



**Verified Carbon
Standard**

METHANE RECOVERY PROJECT PRINCEPEEL WILBERTOORD, NORTH BRABANT, THE NETHERLANDS

Document Prepared by

Carbon Check (India) Private Ltd.



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Prepared By	Carbon Check (India) Private Ltd.
Contact	Carbon Check (India) Private Ltd. Unit No.: 1701, Logix Office Tower, Plot No.: BW - 58, Sector - 32, NOIDA (Uttar Pradesh) - 201301, India www.carboncheck.co.in
Approved by	Amit Anand, CEO
Work carried out by	Vikash Kumar Singh (Team Leader, Technical Expert) Indumathi C (Technical Reviewer)

Summary:

A brief description of the validation and the project

Validation: B.V. Landgoed de Princepeel has appointed Carbon Check (India) Private Ltd., to carry out the renewal of crediting period validation of the project “Methane Recovery Project Princepeel Wilbertoord, North Brabant, the Netherlands”, with regards to the relevant requirements of VCS Standard Version 4.1

Project: The project “Methane Recovery Project Princepeel Wilbertoord, North Brabant, the Netherlands employs CDM methodologies /B02-a,b,c/. The project /01/ is methane recovery project through controlled anaerobic digestion from animal manure as well as from agricultural and industrial waste that takes place on the estate of the project BV Landgoed de Princepeel located in Wanroij, Province of North Brabant, the Netherlands. The project company is owned by the Smits Group, a family-run business founded in the 1960's and specialized in the sustainable production of crops, animal breeding and green energy and specialized in the production of organic fertilizer and nitrogen compounds. The project activity involves power generation using Combined Heat and Power engines (CHP) to produce electricity and heat with the biogas generated. Furthermore, the project activity mitigates GHG emissions by replacing fossil fuels with decentral renewable thermal energy.

Prior to the implementation of the project activity, pig and cattle manure was stored in open storage tanks over 6 months before being used as fertilizer for farmlands. The manure when kept in open pits, tanks or lagoons undergo anaerobic fermentation and release greenhouse gases (CH₄, CO₂ and N₂O) to the atmosphere. Furthermore, waste from agricultural production processes and industrial food wastes were commonly disposed of on waste landfill sites. The open rotting of this organic matter was causing uncontrolled and uncaptured methane emissions on the dump sites. Using of these wastes in the biogas power plants does have a further methane emission reduction potential in addition to the effect from using the animal manure. In addition, before commissioning the biogas plant, livestock stalls and hygienization unit were heated by propane gas. Moreover, potatoes were dried by means of natural gas. The use of fossil fuels causes CO₂ emissions which are reduced when substituted by utilizing the waste heat of the biogas power plant.

The purpose and scope of validation

Purpose: The purpose of a validation (renewal of crediting period) is to have a thorough and independent assessment of the proposed project activity against the applicable VCS requirements, in particular, the project's baseline, monitoring plan and compliance with the relevant VCS and host Party criteria. These are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of emission reductions. Carbon Check's objective is to perform a thorough, independent assessment of the validation of the project activity.

Scope: Validation scope is defined as an independent and objective review of the Project Description (PD). The PD is reviewed against the relevant criteria and guidance documents provided by VCS which include the following: VCS Program Guide /B01/, VCS Standard /B01/, Program Definitions /B01/, Registration & Issuance Process /B01/, VCS Validation and Verification Manual /B01/ applicable at the time in order to confirm that the project meets the applicability conditions of the selected baseline and monitoring methodologies and applicable tools as time of renewal /B02/, also assess the claims and assumptions made in the PD without limitation on the information provided by the project participants.

The method and criteria used for validation

The validation consists of the following four phases:

- I. A desk review of the project description documents
 - A review of data and information;
 - Cross checks between information provided in PD and information from sources with all necessary means without limitations to the information provided by the project proponent;
- II. Remote interviews with project stakeholders
 - Interviews with relevant stakeholders in host country with personnel having knowledge with the project development via telephone, email or direct on-site visits;
 - Cross checking between information provided by interviewed personnel with all necessary means without limitations to the information provided by the project proponent;
- III. Reference to available information relating to projects or technologies similar to project under validation and review based on the approved methodology being applied for the appropriateness of formulae and accuracy of calculations.
- IV. The resolution of outstanding issues and the issuance of the final validation report and opinion.

The number of findings raised during validation

During the course of validation, a total of 05 findings were raised, which include:

03 Corrective Action Requests (CARs);

02 Clarification Requests (CLs);

00 Forward Action requests (FARs).

All the raised findings have been successfully closed by the Project Proponent.

Any uncertainties associated with the validation

There are no uncertainties associated with the validation of the project activity. The validation has been done with a reasonable level of assurance.

Summary of the validation conclusion

Carbon Check (India) Private Ltd. concludes the validation with a positive opinion that the VCS Project “Methane Recovery Project Princepeel Wilbertoord, North Brabant, the Netherlands” as described in the VCS PD /01-c/, meets all applicable VCS requirements, including those specified in the VCS Standard /B01/, relevant methodologies, tools and guidelines.

Carbon Check (India) Private Ltd. therefore the renewal of the project.

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1 INTRODUCTION

1.1 Objective

B.V. Landgoed de Princepeel has appointed the VVB, Carbon Check (India) Private Ltd. to perform a renewal of crediting period validation of the VCS Project “Methane Recovery Project Princepeel Wilbertoord, North Brabant, the Netherlands”. This report summarizes the findings of validation of the project, performed on the basis of the VCS Program Guide (v4.0, dated 19/09/2019), VCS Standard (v4.1, dated 22/04/2021), Program Definitions (v4.1, dated 22/04/2021), Registration & Issuance Process (v4.0, dated 19/09/2019), VCS Validation and Verification Manual (v 3.2, dated 19/10/2016). Validation is required for all VCS project activities intending to register a project under the VCS program. This report contains the findings and resolutions from the validation of the project.

The purpose of a validation is to have a thorough and independent assessment of the proposed project against the applicable VCS requirements, in particular, the project's baseline, monitoring plan and the project's compliance with relevant VCS and host Party criteria. These are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of emission reductions, VCU's.

1.2 Scope and Criteria

The validation scope is defined as an independent and objective review of the Project Description (PD), project design, the project's baseline study and monitoring plan and other relevant documents. The PD is reviewed against the relevant criteria and decisions by the VCS Program, and against the approved baseline and monitoring methodology. Carbon Check has employed a risk-based approach in the validation, focusing on the identification of significant risks and reliability of project monitoring and generation of emission reductions.

The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

The validation is carried out on the basis of the following requirements, applicable for this project:

- VCS Program Guide (v4.0, dated 19/09/2019)
- VCS Standard (v4.1, dated 22/04/2021)
- Program Definitions (v4.1, dated 22/04/2021)
- Registration & Issuance Process (v4.0, dated 19/09/2019)
- VCS Validation and Verification Manual (v 3.2, dated 19/10/2016)

- CDM Methodologies & tools /B02/.
- Other relevant rules, including the host country legislation

1.3 Level of Assurance

☒ Reasonable level of assurance

☐ Limited level of assurance

1.4 Summary Description of the Project

As verified through remote inspection and documents review /01/, /04/, /05/, /07/, /08/, /09//. the project is a methane recovery project through controlled anaerobic digestion from animal manure as well as from agricultural and industrial waste. The verified physical address /01/ of the project is Wilbertoord in North Brabant, southeastern part of the Netherlands. The geographical coordinates are N51°39' 20.988" E5°46' 30". The project activity also involves /01/, /04/, /05/, /07/, /08/, /09// power generation using Combined Heat and Power engines (CHP) to produce electricity and heat with the biogas generated. Validation team based on interview with the project proponent and through document review /B03/ confirms that prior to the implementation of the project activity, pig and cattle manure was stored in open storage tanks over 6 months before being used as fertilizer for farmlands. The manure when kept in open pits, tanks or lagoons undergo anaerobic fermentation and release greenhouse gases (CH₄, CO₂ and N₂O) to the atmosphere. Furthermore, waste from agricultural production processes and industrial food wastes were commonly disposed of on waste landfill sites. The open rotting of this organic matter was causing uncontrolled and uncaptured methane emissions on the dump sites. The hear requirement of the project was met by propane gas. Moreover, potatoes were dried by means of natural gas. Thus, validation team confirms that the project activity mitigates GHG emissions by avoidance of methane and through replacing fossil fuels with decentral renewable thermal energy.

The annual average estimation of GHG emission reductions from the project activity is 17,209 t CO₂e/year. The total GHG emission reductions over this crediting period of 10 years are 172,088 t CO₂e/year. The project proponent for the project activity is B.V. Landgoed de Princepeel, owns the rights to VCUs /06/.

2 VALIDATION PROCESS

2.1 Method and Criteria

B.V. Landgoed de Princepeel has appointed the VVB, Carbon Check (India) Private Ltd., to carry out the renewal of crediting period validation of the project "Methane Recovery Project Princepeel Wilbertoord, North Brabant, the Netherlands", with regards to the requirements of section 3.8.9 of VCS Standard Version /B01-a/.

The validation includes a thorough and independent assessment of the project against the applicable VCS requirements, in particular, the project's baseline, additionality, monitoring plan and the project's

compliance with relevant VCS and host party criteria. The validation involves assessment of the project and to confirm that the project meets the applicability conditions of the selected methodologies /B02/ and also assess the claims and assumptions made in the PD /01-c/ without limitation on the information provided by the project participants. The overall validation was conducted using Carbon Check's internal procedures.

2.2 Document Review

During the document review, CCIPL has applied standard auditing techniques including but not limited to document reviews and remote interviews, review of the applicable/applied methodologies and its underlying formulae and calculations to assess the quality of information provided.

This report contains the findings and resolutions from the validation and a validation opinion on the proposed project thus confirming the project design as document is sound and reasonable and meets the stated requirements and identified criteria.

The VCS project description, emission reduction calculation spread sheet and supporting documents related to the project design and baseline were reviewed as per VCS standard /B01/ requirements. The desk review included:

- A review of the data and information presented to verify completeness and consistency in accordance with VCS standard /B01/ requirements;
- A review of the project description and monitoring methodology, paying particular attention to the applicability conditions of the methodology and baseline and additionality related requirements.
- A review of the monitoring plan and the project's compliance with relevant VCS criteria.

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 VCS PD version 01 /01-a/ was initially reviewed and CCIPL requested the PP to present the supporting information and documents. The documents reviewed by CCIPL are listed below in Appendix 1. Through the process of the validation, the revised VCS PD and the supporting documents were evaluated to confirm the actions taken by the PP to the CARs and CLs issued by the validation team.

The table in Appendix 1 outlines the documentation reviewed during the validation.

2.3 Interviews

The table below describes the remote interview process and further identifies personnel, including their roles, who were interviewed and/or provided information additional to that provided in the project description /01/ and any supporting documents.

SR. No.	Date	Name	Organisation	Topic
/i-01/	16/02/2021	Pauline Kalathas	Senior Carbon Project Developer everi GmbH	• Project Design • Project Implementation status • Project start date and Project Location • Baseline Scenario • Baseline Identification and Additionality • Qualification and Training • Monitoring and reporting documentation • Quality Assurance – Management and operating system • Social and Environmental Impacts • Local Stakeholders meeting process • Compliance with relevant laws • Roles and responsibility
/i-02/	16/02/2021	Mr. Peter	Plant Manager, B.V. Landgoed de Princepeel	• Project Design • Project Implementation status • Project start date and Project Location • Baseline Scenario • Baseline Identification and Additionality • Qualification and Training • Monitoring and reporting documentation • Quality Assurance – Management and operating system • Social and Environmental Impacts • Local Stakeholders meeting process • Compliance with relevant laws • Roles and responsibility
/i-03/	16/02/2021	Tamino-Turgay zum Felde	Consultant, everi GmbH	• Project Design • Project Implementation status • Project start date and Project Location • Baseline Scenario

				• Baseline Identification and Additionality • Qualification and Training
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2.4 Site Inspections

Carbon Check has not conducted an on-site inspection due to the recent pandemic COVID19 and due to its related policy measures created restrictions all over the world impacting travel activities on an international level and even for in-country travel. A reasonable level of assurance has been maintained through the alternative means used for the purpose of validation as follows:

- An assessment of the implementation and operation of the proposed project through remote interviews with the representatives of project proponent.
- Confirmation of the pre-project scenario
- Confirmation of the applicability of the methodology and monitoring and controlling instruments and operational arrangements.
- Assessment of the project boundaries
- Assessment of the monitoring provisions by checking the monitoring arrangement.

2.5 Resolution of Findings

This section summaries the findings from the validation of the project activity. In this section the findings from the document review, assessments and remote interviews are provided.

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

Corrective action requests (CAR) are issued, where:

- mistakes have been made with a direct influence on project results requiring adjustments of the VCU's monitoring report;
- applicable methodological specific requirements have not been met.

A **Clarification request (CL)** may be used where additional information is needed to fully clarify an issue or where the information is not transparent enough to establish whether a requirement is met.

A total 03 CAR, and 02 CLs had been raised and successfully closed. Please refer to Appendix 4 below for the details of the CARs/CLs and their closure.

2.5.1 Forward Action Requests

A **forward action request (FAR)** should be issued, where:

- i. the actual project monitoring and reporting practices requires attention and /or adjustment for the consecutive verification period, or
- ii. an adjustment of the MP is recommended.

In the context of FARs, risks have been identified, which may endanger the delivery of high quality emissions reductions in the future, i.e. by deviations from standard procedures as defined by the MP. As a consequence, such aspects should receive a special focus during the consecutive verification. A FAR may originate from lack of data sustaining claimed emission reductions.

3 VALIDATION FINDINGS

3.1 Project Details

As verified through remote inspection and documents review /01/, /04/, /05/, /07/, /08/, /09//. the project is a methane recovery project through controlled anaerobic co-digestion of multiple sources of biomass substrates, namely animal manure as well as from agricultural and industrial waste. The verified physical address /01/ of the project is Province of North Brabant, the Netherlands. The project activity also involves /01/, /04/, /05/, /07/, /08/, /09/ power generation using Combined Heat and Power engines (CHP) to produce electricity and heat with the biogas generated. Validation team based on interview with the project proponent and through document review /B03/ confirms that prior to the implementation of the project activity, pig and cattle manure was stored in open storage tanks over 6 months before being used as fertilizer for farmlands. The manure when kept in open pits, tanks or lagoons undergo anaerobic fermentation and release greenhouse gases (CH₄, CO₂ and N₂O) to the atmosphere. Furthermore, waste from agricultural production processes and industrial food wastes were commonly disposed of on waste landfill sites. The open rotting of this organic matter was causing uncontrolled and uncaptured methane emissions on the dump sites. The hear requirement of the project was met by propane gas. Moreover, potatoes were dried by means of natural gas. Thus, validation team confirms that the project activity mitigates GHG emissions by avoidance of methane and through replacing fossil fuels with decentral renewable thermal energy. The components of the project was verified during the remote inspection /24/,/25/ and through review of documents /05/,/07/,/08/,/09/,/14/,/15/,/16/ details of the project are as below:

Pre-storage manure

All of the manure supplied is transported by trucks to the biogas system. This applies to the pig manure coming from BV Landgoed de Princepeel's farms as well as to the pig and cattle manure coming from external farms. In the present situation, the storage takes place in a manure cellar. From the manure cellar, the manure is fed via a pipe system to the digester.

Manure digester

In the present situation, the digester consists of seven stirred and heated digesters and post-digesters (total 15.400 m³) with a slightly conical bottom. These are well insulated on the outside to limit heat loss. In the interspace, these are not insulated to be able to dissipate heat in the summer. The silos and the biogas holder are sealed gas-tight by means of a foil. The biogas is extracted from the biomass in these silos.

In principle, the supply of manure and co-substrates and the removal of digestate take place simultaneously with the aid of a manure pump with an overflow system. The biogas is collected in a gas storage located above the manure digester. The digestate is removed and stored in manure cellars.

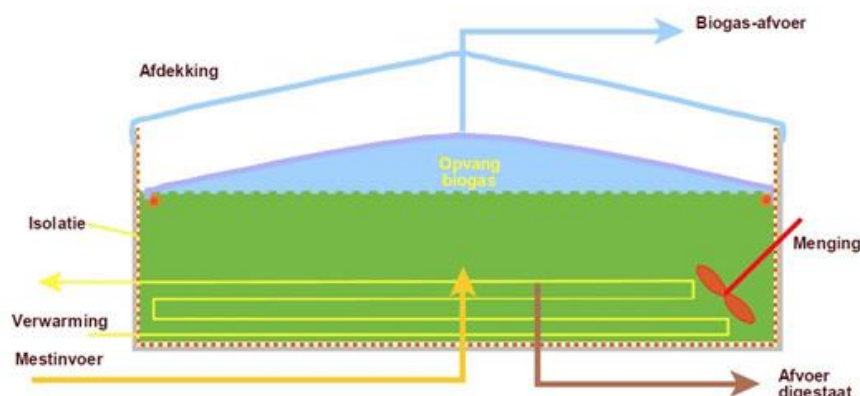


Figure 1: Manure digester operation principle

Biogas collection

The biogas is used for electricity and heat production in a CHP unit with a total electric capacity of 6 MW_{el} and a total thermal capacity of 7,4MW_{th}. It consists of 6 CHP units as described in the table below. The electricity produced is fed into the national electricity grid. The heat produced is used for heating the digesters, for pre-heating the food for piglets, for the hygienization of the digestate

The biogas is used for electricity and heat production in a CHP unit with a total electric capacity of 6 MW_{el} and a total thermal capacity of 7,4MW_{th}. It consists of 6 CHP unit as described in the table below. The electricity produced is fed into the national electricity grid. The heat produced is used for heating the digesters, for pre-heating the food for piglets, for the hygienization of the digestate.

CHP Units	Electric capacity installed (kW _{el})	Thermal capacity installed (kW _{th})	Electric efficiency (%)	Start operation date
CHP 1 - Waukesha 475	475	695	35,20	2006
CHP 2 - Waukesha 550	550	865	37,60	2006
CHP 3 - Jenbacher 320	1.067	1.339	39,30	2006
CHP 4 - Jenbacher 320	1.067	1.339	39,30	2006
CHP 5 - Jenbacher 420	1.415	1.405	42,00	2008
CHP 6 - Jenbacher 420	1.489	1.709	41,80	2014

Post-storage

The post-storage/post-fermentation takes place in cellars and the concrete basin (54.500 m³). The biogas that is released is also led to the CHPs where it is burned or to the installation where the biogas is upgraded. From the storage, the digestate is transferred to the hygienization unit.

Hygienization of digestate

The digestate is hygienized with the aim of making it export-worthy. Manure hygiene means that pathogenic organisms in the manure are eliminated by a treatment. The micro-organisms present die

and the manure fraction becomes biologically inactive. EU regulations (regulation 1774/2002) indicate that the marketing of manure and processed manure products requires a heat treatment for at least 60 minutes at 70°C. The heat required for hygienisation is generated within the facility by the CHP installation.

Digestate separation

The digestate that has been hygienized is separated by means of a centrifuge. The thin fraction will be forced out through a fine-mesh filter by the centrifugal force and will separate from the thick fraction. The manure separator is a completely closed installation. The solid fraction goes directly to the belt dryer. The thin fraction is stored and then stripped of ammonia.

Stripping thin fraction digestate

When stripping the thin fraction, the temperature of the digestate is raised and lime milk is added to raise the pH value. This shifts the NH_3/NH_4 equilibrium towards free ammonia. Then air is blown through the digestate, which carries the ammonia along. The ammonia entrained in the air is absorbed (washed) in sulfuric acid, resulting in ammonium sulphate which is stored and then discharged from the installation. The discharged ammonium sulphate is applied within industry or used as fertilizer.

Drying thick fraction digestate

After separation, the thick fraction of the digestate is dried on the belt dryer until it consists of approximately 90% dry matter. The solid fraction is dried horizontally by means of a rotating belt using heat generated in the CHP installation. The exhaust gases released from the gas engines are fed directly into the inlet of the digestate dryer. Air is drawn into the air duct from the room in which the dried digestate is stored to cool the air temperature back to a maximum of 100 degrees Celsius. A sprinkler system has been installed in the digestate dryer that kicks in when the temperature in the dryer exceeds 100 degrees Celsius. Based on process control, action is already taken before the sprinkler is activated by emitting the exhaust gases via the traditional route, i.e. via the exhausts.

When the thick fraction has a dry matter percentage of approximately 90%, it is partly deposited and partly pressed into pellets on our own equipment for subsequent deposit. Thick fraction that has not yet been sufficiently dried goes first to the drying chamber to further evaporate.

Drying room

The thick fraction that is not sufficiently dried first goes to the drying room before it is further processed. The floor on which the solid fraction lies is provided with holes through which warm air from the CHP installation passes through the fraction. This dry air absorbs moisture and is then discharged and processed by the newly established combined air washing system and biofilter. The thick fraction is further dried in the drying chamber until the desired percentage of dry matter is reached.

Evaporate thin fraction

After the thin fraction has been stripped, the total volume is reduced by 50% to 67% by means of three evaporators to be set up. A thin fraction is sprayed out into the evaporation chamber. Here, not yet saturated warm air flows through it, which absorbs moisture. This saturated air is discharged

towards and processed by the newly established combined air washing system and biofilter. The viscous substance that arises during this process is added to the dry fraction after the separation process and goes to the belt dryer. The remaining thin fraction is stored in a basin to eventually be distributed on our own land or sold to third parties. The basins are completely closed and the air is burned in a CHP installation. The process of evaporation takes place using electricity and heat generated within the company's own facility.

The annual average estimation of GHG emission reductions from the project activity is 17,209 t CO₂e/year. The total GHG emission reductions over this crediting period of 10 years are 172,088 t CO₂e/year. The project proponent for the project activity is B.V. Landgoed de Princepeel, owns the rights to VCU's /06/.

The start date for the project is 01st June 2007 /03/ which is the date when first CHP of this project activity was commissioned.

As per the requirements of section 3.8.8 of VCS-Standard_v4.1 /B01/:

"Where projects fail to renew the project crediting period, the project crediting period shall end and the project shall be ineligible for further crediting."

Furthermore, section 3.8.9 (3) of VCS-Standard_v4.1 /B01/, requires the following:

"The updated project description shall be validated in accordance with the VCS Program rules. In addition, the project shall be validated against the (current) scope of the VCS. Such validation report shall be issued after the end of the (previous) project crediting period but within two years after the end of the (previous) project crediting period. Additional time is granted for projects to complete such validation where they are switching to a new VCS methodology (new VCS methodology in this context has the same meaning as set out in Section 3.7.1) when renewing the project crediting period. Specifically, projects switching to a new VCS methodology and completing such validation within one year of the approval of the methodology by Verra may complete such validation within three years of the end of the (previous) project crediting period."

Validation team has noted that the project does not comply with the above requirements related to the renewal of the crediting period, however VERRA has provided a project specific exemption /20/ (which is also available on VERRA public registry) with following conditions:

"Considering the facts and information provided, Verra hereby grants an exemption from Section 3.8.9(3) of the VCS Standard v4.1, to the Project Proponents. The Project Proponents are requested to submit documents for all the projects listed above for renewal of their project crediting periods no later than 31 December 2021."

The crediting period starts on 01/06/2017 /01/, after the end date of first crediting period of the project.

As verified /01/, /02/, the project has a total electrical generation capacity of less than 15 MW_{el}, thermal generation capacity less than 45 MW_{th} and will generate emission reductions less than 60 ktCO₂e per year for the methane avoidance component. Therefore, the project is in accordance with small-scale limits.

Validation team based on review of VCS PD /01/ and records of previous issuances /B03/, noted that before the implementation of the project activity, the project has been planned based on the UNFCCC criteria for JI projects according to Article 6 of the Kyoto Protocol and subsequent decisions of the Joint Implementation Supervisory Committee with regard to JI modalities and procedures and the application of approved methodologies. This should allow the conversion of the project into a JI project at a later stage. However, the project has never been converted into a JI project and hence, is not listed as a JI project on the UNFCCC website.

The project has then been adapted to the VCS requirements and has published the corresponding addendum in 2009 in order to generate voluntary carbon units.

Validation team based on review of VCS PD (appendix A) and provided evidences /21/,/22/,/23/ confirms that agricultural anaerobic digestion is not considered in the greenhouse gas inventory of the Netherlands, so the emission reductions caused by the avoided uncontrolled decay of waste or manure will not be counted towards the greenhouse gas emission inventory of the Netherlands. Project activity does not claim emission reductions from production of electric energy. In this aspect, it has no influence on projects that have binding emission limits under the EU ETS.

The project proponent has declared /13/ that the project is not in registration under any other GHG program. The validation team has checked the UNFCCC database of registered projects or projects under validation and was able to confirm that the listed projects are not the proposed project activity. The proposed project activity instances do not generate another form of environmental credit. The project proponent indicates in the VCS PD that the project does not intend to generate any other form of GHG related environmental credit other than those claimed under this VCS project.

3.2 Safeguards

3.2.1 No Net Harm

Project has been formally approved /10/ by the responsible regional authorities of the Netherlands in accordance with the Dutch building law “Wet op de Ruimtelijke Ordening”. This act provides the set of rules which regulates the impact assessment of plants or projects on the environment. The approval /10/ covers the installation and operation of the biogas power plant including all components such as storage, feeders, fermenters, CHP modules, etc.

Based on above assessment, validation team confirms that project has no relevant negative environmental and socio-economic impacts and contributes positively by providing environment friendly power generation leading to sustainable development of the region.

3.2.2 Local Stakeholder Consultation

Validation team based on review of VCS project page /B03/ confirms that Project is already registered with VCS (VCS ID 337). The Local Stakeholder Consultation process was already conducted in line with the requirements during the project registration.

3.2.3 Environmental Impact

Validation team has checked that according to the Dutch legislation /10/ biogas plants below a manure capacity of 30,000 tons do not require a full environmental impact assessment (EIA), but only an environmental impact check. A full environmental impact assessment (EIA) has been conducted in order to comply with the Dutch environmental requirements. The project capacity to treat substrates in the was 100.000 t per year.

3.2.4 Public Comments

Not applicable for renewal of crediting period as confirmed by VERAA /25/.

3.2.5 AFOLU-Specific Safeguards

Not Applicable.

3.3 Application of Methodology

3.3.1 Title and Reference

Three small-scale methodologies according to the CDM standards of the UNFCCC are used in the project:

Type III, other project activities:

- AMS III.AO “Methane recovery through controlled anaerobic digestion” (Version 1.0), referring to the capture of methane gases from biomass or other organic matter.
- AMS III.D “Methane recovery in agricultural and agro-industrial activities” (Version 11), referring to the capture of methane gases from decomposing manure. The actual version is named “Methane recovery in animal manure management systems” (Version 21).

Type I, Renewable Energies:

- AMS I.C, “Thermal energy for the user with or without electricity” (Version 09), referring to the utilization of the waste heat to replace fossil energy. The actual version is named “Thermal energy production with or without electricity” (Version 21).

The methodologies also refer to the latest approved version of the following tools:

- Project and leakage emissions from anaerobic digesters, Tool 14
- Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period, Tool 11

3.3.2 Applicability

The project meets all the relevant applicability conditions for small scale project activity. As verified /01/, /02/, the project has a total electrical generation capacity of less than 15 MW_{el}, thermal generation capacity less than 45 MW_{th} and will generate emission reductions less than 60 ktCO_{2e} per year for the methane avoidance component. Therefore, the project is in accordance with small-scale limits.

The applicability conditions of the different methodologies used for the project activity as described in the VCS PD /01/, has been assessed by the validation team. Validation team based on review of VCS PD /01/, applied methodologies /B02-a,b,c/, document review /01/. /04/, /05/. /07/, /08/, /09/, /11/, /14/, /15/, /16/, /18/ and through remote inspection /24/, /25/ and interview /i-01/, /i-02/ confirms that project meets the applicability criteria of each of the applied methodologies and the tools used.

The table below provides assessment of the tool used:

Applicability Criteria Tool 14		Justification	Assessment
1	The following sources of project emissions are accounted for in this tool: (a) CO₂ emissions from consumption of electricity associated with the operation of the anaerobic digester; (b) CO₂ emissions from consumption of fossil fuels associated with the operation of the anaerobic digester; (c) CH₄ emissions from the digester (emissions during maintenance of the digester, physical leaks through the roof and side walls, and release through safety valves due to excess pressure in the digester); and (d) CH₄ emissions from flaring of biogas.	CH₄ project emissions from digesters (c) and from flaring of biogas (d) are considered in the project activity.	Validation team confirms that the CH₄ project emissions from digesters (c) and from flaring of biogas (d) are considered in the project activity .This has been confirmed based on document review /01/. /02/ and through interview and that project meets this applicability criteria.
2	The following sources of leakage emissions are accounted for in this tool: (a) CH₄ and N₂O emission from composting of digestate;	CH₄ leakage emissions from anaerobic decay of digestate subjected to anaerobic storage (b) are considered in the project activity.	CH₄ leakage emissions from anaerobic decay of digestate subjected to anaerobic storage (b) are considered in the project activity. This has been confirmed based on document review /01/. /02/ and through

Applicability Criteria Tool 14		Justification	Assessment
	(b) CH ₄ emissions from the anaerobic decay of digestate disposed in a SWDS or subjected to anaerobic storage, such as in a stabilization pond		interview and that project meets this applicability criteria.
3	Emission sources associated with N ₂ O emissions from physical leakages from the digester, transportation of feed material and digestate or any other on-site transportation, piped distribution of the biogas, aerobic treatment of liquid digestate and land application of the digestate are neglected because these are minor emission sources or because they are accounted in the methodologies referring to this tool.	Applicable.	This criteria is applicable and has been confirmed based on document review /01/, /02/ and through interview and that project meets this applicability criteria.

Applicability Criteria Tool 11, Version 03.0.1		Justification	Assessment
1	This tool provides a stepwise procedure to assess the continued validity of the baseline and to update the baseline at the renewal of a crediting period, as required by paragraph 49 (a) of the modalities and procedures of the clean development mechanism.	The current PD is made in the frame of the renewal of the crediting period of the project activity. The continued validity of the baseline has to be assessed and updated according to the procedures of tool 11.	Please refer the assessment in section 3.3.4 of this report.

Applicability Criteria Tool 11, Version 03.0.1	Justification	Assessment
The tool consists of two steps. The first step provides an approach to evaluate whether the current baseline is still valid for the next crediting period. The second step provides an approach to update the baseline in case that the current baseline is not valid anymore for the next crediting period.		

3.3.3 Project Boundary

The project applied the following methodologies:

- AMS-III.D. “Methane recovery in animal manure management systems”, Version 21.0, and
- AMS-I.C. “Thermal energy production with or without electricity”, Version 21.0.
- AMS-III.AO “Methane recovery through controlled anaerobic digestion --- Version” 1.0

As per the paragraph 14 of AMS-III.D, version 21.0 /B02-a/:

“The project boundary includes the physical, geographical site(s) of:

- The livestock;
- Animal manure management systems (including centralized manure treatment plant where applicable);
- Facilities which recover and flare/combust or use methane. “

According to paragraph 11 of AMS-III.AO, the project boundary is the physical, geographical site, where the solid waste would have been disposed and the methane emission occurs in absence of the proposed project activity.

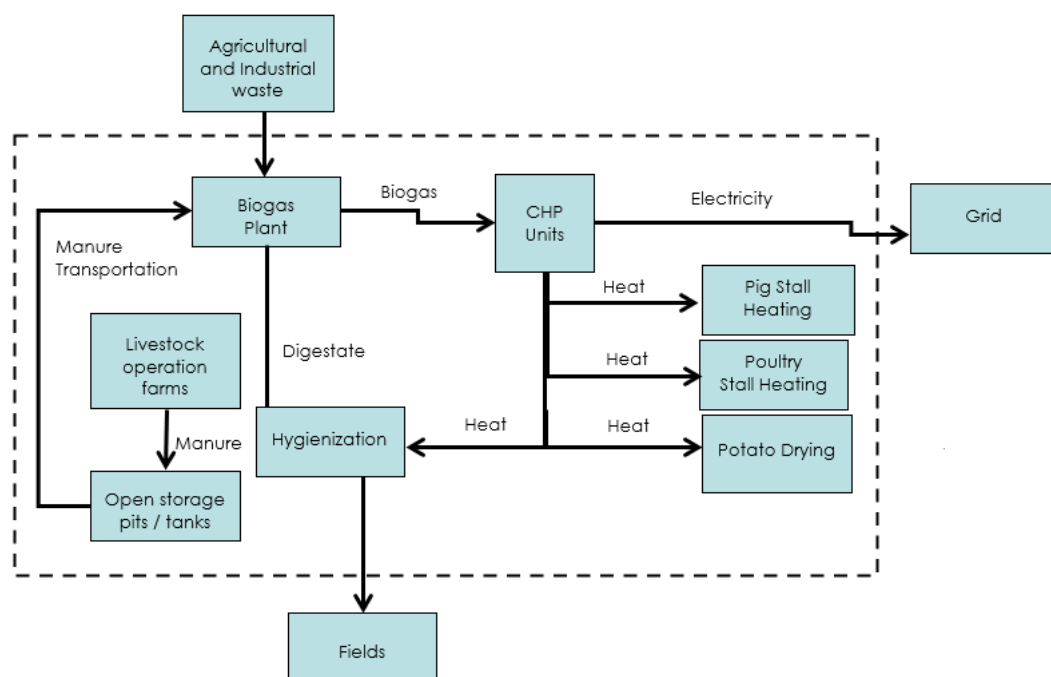
Furthermore, as per the paragraph 24 of AMS-I.C, version 21.0 /B02-b/:

“The spatial extent of the project boundary encompasses:

- (a) All plants generating electricity and/or thermal energy located at the project site, whether fired with biomass, fossil fuels or a combination of both;

- (b) All power plants connected physically to the electricity system (grid) that the project plant is connected to;
- (c) Industrial, commercial or residential facility, or facilities, consuming energy generated by the system and the processes or equipment affected by the project activity;
- (d) The processing plant of biomass residues, for project activities using solid biomass fuel (e.g. briquette), unless all associated emissions are accounted for as leakage emissions or are part of an independently registered CDM project;
- (e) The geographic boundaries of the dedicated plantations if the feedstock is biomass produced in dedicated plantations;
- (f) The transportation itineraries, if the biomass is transported over distances greater than 200 kilometres, unless all associated emissions are accounted for as leakage emissions;
- (g) The site of the anaerobic digester in the case of project activity that recovers and utilizes biogas for producing electricity and/or thermal energy and applies this methodology on a standalone basis, i.e. without using a Type III component of a SSC methodology.”

Validation team based on review of VCS PD /01/ and remote inspection /24/,/25/ confirms that project boundary as delineated in the VCS PD is as per applied methodologies /B02-a,b/ and include all applicable sources and gases. The verified diagram of the project boundary as below:



3.3.4 Baseline Scenario

Validation team based on review of VCS PD /01/, remote inspection and documents available on verra public registry /B03/ confirms that the project activity consists of 3 components based on 3 methodologies:

- Component 1: The first component of the project activity is the recovery and gainful use of methane through the improvement of animal manure management systems (AMS-III.D.).

- Component 2: The second component of the project activity is the displacement of fossil fuels through the recovery and use of biogas for thermal energy production (AMS-I.C.).
- Component 3: The third component of the project activity is the recovery and gainful use of methane through digestion of agricultural and industrial waste (AMS-III.AO).

As per section 3.8.9 of the VCS-Standard /B01/,

“The validity of the original baseline scenario shall be demonstrated, or where invalid a new baseline scenario shall be determined, when renewing the project crediting period, as follows:

a) The validity of the original baseline scenario shall be assessed. Such assessment shall include an evaluation of the impact of new relevant national and/or sectoral policies and circumstances on the validity of the baseline scenario.

b) Where it is determined that the original baseline scenario is still valid, the GHG emissions associated with the original baseline scenario shall be reassessed using the latest version of the CDM Tool to assess the validity of the original/current baseline and to update the baseline at the renewal of a crediting period.

c) Where it is determined that the original baseline scenario is no longer valid, the current baseline scenario shall be established in accordance with the VCS Program rules.

d) The project description, containing updated information with respect to the baseline, the estimated GHG emission reductions or removals and the monitoring plan, shall be submitted for validation. Such updates shall be based upon the latest approved version of the methodology or its replacement. Where the project does not meet the requirements of the latest approved version of the methodology or its replacement, the project proponent shall select another applicable approved methodology (which may be a new methodology or methodology revision it has had approved via the methodology approval process), or shall apply a methodology deviation (where a methodology deviation is appropriate). Failing this, the project shall not be eligible for renewal of its project crediting period.”

Validation team based on review of VCS PD /01/, remote inspection /23/,/24/, interviews /1-01/, /102/ and document review /11/ confirms that the *original baseline scenario is still valid and its been demonstrated in the VCS PD /01/, using the latest version of the CDM Tool to assess the validity of the original/current baseline and to update the baseline at the renewal of a crediting period. Furthermore, based on review of VCS PD /01/, ER sheet /02/ and applied methodologies/tools /B02/, it can be confirmed that the project description contains updated information with respect to validity of the original, baseline, updated estimated GHG emission reductions and the monitoring plan as per the latest version of the applied methodologies /B02/, Furthermore, project proponent has also provided a summary of methodology deviation.* In conclusion, the baseline scenarios for the different project Components have been assessed and determined as valid and the data and parameters are updated according to the latest versions of the methodologies.

Regarding Components 1 and 2, the project is in line with all laws and regulation in the Netherlands. As verified /B03/, at the time of the original PD, no regulation exists in the Netherlands requiring the collection and/or destruction of methane from livestock manure (Component 1). Also, there was no regulation in place in the Netherlands that prescribes the replacement of fossil fuels for the process of drying potatoes, heating livestock stalls or hygienization of manure/digestate (Component 2).

As per the VCS PD /01/, submitted for renewal of crediting period validation, regarding component 3, project proponent cannot assessed that the landfilling of agricultural and industrial waste is compliant with mandatory national and/or sectoral policies in the Netherlands and thus the validity of the current baseline of Component 3 cannot be demonstrated. As a result, this component is excluded from further assessments and calculations in relation to GHG emissions reductions. This is deemed acceptable to the validation team.

Validation team confirms that the baseline scenario opted by the project activity is in accordance with the requirements of the applied methodology /B02/ and is justified.

3.3.5 Additionality

As per section 3.8.9 of the VCS VCS-Standard_v4.1 /B01/,

“A full reassessment of additionality is not required when renewing the project crediting period. However, regulatory surplus shall be demonstrated in accordance with the requirements set out in the VCS Program rules and the project description shall be updated accordingly.”

The regulations for the storage of manure are laid down in § 3.4.6 of the already mentioned Activities Decree (Activiteitenbesluit milieubeheer).¹ Two essential contents are provided in the above regulation:

- First, that minimum distances to odour-sensitive facilities must be maintained (Art. 3.51) and
- Second, that leakage into the soil is prevented by appropriate construction measures (Art. 3.52). This is particularly related to the EU Nitrates Directive (91/676/EEC), whose primary objective is to protect the groundwater.

Validation team confirms that no further laws relevant in the context (of project measures) exist in the host country and as clarified during the remote inspection, it is common practice in the host country to store manure in pits, tanks, or lagoons without capturing the leaking methane. This is further cross-checked with the text of the National Climate Agreement of the Netherlands where “options”² are presented which farmers might implement to reduce GHG emissions from storing manure. However, these are neither mandatory nor incentivized through other mechanisms.

Validation team based on above assessment confirms /B03/, that no regulation /11/ exists in the Netherlands requiring the collection and/or destruction of methane from livestock manure. It is common practice to store livestock manure in pits, tanks or lagoons without capturing the methane generated during the storage period as described in Annex 7 of the National Inventory Report 2021 of the Netherlands. The storage of manure as described above is the most economic, viable and reasonable option for farm owners. This remains unchanged as compare to the original PDD /B03/.

Therefore, the validation team confirms that the project is additional as the *regulatory surplus has been demonstrated* in the VCS PD /01/ and also evident from the provided documents /11/.

¹ Activiteitenbesluit milieubeheer:
<https://wetten.overheid.nl/ici1.3:c:BWBR0022762&hoofdstuk=3&afdeling=3.4¶graaf=3.4.6&z=2021-07-01&g=2021-07-01>

² Dutch Climate Agreement (2019):
<https://www.klimaatakkoord.nl/binaries/klimaatakkoord/documenten/publicaties/2019/06/28/national-climate-agreement-the-netherlands/20190628+National+Climate+Agreement+The+Netherlands.pdf> p. 136, paragraph g.

3.3.6 Quantification of GHG Emission Reductions and Removals

The equations and choices provided in the methodologies and all other methodological tools are correctly quoted in the PD /01-c/. The emission reductions of the project instances of the project would be calculated using the formulae mentioned in the applied methodologies /B02/.

Validation team based on the review of the PD /01-c/, confirms that the formulae are correctly presented for the determination of emissions reductions at project instance level. The parameters and equations presented in the PD /01-c/, as well as other applicable documents, have been compared with the information and requirements presented in the methodology respectively. An equation comparison has also been made to ensure consistency between all the formulae presented in the PD/01-c/ and ER spreadsheet/02/ and methodologies /B02-a,b,c/.

In conclusion, all values used in the VCS PD to calculate emission reductions are considered reasonable in the context of the project and calculation approach is correct.

3.3.7 Methodology Deviations

Methodology deviations under AMS-III.D

1. Quantity of animal manure ($Q_{\text{manure},j,LT,y}$)

Deviant from the Methodology AMS-III.D, the manure input is not measured on a dry basis but on the amount of fresh manure, as it is the practice in the Netherlands. The fresh manure produced on the farms is transported directly to the biogas plant, where it is first weighed and then treated in the plant.

In order to have the equivalent value of the manure on a dry basis as required in the methodology, the measured amount of fresh manure has to be multiplied by the values for dry matter content of animal manure (dm_{LT}), depending on the livestock type and the animal manure management system:

$$Q_{\text{manure},j,LT,y} = Q_{fm,j,LT,y} \cdot dm_{j,LT}$$

Where :

$Q_{\text{manure},j,LT,y}$	Quantity of manure treated from livestock type LT and animal manure management system j (t/y, dry basis)
$Q_{fm,j,LT,y}$	Measured quantity of fresh manure treated from livestock type LT and animal manure management system j (t/y, fresh basis)
$dm_{j,LT}$	Average dry matter content from manure of livestock type LT and animal manure management system j (t dry matter/ t fresh matter)

The average dry matter content from manure will be measured by accredited laboratories specialized in that field, as is already carried out on farms to analyse the composition of the manure. Since the project is a co-digestion project with many manure suppliers, samples for analysing the dry matter content of manure will only be taken at the 4 different farms in order to obtain an average dry matter content value for each animal category, but not for each of the > 20 supplier farms. The efforts and costs to carry out manure analyses from 20 to 30 different

suppliers is out of all proportion to the project size (micro-scale project as defined under Tool 19³) and the achieved amount of emission reductions from manure digestion. Also, the manure suppliers are changing from time to time, depending on their own manure availability and use. Therefore, the annual average value for $dm_{j,LT}$ from the farms will be used as the basis for the value for $dm_{j,LT}$ for the other farms. In order to follow the principle of conservativeness as required in Section 2.2.1 of the VCS Standard, only 90% of the measured $dm_{j,LT}$ value will be used for dry matter content of manure coming from external farms.

The methodology deviation for obtaining manure values based on dry matter content have no negative impact on the quantification of GHG emission reductions as all derived values are based on measured project specific data. Accuracy can thus be ensured, and an overestimation of emission reductions can be excluded, since a conservative approach is used to calculate the manure dry matter content from external farms based on

Validation team confirms that this methodology deviation has no negative impact on the quantification of GHG emission reductions since the calculated number of animal and manure amounts are carried out by independent bodies and are subject to very strict controls.

2. Methodology deviations under AMS-I.C

Since the amount of heat required in the project activity does not correspond to that used in the baseline scenario, direct measurements of $EG_{thermal,CO2,HYG,y}$ cannot be used for the calculation. This can be explained as follows: while the baseline scenario does require only the manure to be heated up from storage ($10,8^{\circ}C$ = ambient temperature) to $70^{\circ}C$, the actual installed apparatus does heat up the complete digestate from fermenter exit temperature of about $37^{\circ}C$.

As for the first crediting period, a calculative approach will be used. The energy demand for heating up a liquid from a given temperature can easily be calculated by means of physical equations. Only the heat capacity of the liquid and the inlet temperature need to be known. The heat capacity of manure was set to the one for water. The inlet temperature was fixed to the average annual ambient temperature. According to paragraph 42. c) of the AMS-I.C and for conservativity reasons, a default value of 100% of efficiency of the baseline unit has been chosen.

$$Heat_{HYG,y} = Q_{fm,i,LT,y} \cdot Cap_{heat,BE} \cdot (T_{HYG} - T_{inlet,BE}) \cdot 1/Eff_{ex}$$

Where:

$EG_{thermal,y}$	Net quantity of thermal energy supplied by the project activity during the year y (TJ)
$Q_{fm,j,LT,y}$	annual manure excreted from the animals in kg during the year y

³ Tool 19: Demonstration of additionality of microscale project activities,
<https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-19-v9.pdf>, p.3

Cap _{Heat, BE}	heat capacity of the manure to be pre-heated, set to the capacity of water 4,18 kJ/kg K
T _{Hyg}	needed hygienization temperature, set to 70 °C
T _{Inlet, BE}	manure inlet temperature to the hygienization system in the baseline scenario, set to the average ambient temperature 10,8 °C
Eff _{Hex}	heat exchanger efficiency, set to 100 %

The calculation approach described has no negative impact on the quantification of the emission reductions and can be evaluated as accurate and conservative.

Furthermore, the exhaust gases released from the gas engines are fed directly into the inlet of the digestate dryer. The exhaust gas supply is registered per CHP by means of an open-close signal with an end contact. For each quarter of an hour, it is registered how many seconds the exhaust gas valve has been open. The thermal energy used for drying digestate out of exhaust gases is calculated using the equation given in the Appendix of this document (based on measured gross electricity production, and electric and thermal efficiency of the CHPs). The measurements and calculations are done monthly by an external independent company Fudura B.V., which reads, collects and validates the necessary measurement data and send the data to the grid operator. Fudura also takes care of the control and maintenance of the meters. Therefore, the calculated values for thermal energy use from exhaust gas are considered as very accurate and have no negative impact on the quantification of GHG emission reductions.

Validation team confirms that the calculation approach described has no negative impact on the quantification of the emission reductions and can be evaluated as accurate and conservative and thus deemed the deviation appropriate and acceptable.

3.3.8 Monitoring Plan

The project employs three (03) baseline and monitoring methodologies /B02,a,b,c/. According to section 5.1 and 5.2 of PD /01-c/ the parameters determined ex-ante and those to be monitoring ex post as per the requirements of the methodologies /B02,a,b,c/.

Validation team confirms that the overall monitoring plan complies with the requirements of the methodologies /B02-a,b,c/, the monitoring arrangements describes in the monitoring plan are feasible within the project design and the project proponents will be able to implement the described monitoring plan.

Please refer to appendix 5 for detailed assessment on monitoring parameters

3.4 Non-Permanence Risk Analysis

This is not applicable to the project activity as the Project is not an AFOLU (Agriculture, Forestry and Other Land Use) project.

4 VALIDATION CONCLUSION

The Project Proponent, B.V. Landgoed de Princepeel, has commissioned the VVB, Carbon Check (India) Private Ltd. to perform an independent validation (for renewal of crediting period) of the VCS Project Activity (ID 337) “Methane Recovery Project Princepeel Wilbertoord, North Brabant, the Netherlands”. This report summarises the findings of the validation of the project, performed on the basis of VCS criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation process was performed on the basis of all guidance and criteria as provided in VCS Standard version 4.1 /B01-a/, VCS Program Guide version 4.0 /B01-b/, VCS Validation and Verification Manual version 3.2/B01-c/ and Registration & Issuance Process version 4.0/B01-d/.

The project activity provides the information in PD/01-c/ as required by the VCS Standard /B01-a/ and Validation and Verification Manual /B01-c/ and in Carbon Check’s opinion meets the requirements of the applied baseline and monitoring methodologies /B02/, and is likely to achieve the estimated emission reductions. The validation has been performed using a risk- based approach, as described above. The annual average estimation of GHG emission reductions from the project activity is 17,209 t CO₂e/year. The total GHG emission reductions over this crediting period of 10 years are 172,088 t CO₂e/year.

Carbon Check (India) Private Ltd concludes the validation with a positive opinion that the VCS Project Activity “Methane Recovery Project Princepeel Wilbertoord, North Brabant, the Netherlands”, as described in the PD) /01-c/, meets all the applicable VCS requirements, including those specified in the Project Standard, relevant methodology, tools and guidelines.

The selected baseline and monitoring methodologies /B02/ is applicable to the project and correctly applied. Carbon Check (India) Private Ltd therefore requests for the renewal of the crediting period of the project as a VCS project activity.

CC IPL’s validation opinion is purely based on the information made available to us by the project proponent during the course of validation and hence CC IPL cannot guarantee the accuracy or correctness of the information. Keeping this in mind, no party can hold CC IPL liable for any decisions made or not made in this report.

APPENDIX 1.1: REFERENCE DOCUMENTS

Ref	Document
/01/	a) VCS PD, version 01 dated 15/12/2021
	b) VCS PD, version 02 dated 19/12/2021
	c) VCS PD, version 04, dated 17/03/2022
	d) VCS PD, version 03, dated 22/12/2021

/02/	a) ER estimation spread sheet corresponding to /01-a/ b) ER estimation spread sheet corresponding to /01-b/ c) ER estimation spread sheet corresponding to /01-c/ & /01-d/
/03/	Evidence of start of operation of the plant (first CHP at the project site) i.e. the project start date as per VCSA requirements a) 2014-12-17 - Princepeel - SDE beschikking verlengde levensduur - SDE2014 b) 2016-06-24 - Princepeel - Beschikking verlengde levensduur - SDE1664594
/04/	Mass-energy flow diagram and plant layout diagram with details of all physical component of the project activity.- file name "2020-03-03 Procesomschrijving Volkelseweg 57 - CONCEPT_EN" & "2020-12-04 Processchema Volkelseweg 57 _EN"
/05/	Technical specifications of the CHP Plant and design/specifications of the digesters and other units including the storage tanks- a) Meetprotocol elektriciteit en warmte - B.V. Landgoed de Princepeel - 2018 b) Jenbacher 3 - Data sheet c) BIJLAGE 3 - Technische Beschrijving Longblock
/06/	Proof of right of VCUs and ownership of project- Extract from commercial register- "B.V. Landgoed de Princepeel uittreksel KvK "
/07/	Details of usage of heat & electricity generated by the project including evidence of any power and/or heat sales agreement: a) Document "Meetprotocol elektriciteit en warmte - B.V. Landgoed de Princepeel – 2018" which is an official electricity and heat measurements protocol renewed every 5 years: . ELECTRICITY: Schematic representations of electricity flow, including system boundary and meters (p.6) + power meters specifications (p.10) HEAT: Schematic representation of heat use (p.8) + heat meters specifications (p.12)
/08/	Evidence of connected load of the project activity- a) Meetprotocol elektriciteit en warmte - B.V. Landgoed de Princepeel - 2018 b) Assurance Rapport 2020 Landgoed de Princepeel B.V.
/09/	Evidence of rated capacity of the CHP plant to confirm the small scale threshold- Meetprotocol elektriciteit en warmte - B.V. Landgoed de Princepeel - 2018"
/10/	Requisite statutory clearances for the operation of the plant including the latest environmental Impact assessment approval from governmental authorities- Princepeel Environmental Permit
/11/	Evidence to confirm that the host country requirements on the disposal/use of feedstock/manure used in the project and use of heat in absence of the project. Also to confirm validity of the original baseline scenario.- a) National Inventory Report 2021 & Annex 7 of NIR 2021 "Methodology for estimating emissions from agriculture in the Netherlands" b) Evidence in tab "Manure surplus" MANURE: NIR 2021 p. 174 (https://unfccc.int/documents/273459) c) NIR 2021 Annex 7 "Methodology for estimating emissions from agriculture in the Netherlands" p. 51 "Manure surplus" Tab d) HEAT: NIR 2021 p. 70 and p. 114
/12/	Geo-ordinates of the project site- VCS PD- N 51° 39' 20.988" E 5° 46' 30"
/13/	Declaration from the project proponent that the project is not creating any other form of environmental credit under any specific program & that the project has not or shall not claim carbon credits any other scheme after Registration of the project under VCS.- "Letter of declaration-Princepeel"

/14/	Evidence of manure quantity procured from different sources including km distance- refer file "Adress mest"
/15/	Evidence of retention time of less than 24 hours for the storage of manure before being fed into the anaerobic digester.
/16/	Historical data (of continuous operation of CHP plant plus with full utilization of biogas produced) as an evidence of no flaring from the project- a) "Electricity prod cons_2010 2011"+"App D - 7 - CQ_BIN_Meetwaarden_per_installatie_2013-2017"
/17/	Evidence of all ex-ante parameters as listed in section 5.1 of the VCS PD
/18/	Photograph & technical specification of all the monitoring equipment within project activity and also at any recipient (of heat) plant .
/19/	Summary of changes (as compare to first crediting period) in the project activity or any other changes related to project ownership.
/20/	Exemption letter from VERRA dated 06/07/2021 granting an exemption from Section 3.8.9(3) of the VCS Standard v4.1, to the Project Proponents and submission of documents by project crediting periods no later than 31 December 2021.
/21/	Evidence of no double counting- VCS PD Annex
/22/	Report meeting of the Board of Experts (CvD) of Green Deal National Carbon Market (GDNK)- Exemption request sent to Verra with all the information and correspondence with Verra about double counting
/23/	Email correspondence between Verra and Network regarding double counting issue
/24/	Screen shot of centralised control system installed at the project site and Video recording of the plant site on the date of remote inspection
/25/	Email from VERRA dated 16 th November 2021

APPENDIX 1.2: BACKGROUND DOCUMENTS

Ref	Document
/B01/	VCS Requirements a. VCS Standard (v4.1, dated 22/04/2021) b. VCS Program Guide (v4.0, dated 19/09/2019) c. VCS Validation and Verification Manual version (v3.2, dated 19/10/2016) d. Registration & Issuance Process (v4.0, dated 19/09/2019) e. VCS Program Definitions version (v4.1, dated 22/04/2021) f. VCS PD template version 4.0
/B02/	Applied baseline and monitoring methodologies & corresponding tools: a) AMS III.AO "Methane recovery through controlled anaerobic digestion" (Version 1.0), referring to the capture of methane gases from biomass or other organic matter. b) AMS III.D "Methane recovery in agricultural and agro-industrial activities" (Version 11), referring to the capture of methane gases from decomposing manure. The actual version is named "Methane recovery in animal manure management systems" (Version 21).

	c) AMS I.C, “<i>Thermal energy for the user with or without electricity</i>” (Version 09), referring to the utilization of the waste heat to replace fossil energy. The actual version is named “<i>Thermal energy production with or without electricity</i>” (Version 21). d) Project and leakage emissions from anaerobic digesters, Tool 14 e) Demonstration of additionality of small-scale project activities, Tool 21 f) Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period, Tool 11
/B03/	Records of previous verification and validation at the time of registration of the project as available on VCS project page (337)
/B04/	Website and links: 1. IPCC (http://www.ipcc-nggip.iges.or.jp) 2. http://cdm.unfccc.int 3. http://www.v-c-s.org

APPENDIX 2: ABBREVIATIONS

CDM	Clean Development Mechanism
BE	Baseline Emission
CAR	Corrective Action Request
CC IPL	Carbon Check (India) Private Ltd.
CDM	Clean Development Mechanism
CL	Clarification Request
CO ₂	Carbon Dioxide
CO _{2e}	Carbon Dioxide Equivalent
DOE	Designated Operational Entity
DPR	Detailed project report
DVR	Draft Validation Report
EB	CDM Executive Board
EF	Emission Factor
ER	Emission Reduction
FAR	Forward Action Request
FVR	Final validation Report
GHG	Greenhouse gas(es)
GWh	Giga Watt Hour
IPCC	Intergovernmental Panel on Climate Change
MW	Mega Watt
MWh	Mega Watt Hour
NA	Not Applicable
OSV	On Site Visit
PD	Project Description
PP	Project Proponent
QC/QA	Quality control/Quality assurance
TR	Technical Review
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
VCSA	Verified Carbon Standard Association
VCU	Verified Carbon Unit
VVM	Validation and Verification Manual
VVS	Validation and Verification Standard

APPENDIX 3: CERTIFICATES OF COMPETENCE



Carbon Check (India) Private Ltd.

Vikash Kumar Singh

has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 07.0):

For following functions:

Validator	☒	Team Leader	☒	Technical reviewer	☒
Verifier	☒	Technical Expert	☒	Local Assessor ¹	☒

In the following Technical Areas:

TA 1.1	☒	TA 3.1	☒	TA 5.2	☐	TA 9.2	☐	TA 13.2	☒
TA 1.2	☒	TA 4.1	☒	TA 8.1	☐	TA 10.1	☐	TA 14.1	☐
TA 2.1	☐	TA 5.1	☐	TA 9.1	☐	TA 13.1	☒		

Mr. Amit Anand
CEO

Date of Approval
24/12/2020

Valid Till
24/12/2021

Revision History of the Document

26/12/2014	Initial Adoption
24/12/2015	Annual Revision
20/01/2016	Interim Revision for office address change
23/12/2017	Annual Revision
24/12/2017	Annual Revision
24/12/2018	Annual Revision
24/12/2019	Annual Revision
01/03/2020	Interim Revision for office address change
01/09/2020	Interim Revision for CCIPL logo change
24/12/2020	Annual Revision

¹ India, South Africa

CARBON CHECK (INDIA) PRIVATE LIMITED

CIN: U74930DL2012PTC232495

Regd. Off: 2071/38, 2nd Floor, Naiwala, Karol Bagh, New Delhi - 110005

Corporate off: Unit No. 1701, Logix City Centre Office Tower, Plot No. BW-58, Sector-32 Noida, Uttar Pradesh

Tel: +91 120 4373114 | URL: www.carboncheck.co.in | e-mail: info@carboncheck.co.in



Carbon Check (India) Private Ltd.

Sanjay Agarwalla

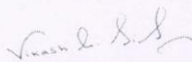
has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 07.0):

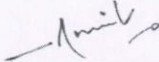
For following functions:

Validator	☒	Team Leader	☒	Technical reviewer	☒
Verifier	☒	Technical Expert	☒	Local Assessor ¹	☒

In the following Technical Areas:

TA 1.1	☒	TA 3.1	☒	TA 5.2	☒	TA 9.2	☒	TA 13.2	☐
TA 1.2	☒	TA 4.1	☒	TA 8.1	☐	TA 10.1	☐	TA 14.1	☐
TA 2.1	☒	TA 5.1	☒	TA 9.1	☒	TA 13.1	☒		


 Mr. Vikash Kumar Singh
 Compliance Officer


 Mr. Amit Anand
 CEO

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Revision History of the Document

26/12/2014	Initial Adoption
24/12/2015	Annual Revision
20/01/2016	Interim Revision for office address change
23/12/2017	Annual Revision
24/12/2017	Annual Revision
24/12/2018	Annual Revision
24/12/2019	Annual Revision
01/03/2020	Interim Revision for office address change
01/09/2020	Interim Revision for CCIPL logo change
24/12/2020	Annual Revision

¹ India

CARBON CHECK (INDIA) PRIVATE LIMITED
 CIN: U74930DL2012PTC232495

Regd. Off: 2071/38, 2nd Floor, Naiwala, Karol Bagh, New Delhi - 110005

Corporate off: Unit No. 1701, Logix City Centre Office Tower, Plot No. BW-58, Sector-32 Noida, Uttar Pradesh
 Tel: +91 120 4373114 | URL: www.carboncheck.co.in | e-mail: info@carboncheck.co.in

APPENDIX 4: FINDINGS LOG APPENDIX 4: FINDINGS LOG

Finding	CAR 01		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding (DOE)	Section 1.9 of the VCS PD shall provide the crediting period dates for the renewal.		
Corrective Action or clarification #1 (PP shall write a detailed and clear corrective action or further information for clarification as per finding)	The dates for the second crediting period have been added in section 1.9 of the VCS PD document according to the VCS Standard requirements.		
DOE Assessment #1 <i>The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	VCS PD has been revised to address the finding; checked and confirmed by the VVB.		
Conclusion Tick the appropriate checkbox	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed		

Finding	CAR 02		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding (DOE)	Project proponent is requested to use international numeration system throughout the VCS PD and not using decimals.		
Corrective Action or clarification #1 (PP shall write a detailed and clear corrective action or further information for clarification as per finding)	The numeration system throughout the VCS PD has been corrected using international numeration system. The values with decimals have been rounded to full integer, where relevant.		
DOE Assessment #1 <i>The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	VCS PD has been revised to address the finding; checked and confirmed by the VVB.		
Conclusion Tick the appropriate checkbox	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed		

Finding	CAR 03		
Classification	☒ CAR	☐ CL	☐ FAR

Finding	CAR 03
Description of finding (DOE)	As per the applied methodology, AMS I.C. version 21, the monitoring of biomass residues (refer page 30 of 40, AMS I.C. version 21) used in the project is missing. Also, the parameter Net calorific value of biomass type k (NCV_k) is missing which is required by AMS I.C. version 21 (refer page 32 of 40, AMS I.C. version 21) Furthermore, during the remote inspection it was clarified that biogas can be calculated and not measured which forms a deviation to the applied methodology.
Corrective Action or clarification #1 (PP shall write a detailed and clear corrective action or further information for clarification as per finding)	Following parameters which will be monitored for cross check reasons have been included in sections 5.1 and 5.2 of the VCS PD: biogas production (BGP), based on electricity production (EEP), methane content (MC) and electrical efficiency of the CHPs (ETA_{CHP-el}), quantity of co-ferments ($B_{Biomass,y}$). The calculation of the quantity of biogas has been added as a deviation in section 3.6 of the VCS PD.
DOE Assessment #1 <i>The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The missing parameters as indicated in the finding has been added in the revised VCS PD; checked and confirmed by the VVB. Furthermore, the section of deviation has also been revised in order to address the concern raised in the findings for not conducted direct measurement of the biomass residue (biogas) used in the project. The deviation is deemed appropriate and acceptable to the VVB.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed

Table 1. CLs from this validation

Finding	CL 01
Classification	☐ CAR ☒ CL ☐ FAR

Finding	CL 01
Description of finding (DOE)	For the parameter “dmj,LT,y”, Project proponent has opted a sampling method all Princepeel farms for each animal category are sent to laboratories to measure the respective dry matter Content. However, no sampling plan has been provided. The sample should be representative sample (90/10 precision) of the population. Furthermore, please justify the appropriateness of following statement of VCS PD: <i>“For manure coming from external farms: The average dry matter content of the annually aggregated average measured values from the Princepeel farms is multiplied by 90% to obtain the value used for dry matter content(conservative approach)”</i>
Corrective Action or clarification #1 (PP shall write a detailed and clear corrective action or further information for clarification as per finding)	A sampling plan with a confidence/precision of 90/10 has been included in section 5.2 of the VCS PD. Using 90% from the measured values of the dry matter content of the Princepeel farms correspond to a conservative approach, as the animal husbandry systems in the Netherlands are similar across the country. Concerning the pig manure, the dry matter content of it can vary, depending on whether the pigs are fed with wet or dry feed. Wet feed logically leads to lower dry matter content. Since the Princepeel group uses wet feed for its pigs, the measured values for dm are assumed to be conservative. Therefore, using 90% of these measured dm values can be considered as a conservative calculation approach.
DOE Assessment #1 <i>The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Table for parameter “dmj,LT,y” has been appropriately revised ; checked and confirmed by the VVB. Furthermore, Project proponent has also justified the quoted statement of the finding.
Conclusion Tick the appropriate checkbox	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed

Finding	CL 02
Classification	☐ CAR ☒ CL ☐ FAR

Finding	CL 02
Description of finding (DOE)	The project applies AMS III.AO version 01. The paragraph 1 (b) applies to the project as it is a co-digestion of multiple sources of biomass substrates, namely animal manure and other agricultural and industrial wastes. Validation team has noted that component 3 i.e. other agricultural and industrial wastes is excluded from further assessments and calculations in relation to GHG emissions reductions. This is deemed acceptable to the validation team. However, the compliance of paragraph 1 (c) AMS III.AO version 01 is required to demonstrated in particularly the project emissions calculation for all co-digested substrates even if baseline is assumed as zero. This is further evident from the project boundary under section 3.2 of the VCS PD, which does include the boundary as well as sources and gases of AMS III.AO version 01.
Corrective Action or clarification #1 <i>(PP shall write a detailed and clear corrective action or further information for clarification as per finding)</i>	The project emissions calculation for all co-digested substrates has been added in section 4.2, paragraph 3 of the VCS PD, according to the requirements of AMS-III.AO under paragraph 1 (b) and paragraph 13.
DOE Assessment #1 <i>The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	VVB based on review of revised PD confirms that Project proponent has appropriately revised section 3.3 to update project boundary inline with the requirements of AMS III.AO version 01. Furthermore, compliance of paragraph 1 (c) AMS III.AO version 01 is now met since Project proponent has included/accounted all emission sources for the other biomass substrates for which baseline emission is not being claimed by the Project proponent. This is deemed acceptable to the VVB.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed

APPENDIX 5: ASSESSMENT ON EX- ANTE AND MONITORING PARAMETERS

EX ANTE Parameter Fixed

Data and parameter from the AMS-III.D

Ex-ante Paramter	Value during 2 nd CP	VVB Assesments
GWP _{CH4}	28	The value of GWP _{CH4} is applied according to IPCC AR5 which is in line with paragraph 3.14.4 of VCS Standard Version 4.1 and hence acceptable.
D _{CH4}	0.00067	
U _{fb}	0.94	
MCF _j	Manure type MCF _j Liquid cattle manure: 17% Liquid pig manure: 36%	
B _{0,LT}	Manure type BoLT Liquid cattle manure 0.22 Liquid pig manure 0.31	The rest of the ex -ante parameters are in compliance with the applied methodology i.e. AMS-III.D Validation team has checked and found inline with the PD.
MS _{i,y}	100%	
CT _y	36	
EFCO _{2,transport}	1.028	

Data and parameter from AMS-I.C

Ex-ante Paramter	Value during 2 nd CP		VVB Assessments
EF _{NG,CO2}	56.4		The ex -ante parameters are in compliance with the applied methodology i.e. AMS-I.C Validation team has checked and found inline with the PD.
η _{BL,thermal}	100		
CapHeat,BE	4.18		
T _{Hyg}	70		
T _{Inlet,BE}	10.8		
Effex	100		
ETA _{CHP-el}	CHP Units	Electric efficiency	
		%	
	Waukesha 475	35.20	
	Waukesha 550	37.60	
	Jenbacher 320	39.30	
	Jenbacher 320	39.30	
	Jenbacher 420	42.00	
	Jenbacher 420	41.80	

Data and Parameters Monitored

Monitoring Parameter Requirement	Assessment/ Observation by the VVB	
Data / Parameter:	Qfm,j,LT,y	
Description	Quantity of fresh manure treated from livestock type LT at animal manure management system j	
Value(s) applied	Manure from Princepeel farms	Quantity [kg]/y]
	Liquid pig manure	35,000
	Manure from ext. farms	Quantity [kg]/y]
	Liquid pig manure	7,000
	Liquid cattle manure	8,000
VVB assessment	VVB Assessments:- This value will be calculated Manure from external farms is weighed when delivered by a truck weighing scale. Manure from the own farm is calculated based on the current animal number. The daily amounts of manure entering the biogas plant are recorded in the electronic database.. The actual value will be monitored ex post .	

Monitoring Parameter Requirement	Assessment/ Observation by the VVB	
Data / Parameter:	dm _{j,LT,y}	
Description	Dry matter content of animal manure from livestock type LT and animal manure management system j in year	
Value(s) applied	Manure from Princepeel farms	Dry matter content [kg/kg]
	Liquid cattle manure	0.128
	Liquid pig manure	0.115
	Manure from ext. farms	Dry matter content [kg/kg]
	Liquid cattle manure	0.115
	Liquid pig manure	0.104
VVB assessment	VVB Assessments:- This value will be calculated by Dry matter content analyses from specialized accredited laboratories as Eurofins or TLR international laboratories. The actual value will be monitored ex post .	

Monitoring Parameter Requirement	Assessment/ Observation by the VVB	
Data / Parameter:	SVS _{j,LT,y}	
Description	Organic dry matter content (=specific volatile solids content) of animal manure from livestock type LT and animal manure management system j in year y	
Value(s) applied	Manure from Princepeel farms	Organic dry matter content [kg/kg]
	Liquid cattle manure	0.557
	Liquid pig manure	0.821
	Manure from ext. farms	Organic dry matter content [kg/kg]
	Liquid cattle manure	0.502
	Liquid pig manure	0.739
VVB assessment	VVB Assessments:- This value will be calculated by Organic dry matter content analyses from specialized accredited laboratories as Eurofins or TLR international laboratories. This is required for the calculation of project emission. The actual value will be monitored ex post .	

Monitoring Parameter Requirement	Assessment/ Observation by the VVB
Data / Parameter:	EG _{thermal,AS,y}
Description	Quantity of thermal energy consumption for the ammonia stripping process during the year y
Value(s) applied	55,000
VVB assessment	VVB Assessments:- The heat use is measured by a heat meter and recorded digitally. The daily measurements are recorded and send by Fudura both monthly and annually to CertiQ for certification.The actual value will be monitored ex post .

Monitoring Parameter Requirement	Assessment/ Observation by the VVB
Data / Parameter:	EG _{thermal,DD,y}
Description	Quantity of thermal energy consumption for total external heat use during the year y
Value(s) applied	10,000

VVB assessment	VVB Assessments:- The heat use is measured by a heat meter and recorded digitally. The daily measurements are recorded and send by Fudura both monthly and annually to CertiQ for certification. This is required for the calculation of project emission. The actual value will be monitored ex post .
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Monitoring Parameter Requirement	Assessment/ Observation by the VVB
Data / Parameter:	EGthermal,TE,y
Description	Quantity of thermal energy consumption for the thermal evaporating process during the year y
Value(s) applied	60,000
VVB assessment	VVB Assessments:- This value will be calculated by measurements reports (Meetrapport) certified by CertiQ, the Dutch issuing body for guarantees of origin and certificates of origin for heat and electricity generated from sustainable sources, and required for grant payment. This is required for the calculation of project emission. The actual value will be monitored ex post .

Monitoring Parameter Requirement	Assessment/ Observation by the VVB
Data / Parameter:	EGthermal,WKK1,y
Description	Quantity of thermal energy consumption for the digestate drying process during the year y
Value(s) applied	22,000
VVB assessment	VVB Assessments:- The heat use is measured by a heat meter and recorded digitally. The daily measurements are recorded and send by Fudura both monthly and annually to CertiQ for certification.. The actual value will be monitored ex post .

Monitoring Parameter Requirement	Assessment/ Observation by the VVB
Data / Parameter:	EGthermal,EG,y

Description	Quantity of thermal energy consumption for the digestate drying process by exhaust heat during the year y
Value(s) applied	21,000
VVB assessment	VVB Assessments:- This value will be calculated by the amount of electricity produced (EEP), the methane content of the biogas and the efficiency of the CHP engines. The actual value will be monitored ex post.

Monitoring Parameter Requirement	Assessment/ Observation by the VVB
Data / Parameter:	DAFw
Description	Average incremental distance for manure transportation
Value(s) applied	2 and 80
VVB assessment	VVB Assesments:- The distance between the manure suppliers and the biogas plant will be calculated based on the addresses of the manure suppliers. Together with the respective manure amounts from each supplier, the weighted average incremental distance for manure transportation can be calculated. The actual value will be monitored ex post.

Monitoring Parameter Requirement	Assessment/ Observation by the VVB
Data / Parameter:	BGP
Description	Biogas produced
Value(s) applied	16,000,000
VVB assessment	VVB Assesments:- Calculated by the amount of electricity produced (EEP), the methane content of the biogas and the efficiency of the CHP engines .The actual value will be monitored ex post.

Monitoring Parameter Requirement	Assessment/ Observation by the VVB
Data / Parameter:	EEP

Description	Electrical energy produced
Value(s) applied	36,000,000
VVB assessment	VVB Assesments:- Electric power meter at each CHP measures the produced electric energy. The actual value will be monitored ex post.

Monitoring Parameter Requirement	Assessment/ Observation by the VVB
Data / Parameter:	MC
Description	Methane content of the biogas
Value(s) applied	55
VVB assessment	VVB Assesments:- The methane content is calculated based on literature values for all the substrate inputs (annually weighed average content) or the gas analyzer is used to measure daily the amount of methane in the biogas. The measured values are recorded by the operations staff and logged electronically. The actual value will be monitored ex post.

Monitoring Parameter Requirement	Assessment/ Observation by the VVB
Data / Parameter:	BBiomass,y
Description	BBiomass,y
Value(s) applied	50,000
VVB assessment	VVB Assessments:- Each co-ferment is weighed at delivery. The mass of the co-ferment is noted on the delivery receipt and recorded in the electronic database .The actual value will be monitored ex post.