  = Amount of methane in the LFG which is destroyed by flaring in year y (t CH<sub>4</sub>/yr) = ex-post
- $F_{CH_4,EL,y}$  = Amount of methane in the LFG which is used for electricity generation in year y (t CH<sub>4</sub>/yr) = ex-post
- $F_{CH_4,HG,y}$  = Amount of methane in the LFG which is used for heat generation in year y (t CH<sub>4</sub>/yr) = ex-post
- $F_{CH_4,NG,y}$  = Amount of methane in the LFG which is sent to the natural gas distribution network in year y (t CH<sub>4</sub>/yr) = ex-post

*Amount of methane destroyed by flaring ( $F_{CH_4,flared,y}$ )*

$F_{CH_4,flared,y}$  is determined as the difference between the amount of methane supplied to the flare system and any methane emissions from the flare system, as follows:

$$F_{CH_4,flared,y} = F_{CH_4,sent\_flare,y} - \frac{PE_{flare,y}}{GWP_{CH_4}}$$

Where:

- $F_{CH_4,flared,y}$  = Amount of methane in the LFG which is destroyed by flaring in year y (t CH<sub>4</sub>/yr) = ex-post
- $F_{CH_4,sent\_flare,y}$  = Amount of methane in the LFG which is sent to the flare in year y (t CH<sub>4</sub>/yr) = ex-post
- $PE_{flare,y}$  = Project emissions from flaring of the residual gas stream in year y (t CO<sub>2</sub>e/yr) = ex-post
- $GWP_{CH_4}$  = Global warming potential of CH<sub>4</sub> (t CO<sub>2</sub>e/t CH<sub>4</sub>) = 21

$F_{CH_4,sent\_flare,y}$  is determined directly using the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream", applying the requirements described above where the gaseous stream the tool shall be applied to is the LFG delivery pipeline to the flare system.

The project emissions from flaring of the residual gas stream ( $PE_{flare,y}$ ) are estimated using the Tool to determine project emissions from flaring version 02.0.0.

$$PE_{flare,y} = GWP_{CH_4} * \sum_{m=1}^{525600} F_{CH_4,RG,m} * (1 - \eta_{flare,m}) * 10^{-3}$$



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Where:

$PE_{flare,y}$	= Project emissions from flaring of the residual gas stream in year y (t CO <sub>2</sub> e/yr) = 314
$GWP_{CH4}$	= Global warming potential of CH <sub>4</sub> (t CO <sub>2</sub> e/t CH <sub>4</sub> ) =21
$F_{CH4,RG,m}$	= Mass flow of methane in the residual gas in the minute m (kg) =0
$GWP_{CH4}$	= Global warming potential of CH <sub>4</sub> (t CO <sub>2</sub> e/t CH <sub>4</sub> ) =21
$\eta_{flare,m}$	= Flare efficiency in minute m =0.97

For the *ex-ante* calculation, the flare efficiency is considered 97% based on the flare specifications. However, the actual hourly flare efficiency will be monitored according to the monitoring methodology stated in the Tool for project emissions from flaring and taken into account for the *ex-post* project emissions calculation.

### Step A.1.1: Ex ante estimation of $F_{CH4,PJ,y}$

An *ex ante* estimate of  $F_{CH4,PJ,y}$  is required to estimate baseline emission of methane from the SWDS (according to equation 2) in order to estimate the emission reductions of the proposed project activity in the CDM-PDD. It is determined as follows:

$$F_{CH4,PJ,y} = \eta_{PJ} * BE_{CH4,SWDS,y} / GWP_{CH4}$$

Where:

$F_{CH4,PJ,y}$	= Project emissions from flaring of the residual gas stream in year y (t CO <sub>2</sub> e/yr) = 314
$\eta_{PJ}$	= Efficiency of the LFG capture system that will be installed in the project activity =0.5
$BE_{CH4,SWDS,y}$	= Amount of methane in the LFG that is generated from the SWDS in the baseline scenario in year y (t CO <sub>2</sub> e/yr) =104,718
$GWP_{CH4}$	= Global warming potential of CH <sub>4</sub> (t CO <sub>2</sub> e/t CH <sub>4</sub> ) = 21

$BE_{CH4,SWDS,y}$  is determined using the methodological tool “Emissions from solid waste disposal sites”. The following guidance should be taken into account when applying the tool:

- $f_y$  in the tool shall be assigned a value of 0 because the amount of LFG that would have been captured and destroyed is already accounted for in equation 2 of this methodology;
- In the tool,  $x$  begins with the year that the SWDS started receiving wastes (e.g. the first year of SWDS operation); and
- Sampling to determine the fractions of different waste types is not necessary because the waste composition can be obtained from previous studies.



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To calculate the methane generation potential, the following formula from Tool “Emissions from solid waste disposal sites” should be used:

$$\left\langle \begin{matrix} BE_{CH_4, SWDS, y} \\ PE_{CH_4, SWDS, y} \\ LE_{CH_4, SWDS, y} \end{matrix} \right\rangle = \phi_y (1 - f_y) \cdot GWP_{CH_4} \cdot (1 - OX) \cdot \frac{16}{12} \cdot F \cdot DOC_{f, y} \cdot MCF_y \cdot \sum_{i=1}^m \sum_j W_{j, x} \cdot DOC_j \cdot e^{-k_j \cdot (y-x)} \cdot (1 - e^{-k_j})$$

Where:

$BE_{CH_4, SWDS, y}$	= Amount of methane in the LFG that is generated from the SWDS in the baseline scenario in year y (t CO <sub>2</sub> e/yr) =104,718
$\phi_y$	= Model correction factor to account for model uncertainties for year y =0.75
$f_y$	= Fraction of methane captured at the SWDS and flared, combusted or used in another manner that prevents the emissions of methane to the atmosphere in year y =0
$GWP_{CH_4}$	= Global warming potential of CH <sub>4</sub> (t CO <sub>2</sub> e/t CH <sub>4</sub> ) =21
$OX$	= Oxidation factor (reflecting the amount of methane from SWDS that is oxidised in the soil or other material covering the waste) =0.1
$F$	= Fraction of methane in the SWDS gas (volume fraction) =0.5
$DOC_{f, y}$	= Fraction of degradable organic carbon (DOC) that decomposes under the specific conditions occurring in the SWDS for year y (weight fraction) =0.5
$MCF_y$	= Methane Correction Factor for year y =1
$W_{j, x}$	= Amount of solid waste type j disposed or prevented from disposal in the SWDS in the year x (t) =414,529
$DOC_j$	= Fraction of degradable organic carbon in the waste type j (weight fraction) =0.139
$k_j$	= Decay rate for the waste type j (1 / yr) =0.034
$j$	= Type of residual waste or types of waste in the MSW
$x$	= Years in the time period in which waste is disposed at the SWDS, extending from the first year in the time period (x = 1) to year y (x = y).
$y$	= Year of the crediting period for which methane emissions are calculated (y is a consecutive period of 12 months) =

### Step A.1.2: Determination of $F_{CH_4, BL, y}$

This step provides a procedure to determine the amount of methane that would have been captured and destroyed (by flaring) in the baseline due to regulatory or contractual requirements, or to address safety and odour concerns (collectively referred to as requirement in this step). The four cases in Table 2 are distinguished. The appropriate case should be identified and the corresponding instructions followed.



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### Cases for determining methane captured and destroyed in the baseline

Situation at the start of the project activity	Requirement to destroy methane	Existing LFG capture and destruction system
Case 1	No	No
Case 2	Yes	No
Case 3	No	Yes
Case 4	Yes	Yes

The proposed project activity corresponds to case 1: *No requirement to destroy methane exists and no existing LFG capture system.*

This selection is justified because regulatory requirements do not indicate any specific amount of gas collection and destruction or utilization and that in practice, no amounts of LFG are actually collected and flared in the Ciudad Juarez landfill. Therefore,  $F_{CH_4, BL, y}$  will be equal to zero for the *ex-ante* ER calculation. Nevertheless, laws and regulations will be periodically, and at least once a year, reviewed and the  $F_{CH_4, BL, y}$  will be modified accordingly in case any law or regulation requires a minimal amount of methane to be captured and/or destroyed.

### Step A.2: Baseline emissions associated with electricity generation ( $BE_{EC, y}$ )

The baseline emissions associated with electricity generation in year  $y$  ( $BE_{EC, y}$ ) is calculated using the “*Tool to calculate baseline, project and/or leakage emissions from electricity consumption*”. When applying the tool:

- (a) The electricity sources  $k$  in the tool correspond to the sources of electricity generated identified in the selection of the most plausible baseline scenario; and
- (b)  $EC_{BL, k, y}$  in the tool is equivalent to the net amount of electricity generated using LFG in year  $y$  ( $EG_{PJ, y}$ )

**Scenario A** described in the Tool applies for the calculation in the following equation:

$$BE_{EC, y} = \sum_k EC_{BL, k} * EF_{EL, k, y} * (1 + TDL_{k, y})$$

Where:

$BE_{EC, y}$  = Baseline emissions from electricity consumption in year  $y$  (tCO<sub>2</sub>/yr) =0

$EC_{BL, k}$  = Quantity of electricity that would be consumed by the baseline electricity consumption source  $k$  in year  $y$  (MWh/yr) =0

$EF_{EL, k, y}$  = Emission factor for electricity generation for source  $k$  in year  $y$  (tCO<sub>2</sub>/MWh) =0



## VALIDATION OPINION: RENEWAL OF CREDITING PERIOD

$TDL_{k,y}$  = Average technical transmission and distribution losses for providing electricity to source k in year y = 0

Following the option A1 of the scenario A, the  $EF_{EL,k,y}$  will be determined by following the “*Tool to calculate the emission factor for an electricity system*” (which will be described later in this section), which is the calculation of a combined emission factor of the applicable electricity system ( $EF_{EL,k,y} = EF_{grid,CM,y}$ ). As stated in the Tool to calculate baseline, project and/or leakage emissions from electricity consumption, the default value of 3% will be used for  $TDL_{k,y}$ .

### Project emissions:

Project emissions are calculated as follows:

$$PE_y = PE_{EC,y} + PE_{FC,y}$$

Where:

$PE_y$  = Project emissions in year y (t CO<sub>2</sub>/yr) = 0

$PE_{EC,y}$  = Emissions from consumption of electricity due to the project activity in year y (t CO<sub>2</sub>/yr) consumption source k in year y (MWh/yr) = 0

$PE_{FC,y}$  = Emissions from consumption of fossil fuels due to the project activity, for purpose other than electricity generation, in year y (t CO<sub>2</sub>/yr) = 0

It is not foreseen any use of fossil fuels on Ciudad Juarez landfill due to the implementation of the project activity ( $PE_{FC,y}=0$ ); hence, the project emissions are equivalent to emissions from electricity consumption and will be calculated as follows:

$$PE_y = PE_{EC,y}$$

The project emissions from consumption of electricity by the project activity ( $PE_{EC,y}$ ) shall be calculated using the “*Tool to calculate baseline, project and/or leakage emissions from electricity consumption*”:

$$PE_{EC,y} = \sum_k EC_{PJ,j,y} * EF_{EL,j,y} * (1 + TDL_{j,y})$$

Where:

$PE_{EC,y}$  = Are the project emissions from electricity consumption by the project activity in the year y (tCO<sub>2</sub> / yr) = 0

$EC_{PJ,j,y}$  = Quantity of electricity consumed by the project electricity consumption source j in year y (MWh/yr) = 0



## VALIDATION OPINION: RENEWAL OF CREDITING PERIOD

$EF_{EL,j,y}$  = Emission factor for electricity generation for source  $j$  in year  $y$  (tCO<sub>2</sub>/MWh) = 0

$TDL_{j,y}$  = Average technical transmission and distribution losses for providing electricity to source  $j$  in year  $y$  (%) = 0

Following the option A1 of the scenario A, the  $EF_{EL,j,y}$  will be determined by following the “*Tool to calculate the emission factor for an electricity system*” (which will be described next in this section). As stated in the Tool to calculate baseline, project and/or leakage emissions from electricity consumption, the default value of 20% will be used for  $TDL_{j,y}$ .

### **From the “Tool to calculate the emission factor for an electricity system”**

The tool is employed since it has been identified that the emission factor for the electricity generation for source  $k$  and  $j$  would be from the interconnected national grid ( $EF_{EL,k,y}$  and  $EF_{EL,j,y}$ ).

The steps to following for calculate emission factor are:

1. Identify the relevant electric system.
2. Choose whether to include off-grid power plants in the project electricity system (optional).
3. Select a method to determine the operating margin (OM).
4. Calculate the operating margin emission factor according to the selected method.
5. Calculate the build margin emission factor.
6. Calculate the combined margin (CM) emissions factor.

#### *Step 1. Identify the relevant electric system.*

The regions in the Mexican grid are interconnected; for this, the relevant electric power system is the entire Mexican grid (Source: SENER “Electricity Sector Outlook 2008-2017”), moreover the public information of the Mexican Energy Ministry “SENER” is for type of fuel for consumption and fuel share and technology for gross generation and power share, not for regions.

#### *Step 2 - Calculate the Operating Margin (OM) emission factor(s) ( $EF_{OM,y}$ )*

As per the approved methodology ACM0002, dispatch data analysis should be the first methodological choice. However due to lack of data availability ‘Dispatch Data Analysis’ is not selected. According to ACM0002, the “Simple OM” method is applicable to any project activity connected to the project electricity system (grid) where the low cost/must run resources constitutes less than 50% of the total grid generation. This is the situation presented by the Ciudad Juarez Landfill Gas to Energy Project; hence, the Simple OM method is applicable. The OM can be calculated *ex-ante*, using the full generation weighted average for the most recent 3 years for which data are available at the time of PDD submission.

The Simple OM emission factor ( $EF_{OM,simple,y}$ ) is calculated as the generation-weighted average emissions per electricity unit (tCO<sub>2</sub>/MWh) of all generating sources serving the system, not including low-operating cost and must-run power plants:





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$$EF_{OM,y} = \frac{\sum_{i,j} F_{i,j,y} * COEF_{i,j}}{\sum_j GEN_{j,y}}$$

**Where:**

$EF_{OM,y}$  = Simple OM emission factor = 0.6484

$F_{ij,y}$  = is the amount of fuel  $i$  (in a mass or volume unit) consumed by relevant power sources  $j$  in year(s)  $y$

$COEF_{i,j}$  = is the CO<sub>2</sub> emission coefficient of fuel  $i$  (tCO<sub>2</sub> / mass or volume unit of the fuel), taking into account the carbon content of the fuels used by relevant power sources  $j$  and the percent oxidation of the fuel in year(s)  $y$

$GEN_{j,y}$  = is the electricity (MWh) delivered to the grid by source  $j$

The CO<sub>2</sub> emission coefficient COEF <sub>$i$</sub>  is obtained as:

$$COEF_i = NCV_i * EF_{CO_2,i} * OXID_i$$

**Where:**

$NCV_i$  = is the net calorific value (energy content) per mass or volume unit of a fuel  $i$

$EF_{CO_2,i}$  = is the CO<sub>2</sub> emission factor per unit of energy of the fuel  $i$

$OXID_i$  = is the oxidation factor of the fuel

**STEP 2. Calculate the Build Margin emission factor ( $EF_{BM,y}$ ) as the generation-weighted average emission factor (tCO<sub>2</sub>/MWh) of a sample of power plants  $m$ , as follows:**

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y} * COEF_{i,m}}{\sum_m GEN_{m,y}}$$

**Where:**



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$EF_{BM,y}$  = Build Margin emission factor =0.3157

$F_{im,y}$  = is the amount of fuel  $i$  (in a mass or volume unit) consumed by relevant power sources  $m$  in year(s)  $y$ ;

$COEF_{i,m}$  = is the CO<sub>2</sub> emission coefficient of fuel  $i$  (tCO<sub>2</sub> / mass or volume unit of the fuel), taking into account the carbon content of the fuels used by relevant power sources  $m$  and the percent oxidation of the fuel in year(s)  $y$

$GEN_{m,y}$  = is the electricity (MWh) delivered to the grid by source  $m$ .

The Build Margin emission factor  $EF_{BM,y}$  *ex-ante* is based on the most recent information available on plants already built for sample group  $m$  at the time of PDD submission. The sample group  $m$  consists of the power plant capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

**STEP 3. Calculate the baseline emission factor  $EF_y$**  as the weighted average of the Operating Margin emission factor ( $EF_{OM,y}$ ) and the Build Margin emission factor ( $EF_{BM,y}$ ):

$$EF_y = w_{OM} * EF_{OM,y} + w_{BM} * EF_{BM,y}$$

The weighting of operating and build margin is done as indicated in the tool for the second crediting period, i.e.  $w_{OM} = 0.25$  and  $w_{BM} = 0.75$ .

### Leakage:

Per ACM0001, no leakage effects correspond to the project activity of LFG capture and flaring.

### Emission reductions

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

Where:

$ER_y$  = Emission reductions in year  $y$  (t CO<sub>2</sub>e/yr) =123,208

$BE_y$  = Baseline emissions in year  $y$  (t CO<sub>2</sub>e/yr) =123,523

$PE_y$  = Project emissions in year  $y$  (t CO<sub>2</sub>/yr) =314



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Parameter	Note	Value used
$\phi$	model correction factor	0.75
$f$	fraction of methane captured at the SWDS and flared, combusted or used in another manner	0.0
<b>GWP</b>	Global Warming Potential of methane	21
<b>OX</b>	oxidation factor	0.1
<b>F</b>	fraction of methane in the SWDS gas	0.5
<b>DOC<sub>f</sub></b>	fraction of degradable organic carbon	0.5
<b>MCF</b>	methane correction factor	1
<b>W<sub>j,x</sub></b>	amount of organic waste type $j$ prevented from disposal in the SWDS in the year $x$	As per waste profile
<b>DOC<sub>j</sub><sup>(1)</sup></b>	fraction of degradable organic carbon	<b>Waste type</b> <b>DOC<sub>j</sub></b>
		Pulp, paper and cardboard 44
		Wood & Straw (excl. lignin) 50
		Garden/Park Waste (organic putrescibles) 49
		Food, food waste, beverages and tobacco 38
		Textiles 30
<b>k<sub>j</sub><sup>(1)</sup></b>	decay rate for the waste type	<b>Waste type</b> <b>K<sub>j</sub></b>
		Pulp, paper and cardboard 0.040
		Wood & Straw (excl. lignin) 0.020
		Garden/Park Waste (organic putrescibles) 0.050
		Food, food waste, beverages and tobacco 0.060
<b>j</b>	waste type category	-
<b>MAT<sup>(2)</sup></b>	mean annual temperature	19.7 centigrade
<b>MAP<sup>(2)</sup></b>	mean annual precipitation	223.8 mm
<b>PET<sup>(2)</sup></b>	potential evapo-transpiration	2420 mm

<sup>(1)</sup> Source: Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site.

<sup>(2)</sup> Source: Project EIA.

**Table 7: Waste Content by Type**

Waste type	Percentage (%)
Pulp, paper and Cardboard	15.16
Wood & Straw (excl. lignin)	1.44
Garden/Park Waste (organic putrescibles)	3.6
Food, food waste, beverages and tobacco	43.48



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<b>Total</b>	<b>63.68</b>
<b>Inorganic</b>	<b>36.32</b>

According to ACM0002, the electricity baseline emission factor is calculated as the weighted average of the Operating Margin emission factor (EFOM,y) and the Build Margin emission factor (EFBM,y) where the weights is done as indicated in the tool for the second crediting period, i.e. wOM = 0.25 and wBM = 0.75. This is presented below.

Mexican Grid OM Ex Ante (tCO <sub>2</sub> /MWh)	0.6484
Mexican Grid BM Ex Ante (tCO <sub>2</sub> /MWh)	0.3157
Mexican Grid CM Ex Ante (tCO <sub>2</sub> /MWh)	0.3989

Against this combined margin emission factor, the annual ERs generated by the Project as a result of displacing fossil fuel-based electricity generation in the first crediting period are summarized in the table below.

### Annual ERs from electricity displaced during the second crediting period

Year	Emissions Reductions from Electricity Displaced (tCO <sub>2</sub> e)
2014 <sup>1</sup>	1,791
2015	21,491
2016	21,491
2017	21,491
2018	21,491
2019	21,491
2020	21,491
2021 <sup>2</sup>	19,700
<b>Total</b>	<b>150,439</b>

<sup>1</sup> November 30 to December 31-2014

<sup>2</sup> January 01 to November 29-2021

### Summary of ex ante estimates of emission reductions

Year	Baseline emissions (t CO <sub>2</sub> e)	Project emissions (tCO <sub>2</sub> e)	Leakage (t CO <sub>2</sub> e)	Emission reductions (t CO <sub>2</sub> e)
2014 <sup>1</sup>	13,168	34	0.0	13,134
2015	153,422	396	0.0	153,026
2016	148,981	382	0.0	148,599
2017	144,690	370	0.0	144,320
2018	140,543	357	0.0	140,186



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2019	136,536	345	0.0	136,190
2020	132,663	334	0.0	132,330
2021 <sup>2</sup>	118,178	295	0.0	117,882
<b>Total</b>	<b>988,181</b>	<b>2,513</b>	<b>0.0</b>	<b>985,667</b>
<b>Total crediting years</b>	7			
<b>Annual average over the crediting period</b>	<b>123,523</b>	<b>314</b>	<b>0.0</b>	<b>123,208</b>

<sup>1</sup> November 30 to December 31-2014

<sup>2</sup> January 01 to November 29-2021

### Opinion:

In the opinion of the validation team, it is confirmed that

- All assumptions and data used by the project participants are listed in the PDD, including their references and sources;
- All documentation used by project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the PDD;
- All values used in the PDD are considered reasonable in the context of the proposed project activity;
- The baseline methodology and corresponding tool(s) have been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions;
- All estimates of the baseline emissions can be replicated using the data and parameter values provided in the PDD.



## VALIDATION OPINION: RENEWAL OF CREDITING PERIOD

### 5 VALIDATION OPINION

*PJRCES has performed a validation of renewal of the crediting period for registered CDM project for Ciudad Juarez Landfill Gas to Energy Project in Mexico (UNFCCC registration No. 1123). The validation was performed in accordance with the Clean Development Mechanism Project Standard, Version 7, and included an assessment of:*

- (a) An impact of new relevant national and/or sectoral policies and circumstances on the baseline taking into account relevant EB guidance with regard to renewal of the crediting period at the time of requesting renewal of crediting period;*
- (b) The correctness of the application of an approved baseline methodology for the determination of the continued validity of the baseline or its update, and the estimation of emission reductions for the applicable crediting period.*

*It has been validated that the PP has updated sections of the PDD relating to the baseline, estimated emission reductions and the monitoring plan using the most recent version of baseline and monitoring methodology applicable for the project activity. The original baseline is still valid after reviewing most recently available Mexican National Policies and Laws; substantiating that current baseline scenario is still "Atmospheric release of the LFG", which is in accordance with the baseline and monitoring methodologies ACM0001: Flaring or use of landfill gas version 15.0 and ACM0002: Grid-connected electricity generation from renewable sources version 16.0 and applicable tools. The project meets the relevant UNFCCC requirements for the renewal of the crediting period, and the emission reductions are in line with the latest applicable methodology.*

*The total emission reductions from the project are estimated to be on the average 123,208 tCO<sub>2</sub>e per year over the selected second renewal-crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.*

*The monitoring plan provides for the monitoring of the project's emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design and it is PJRCES's opinion that the project participants are able to implement the monitoring plan.*

*In summary, it is PJRCES's opinion that the Ciudad Juarez Landfill Gas to Energy Project in Mexico, as described in the PDD of version 4.1 dated 21 May 2015, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring ACM0001: Flaring or use of landfill gas version 15.0 and ACM0002: Grid-connected electricity generation from renewable sources version 16.0 and applicable tools. PJRCES thus requests the registration of renewal of crediting period for the project."*

*Bilal Anwar*



## VALIDATION OPINION:RENEWAL OF CREDITING PERIOD

### 6 REFERENCES

The following tables list the documentation that was reviewed during the validation

#### Methodologies, tools and other guidance by the CDM Executive Board

Ref.	Description	Version	Date	File Name
/1/	ACM0001 - Flaring or use of landfill gas	15.0	8 November 2013 EB 76, Annex 7	<a href="https://cdm.unfccc.int/methodologies/DB/D44X8FH8SFCXREE6037AXJSBGGFVDO">https://cdm.unfccc.int/methodologies/DB/D44X8FH8SFCXREE6037AXJSBGGFVDO</a>
/2/	ACM0002: Grid-connected electricity generation from renewable sources	16.0	28 November 2014 EB 81, Annex 9	<a href="https://cdm.unfccc.int/methodologies/DB/D44X8FH8SFCXREE6037AXJSBGGFVDO">https://cdm.unfccc.int/methodologies/DB/D44X8FH8SFCXREE6037AXJSBGGFVDO</a>
/3/	Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period	03.0.1	EB 66, Annex 47 2 March 2012	<a href="https://cdm.unfccc.int/methodologies/DB/D44X8FH8SFCXREE6037AXJSBGGFVDO">https://cdm.unfccc.int/methodologies/DB/D44X8FH8SFCXREE6037AXJSBGGFVDO</a>
/4/	Emissions from solid waste disposal sites	06.0.1	EB 66, Annex 46 2 March 2012	<a href="https://cdm.unfccc.int/methodologies/DB/D44X8FH8SFCXREE6037AXJSBGGFVDO">https://cdm.unfccc.int/methodologies/DB/D44X8FH8SFCXREE6037AXJSBGGFVDO</a>
/5/	Project emissions from flaring	02.0.0	EB 68, Annex 15 20 July 2012	<a href="https://cdm.unfccc.int/methodologies/DB/D44X8FH8SFCXREE6037AXJSBGGFVDO">https://cdm.unfccc.int/methodologies/DB/D44X8FH8SFCXREE6037AXJSBGGFVDO</a>
/6/	Procedure for renewal of the crediting period of a registered cdm project activity	06.0	EB 63, Annex 29 29 September 2011	<a href="http://cdm.unfccc.int/Reference/Procedures/reg_proc04.pdf">http://cdm.unfccc.int/Reference/Procedures/reg_proc04.pdf</a>
/7/	CDM validation and verification standard	07.0	EB 79, Annex 4 1 June 2014	<a href="https://cdm.unfccc.int/methodologies/DB/D44X8FH8SFCXREE6037AXJSBGGFVDO">https://cdm.unfccc.int/methodologies/DB/D44X8FH8SFCXREE6037AXJSBGGFVDO</a>
/8/	CDM project standard	07.0	EB 79, Annex 3 1 June 2014	<a href="https://cdm.unfccc.int/methodologies/DB/D44X8FH8SFCXREE6037AXJSBGGFVDO">https://cdm.unfccc.int/methodologies/DB/D44X8FH8SFCXREE6037AXJSBGGFVDO</a>



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### Documents provided by the project participants

Ref.	Description	Version	Date	File Name
/9/	PDD - Ciudad Juarez Landfill Gas to Energy Project.	2	14 July 2014	PDD_form5 0_Ciudad Juarez_14_07_2 014
		3	22 October 2014	PDD_form5 0_Ciudad Juarez_22_10_2 014
		4	13 February 2015	PDD_form5 0_Ciudad Juarez_13_02_1 5
		4.1	21 May 2015	PDD Ciudad Juarez (21May2015)
/10/	Spreadsheet calculations of emission reductions	NA	14 July 2014	Baseline Calculations_sec ond crediting period_updated
		NA	22 October 2014	Baseline Calculations_sec ond crediting period_updated_ October 21_14
		02	19 February 2015	Baseline Calculations_sec ond crediting period_updated_ 19_February_15
/11/	Registered PDD and validation report and verification reports	several	several	<a href="https://cdm.unfccc.int/Projects/DB/TUEV-SUED1179241731.11">https://cdm.unfccc.int/Projects/DB/TUEV-SUED1179241731.11</a>
/12/	Project: 1123 Ciudad Juarez Landfill Gas to Energy Project - Request for post-registration changes	several	several	<a href="https://cdm.unfccc.int/PRCContainer/DB/prcp686787438/view">https://cdm.unfccc.int/PRCContainer/DB/prcp686787438/view</a>





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/13/	Municipal Waste disposal report provided by the Juarez Municipality	NA	NA	Yearly waste 1994-2014.pdf
/14/	Monthly demonstration of Energy Generation provided by the National Energy Control Center of Mexico	Several	Several	Internal Energy consumption
/15/	Caterpillar Gas Engine Technical Data	DM5859-03	22 October 2009	Gas_engine_technical data G3520_caterpillar
/16/	Daily waste report 18-23 August 2014	NA	NA	Daily waste report 18-23_August
/17/	Daily Waste scale tickets	Several	Several	Boletos de Pesaje
/18/	Communication from PPs to UNFCCC with the intention of renewing the credit period	NA	28 May 2014	UNFCCC notification
/19/	Mexican Official Statistics and National Energy Production information	NA	NA	<a href="http://www.sener.gob.mx/portal/Default.aspx?id=1433">http://www.sener.gob.mx/portal/Default.aspx?id=1433</a>
/20/	Emission Factor calculation of Mexican Grid	NA	22 October 2014	Grid EF Mexico _second crediting period_2010-2011-2012_AZ_October 2014
/21/	Environmental Regulations and Law regarding waste disposal and GHG emissions from solid waste	several	several	<a href="http://www.semarnat.gob.mx/archivosanteriores/apoyossubsidios/residuos/Documentos/Lineamientos-ProyRSU-SEMARNAT-2013.pdf">http://www.semarnat.gob.mx/archivosanteriores/apoyossubsidios/residuos/Documentos/Lineamientos-ProyRSU-SEMARNAT-2013.pdf</a>



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## VALIDATION OPINION:RENEWAL OF CREDITING PERIOD

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## VALIDATION OPINION:RENEWAL OF CREDITING PERIOD

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# APPENDIX A

# VALIDATION PROTOCOL



## VALIDATION OPINION: RENEWAL OF CREDITING PERIOD

**Table 1: Requirements Checklist**

CDM Validation Requirement	Remarks	Evidence	Conclusion
<b>A. General requirements</b>			
<b>A.1 Updation of PDD as per most recent version of the baseline and monitoring methodology</b>			
<b>A.1.1</b> Whether project participants have updated the sections of PDD relating to the baseline as per most recent version of the baseline and monitoring methodology applicable for the project activity?	<p>The project participants applied the approved baseline methodology ACM0001 Version 05: Consolidated baseline methodology for landfill gas project activities and ACM0002 Version 6: Consolidated baseline methodology for grid-connected electricity generation from renewable sources.</p> <p>The baseline scenario is the same scenario existing prior to the implementation of the proposed project. In the absence of the project activity, it has been the continued uncontrolled release of landfill gas to the atmosphere, similarly to most landfills in the Host Country.</p> <p>CAR01 - However ACM0001 and ACM0002 are both on version 15. PPs are requested to update the methodologies as well tools guidelines and standards.</p> <p>CAR03 – PPs are requested to clarify the discrepancy between the installed capacity on Brief history of the project and the actual installed capacity at the power plant witnessed during the site visit.</p>	/9/ /11/ /12/	CAR01 CAR04
<b>A.1.2</b> Whether project participants have updated the sections of PDD relating to the estimated emission reductions as per most recent version of the baseline and monitoring methodology applicable for the project activity?	The project participants updated PDD and spreadsheet calculation using the approved baseline methodology ACM0001 Version 05: Consolidated baseline methodology for landfill gas project activities and ACM0002 Version 6: Consolidated baseline	/9/ /11/ /12/	CAR01



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CDM Validation Requirement	Remarks	Evidence	Conclusion
	methodology for grid-connected electricity generation from renewable sources.  CAR01 - However ACM0001 and ACM0002 are both on version 15. PPs are requested to update the methodologies as well tools guidelines and standards.		
<b>A.1.3</b> Whether project participants have updated the sections of PDD relating to the monitoring plan as per most recent version of the baseline and monitoring methodology applicable for the project activity?	The project participants updated PDD and spreadsheet calculation using the approved baseline methodology ACM0001 Version 05: Consolidated baseline methodology for landfill gas project activities and ACM0002 Version 6: Consolidated baseline methodology for grid-connected electricity generation from renewable sources.  CAR01 - However ACM0001 and ACM0002 are both on version 15. PPs are requested to update the methodologies as well tools guidelines and standards.	/9/ /11/ /12/	CAR01
<b>A.2 Project participants included in the request for renewal of crediting period</b>			
<b>A.2.1</b> Names of registered project participants for the project activity	The PDD states the project participants are Biogas de Juarez S.A de C.V and Japan Carbon Finance. CAR2 - PPs should have consistence information along the PDD. i.e. first page of PDD has a discrepancy. PPs are requested to correctly it accordingly. CAR3 - Also, no evidences were presented to DOE as a request for renewal of crediting period	/9/ /11/ /12/	CAR02 CAR03
<b>A.2.2</b> Names of project participants included in the request for renewal of crediting period	The PDD states the project participants are Biogas de Juarez S.A de C.V and Japan Carbon Finance. CAR2 - PPs should have consistence information along the PDD. i.e. first page of PDD has a	/9/ /11/ /12/	CAR02 CAR03



## VALIDATION OPINION:RENEWAL OF CREDITING PERIOD

CDM Validation Requirement	Remarks	Evidence	Conclusion
	discrepancy. PPs are requested to correctly it accordingly. CAR3 - Also, no evidences were presented to DOE as a request for renewal of crediting period		
<b>A.2.3</b> Compare the current and original participants, to assess whether project participants in A2.1 and A2.2 are consistent	According to registered PDD and new PDD the project participants are the same for both crediting periods.	/9/ /11/ /12/	OK
<b>B. Baseline and monitoring methodology</b>			
<b>B.1 Methodology applicability</b>			
<b>B.1.1</b> Original applied baseline and monitoring methodology in registered project			
<b>B.1.2</b> Has the project proponent applied the relevant baseline and monitoring methodology that has been previously approved by the CDM Executive Board?	The project participants applied the approved baseline methodology ACM0001 Version 05: Consolidated baseline methodology for landfill gas project activities and ACM0002 Version 6: Consolidated baseline methodology for grid-connected electricity generation from renewable sources. The baseline scenario is the same scenario existing prior to the implementation of the proposed project. In the absence of the project activity, it has been the continued uncontrolled release of landfill gas to the atmosphere, similarly to most landfills in the Host Country.  CAR01 - However ACM0001 and ACM0002 are both on version 15. PPs are requested to update the methodologies as well tools guidelines and standards.	/9/ /11/ /12/	CAR01
<b>B.1.3</b> Does the project activity meet all of the applicability criteria defined in the approved methodology? Please, clarify	The project participants applied the approved baseline methodology ACM0001 Version 05: Consolidated baseline methodology for landfill gas project activities and ACM0002 Version 6: Consolidated baseline	/9/ /11/ /12/	CAR01 CAR05



## VALIDATION OPINION: RENEWAL OF CREDITING PERIOD

CDM Validation Requirement	Remarks	Evidence	Conclusion
	<p>methodology for grid-connected electricity generation from renewable sources.</p> <p>The baseline scenario is the same scenario existing prior to the implementation of the proposed project. In the absence of the project activity, it has been the continued uncontrolled release of landfill gas to the atmosphere, similarly to most landfills in the Host Country.</p> <p>CAR01 - However ACM0001 and ACM0002 are both on version 15. PPs are requested to update the methodologies as well tools guidelines and standards.</p>		
<p><b>B.1.4</b> Does the project boundary defined include all emission sources and the clear demarcation on the physical and geographical boundary of the proposed CDM project activity? Is the selection of all emission sources (baseline, project and leakage) been justified?</p>	<p>The project participants applied the approved baseline methodology ACM0001 Version 05: Consolidated baseline methodology for landfill gas project activities and ACM0002 Version 6: Consolidated baseline methodology for grid-connected electricity generation from renewable sources.</p> <p>The baseline scenario is the same scenario existing prior to the implementation of the proposed project. In the absence of the project activity, it has been the continued uncontrolled release of landfill gas to the atmosphere, similarly to most landfills in the Host Country.</p> <p>CAR01 - However ACM0001 and ACM0002 are both on version 15. PPs are requested to update the methodologies as well tools guidelines and standards.</p>	<p>/9/ /11/ /12/</p>	CAR01
<p><b>B.2</b> <i>Validity of the original baselines</i></p>			
<p><b>B.2.1</b> Whether the original baseline are still applicable to the project activity, if the answer is positive, then no other procedures are needed; if</p>	<p>The baseline scenario is the same scenario existing prior to the implementation of the project activity. In the absence of the proposed project, the LFG would be vented.</p>	<p>/9/ /11/ /12/</p>	OK



## VALIDATION OPINION: RENEWAL OF CREDITING PERIOD

<b>CDM Validation Requirement</b>	<b>Remarks</b>	<b>Evidence</b>	<b>Conclusion</b>
the answer is no, then proceed to the following from B.2.2 upward			
<b>B.2.2</b> The impact of new relevant national and/or sectoral policies and circumstances on the baseline taking into account relevant guidance from the Board with regard to renewal of the crediting period at the time of requesting renewal of crediting period;	NA	/9/ /11/ /12/	OK
<b>B.2.3</b> The correctness of the application of an approved baseline methodology for the determination of the continued validity of the baseline or its update, and the estimation of emission reductions for the applicable crediting period.	NA	/9/ /11/ /12/	OK
<b>B.2.4</b> Is the documentation of the baseline determination clear w.r.t the following: - All assumptions and data used by the project participants are listed in the PDD and related document to be submitted for registration. - All Documentation is relevant as well as correctly quoted and interpreted - Assumptions and data can be deemed reasonable. - Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD and the same has been confirmed. - The methodology is correctly applied to identify what would have happened in the absence of the CDM project activity proposed.	NA	/9/ /11/ /12/	OK
<b>B.3 Emission Reductions</b>			





## VALIDATION OPINION: RENEWAL OF CREDITING PERIOD

CDM Validation Requirement	Remarks	Evidence	Conclusion
<b>B.3.1 Baseline Emissions</b>			
B.3.1.1 Are correct equations and parameters used in accordance with the approved methodology selected in calculating the baseline emissions?	<p>The project participants updated PDD and spreadsheet calculation using the approved baseline methodology ACM0001 Version 05: Consolidated baseline methodology for landfill gas project activities and ACM0002 Version 6: Consolidated baseline methodology for grid-connected electricity generation from renewable sources.</p> <p>CAR01 - However ACM0001 and ACM0002 are both on version 15. PPs are requested to update the methodologies as well tools guidelines and standards.</p> <p>CAR06 – Parameters used to estimate emission reductions could not be checked as evidences were not presented. PPs are request to present evidences and to include those in the PDD.</p>	/9/ /11/ /10/ /12/	CAR01 CAR06
B.3.1.2 In case of data and parameters that are not monitored throughout the crediting period, and have already been determined and will remain fixed throughout the crediting period, assess that all data sources and assumptions are appropriate and calculations are correct, applicable to the proposed CDM project activity and will result in a conservative estimate of the emission reductions ( <i>less baseline emissions</i> )	<p>The project participants updated PDD and spreadsheet calculation using the approved baseline methodology ACM0001 Version 05: Consolidated baseline methodology for landfill gas project activities and ACM0002 Version 6: Consolidated baseline methodology for grid-connected electricity generation from renewable sources.</p> <p>CAR01 - However ACM0001 and ACM0002 are both on version 15. PPs are requested to update the methodologies as well tools guidelines and standards.</p> <p>CAR06 – Parameters used to estimate emission reductions could not be checked as evidences were not presented. PPs are request to present evidences and to include those in the PDD.</p>	/9/ /11/ /10/ /12/	CAR01 CAR06 CAR07



## VALIDATION OPINION: RENEWAL OF CREDITING PERIOD

CDM Validation Requirement	Remarks	Evidence	Conclusion
	CAR07 – PPs are requested to update and correct the data and parameters to be monitored in accordance to the latest version of methodology.		
<b>B.3.2 Project Emission</b>			
B.3.2.1 Are correct equations and parameters used in accordance with the approved methodology selected in calculating the project emissions?	<p>The project participants updated PDD and spreadsheet calculation using the approved baseline methodology ACM0001 Version 05: Consolidated baseline methodology for landfill gas project activities and ACM0002 Version 6: Consolidated baseline methodology for grid-connected electricity generation from renewable sources.</p> <p>CAR01 - However ACM0001 and ACM0002 are both on version 15. PPs are requested to update the methodologies as well tools guidelines and standards.</p> <p>CAR06 – Parameters used to estimate emission reductions could not be checked as evidences were not presented. PPs are request to present evidences and to include those in the PDD.</p> <p>CAR07 – PPs are requested to update and correct the data and parameters to be monitored in accordance to the latest version of methodology.</p>	<p>/9/ /11/ /10/ /12/</p>	<p>CAR01 CAR06 CAR07</p>
B.3.2.2 In case of data and parameters that are not monitored throughout the crediting period, and have already been determined and will remain fixed throughout the crediting period, assess that all data sources and assumptions are appropriate and calculations are correct, applicable to the proposed CDM project activity and will result in a	<p>The project participants updated PDD and spreadsheet calculation using the approved baseline methodology ACM0001 Version 05: Consolidated baseline methodology for landfill gas project activities and ACM0002 Version 6: Consolidated baseline methodology for grid-connected electricity generation from renewable sources.</p>	<p>/9/ /11/ /10/ /12/</p>	<p>CAR01 CAR06 CAR07</p>



## VALIDATION OPINION: RENEWAL OF CREDITING PERIOD

CDM Validation Requirement	Remarks	Evidence	Conclusion
conservative estimate of the emission reductions (higher project emissions)	<p>CAR01 - However ACM0001 and ACM0002 are both on version 15. PPs are requested to update the methodologies as well tools guidelines and standards.</p> <p>CAR06 – Parameters used to estimate emission reductions could not be checked as evidences were not presented. PPs are request to present evidences and to include those in the PDD.</p> <p>CAR07 – PPs are requested to update and correct the data and parameters to be monitored in accordance to the latest version of methodology.</p>		
<b>B.3.3 Leakage Emissions</b>			
B.3.3.1 Are correct equations and parameters used in accordance with the approved methodology selected?	<p>The project participants updated PDD and spreadsheet calculation using the approved baseline methodology ACM0001 Version 05: Consolidated baseline methodology for landfill gas project activities and ACM0002 Version 6: Consolidated baseline methodology for grid-connected electricity generation from renewable sources.</p> <p>CAR01 - However ACM0001 and ACM0002 are both on version 15. PPs are requested to update the methodologies as well tools guidelines and standards.</p> <p>CAR06 – Parameters used to estimate emission reductions could not be checked as evidences were not presented. PPs are request to present evidences and to include those in the PDD.</p> <p>CAR07 – PPs are requested to update and correct the data and parameters to be monitored in accordance to the latest version of methodology.</p>	<p>/9/ /11/ /10/ /12/</p>	<p>CAR01 CAR06 CAR07</p>



## VALIDATION OPINION: RENEWAL OF CREDITING PERIOD

CDM Validation Requirement	Remarks	Evidence	Conclusion
B.3.3.2 In case of data and parameters that are not monitored throughout the crediting period, and have already been determined and will remain fixed throughout the crediting period, assess that all data sources and assumptions are appropriate and calculations are correct, applicable to the proposed CDM project activity and will result in a conservative estimate of the emission reductions ( <i>less baseline emissions</i> )	<p>The project participants updated PDD and spreadsheet calculation using the approved baseline methodology ACM0001 Version 05: Consolidated baseline methodology for landfill gas project activities and ACM0002 Version 6: Consolidated baseline methodology for grid-connected electricity generation from renewable sources.</p> <p>CAR01 - However ACM0001 and ACM0002 are both on version 15. PPs are requested to update the methodologies as well tools guidelines and standards.</p> <p>CAR06 – Parameters used to estimate emission reductions could not be checked as evidences were not presented. PPs are request to present evidences and to include those in the PDD.</p> <p>CAR07 – PPs are requested to update and correct the data and parameters to be monitored in accordance to the latest version of methodology.</p>	/9/ /11/ /10/ /12/	CAR01 CAR06 CAR07
B.3.3.3 Please, mention the expected emission reductions generated from implementation of the project activity.	<p>The project participants updated PDD and spreadsheet calculation using the approved baseline methodology ACM0001 Version 05: Consolidated baseline methodology for landfill gas project activities and ACM0002 Version 6: Consolidated baseline methodology for grid-connected electricity generation from renewable sources.</p> <p>CAR01 - However ACM0001 and ACM0002 are both on version 15. PPs are requested to update the methodologies as well tools guidelines and standards.</p> <p>CAR06 – Parameters used to estimate emission reductions could not be checked as evidences were not</p>	/9/ /11/ /10/ /12/	CAR01 CAR06



## VALIDATION OPINION: RENEWAL OF CREDITING PERIOD

CDM Validation Requirement	Remarks	Evidence	Conclusion
	<p>presented. PPs are request to present evidences and to include those in the PDD.</p> <p>Nevertheless, the registered PDD states 170,499 metric tonnes CO2 equivalent per annum and the new PDD states 119,339</p>		
<b>B.4 Monitoring Plan</b>			
<b>B.4.1</b> Does the monitoring plan defined in the PDD, contain all necessary parameters required for calculating ' <i>baseline emissions</i> ' in line with the methodology?	<p>The project participants updated PDD and spreadsheet calculation using the approved baseline methodology ACM0001 Version 05: Consolidated baseline methodology for landfill gas project activities and ACM0002 Version 6: Consolidated baseline methodology for grid-connected electricity generation from renewable sources.</p> <p>CAR01 - However ACM0001 and ACM0002 are both on version 15. PPs are requested to update the methodologies as well tools guidelines and standards.</p> <p>CAR07 – PPs are requested to update and correct the data and parameters to be monitored in accordance to the latest version of methodology.</p>	<p>/9/ /11/ /10/ /12/</p>	<p>CAR01 CAR07</p>
<b>B.4.2</b> Does the monitoring plan defined in the PDD, contain all necessary parameters required for calculating ' <i>project emissions</i> ' in line with the methodology?	<p>The project participants updated PDD and spreadsheet calculation using the approved baseline methodology ACM0001 Version 05: Consolidated baseline methodology for landfill gas project activities and ACM0002 Version 6: Consolidated baseline methodology for grid-connected electricity generation from renewable sources.</p> <p>CAR01 - However ACM0001 and ACM0002 are both on version 15. PPs are requested to update the methodologies as well tools guidelines and standards.</p>	<p>/9/ /11/ /10/ /12/</p>	<p>CAR01 CAR07</p>



## VALIDATION OPINION: RENEWAL OF CREDITING PERIOD

CDM Validation Requirement	Remarks	Evidence	Conclusion
	CAR07		
<b>B.4.3</b> Does the monitoring plan defined in the PDD, contain all necessary parameters required for calculating 'leakage emissions' in line with the methodology?	<p>The project participants updated PDD and spreadsheet calculation using the approved baseline methodology ACM0001 Version 05: Consolidated baseline methodology for landfill gas project activities and ACM0002 Version 6: Consolidated baseline methodology for grid-connected electricity generation from renewable sources.</p> <p>CAR01 - However ACM0001 and ACM0002 are both on version 15. PPs are requested to update the methodologies as well tools guidelines and standards.</p> <p>CAR07 – PPs are requested to update and correct the data and parameters to be monitored in accordance to the latest version of methodology.</p>	/9/ /11/ /10/ /12/	CAR01 CAR07
<b>B.4.4</b> Has the feasibility of the monitoring arrangements within the project design been confirmed through interviews and physical visits to the site, where required?	<p>The project participants updated PDD and spreadsheet calculation using the approved baseline methodology ACM0001 Version 05: Consolidated baseline methodology for landfill gas project activities and ACM0002 Version 6: Consolidated baseline methodology for grid-connected electricity generation from renewable sources.</p> <p>CAR01 - However ACM0001 and ACM0002 are both on version 15. PPs are requested to update the methodologies as well tools guidelines and standards.</p>	/9/ /11/ /10/ /12/	CAR01
<b>B.4.5</b> The implementation of the monitoring plan, quality assurance and quality control procedures are verifiable	<p>The project participants updated PDD and spreadsheet calculation using the approved baseline methodology ACM0001 Version 05: Consolidated baseline methodology for landfill gas project activities and ACM0002 Version 6: Consolidated baseline</p>	/9/ /11/ /10/ /12/	CAR01



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**VALIDATION OPINION:RENEWAL OF CREDITING PERIOD**

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<i><b>CDM Validation Requirement</b></i>	<i><b>Remarks</b></i>	<i><b>Evidence</b></i>	<i><b>Conclusion</b></i>
	methodology for grid-connected electricity generation from renewable sources.  CAR01 - However ACM0001 and ACM0002 are both on version 15. PPs are requested to update the methodologies as well tools guidelines and standards.		

## VALIDATION OPINION: RENEWAL OF CREDITING PERIOD

**Table 2: Resolution of issues identified in table 1 of the validation protocol**

<i>Draft report clarification requests, corrective action requests and forward action request</i>	<i>Ref. to the section of the table 2 above</i>	<i>Summary of project owner response</i>	<i>Validation team conclusion</i>
<b>CAR01</b> - ACM0001 and ACM0002 are both on version 15. PPs are requested to update the methodologies as well tools guidelines and standards.	Sections A and B	Corrected. Version 15 of the methodologies was used. Which corresponds to the latest approved by de CDM Executive Board.	PPs have updated methodologies, tools and guidelines. The modifications are consistent and considered to be correct.  CAR is CLOSED
<b>CAR02</b> - PPs should have consistence information along the PDD. I.e. first page of PDD has a discrepancy when compared to the PDD. PPs are requested to correctly it accordingly.	A.2.1; A.2.2	Corrected. Please refer the new version of PDD.	PPs have corrected the discrepancies in accordance.  CAR is CLOSED
<b>CAR03</b> – no evidences were presented to DOE as a request for renewal of crediting period.	A.2.1; A.2.2	Please find enclosed to this answer the following evidences: <ul style="list-style-type: none"> <li>- Yearly waste report. Which includes the amount of SW disposed in the landfill since 1994.</li> <li>- Daily waste report for a typical week. August 18 to 23 is presented.</li> <li>- Monthly CFE invoices used to determine the internal enegy consumption.</li> <li>- Gas engine technical data</li> <li>- Documents used to calculate Mexican grid emission Factor.</li> </ul>	PPs have presented the stated evidences. Those could be found on internet. Exceptions are: <ul style="list-style-type: none"> <li>- Yearly waste report. This includes the amount of SW disposed in the landfill since 1994.</li> <li>- Daily waste report for a tipical week. August 18 to 23 is presented.</li> <li>- Monthly CFE invoices used to determine the internal enegy consumption.</li> </ul> PPs are requested to present invoices and scale ticket for the period  <del>CAR remains OPENED</del>





## VALIDATION OPINION: RENEWAL OF CREDITING PERIOD

		(Please refers the folder „EF support“ which includes eleven files used in the calculation.	PPs have presented requested evidences, which are found to be reliable as they are provided by the Mexican Government.  CAR is CLOSED
<b>CAR04</b> – PPs are requested to clarify the discrepancy between the installed capacity on Brief history of the project and the actual installed capacity at the power plant witnessed during the site visit.	A.1.1.	Corrected. Current installed capacity of 6.4 MW was included in the “brief history of the project” section. Please refer the new version of PDD.	PPs have updated and correct the PDD as per what was witnessed during the site visit.  CAR is CLOSED
<b>CAR06</b> – Parameters used to estimate emission reductions could not be checked as evidences were not presented. PPs are request to present evidences and to include those in the PDD.	Section B	<p>Please find enclosed to this answer the following evidences:</p> <ul style="list-style-type: none"> <li>- Yearly waste report. Which includes the amount of SW disposed in the landfill since 1994.</li> <li>- Daily waste report for a tipical week. August 18 to 23 is presented.</li> <li>- Monthly CFE invoices used to determined the internal enegy consumption.</li> <li>- Gas engine technical data</li> <li>- Documents used to calculate Mexican grid emission Factor. (Please refers the folder „EF support“ which includes eleven files used in the calculation.</li> </ul> <p>Please take into account that those evidences have been included in both PDD and baseline calculations files.</p>	<p>PPs have presented the stated evidences. Those could be found on internet. Exceptions are:</p> <ul style="list-style-type: none"> <li>- Yearly waste report. This includes the amount of SW disposed in the landfill since 1994.</li> <li>- Daily waste report for a tipical week. August 18 to 23 is presented.</li> <li>- Monthly CFE invoices used to determine the internal enegy consumption.</li> </ul> <p>PPs are requested to present invoices and scale ticket for the period</p> <p><del>CAR remains OPENED</del></p> <p>PPs have presented requested evidences, which are found to be reliable as they are provided by the Mexican Government.</p> <p>CAR is CLOSED</p>



## VALIDATION OPINION:RENEWAL OF CREDITING PERIOD

<b>CAR07</b> – PPs are requested to update and correct the data and parameters to be monitored in accordance to the latest version of methodology and to present evidences as needed.	Section B	Section B.7.1 was corrected in accordance to the latest version of the methodology. The following evidences are presented:	PPs have updated methodologies, tools and guidelines. The modifications are consistent and considered to be correct.  CAR is CLOSED
<b>CAR08</b> – PPs are requested to correct typos and remove the guidelines from the end of PDD.	SectionA	Corrected.	PPs have corrected typos along the PDD and removed the guidance given in the form from the end of the PDD. The modifications are consistent and considered to be correct.  CAR is CLOSED



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## VALIDATION OPINION:RENEWAL OF CREDITING PERIOD

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## VALIDATION OPINION:RENEWAL OF CREDITING PERIOD

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# APPENDIX B

## *Curriculum Vitae of validation team*

## VALIDATION OPINION:RENEWAL OF CREDITING PERIOD

<b>Name:</b> Ricardo Costa
<b>Role:</b> Lead Validator
<b>Competency Profile:</b> He is Environmental Engineer working in the environmental field since 1996. My more important experiences are in the management, construction and operation of wastewater treatment plants and landfill biogas recovery plants and its respective environmental licensing at competent agencies. He performed several activities controlling operational treatment processes; and instrumental, microbiological, physical and chemical analysis. Moreover, he has played important roles in international environmental monitoring during the past decade. He has experience regarding the implementation of ISO 9001, 14001 and OHSAS 18001 standards.
<b>Name:</b> Carlos Casco
<b>Role:</b> Financial Expert
<b>Competency Profile:</b> Carlos Casco has an academic background in mechanical engineering and master in Business Administration. He was involved in several CDM projects activities and received extensive training on all aspects of the Validation and Verification Process. Led a team which carried out a consulting about cost reduction and competitive position at Andinatel S.A., advising saves about \$ 35MM and calculated the intellectual capital. Member of the consulting team that developed the study of economic and social feasibility of the hemocentro's construction to the Cruz Roja Ecuatoriana, reaching the finance through the CEREPS.
<b>Name:</b> Bilal Anwar
<b>Role:</b> Technical Reviewer
<b>Competency Profile:</b> Final Approver Bilal Anwar has over twelve years of experience in International Climate Change Policy, global regimes of greenhouse gas reduction projects and corporate sector greenhouse strategies. A significant part of his experience is in Clean Development Mechanism (CDM) in which he got involved from its inception. He worked in the United Nations Framework Convention on Climate Change Secretariat (UNFCCC) where he was involved in the inter-governmental negotiation process, leading to the agreement on Marrakech Accords, which operationalized the CDM as a global carbon market mechanism. He has been closely involved in the development of CDM methodologies, its regulatory, procedural and legal frameworks in support of the CDM Executive Board. He was the team leader of CDM Accreditation Unit in the secretariat. Subsequently Bilal worked for two years as a Technical Director for ERM certification and Verification Services (DOE) based in London. In this role, Bilal worked on the operational and management aspects of the company in order to deliver quality reports in compliance with the regulatory requirements and quality expectations of the CDM Executive Board and undertook review of CDM projects for energy, waste and transport sector. Currently, Bilal is responsible for final approval of CDM reports in Perry Johnson Registrars Carbon Emission Services.



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## VALIDATION OPINION:RENEWAL OF CREDITING PERIOD

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