

El Panul – EcoMethane Landfill Gas Project

Monitoring Period: 2008-03-01 to 2009-10-05
(incl. both days)

Report No: 8000404677 - 11/651 – (Pre-CDM)

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Summary:

EcoSecurities International Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the Pre-CDM validation and verification of the project “El Panul – EcoMethane Landfill Gas Project”, with regard to the relevant requirements of VCS standard version 03.

The project activity involves the installation of a plant for collection and flaring of biogas in El Panul landfill. Thus, the project activity displaces green house gas (GHG) emissions currently produced by the atmospheric release of biogas.

Reporting period: From 2008-03-01 to 2009-10-05 (incl. both days)

In the course of the VCS Pre-CDM validation and verification six (6) Corrective Action Requests (CAR) and

three (3) Clarification Requests (CL) were raised and these CAR and CL's were successfully closed.

The review of the project design documentation and additional documents related to VCS requirements; the subsequent background investigation and follow-up interviews have provided TÜV NORD JI/CDM CP with sufficient evidence to validate the fulfillment of the stated criteria.

In detail the validation conclusions can be summarized as follows:

- The project is in line with all relevant host country criteria (Chile) and all relevant VCS Standard Version 3 criteria.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 17,973 tons CO₂e is most likely to be achieved within the given VCS crediting period.
- The project activity meets the criteria of the clauses 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.2, 1.12.3, 1.12.4 and 1.13 of the VCS-PD as per VCS version 3 and is likely to achieve the estimated emission reductions.

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

Regarding the VCS verification, it was based on the draft monitoring report^{/MR/}, revised monitoring report^{/MR/}, emission reduction calculation spreadsheet^{/XLS/}, the monitoring plan as set out in the validated PD^{/PD/}, and supporting documents made available to the TÜV NORD JI/CDM CP by the project participant.

As the result of the Pre-CDM verification, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period (2008-03-01 to 2009-10-05) as follows:

Emission reductions 17,973 t CO₂ equivalents

The monitoring period has been split into annual emission reductions achieved and the verified emission reductions are as follows:

- from 2008-03-01 to 2008-12-31 is 7,967 tCO₂e
- from 2009-01-01 to 2009-10-05 is 10,006 tCO₂e

Totalling 17,973 t CO₂ equivalents for the monitoring period.

Abbreviations

CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDEC	Economic Dispatch Center “ <i>Centro de Despacho Económico de Carga</i> ”
CER	Certified Emission Reduction
CNE	National Commission of Energy - “ <i>Comisión Nacional de Energía</i> ”
CL	Clarification Request
CO ₂	Carbon dioxide
CO _{2eq}	Carbon dioxide equivalent
CONAMA	Environmental National Commission – DNA of Chile - “ <i>Comisión Nacional del Medio Ambiente</i> ” – (now: Environmental Ministry)
DNA	Designated National Authority
EB	CDM Executive Board
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MR	Monitoring Report
NETRIX	Netrix Data Hosting
PA	Project Activity
PDD	Project Design Document
PP	Project Proponent
SIC	Central Interconnected System – “ <i>Sistema Interconectado Central</i> ”
S/N	Serial Number
Tasui	Servicios Tasui S.A. (Landfill operator)
TE	Technical Expert
TL	Team Leader
TR	Technical Reviewer

QAI/QC	Quality Assurance / Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
XLS	Emission Reduction Calculation Spread Sheet

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1 INTRODUCTION

EcoSecurities International Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the Pre-CDM validation and verification of the project:

“El Panul – EcoMethane Landfill Gas Project”

with regard to the relevant requirements of the Verified Carbon Standard; VCS version 03^{VCS/}. The verifiers have reviewed the implementation of the monitoring plan (MP) in the validated VCS project for the monitoring period 2008-03-01 to 2009-10-05 (incl. both days).

The applied monitoring methodology is ACM0001 “Consolidated baseline and Monitoring Methodology for landfill gas project activities” Version 08.

1.1 Objective

The purpose of this verification, by independent checking of objective evidence, is as follows:

- to verify that the project is implemented as described in the project description;
- to assess the implementation of the monitoring plan (MP) content in the VCS-PD;
- to assess the project's compliance with other relevant rules, including the host country (Chile) legislation;
- to confirm that the monitoring system is implemented and fully functional to generate voluntary emission reductions (VERs / VCUs) without any double counting; and
- to establish that the data reported are accurate, complete, consistent, transparent and free of material error or omission by checking the monitoring records and the emissions reduction calculation.

1.2 Scope and Criteria

The verification of this project is based on the validated Project Description^{/PDD/ & /VCS-PD/}, the monitoring report^{/MR/}, emission reduction calculation spread sheet^{/XLS/}, supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment. Furthermore, publicly available information was considered as far as it was available and required.

The TÜV NORD JI/CDM CP has employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generation of emission reductions.

1.3 Level of assurance

The verification has been planned and organized to achieve a

- ☒ reasonable level of assurance
- ☐ limited level of assurance.

1.4 Summary Description of the Project

1.4.1 Project Characteristics

Essential data of the project is presented in the following Table 1-4.1, Table 1-4.2 and Table 1-4.3.

Table 1-4.1: Project Characteristics

Item	Data
Project title	El Panul – Ecomethane Landfill Gas Project
Project owner	Biogas Technology Ltd.
Any specific project categories	☐ Mega project ($> 10^6$ t CO _{2eq} / a) ☒ Project (5000 t CO _{2eq} / a to 10^6 t CO _{2eq} / a) ☐ Micro project (< 5000 t CO _{2eq} / a) ☐ AFOLU project ☐ Grouped project ☐ No specific project category
VCS MR dated	Draft: 2011-12-02 Final: 2012-01-10
Applied Methodology	AM0001 - Consolidated baseline and Monitoring Methodology for landfill gas project activities - Version 08
Scope/Technical area	13 – Waste handling and disposal
Project starting date	2008-03-01
Crediting period	☒ Renewable Crediting Period (7 y) ☐ Renewable Crediting Period (10 y)
Start of crediting period	2008-03-01

1.4.2 Project Location

The details of the project location are given in Table 1-4.2:

Table 1-4.2: Project Location

No.	Project Location
Host Country	Chile
Region:	Region IV / Region of Coquimbo, Elqui Province.
Project location address:	South of Coquimbo in the “Altas de Panul” region, 3 km east of the main road “Ruta 5 Norte” (Route 5 North), and 18 km from the city of La Serena
Latitude (Power house):	30°01'10" S
Longitude (Power house):	71°21'31" E.

1.4.3 Technical Project Description

The key parameters of the project are given in Table 1-4.3:

Table 1-4.3a: Technical data of the project

Flare

Parameter	Unit	Value
Quantity		01
Manufacturer		Biogas Technology
Biogas composition	%CH ₄	20 - 100
Maximum Biogas flow rate	Nm ³ /h	2,000
Operating Temperature	°C	700 – 1,200
Efficiency	%	99.9
Retention time	sec	0.5 (at maximum flow rate)

Blower

Parameter	Unit	Value
Quantity		01
Manufacturer		HOWDEN PROCESS COMPRESSORS CHESTERFIELD, ENGLAND
Model		DONKIN V50 MK7 (ATEX)
Serial No		F7760
Max speed	r.p.m	6,200
Max outlet	Bar	0.4
Max ambient	°C	40

Table 1-4.3b: Parameters confirmed during verification

Parameter	Name	Unit	Value
Total amount of landfill gas captured at Normal Temperature and Pressure	$LFG_{total,y}$	Nm^3	2,857,507
Amount of landfill gas flared at Normal Temperature and Pressure	$LFG_{flare,y}$	Nm^3	Please refer to $LFG_{total,y}$
Project emissions from flaring of the residual gas stream in year y	$PE_{flare,y}$	tCO_2e	2,605
Methane fraction in the landfill gas	w_{CH_4}	$\% (m^3 CH_4 / m^3 LFG)$	46.9
Temperature in the exhaust gas of the flare	T_{flare}	$^{\circ}C$	766
Onsite consumption of electricity provided by the grid and/or captive power plant(s) and attributable to the project activity during year y	$EC_{PJ,y}$	MWh	74
Average technical transmission and distribution losses in the grid in year y for the voltage level at which electricity is obtained from the grid at the project site	TDL_y	$\%$	2008: 11 2009: 10
Adjustment factor	AF	$\%$	5

2 VALIDATION PROCESS, FINDINGS AND CONCLUSION

2.1 Validation Process

As the project activity has already been registered as a CDM project activity (Reference No. 2512) and as the verification corresponds only to the pre-CDM monitoring period, only Section 2.2.1 of the Verification Report template needs to be completed for the gap validation as per VCS Version 03 guidance and requirements.

2.2 Validation Findings

2.2.1 Gap Validation

- **Objective**

The objective of the gap validation is to assess whether the VCS-PD follows the VCS standard Version 03 particularly the clauses 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.2, 1.12.3, 1.12.4 and 1.13 of the VCS-PD.

This supplementary validation report is only valid in conjunction with the CDM registered documents for the project “El Panul – EcoMethane Landfill Gas Project”, reference No. 2512.

• Scope and Criteria

The scope of the validation covers the clauses of 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.2, 1.12.3, 1.12.4 and 1.13 of the VCS-PD as required by the VCS Standard Version 3.

• VCS project Description

A brief description of the VCS project has been described in the CDM PDD^{/PDD/} of the project registered as CDM project activity with the CDM EB, reference No. 2512.

(<http://cdm.unfccc.int/Projects/DB/DNV-CUK1239804465.23/view>)

• Review of Document

The Supplementary VCS-PD^{/VCS-PD/} and supporting background documents related to the project design and baseline were reviewed.

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

The references used in the course of this validation are summarized in section 5.

• Resolution of any material discrepancy

Material discrepancies identified in the course of the validation are addressed either as CARs, CLs or FARs.

• Assessment of VCS-PD

In this section the assessments and findings from the desk review of the VCS-PD, site visit, interviews and supporting documents as well as the final assessments are summarised. Table 2-1 includes an overview of all raised CARs, CLs and FARs.

Table 2-1: Overview of CARs, CLs and FARs issued

No.	Topic / Chapter	CAR	CL	FAR
3.1	VCS-PD Template Section - 1.2	-	-	-
3.2	VCS-PD Template Section - 1.3	1	-	-
3.3	VCS-PD Template Section - 1.5	-	-	-
3.4	VCS-PD Template Section – 1.6	1	-	-
3.5	VCS-PD Template Section – 1.7	-	-	-
3.6	VCS-PD Template Section - 1.9	-	-	-

3.7	VCS-PD Template Section - 1.10	-	-	-
3.8	VCS-PD Template Section - 1.12.1	-	-	-
3.9	VCS-PD Template Section - 1.12.2	-	-	-
3.10	VCS-PD Template Section - 1.12.3	-	-	-
3.11	VCS-PD Template Section - 1.12.4	-	-	-
3.12	VCS-PD Template Section - 1.13	-	-	-
-	SUM	2	0	0

- VCS-PD Template Section - 1.2 Sectoral Scope and Project Type

Description

Demonstration that the project is applicable of the selected sectoral scope and project type.

Related Findings

- ☒ No CARs, CLs or FARs have been identified in this context
- ☐ The following finding(s) have been addressed:

Final Assessment

The Sectoral Scope of the project activity is *13: Waste Handling and Disposal* and the project type is *Landfill Gas Project Activity*.

The project involves the installation of a plant for collection and flaring of biogas in El Panul landfill located in the province of Coquimbo, Chile. Therefore the sectoral scope and project type applied to the project activity in the VCS-PD is correct.

- ☒ Sectoral Scope and Project Type are in line with the applicable VCS criteria.

- VCS-PD Template Section - 1.3 Project Proponent

Description

Demonstration that the project proponent was included in the VCS-PD.

Related Findings

☐ No CARs, CLs or FARs have been identified in this context

☒ The following finding(s) have been addressed:

Finding:	3.2-1		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	During on site visit it was identified that the project proponent is EcoSecurities International Limited. The project proponent was incorrectly determined in the MR. Correction is required.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	MR v2 and PD v2 name EcoSecurities International Limited as the project proponent, rather than EcoSecurities Group PLC.		
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The validation team has checked the revised PD and it has been confirmed that the Project Proponent has been changed to EcoSecurities International Limited. Hence, it is concluded that the VCS-PD is correct. <u>CAR is closed.</u>		
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements		

Final Assessment

The project proponent is EcoSecurities International Limited. Description of the project proponent was correctly included in the VCS-PD. The validation team crosschecked the VCS-PD against the CDM PDD. No discrepancies were identified.

☒ Project Proponent is in line with the applicable VCS criteria.

- **VCS-PD Template Section - 1.5 Project Start Date**

Description

Demonstration that the project start date of the project activity is in line with the VCS Standard Version 3.

Related Findings

☒ No CARs, CLs or FARs have been identified in this context

☐ The following finding(s) have been addressed:

Final Assessment

The selected project start date is 2008/03/01 which is the date of first commissioning of the project activity corresponding to the date when the project enclosed began flaring landfill gas. Evidence^{/PSD/} of the project start date was provided to the validation team.

According to the VCS the project start date is the date on which the project began generating GHG emission reductions or removals.

☒ The project start date is in line with the applicable VCS criteria.

- **VCS-PD Template Section – 1.6 Project Crediting Period**

Description

Demonstration that the project crediting period is in line with the VCS Standard Version 3.

Related Findings

☐ No CARs, CLs or FARs have been identified in this context

☒ The following finding(s) have been addressed:

Finding:	3.4-1		
Classification	☒ CAR	☐ CL	☐ FAR

Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The project crediting period was incorrectly determined. As the project was registered as a CDM on 2009/10/06 the VCS crediting period shall ends a day before: 2009/10/ <u>05</u>
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	PD v2 defines the end of the VCS crediting period as October 5, 2009 (inclusive).
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	A revised PD has been provided by the PP, the validation team has checked Section 1.6 of the PD and it has been identified that the VCS crediting period has been changed to 2008/03/01 to 2009/10/05 (both dates included). This is found correct as the CDM registration date is 2009/10/06. Hence, the validation team concludes that the crediting period is correct and in accordance with the VCS Guidelines and requirements. <u>CAR is closed.</u>
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Final Assessment

The selected project crediting period is from 2008/03/01 to 2009/10/05 (Including both dates). The project activity was registered as a CDM project on 2009/10/06. Therefore no overlapping of GHG programmes occurred.

According to the VCS projects that have been registered under more than one other GHG program, they are not eligible for VCU issuance after the date that is the earliest end date of all applicable project crediting periods.

☒ The project crediting period is in line with the applicable VCS criteria.

- VCS-PD Template Section – 1.7 Project Scale and Estimated GHG Emission Reductions or Removals

Description

Demonstration that the selected project scale is in line with the VCS Standard Version 3.

Related Findings

- ☒ No CARs, CLs or FARs have been identified in this context
- ☐ The following finding(s) have been addressed:

Final Assessment

According to the VCS projects are categorized by size according to their estimated average annual GHG emission reductions or removals. As the project activity estimated average annual GHG emission reduction is less than 1,000,000 tCO₂e per year the project activity scale corresponds to “Project” category.

- ☒ The project scale is in line with the applicable VCS criteria.

- VCS-PD Template Section – 1.9 Project Location

Description

Demonstration that the project location is in line with the VCS Standard Version 3.

Related Findings

- ☒ No CARs, CLs or FARs have been identified in this context
- ☐ The following finding(s) have been addressed:

Final Assessment

According to the VCS project location determination for non-AFOLU projects shall be specified by a single geodetic coordinate. The VCS-PD provides a single geodetic coordinate. Moreover the validation team crosschecked the geodetic coordinate stated in the CDM PDD. No discrepancies were identified.

- ☒ The project location is in line with the applicable VCS criteria.

- VCS-PD Template Section – 1.10 Conditions prior to Project Initiation

Description

Demonstration that description of the conditions prior to Project Initiation are in line with the VCS Standard Version 3.

Related Findings

☒ No CARs, CLs or FARs have been identified in this context

☐ The following finding(s) have been addressed:

Final Assessment

According to the VCS the project description shall include a description of conditions prior to project initiation. The VCS-PD includes such description.

Furthermore the validation team crosschecked the information of conditions prior to project initiation stated in the CDM PDD. No discrepancies were identified.

☒ Description of the conditions prior to project Initiation is in line with the applicable VCS criteria.

- VCS-PD Template Section – 1.12.1 Proof of Title

Description

Demonstration that the Proof of Title is available and it is in line with the VCS Standard Version 3.

Related Findings

☒ No CARs, CLs or FARs have been identified in this context

☐ The following finding(s) have been addressed:

Final Assessment

The Proof of Title shown by the PP is the Verified emission reductions and purchase agreement signed on 2011/08/15 between Biogas Technology Limited and EcoSecurities International Limited. The Proof of Title represents a right of use arising by virtue of a statutory, property or contractual right in the plant, equipment or process that generates GHG emission reductions and/or removals (where such right includes the right of use of such reductions or removals and the project proponent has not been divested of such right of use). The proof of title is considered confidential by the PP and therefore was only shown and not provided. The validation checked the proof of evidence and is considered correct.

This is in compliance with description of ownership of the VCS criteria.

☒ Proof of title is available and it is in line with the applicable VCS criteria.

- VCS-PD Template Section – 1.12.2 Emissions Trading Programs and Other Binding Limits

Description

Demonstration whether the project reduces GHG emissions from activities that are included in an emissions trading program or take place in a jurisdiction or sector in which binding limits are established on GHG emissions

Related Findings

☒ No CARs, CLs or FARs have been identified in this context

☐ The following finding(s) have been addressed:

Final Assessment

Chile does not have a regional GHG reduction scheme or target while Chile is a non-Annex I country within the Kyoto Protocol. The UNFCCC web site was checked.

☒ The project activity does not participate in an emissions trading program which is in line with the applicable VCS criteria.

- VCS-PD Template Section – 1.12.3 Participation under Other GHG Programs

Description

Demonstration that project activities participating under other GHG programs are in line with the VCS Standard Version 3.

Related Findings

☒ No CARs, CLs or FARs have been identified in this context

☐ The following finding(s) have been addressed:

Final Assessment

The project activity was registered as a CDM project on 2009/10/06. The selected VCS project crediting period is from 2008/03/01 to 2009/10/05 (Including both dates). Therefore, no overlapping of GHG programmes occurred.

The PP has provided the VCS-PD including sections described in section 3.12.4 of the VCS Standard Version 3. Furthermore, the validation report was submitted to the relevant program to request registration within two years of the project start date.

☒ Participation of the project activity under other GHG programs is in line with the applicable VCS criteria.

- VCS-PD Template Section – 1.12.4 Other Forms of Environmental Credit

Description

Demonstration that the project activity has not created another form of GHG-related environmental credit in accordance with the VCS Standard Version 3.

Related Findings

☒ No CARs, CLs or FARs have been identified in this context

☐ The following finding(s) have been addressed:

Final Assessment

The project activity has not created another form of GHG-related environmental credit, such as renewable energy certificates.



The project activity has not created another form of GHG-related environmental credit which is in line with the applicable VCS criteria.

- VCS-PD Template Section – 1.13 Additional Information Relevant to the Project

Description

Demonstration that the project activity provides additional relevant information such as eligibility criteria, leakage management and commercially sensitive information in accordance with the VCS Standard Version 3.

Related Findings



No CARs, CLs or FARs have been identified in this context



The following finding(s) have been addressed:

Final Assessment

According to the VCS additional relevant information to the project shall be given, including eligibility criteria for new instances of project activities for grouped projects, a description of any leakage management plan or mitigation measures and any further information which may relate to the eligibility of the project, risks to net GHG emission reductions or removals, the quantification of net GHG emission reductions or removals, and an indication of commercially sensitive information that has been excluded from the public project description.

Eligibility criteria were fulfilled and demonstrated in the CDM Validation Report^{/Val/}. No leakage is considered for projects registered under methodology ACM0001. Finally, no commercially sensitive information is included in the VCS-PD. As a reference the PP mentioned as commercially sensitive information the proof of title and VER calculation spread sheet.



Additional relevant Information to the project activity which was given is in line with the applicable VCS criteria.

2.2.2 Methodology Deviations

No methodology deviations are applied to the project.

2.2.3 New Project Activity Instances

Not applicable as the proposed project activity is not part of grouped projects.

2.3 Validation Conclusion

The review of the project design documentation^{/PDD/ & /VCS-PD/} and additional documents related to VCS requirements; the subsequent background investigation and follow-up interviews have provided TÜV NORD JI/CDM CP with sufficient evidence to validate the fulfilment of the stated criteria.

In detail the conclusions can be summarised as follows:

- The project is in line with all relevant host country criteria (Chile) and all relevant VCS Standard Version 3 criteria.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 17,973 tons CO₂e is most likely to be achieved within the given VCS crediting period.
- The project activity meets the criteria of the clauses 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.2, 1.12.3, 1.12.4 and 1.13 of the VCS-PD as per VCS version 3 and is likely to achieve the estimated emission reductions.

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

3 VERIFICATION PROCESS

3.1 Method and Criteria

The verification of the project consisted of the following steps:

- Contract review
- Appointment of team members and technical reviewers
- Desk review of the Monitoring Report^{MR/} submitted by the client and additional supporting documents.
- Verification planning,
- On-Site assessment,
- Background investigation and follow-up interviews with personnel of the project developer and its contractors,
- Draft verification reporting
- Resolution of corrective actions (if any)
- Final verification reporting
- Technical review
- Final approval of the verification.

Verification is based on the criteria laid down by VCS version 03.

The sequence of the verification is given in the table 3.1 below:

Table 3.1: Verification sequence

Topic	Time
Assignment of verification	2011-12-06
On-site visit	2011-12-12
Draft reporting finalised	2011-12-14
Technical review on draft reporting finalised	2011-12-15
Final reporting finalised	2012-03-23
Technical review and minor corrections on the final report finalised	2012-05-30

The main verification steps are described below.

3.2 Appointment of team members and technical reviewer

On the basis of a competence analysis and individual availabilities a verification team was appointed. Furthermore, the personnel for the technical review and the final approval was determined.

The list of involved personnel, the tasks assigned and the qualification status are summarized in the table 3.2-1 below.

Table 3.2-1: Involved Personnel

	Name	Company	Function ¹⁾	Qualification Status ²⁾	Scheme competence ³⁾	Technical competence ⁴⁾	Verification competence ⁵⁾	Host country Competence	On-site visit
☒ Mr. ☐ Ms.	Raul Gonzalez Mitre	BRTUV	TL	LA	☒	-	☒	☒	☒
☒ Mr. ☐ Ms.	Abraham Garza Alvarez	BRTUV	TE	T	☐	13.1	☐	☒	☒
☒ Mr. ☐ Ms.	Emilio Martin	TUV NORD	TR	LA	☒	13.1	☒	☐	-
☐ Mr. ☒ Ms.	Alexandra Nebel	TUV NORD	FA	SA	☒	-	☒	☐	-

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

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

³⁾ GHG auditor status (at least Assessor)

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

⁵⁾ In case of verification projects

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

B) No team member

3.3 Document Review

The validated PD^{/PDD/} & ^{/VCS-PD/}, VCS MR^{/MR/}, emission reduction calculation spread sheet^{/XLS/} and supporting background documents related to the project implementation, project design, monitoring and baseline were reviewed.

The project proponent furnished performance records of the project in form of data logs, registers, generation reports, and calibration evidence etc. VER Calculation sheet was checked thoroughly by the verification team for correctness of calculation approach. Data input values were also checked from the records maintained by the project proponents. Result of calculations reported in the monitoring report was checked against data values as available from the project proponent in VER calculation sheet. These data values and other information related to project performance including calibrations details are available in the form of data logs and records duly archived and maintained as per the quality assurance/quality control procedure specified as a part of monitoring plan given in the validated PD.

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

The references used in the course of this verification are summarized in Annex 2.

3.4 Interviews

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

Before and during the on-site visit, the verification team performed interviews with the representative of project proponent to confirm selected information and to resolve issues identified in the document review.

Representatives of EcoSecurities International Limited. (project proponent) and the operational staff (Biogas Technology Ltd) of the landfill were interviewed. Details of the interviewed persons are included in Table: Annex 2.4. The main topics of the interviews are summarised in Table 3-4.1.

Table 3-4.1: Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
1. Projects & Operations personnel^{/IM01/} 2. Project proponent/consultant^{/IM02/}	- General aspects of the project - Technical equipment and operation - Changes since validation - Monitoring and measurement equipment - Calibration procedures - Quality management system - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring data management - Data uncertainty and residual risks - GHG emission reduction calculation - Procedural aspects of the verification

Interviewed Persons / Entities	Interview topics
	- Maintenance - Environmental aspect

3.5 Site Inspections

As most essential part of the verification exercise, it is indispensable to carry out an inspection on site in order to verify that the project is implemented in accordance with the applicable criteria. Furthermore the on-site assessment is necessary to check the monitoring data with respect to accuracy to ensure the calculation of emission reductions. The main tasks covered during the site visit include, but are not limited to:

- The on-site assessment included an investigation of whether all relevant equipment is installed and works as anticipated.
- The operating staff was interviewed and observed in order to check the risks of inappropriate operation and data collection procedures.
- Information processes for generating, aggregating and reporting the selected monitored parameters were reviewed.
- The duly calibration of all metering equipment was checked.
- The monitoring processes, routines and documentations were audited to check their proper application.
- The monitoring data were checked completely.
- The data aggregation trails were checked via spot sample down to the level of the meter recordings.

Mr. Abraham Garza Alvarez having technical expertise for scope 13 and Mr. Raul Gonzalez Mitre a CDM Lead Assessor attended the site visit.

3.6 Resolution of Any Material Discrepancy

Material discrepancies identified in the course of the verification are addressed either as CARs, CLs or FARs.

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

- mistakes have been made in assumptions, application of the methodology or the project documentation which will have a direct influence on the project results,
- the requirements deemed relevant for verification of the project with certain characteristics have not been met or
- there is a risk that the project would not be registered or that emission reductions would not be able to be verified and certified.

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

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

A detailed list of the CARs CLs and FAR raised and discussed in the course of this verification is included in the next section 4 of this report.

4 VERIFICATION FINDINGS

In this section the assessments and findings from the desk review of the VCS V01 PDD, site visit, interviews and supporting documents as well as the final assessments are summarised. Table 4-1 includes an overview of all raised CARs, CLs and FARs.

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

No.	Topic / Chapter	CAR	CL	FAR
4.1	Project Implementation Status	3	3	-
4.2	Accuracy of GHG Emission Reduction or Removal Calculations	1	-	-
4.3	Quality of Evidence to Determine GHG Emission Reductions or Removals	-	-	-
4.4	Management and Operational System	-	-	-
-	SUM	4	3	-

4.1 Project Implementation Status

4.1.1 Remaining issues, including any material discrepancy, from previous verification

No FAR was raised during validation. No open issues were determined during validation.

Related Findings

☒ No CARs, CLs or FARs have been identified in this context

☐ The following finding(s) have been addressed:

Final Assessment

No FAR was raised during validation. No open issues were determined during validation.

4.1.2 Implementation status of the project activity

Description

The project was successfully commissioned on 2008-03-01, since then project is operational with some planned/unplanned shutdowns. The phase wise commissioning dates of the project activity have been addressed in the commissioning certificate^{/PSD/}. Project activity was operational during the current monitoring period with minor shutdowns due to reasons outside the project developer and the project proponent control. Monitoring records and the operation log book^{/LogBook/} as well were checked.

As per the onsite assessment, observations, interviews and collected evidences, it is concluded that project activity has been implemented as described in the Project Description^{/PDD/ & /VCS-PD/} validated as per VCS Version 3^{/VCS/}.

No Further Actions request or pending issues were identified in the Validation Report. This was verified by the verification team during the on site visit by checking the audit data.

However the following CAR was raised regarding the VCS crediting period and was successfully closed.

Related Findings

☐ No CARs, CLs or FARs have been identified in this context

☒ The following finding(s) have been addressed:

Finding:	CAR 4.1-1		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section 1.6.: The project crediting period was incorrectly determined. As the project was registered as a CDM on 2009/10/06 the VCS crediting period shall ends a day before: 2009/10/ <u>05</u>		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	MR v2 defines the end of the VCS crediting period as October 5, 2009 (inclusive).		

DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	A revised MR has been provided by the PP, the verification team has checked Section 1.6 of the PD and it has been identified that the VCS crediting period has been changed to 2008/03/01 to 2009/10/05 (both dates included). This is found correct as the CDM registration date is 2009/10/06. Hence, the verification team concludes that the crediting period stated in the MR is correct and in accordance with the PD and the VCS Guidelines and requirements. <u>CAR is closed.</u>
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Final Assessment

The project is found to be implemented as described in validated PD^{/VCS-PD/} and the registered monitoring plan.

4.1.3 Completeness of monitoring

Description

- The monitoring and reporting procedures reflect the requirements of the monitoring plan of the validated PD^{/PDD/ & /VCS-PD/}. The monitoring parameters are recorded as per the monitoring plan and methodology^{/ACM0001/}.
- All parameters and its sources were verified during onsite visit.
- For the monitoring purpose there is a flow meter, a gas analyzer, thermocouples and electricity meter. Records were provided and checked by the verification team.
- The meter readings are found to be measured and recorded continuously by monitoring personnel.
- Landfill gas capture and destruction reports^{/Netrix/} are also found to be archived.
- Data extracted directly from the Netrix were cross-checked against data included in the emission reduction calculation spread sheet.
- The submitted monitoring report^{/MR/} which forms the basis of the verification was observed to be prepared by summarizing consolidated monthly data over the whole monitoring period in accordance with the monitoring plan.
- All necessary monitoring instruments are found to be installed. The measuring devices are well known to the personnel and calibrated as defined by the manufacturer.
- The verification/calibration records^{/CC/} of all the installed measurement equipment were made

available to the verification team. No abnormality was observed in the metering.

- The reporting procedures reflect the requirements of the monitoring report.
- Archiving is found to be appropriate during the whole monitoring period. The landfill operational data (LFG generated & flared, biogas composition, flare temperature and power consumption) also was found to be cross checked by the PP to weed out any anomaly.
- The personnel involved have been found to be trained and demonstrated good skills in operation and maintenance of the biogas plant.
- The verification team has verified all records provided. They are recorded and maintained in line with monitoring plan of the validated PD^{/PDD/} & ^{/VCS-PD/} and the applied methodology. Thus the DOE confirms the completeness of the monitoring in the key areas.

Related Findings

☐ No CARs, CLs or FARs have been identified in this context

☒ The following finding(s) have been addressed:

Finding:	CAR 4.1-2		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section 2.1 and section 3.2 (Parameter LFG_{total,y}): Date of flow meter replacement is incorrect. The date observed in the logbook was 04/08/2008. Furthermore all validity days are also incorrect. During on site visit it was verified that validity day is determined according to installation date and not according to calibration certificate. Moreover installation date of gas analyzer (Parameter W_{CH4}) is incorrect. During on site visit it was verified that installation date was 01/03/2008. Finally date of the last calibration is missing in the monitoring table of parameter w_{CH4}. Calibration shall cover the whole monitoring period.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The date of flow meter replacement was August 6, 2008 in MR v1; in MR v2 it is corrected as August 4, 2008. Validity dates for the flow meter calibration in MR v2 are defined as 3 years after installation. The date of the gas analyser installation is defined as March 1, 2008 in MR v2. One additional calibration date is included in MR v2 to cover the entire monitoring period (beyond Oct 5, 2009).		

DOE Assessment #1

The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.

The PP has provided revised MR and the following has been checked by the verification team:

- Section 2.1 and section 3.2 (Parameter $LFG_{total,y}$): The replacement date for the flow meter has been changed to 2008/08/04. The verification team has checked the operational logbook^{/LogBook/} and it has been identified that the replacement date is correct. Hence, this issue is closed.
- The verification team has checked all the validity days for the equipment calibrations included in Section 3.2 of the MR against the calibration/installation records^{/CC/} and all data was found correct. Hence, this issue is closed.
- Parameter w_{CH4} : The installation date of the gas analyzer has been corrected to 2008/03/01. The verification team has checked the operational logbook^{/LogBook/} and it has been identified that the installation date is correct.

In addition, the monitoring table in Section 3.2. has been updated including the detail calibration dates covering the monitoring period. The gas analyzer calibration dates are as follows:

Serial No.	In Use From/To	Calibration Date	Valid Until
24614	01/03/08 – 15/09/08	27/03/2007	28/02/2009
27061	15/09/08 – 05/10/09	25/04/2008 14/09/2009	14/09/2009 13/09/2010

The verification team has checked the calibration records and tests^{/LogBook/} performed by the PP so as the installation certificates^{/CC-3/} provided by the supplier and the gas span certificates^{/CAL/} and all data was found correct. The calibration dates included in the monitoring table of parameter w_{CH4} are in accordance with the provided evidences. Hence, this issue is closed.

CAR is closed.
Conclusion

Tick the appropriate checkbox

- ☐ To be checked during the first periodic verification
- ☒ Appropriate action was taken
- ☒ Project documentation was corrected correspondingly
- ☐ Additional action should be taken
- ☒ The project complies with the requirements

Finding:

CL 4.1-3

Finding:	CL 4.1-3		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section 3.2: Detail information about the calculation method of parameter PE_{flare} is required. Furthermore, monitoring table for parameter T_{comb} is not as per the registered PDD. Hence, further clarification and correction is required.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Correction in MR v2: - Table PE_{flare} includes criteria used for determination of flare efficiency default values. - Table PE_{flare} includes manufacturer specifications on proper operation. - Other details of PE_{flare} calculation are referred to section 4.2. - Table T_{comb} is removed; this parameter is considered an operational control for manufacturer requirement. These data are available in the VERs calculation spreadsheet.		

Finding:	CL 4.1-3								
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The verification team has checked the revised MR provided by the PP. The monitoring table of parameter PE_{flare} included in Section 3.2 of the MR has been corrected. The PP has included the procedure used to determine the default flare efficiency value as per the “Tool to determine project emissions from flaring gases containing Methane” Version 01 which is as follows: • 0% if the temperature in the exhaust gas of the flare (T_{flare}) is below 500 °C for more than 20 minutes during the hour h . • 50%, if the temperature in the exhaust gas of the flare (T_{flare}) is above 500 °C for more than 40 minutes during the hour h, but the manufactures specifications on proper operation of the flare are not met at any point in time during the hour h. • 90%, if the temperature in the exhaust gas of the flare (T_{flare}) is above 500 °C for more than 40 minutes during the hour h and the manufactures specifications on proper operation of the flare are met continuously during the hour h. In addition, the operational specifications determined by the flare manufacturer have also been included in the monitoring table: <table> <tr> <th>Parameter</th><th>Operational Condition</th></tr> <tr> <td>T_{comb}</td><td>700 – 1200 °C</td></tr> <tr> <td>T_{flare}</td><td>500 – 1200 °C</td></tr> <tr> <td>W_{CH4}</td><td>>20 (% vol)</td></tr> </table> The verification team has checked the flare efficiency determination procedure against the applicable “Tool to determine project emissions from flaring gases containing Methane” Version 01 and it has been identified to be correct, also it is in accordance with the registered CDM PDD and the applicable methodology ACM0001 Version 08. In addition, the flare technical data sheet^{/Tech-1/} has been checked by the verification team and it has been found that the values of the flare operational specifications included in the MR are correct and have also been properly applied in the ER calculation spreadsheet.	Parameter	Operational Condition	T_{comb}	700 – 1200 °C	T_{flare}	500 – 1200 °C	W_{CH4}	>20 (% vol)
Parameter	Operational Condition								
T_{comb}	700 – 1200 °C								
T_{flare}	500 – 1200 °C								
W_{CH4}	>20 (% vol)								

Finding:	CL 4.1-3
	According to the applicable Tool the flare efficiency is determined by monitoring the number of minutes where the temperature of the exhaust gas is above or below 500°C and where the manufacturer's specifications are being met. As shown above the tool defines specific time intervals (20 mins and 40 mins) for comparing the flare conditions and determines the flare efficiency. The PP has measurements every 15 minutes. As sometimes the flare is shut-down and the time to restart its operation is higher than 15 min (the temperature of the flare needs to go down to 300°C before restarting for safety reasons, and this cannot be achieved within a 15 min interval)^{/Tech-1/}, the PP has defined that it is considered that the tool requirements for the 40 min flare operation interval are met as long as all 15 minutes measurements within an hour (there are 4 of them each hour) are above 500°C. In the case any of the 15 minutes measurements during an hour are below 500°C, the PP considers that the tool requirements with regards to the 40 min (STEP 6 of the tool) are not met for that hour. Regarding the flare temperature the <i>Tool to determine project emissions from flaring gases containing Methane Version 01</i> states “An excessively high temperature at the sampling point (above 700 °C) may be an indication that the flare is not being adequately operated or that its capacity is not adequate to the actual flow”. Nevertheless, for the case of the project activity the upper section of the flare (sampling point) can be adequately operated within a temperature range of 500 to 1,200 °C. Hence, the upper limit considered for the flare temperature is 1,200 °C instead of 700°C. The verification team has checked the flare technical data and has confirmed that the normal operational conditions for the flare consider a flare temperature within 500 to 1,200 °C. The verification team has checked these assumptions for the determination of the flare efficiency and they are considered conservative and in line with the requirements from the applicable tool and the manufacturer specifications. The PP is determining the flare efficiency as follows: • 0% if the temperature in the exhaust gas of the flare (T_{flare}) is below 500 °C for more than 15 minutes during the hour h .

Finding:	CL 4.1-3
	50%, if the temperature in the exhaust gas of the flare (T_{flare}) is above 500 °C during the 60 minutes of the hour h, but the manufactures specifications on proper operation of the flare are not met at any point in time during the hour h. 90%, if the temperature in the exhaust gas of the flare (T_{flare}) is above 500 °C during the 60 minutes of the hour h and the manufactures specifications on proper operation of the flare are met continuously during the hour h. Hence, as it has been confirmed the PP is applying conservative assumptions that result in higher project emissions from flaring and in lower emission reductions from the project activity. Regarding the monitoring table of parameter T_{comb} the PP has decided to eliminate it from Section 3.2 of the MR and has included it as a flare operation specification in the monitoring table of parameter PE_{flare}. The verification team has checked the applicable methodology ACM0001 Version 08 and the registered PDD and it has been identified that it is not required to monitor the combustion temperature of the flare, only the applicable “Tool to determine project emissions from flaring gases containing Methane” Versi on 01 requires to monitor the manufactures specifications on proper operation of the flare for the determination of the flare efficiency. Therefore, the verification team concludes that it is appropriate to remove the monitoring table of parameter T_{comb} as it was not considered in the registered CDM PDD and it is only monitored as a flare operational condition in order to determine the flare efficiency as specified in parameter PE_{flare}. Hence, the verification team concludes that the measuring and determination method of parameter PE_{flare,y} is in line with the registered monitoring plan of the PDD and the applied methodology ACM0001 version 08. <u>CL is closed.</u>
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the next periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Finding:	CL 4.1-4		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	According to the registered PDD parameter AF has been fixed ex-ante for the whole crediting period. Nevertheless, parameters “Regulatory requirements relating to landfill gas projects”, AF, $MG_{PR,1}$, W_x and $p_{n,j,1}$ have been included in Section 3.2 instead of Section 3.1. Further clarification is required.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	AF, W_x and $p_{n,j,1}$ (monitored data this period) are removed from MR v2, because they are not included in the monitoring plan nor in the monitoring methodology (ACM0001 v8). They are to be monitored only once in the crediting period and not periodically (AF remain fixed for the rest of the crediting period). This information is available in AF calculation spreadsheet. Details of the AF calculation originally explained in AF table, are explained in Section 4.1 of MR v2. These tables (AF, W_x and $p_{n,j,1}$) are not included in Section 3.1, either, because they don't meet the requirements of the VCS MR template for section 3.1 (<i>data and parameters available at validation</i>). According to ACM0001 v8 “Regulatory requirements relating to landfill gas projects” is to be “recorded annually”, then understood as monitored annually. Thus, it does not meet the requirement of the VCS MR template for section 3.1 either. It does, however, meet the requirement of the VCS MR template for section 3.2 (<i>data and parameters monitored subsequent to validation</i>). $MG_{PR,1}$ (monitored data this period) is not included in the monitoring plan because it is only to be monitored once (not periodically) in the crediting period (remaining fixed the rest of the period). However, monitoring methodology (ACM0001 v8) included this table. Not meeting the requirement of the VCS MR template for section 3.1 and meeting the requirement of the VCS MR template for section 3.2, this parameter is reported in section 3.2.		

Finding:	CL 4.1-4
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The verification team has checked the revised MR provided by the PP. Parameter AF, W_x and $p_{n,j,1}$ have been deleted from the MR. The verification team has checked the registered CDM PDD and these parameters have not been considered in Section B.7.2 also it has been defined that the parameter AF will be fixed ex-ante. In addition, the applicable methodology ACM0001 version 8 states that parameter AF can be determined fixed (Option 1) or continuously monitored (Option 2). Hence, as the PP selected the fixed ex-ante option, the parameter AF shall be determined as follows: <i>“The destruction efficiency of the system used in the project activity is estimated once and remains fixed for the whole crediting period...”</i> As the monitoring methodology ACM0001 Version 08 does not include any monitoring table for this parameters AF, W_x and $p_{n,j,1}$ and considering that these parameters were not defined at the time of the project registration and are only being monitored once during the entire crediting period at the start of the project activity the verification team concludes that it is appropriate to remove them from Section 3.2 of the MR. The detail calculation of parameter AF and how parameters W_x and $p_{n,j,1}$ have been applied for the calculation has been included by the PP in Section 4.1 of the MR. Regarding parameter $MG_{PR,1}$ the PP has included it in Section 3.2 of the MR. The verification team has checked the applicable methodology ACM0001 Version 08 and it has been identified that parameter $MG_{PR,1}$ corresponds to the value in year 1 of the monitoring parameter $MG_{PR,y}$. Parameter $MG_{PR,1}$ was not included in the monitoring plan of the registered CDM PDD because as the PP has chosen option 1 (fixed ex-ante) for the determination of the AF factor parameter $MG_{PR,y}$ is only required to be monitored once during the first year of the project activity. Hence, the verification team concluded that reporting parameter $MG_{PR,1}$ in Section 3.2 of the MR is correct.

Finding:	CL 4.1-4
	Finally, regarding parameter “Regulatory requirements relating to landfill gas projects” the PP has included it in Section 3.2 of the monitoring report. The verification team has checked the registered CDM PDD and it has been identified that this parameter was included in Section B.6.2, also according to the monitoring methodology ACM0001 Version 08 this parameter is included in the section of “<i>Data and parameters not monitored</i>” and its table states that it is “... recorded annually, is used for changes to the adjustment factor (AF) or directly MDBL,y at renewal of the credit period...”. Therefore, based on the above it is not correct to include parameter “Regulatory requirements relating to landfill gas projects” in Section 3.2 of the MR. Further clarification and correction is required. <u>CL remains open.</u>
Corrective Action #2 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	MR v3 includes the requested change. The table for parameter “Regulatory requirements relating to landfill gas projects” is located in Section 3.1 instead of 3.2
DOE Assessment #2 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The verification team has checked the revised MR provided by the PP and it has been identified that parameter “Regulatory requirements relating to landfill gas projects” has been removed from Section 3.2 and is now included in Section 3.1. The verification team has checked the registered PDD and the monitoring methodology ACM0001 Version 08 and it has been confirmed that this parameter is only used at the renewal of the crediting period. Therefore, based on the above it is correct to include parameter “Regulatory requirements relating to landfill gas projects” in Section 3.1 of the MR. Hence, the verification team concludes that the measuring and determination method of parameter “Regulatory requirements relating to landfill gas projects” is in line with the registered monitoring plan of the PDD and the applied methodology ACM0001 version 08. <u>CL is closed</u>

Finding:	CL 4.1-4
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the next periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Finding:	CAR 4.1-5
Classification	☒ CAR ☐ CL ☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The following has been identified in the AF calculation spreadsheet. - Factor F (0.48) used is not correct. - The default values for DOCj and kj parameters applied for the Diapers waste is not in accordance with the IPCC guidelines. - The value calculated for $MG_{PR,1}$ is not correct. Correction is required.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	- Factor F ($=w_{CH4\%}$, % methane content, monitored parameter for July09-June10) is corrected now for the AF calculation. Average was initially miscalculated. - From the study performed in El Panul Landfill for the parameter <i>Weight fraction of the waste type j</i>. The waste type <i>diaper/nappies</i> was initially included in the <i>Pulp, paper and cardboard</i> category. Version 2 of AF calculation includes <i>diapers/nappies</i> in Textile category. According to IPCC 2006, <i>diaper/nappies</i> are similar to the textile category. - Due to the F ($w_{ch4\%}$) miscalculation, $MG_{PR,1}$ was miscalculated also. Corrected in 2nd version.

Finding:	CAR 4.1-5
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The PP has provided a revised AF calculation spreadsheet and the following corrections have been performed: - Factor F “methane content in the biogas” was changed to 0.498. This value was defined as the average methane content during the period of July 2009 to June 2010. The verification team has checked the raw data from the Netrix^{/Netrix/} and all values were found correct. Hence, this issue is closed. - The amount of waste classified as diapers/nappies has been included in the category of “Textiles”. The verification team has checked the IPCC Guidelines 2006 and has confirmed that the values of DOC_j and k_j for the diapers are similar to the values for the textiles. Therefore, the assumption made by the PP to consider the diapers and textiles as one same waste category is found correct. This issue is closed. - The verification team has checked the revised AF calculation spreadsheet and it has been identified that as a result of the changes in the Factor F “methane content in the biogas” and the inclusion of the diapers/nappies wastes in the category of “Textiles” parameter MG_{PR,1} is now correctly calculated. All sources and values have been checked and no discrepancies have been identified. Hence, this issue is closed. Hence, the verification team concludes that the value given in the monitoring report for parameter AF (as a result of the calculation of parameter MG_{PR,1}) is correct and determined in a conservative manner. <u>CAR is closed.</u>
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the next periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Finding:	CL 4.1-6
Classification	☐ CAR ☒ CL ☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section 4.1: Details regarding the AF calculation and its results are missing. Further information is required.

Finding:	CL 4.1-6
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	AF's calculation details were included in Section 3.2 of MR v1; these are included in Section 4.1 of MR v2.
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The verification team has checked the revised MR provided by the PP and it has been identified that details about the AF factor calculation have been included in Section 4.1 of the MR. The calculation procedure has been checked against the applicable methodology ACM0001 Version 08 and the registered CDM PDD and all information and formulas were found correct. In addition, the AF calculation spreadsheet was checked against the MR and it has been identified that all values and results have been consistently applied. Hence, the verification team concludes that the applied formulae and methods for calculating the AF are in accordance with the monitoring plan and the approved methodology ACM0001 Version 08. Furthermore, it is assessed that the provided calculations are complete and reflect all requirements of the monitoring plan. No standard or old values have been used for the AF calculation. <u>CL is closed.</u>
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the next periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Final Assessment

The monitoring and reporting procedures of the project activity reflect the requirements of the monitoring plan of the validated Project Description^{/PDD/ & /VCS-PD/}. The final monitoring report^{/MR/} which forms the basis of the verification was observed to be in accordance with the monitoring plan and the VCS requirements^{/VCS/ & /VCS-MR-T/}.

4.2 Accuracy of GHG Emission Reduction or Removal Calculations

Description

- The approved CDM baseline and monitoring methodology ACM0001 version 8 is applied to the project activity. GHG emission reduction is calculated as baseline emission minus project emission.
- All formula and emission factor used in the calculations of emission reductions are in accordance to the approved methodology ACM0001, and monitoring plan of the validated PDD^{/PDD/ & /VCS-PD/}.
- The calibration frequency of all meters is defined by the meter manufacturer itself. The verification/calibration certificates of all the meters were checked. No discrepancies were identified between manufacturer specification and calibration frequency performed by the PP.
- All records provided were found to be of adequate quality. The verification team has cross checked the resulted value of units supplied by the project activity with the sources and is found to be correct.
- The set of calculations for the actual emission reduction of the current verification period are transparently computed and presented in the spread sheet of VER calculation^{/XLS/}..

Related Findings

☐ No CARs, CLs or FARs have been identified in this context

☒ The following finding(s) have been addressed:

Finding:	CAR 4.2-1		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The manufacturer specifications for w_{CH_4} and T_{flare} used in the ER calculation to define the flare efficiency are not correct. Correction is required.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	VER calculation v2 uses the correct parameters for manufacturer specification on w_{CH_4} (>20%) and T_{flare} (<1200°C).		

Finding:	CAR 4.2-1
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The PP has provided a revised ER calculation spreadsheet. The verification has checked the worksheet “Default Values” and it has been identified that the PP has corrected the manufacturer specifications for w_{CH_4} and T_{flare} to $>20\%$ and $<1,200^{\circ}C$ respectively. The flare technical data sheet^{/Tech-1/} has been checked by the verification team and it has been identified that the values of the flare operational specifications for w_{CH_4} and T_{flare} included in the revised ER calculation spreadsheet are correct. Hence, the verification team concludes that the value given in the monitoring report for parameter $PE_{flare,y}$ is correct and determined in a conservative manner as per the requirements of the the applied methodology ACM0001 version 08 and the “Tool to determine project emissions from flaring gases containing Methane” Version 01. <u>CAR is closed.</u>
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the next periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Final Assessment

The emission reduction spreadsheet is transparent and clearly referenced. The excel sheets were rigorously cross checked with the archived monitored data and no discrepancies were found. All the formulae have been found to be correctly applied in the emission reduction calculations. Thus, the verification team is confident that the ER calculation is correct and accurate.

4.3 Quality of Evidence to Determine GHG Emission Reductions or Removals

Description

- Several documents were submitted by the project proponent as evidence to determine emission reductions.
- All records, sources, data, certificates and information provided were also found valid in the current verification period. These documents were verified through site visit interviews and found to be authentic.
- When possible, records were checked directly from its source in order to cross check the information
- Furthermore competent employees are recruited, who are found knowledgeable not only about the plant operations but also ensuring the quality of the data and recording and maintaining.
- The verification team finds the quality to be of adequate level to assure confidence in the accurate quantification of the emission reductions.

Related Findings

☒ No CARs, CLs or FARs have been identified in this context

☐ The following finding(s) have been addressed:

Final Assessment

Documents used as evidences for input values of ER calculation were assessed and found to be reliable and authentic. The verification team concludes that the evidence and the data are of an acceptable level of quality.

4.4 Management and Operational System

Description

- During the verification site visit it was identified that the operational structure is as stated in the monitoring plan of the registered PDD^{/PDD/}, the validated VCS-PD^{/VCS-PD/} and the monitoring report^{/MR/}.
- Moreover, competent staff is employed to ensure the data quality.
- An operational structure is established with responsibilities identified. Personnel are trained with the most experimented operators.
- Data collection, measurement, calibration, recording and archiving was found to be carried out as per the monitoring plan as described in the validated VCS-PD^{/PDD/ & /VCS-PD/}.
- The verification team is satisfied with the management and operational system.

Related Findings

☒ No CARs, CLs or FARs have been identified in this context

☐ The following finding(s) have been addressed:

Final Assessment

The monitoring report^{/MR/} clearly describes the management and operational system for the current monitoring period.

5 VERIFICATION CONCLUSION

EcoSecurities International Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the Pre-CDM verification of the project “El Panul – EcoMethane Landfill Gas Project”, with regard to the relevant requirements of VCS standard version 03.

The project activity involves the installation of a plant for collection and flaring of biogas in El Panul landfill. Thus, the project activity displaces green house gas (GHG) emissions currently produced by the atmospheric release of biogas.

Reporting period: From 2008-03-01 to 2009-10-05 (incl. both days)

In the course of the VCS Pre-CDM validation and verification six (06) Corrective Action Requests (CAR) and three (03) Clarification Requests (CL) were raised and these CAR and CL's were successfully closed.

The verification is based on the draft monitoring report^{/MR/}, revised monitoring report^{/MR/}, emission reduction calculation spreadsheet^{/XLS/}, the monitoring plan as set out in the validated PD^{/PD/}, and supporting documents made available to the TÜV NORD JI/CDM CP by the project participant.

In detail the conclusions can be summarised as follows:

- All operations of the project are implemented and installed as planned and described in the validated project description and project activity confirms with the verification criteria for project and their GHG emission reductions or removals set out in the VCS rules i.e. VCS 2007.1 and VCS version 03.
- The monitoring plan is in accordance with the applied approved methodology, i.e. ACM0001, version 08.
- The installed equipments essential for measuring parameters required for calculating emission reductions are calibrated appropriately.
- The monitoring system is in place and functional. The project has generated verifiable GHG emission reductions.

As the result of the Pre-CDM verification, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period (2008-03-01 to 2009-10-05) as follows:

Project emissions: 43 t CO₂ equivalents

Baseline emissions: 18,016 t CO₂ equivalents

Emission reductions: 17,973 t CO₂ equivalents.

The monitoring period has been split into annual emission reductions achieved and the verified emission reductions are as follows:

- from 2008-03-01 to 2008-12-31 is 7,967 tCO₂e
- from 2009-01-01 to 2009-10-05 is 10,006 tCO₂e

Totalling 17,973 t CO₂ equivalents for the monitoring period.

Brazil, 2012-05-30



Raul Gonzalez Mitre
TÜV NORD JI/CDM CP
Verification Team Leader

Essen, 2012-05-30



Alexandra Nebel
TÜV NORD JI/CDM Certification Program
Final Approval

ANNEX 2 REFERENCES

Table 2-1: Documents provided by the project proponent

Reference	Document
/AF/	<u>Truck weighting scale calibration:</u> • Calibration certificate No. CT.184/09 of the truck weighting scale by Aaron Scale. Date of calibration: 2009/06/15. Valid till: <u>2009/12/14</u>. • Calibration certificate No. CT.239/09 of the truck weighting scale by Aaron Scale. Date of calibration: 2009/12/14. Valid till: <u>2010/06/14</u>. • Calibration certificate No. CT.131/10 of the truck weighting scale by Aaron Scale. Date of calibration: 2010/06/14. Valid till: <u>2010/12/13</u>. • Calibration certificate No. CT.305/10 of the truck weighting scale by Aaron Scale. Date of calibration: 2010/12/13. Valid till: <u>2011/06/13</u>. • Calibration certificate No. CT.222/11 of the truck weighting scale by Aaron Scale. Date of calibration: 2011/06/13. Valid till: <u>2011/12/13</u>. <u>Waste composition:</u> • Percent composition of domestic and not domestic waste report from El Panul Landfill - "<i>Composición porcentual de residuos sólidos urbanos domiciliarios y no domiciliarios</i>" by La Serena University (analysis performed from 2008/04/07 to 2008/05/03). • Quantity of waste received in El Panul Landfill Report by Servicios Tasui S.A. dated 2011/11/02. Waste quantity/composition calculation spread sheet.
/CAL/	<u>Procedure & data processing of Gas Analyzer:</u> • Calibration procedure for Gas Analyzer by Eco Methane, 2008/05/16 • Calculation spread sheet used for calibration data <u>Calibration Certified Standard:</u> • Certificate of analysis dated on 2007/08/10 by Praxair • HiQ Certificate dated on 2010/11/05 by Linde Group
/CCI/	1. <u>Electricity Meters</u> • Measurement equipment test certificate No. 2008LB022, S/N: 66824216 type ML240 by TECNET. Date of calibration: 2008/07/25. Valid till: <u>2016/07/24</u>.

Reference	Document
	2. <u>FLOW METERS</u> - Flow Calibration Certificate by Endress+Hauser. Flow meter S/N. 89011D02000, dated 2006/09/18. Installation date 2008/03/01*. Valid till <u>2011/02/28</u>. - Flow Calibration Certificate by Endress+Hauser. Flow meter S/N. A4131602000, dated 2008/05/15. Installation date 2008/08/04*. Valid till <u>2011/08/03</u>. * According to Manufacturer specifications^{/Tech_2/} if a flowmeter is stored in clean and dry conditions from new, there is no reason that the original factory calibration should change or shift and the period from the <u>first installation</u> to the first re-calibration is generally as discussed in the previous statements. 3. <u>GAS ANALYZER</u> - Certificate of calibration No. 801, S/N. 24614 by Edinburgh Instruments, calibration date 2007/03/27. Installation date 2008/03/01**. Valid till <u>2009/02/18</u>. - Certificate of calibration No. 821, S/N. 27061 by Edinburgh Instruments, calibration date 2008/04/25. Installation date 2008/09/15**. Valid till <u>2009/09/14</u>. *** ** According to Manufacturer specifications^{/Tech_3/} "Our Gascard II OEM sensors are designed to be installed and operated soon after they leave our factory and thus we do not specify any conditions for their storage. However, we recommend that for long term storage of the cards, they should be kept in an antistatic bag and in original packaging in a cool dry place. <u>There is no shelf life associated with this product</u>". *** According to Manufacturer specifications^{/Tech_3/} calibration can be performed internally and calibration frequency shall be performed yearly. From 2008/03/10 onwards calibration is performed by the PP at least monthly^{/CAL/}. 4. <u>Thermocouple</u> <u>T_{flare} (Top)</u> - Calibration Certificate No. 70439/COC/03, S/N 70439-3 by Rototherm Instrumentation and Control. Calibration date 2007/04/18. Installation date 2008/03/01****. Valid till <u>2009/02/28</u>. - Calibration Certificate No. 11055, S/N 686675-24 by Rototherm Instrumentation and Control. Calibration date 2008/05/14. Installation date 2009/01/13****. Valid till <u>2010/01/12</u>. <u>T_{comb} (bottom)</u> - Calibration Certificate No. 10592, S/N 70044-1 by Rototherm

Reference	Document
	Instrumentation and Control. Calibration date 2006/12/15. Installation date 2008/03/01****. Valid till <u>2009/02/28</u>. Calibration Certificate No. 11055, S/N 686675-2 by Rototherm Instrumentation and Control. Calibration date 2008/05/14. Installation date 2009/01/10****. Valid till <u>2010/01/09</u>. **** According to Manufacturer specifications^{Tech_4} / the date of calibration will normally be effective from the date of installation
/ID_189/	Decree No. 189 Landfill health conditions and basic safety conditions Regulation by Ministry of Health, 2008/01/05 (biogas operation legislation).
/Diag/	Line Diagram of the installed equipment of El Panul Project
/energy/	Electricity consumption spreadsheet
/EPI/	Emergency procedures: Control and Safety of Landfill Gas System by Biogas Technology, June 2007.
/LogBook/	Daily Operational Log Book of the project activity by Biogas Technology S.A. de C.V. covering the monitoring period.
/LR/	- Legal resolution No. 12498 dated on 2007/12/13 by Health Ministry - Patent No. 250914 given by the Municipality of Coquimbo to El Panul Landfill (Tasui)
/Maint/	Monthly Maintenance Chronogram of the Biogas Plant
/MRI/	- Version 1.0 of the Monitoring Report, dated 2011/12/02. - Version 2.0 of the Monitoring Report, dated 2011/12/29. - Version 3.0 of the Monitoring Report, dated 2012/01/10. - Version 4.0 of the Monitoring Report, dated 2012/03/15.
/Netrix/	Netrix raw data
/OCI/	Organizational chart by EcoMethane

Reference	Document
/PM/	Procedures Manual by Biogas Technology S.A. de C.V., 2009/11/23
/Proof/	Verified emission reductions and purchase agreement signed on 2011/08/15 between Biogas Technology Limited and EcoSecurities International Limited (Evidence of Proof of title) – confidential and therefore not provided digitally by the PP.
/PSD/	Commissioning certificate by Biogas Technology, dated on 2008/03/01 (evidence of first commissioning of El Panul Landfill)
/TC/	Training Certificates regarding the operation of the biogas plant dated: • Alberto Astudillo, 2008/02/06 • Sebastian Astudillo, 2008/02/06 • Flaring system training schedule Training Certificates regarding CDM dated: • Alberto Astudillo, 2011/10/06 • Sebastian Astudillo, 2011/10/06
/TDL/	<u>TDL calculation references</u> • CDEC-SIC Yearbook Operation Statistic 2001-2010 • Excel spreadsheet “Distribution companies annual performance document” issued by the CNE • TDL calculation spreadsheet
/Tech/	1. <u>FLARES</u> • Biogas 2000m³h⁻¹ Enclosed Ground Flare System <u>Technical Manual</u> by Biogas Technology Ltd. Biogas Technology Project No. 2877. Doc. No. 2877TM Issue 0.0. 2. <u>FLOWMETER</u> • Letter given by the Manufacturer Endress+Hauser regarding calibration of flowmeters, dated 2008/11/20. • Plot error curve Procedure showing the effects of gas composition change in flow meter t-mass 65 using the Applicator by Biogas Technology Ltd. • Operating Instructions Proline t-mass 65 MODBUS RS485 Thermal Mass Flow Measuring System by Endress+Hauser. ID: BA115D/06/en/02.06

Reference	Document
	3. <u>GAS ANALYZER (GASCARD)</u> - Gascard II / Gascard Plus Operating Manual V1.6, Edinburgh Instruments Ltd. 2001. - Letter from Edinburgh Instruments regarding storage of Gascard II Sensors (CH₄ & CO₂) 4. <u>THERMOCOUPLE</u> - Technical Data Sheet of Mineral Insulated Thermocouples by Rototherm Instrumentation and Control. Ref.: MITC-2007. - Letter from manufacturer Rototherm Instrumentation and Control regarding calibration frequency, 2008/10/23. Ref.: Biogas Calibration-02 - Letter from manufacturer Rototherm Instrumentation and Control regarding Thermocouple probe assemblies, Ref.: storage and calibration, April 2011. 5. <u>BLOWER</u> - Operating and Maintenance Instructions for Howden Donkin V50 Mk7 Centrifugal Gas Booster issues by Howden Process Compressors Ref: CEN/WPY 6. <u>ELECTRICITY METER</u> - Letter from manufacturer Landis Gyr regarding calibration frequency of the electricity meter type ML249, Ref.: Standard statement for electricity meter type ML240, 2010/09/07
/VCS-PD/	- Project Description: VCS Version 3 of the project activity "El Panul – EcoMethane Landfill Gas Project ", Version 1, 2011/12/02 - Project Description: VCS Version 3 of the project activity "El Panul – EcoMethane Landfill Gas Project ", Version 2, 2011/12/29
/WB/	Monthly Work Book of emission reduction calculation extracted from Netrix
/XLS/	Emission reduction calculation spread sheet

Table 2-2: Background investigation and assessment documents

Reference	Document
/ACM0001/	ACM0001 ver. 8, "Consolidated baseline and monitoring methodology for landfill gas project activities"
/ISO 14064-1:2006/	Greenhouse gases – Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals
/ISO 14064-2:2006/	Greenhouse gases – Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements.
/ISO 14064-3:2006/	Greenhouse gases - Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions
/ISO 14065:2007/	Greenhouse gases - Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition
/CLA/	Clarification on requirements for monitoring landfill gas flows in project where only flaring occurs. Date of Meth Panel meeting 2006/06/09. Date of posting 2006/06/21.
/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/IPCC/	1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book
/KPI/	Kyoto Protocol (1997)
/MA/	Decision 3/CMP. 1 (Marrakesh – Accords)
/PDD/	PDD El Panul – EcoMethane Landfill Gas Project, Ver. 9, 2009/09/18
/TEC/	Tool to calculate baseline, project and/or leakage emissions from electricity consumption, Version 01, EB 39 Annex 7

Reference	Document
/TFI/	Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site, Version 05.1, EB 61 Annex 10
/TWD/	Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site, Version 02, EB 35 Annex 10
/VAL/	Validation Report No. 6106-063 for CDM project “El Panul – EcoMethane Landfill Gas Project “ version 04, by DNV dated 2009-09-23
/VCS/	Verified Carbon Standard Version 3
/VVM/	UNFCCC Validation and Verification Manual (Version 01.2, EB 55)

Table 2-3: Websites used

Reference	Link	Organisation
/CDEC-SIC/	www.cdec-sic.cl	CDEC-SIC web site
/cne/	www.cne.cl	CNE web site
/dna/	http://www.mma.gob.cl/1257/w3-channel.html	Environmental Ministry of Chile (before: CONAMA)
/ipcc/	www.ipcc-nggip.iges.or.jp	IPCC publications
/laws/	www.leychile.cl	Chile web site of laws publication
/unfccc/	http://cdm.unfccc.int	UNFCCC

Table 2-4: List of interviewed persons

Reference	Mol ¹		Name	Organisation / Function
/IM01/	V	☒ Mr. ☐ Ms	Sebastian Astudillo	Biogas Technology / Site Technician
/IM01/	V	☒ Mr. ☐ Ms	Alberto Astudillo	Biogas Technology / Site Operator
/IM01/	V	☒ Mr. ☐ Ms	Alejandro Marti	Biogas Technology / Operations Manager
/IM02/	V	☐ Mr. ☒ Ms.	Amy Figueiredo	EcoSecurities / Project Manager
/IM02/	V	☐ Mr. ☒ Ms.	Javiera Labbé	EcoSecurities / Senior Project Manager
/IM03/	V	☒ Mr. ☐ Ms	Hugo Galdames	El Panul Landfill / Administrator

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