



METHANE RECOVERY PROJECT PRINCEPEEL WILBERTOORD NORTH BRABANT, THE NETHERLANDS



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Summary:

AENOR has carried out the verification of the “Methane Recovery Project Princepeel Wilbertoord, North Brabant, the Netherlands”. The project is a project implemented in Wilbertoord, North Brabant, southeaster part of the Netherlands. The geographical coordinates are N51°39’45 E5°44’24”. The project is an agricultural biogas plant that produces renewable energy (electricity and heat) from different organic input materials. The project generates emissions reductions through avoided uncontrolled methane emission out of manure and organic wastes as well as the generation of renewable thermal energy decentrally used to substitute fossil fuels.

The project activity was put into operation in May 2007. The Project has been verified for 2 operation periods in order to certify the correspondingly reduced GHG emissions by this project activity within these periods. The first operation period was from June 1st, 2007 to December 31st, 2007 and the second one from January 1st, 2012 to December 31st, 2012. The project uses a fixed crediting period of 10 years which ends on 31st of May 2017.

The present verification Report certifies the emission reductions that have occurred from the end of the second monitoring period verified previously until the end of the project’s crediting period (01/01/2013 - 31/05/2017), with an emissions reduction for the current monitoring period of 241150 tCO_{2e}

The purpose of the verification was to determine the conformance of the project with respect to the VCS Standard v4.0 and the validated PD and the assessment of the ex-post monitored anthropogenic GHG emissions reductions and/or removals that have occurred as a result of the project’s activities.

The scope of the verification was to assess the conformance of validated project, once implemented, with the VCS requirements and requirements in the validated PD. The process was performed through a combination of desk review, interviews, and communications with relevant personnel.

During the verification 5 OBS and 4 NCs were raised. All these issues were appropriately closed by means of corrections, more clear explanations, and other supporting documents.

Once all issues detected were appropriately resolved, AENOR carried out this final verification report and deems with reasonable level of assurance that the project complies with all of the verification criteria. The assessment team has no restrictions or uncertainties with respect to the compliance of the project with the verification criteria, hence, the audit team concludes that the cumulative net GHG emissions reductions or removals of 241150 tCO₂e over the monitoring period has been quantified in accordance with VCS rules.

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1 INTRODUCTION

1.1 Objective

The objective of the verification audit was to conduct an independent assessment of the project to determine:

- The extent to which methods and procedures, including monitoring procedures, have been implemented in accordance with the validated project description (PD), including the monitoring plan.
- The extent to which GHG emission reductions and removals reported in the monitoring report are materially accurate.

1.2 Scope and Criteria

The scope of the verification audit was to verify the emissions reductions and/or removals of the project against the Verified Carbon Standard, the identified methodology and the validated PD.

The objectives of this audit included a verification of the Project's calculated reductions with the Verified Carbon Standard requirements for the last monitoring period of the project's crediting period (01/01/2013 - 31/05/2017). In addition, the audit assessed the project with respect to the validated baseline scenarios presented in the PD.

In accordance with Section 4.1.8 of the VCS Standard, the criterion for validation and verification was the VCS Version 4, including the following documents:

- VCS Standard v4.0
- VCS Program Guide v4.0

Unless otherwise indicated, the assessment was performed against the most recent version of the relevant VCS guidance document.

1.3 Level of Assurance

The assessment was conducted to provide a reasonable level of assurance of conformance against the defined audit criteria and materiality thresholds within the audit scope. Based on the audit findings, a positive evaluation statement reasonably assures that the project GHG assertions are materially correct and is a fair representation of the GHG data and information.

All the versions of the verification report were subjected to an independent internal technical review before being submitted to the client to confirm that all verification activities had been completed according to the pertinent AENOR instructions required. The technical review was performed by a

technical reviewer(s) qualified in accordance with AENOR's qualification scheme for VCS validation and verification.

The threshold for materiality with respect to the aggregate of errors, omissions and misrepresentations relative to the total reported GHG emission reductions/removals was one percent (1%), as established for large projects by the VCS Standard.

1.4 Summary Description of the Project

The project is a project implemented in Wilbertoord, North Brabant, southeaster part of the Netherlands. The geographical coordinates are N51° 39' 45 E5° 44' 24". The project is an agricultural biogas plant that produces renewable energy (electricity and heat) from different organic input materials. The project generates emissions reductions through avoided uncontrolled methane emission out of manure and organic wastes as well as the generation of renewable thermal energy decentrally used to substitute fossil fuels.

The project activity was put into operation in May 2007. The Project has been verified for 2 operation periods in order to certify the correspondingly reduced GHG emissions by this project activity within these periods. The first operation period was from June 1st, 2007 to December 31st, 2007 and the second one from January 1st, 2012 to December 31st, 2012. The project uses a fixed crediting period of 10 years which ends on 31st of May 2017.

The present verification Report certifies the emission reductions that have occurred from the end of the second monitoring period verified previously until the end of the project's crediting period (01/01/2013 - 31/05/2017), with an emissions reduction for the current monitoring period of 241150 tCO_{2e}.

2 VERIFICATION PROCESS

2.1 Method and Criteria

The verification was performed through a combination of document review and interviews with relevant personnel, as discussed in Sections 2.2 through 2.4 of this report. At all times, the project was assessed for conformance to the criteria described in Section 1.2 of this report. As discussed in Section 2.5, findings were issued to ensure that the project was in full conformance to all requirements.

A project specific Verification Plan was developed to guide the verification auditing process to ensure efficiency and effectiveness. The purpose of the Verification Plan was to present a risk assessment for determining the nature and extent of verification procedures necessary to ensure the risk of auditing error was reduced to a reasonable level. The Verification Plan methodology was derived from all items in our verification process stated above. Any modifications applied to the Verification plan were made based upon the conditions observed for monitoring in order to detect the processes with highest risk of material discrepancy.

The verification activities in which risks were assessed were the evaluations of the monitoring system (data flow, data control procedures, etc.) but mainly the quality of raw data as well as sources and the spreadsheet calculations. AENOR reproduced and verified 100% of data in the “App C - Calculation_Emission Reductions_VCS_v002_Princepeel_MR 2013-2017” for the monitoring period. The project boundary and project area for the monitoring period were checked using the evidence provided by the PP.

AENOR carried out a deep and meticulous review of the spreadsheets in order to verify the correct application of the methodology (formulae, equations.) and checked that data required calculating the GHG reductions were appropriately provided. Based on the assessment carried out, AENOR confirms with a reasonable level of assurance that the claimed emission reductions are free from material errors, omissions, or misstatements.

AENOR confirms that sufficient evidence was presented for the reported net anthropogenic GHG emission reductions and that there is a clear audit trail that contains the evidence and records that validate the stated figure in this verification report since:

- Sufficient evidence available: The project participant has provided the 100% of data used in the calculations to achieve the final amount of GHG emission reductions reported, or the source of data in case of default values, or conservative approaches in case of estimated values.
- Nature of evidence: The raw data were collected from reliable sources. They are detailed in the project documents and have been provided to the verification team and were checked during the interviews.
- Cross-checked evidence: AENOR cross-checked the collected information through interviews with stakeholders and reproducing calculations.

Hence, AENOR confirms that the stated figures in the monitoring report are correct and confirms that is able to certify net anthropogenic GHG removals based on verifiable and reliable evidence.

2.2 Document Review

A detailed review of all project documentation was conducted to ensure consistency with, and identify any deviation from the VCS program requirements, the methodologies applied (AMS III.D, “Methane recovery in agricultural and agro-industrial activities” version 11, AMS II.F, “Energy efficiency and fuel switching measures for agricultural facilities and activities” version 08 and AMS I.C, “Thermal energy for the user with or without electricity” version 21), and the validated PD. Initial review focused on the Monitoring Report (MR) and included an examination of the project details, implementation status, data and parameters, and quantification of GHG emission reductions. Documents reviewed included data from monitoring, calculation spread sheets, and responses to No Conformities (NCs) and Observations (OBS).

The verification included a review of the validated PD and MR, relative to the field conditions and interviews with project management staff and stakeholders.

For a listing of all documents received from the client for this verification, please see Appendix 1.

2.3 Interviews

Interviews were performed as part of the overall verification process which was additional to that provided in the project description, monitoring report and any supporting documents. The AENOR verification team met with individuals with various roles in the project. This included a series of interviews with in-country staff that support the mission of the project. In addition, interviews discussions were conducted with project members. The following table summarizes the interviews carried out during the process.

Name	Title/Organization/Community
Jos van Heugten	Commercial manager
Pauline Kalathas	Project Manager at GES Energie
Pieter Smits	Managing director

Due to the COVID-19 pandemic situation, all interviews were carried out through videoconference or email, as explained in Section 2.4 in different dates during the verification process.

2.4 Site Inspections

Due to the exceptional situation caused by the COVID-19 crisis and the travel restrictions established by governments for safety reasons, it was not possible to carry out a site visit as part of the verification process of the project.

In accordance with VERRA's COVID-19 Travel Guidance for Projects (dated 18 March 2020) and since that the VCS Programs does not explicitly mandate site visits, an exemption of the site was requested on the ground of the crisis situation and considering that a reasonable level of assurance was achievable by other means. AENOR as VVB proposed to carry out a remote verification audit that ensured the achievement of the assurance level required by VCS program.

The remote audit was based on the following auditing techniques:

- Document review and cross checks between the information provided in the MR, the PD and supporting information and evidence provided by the PP Emissions calculations and supporting information and evidence provided.
- Review, based on the selected methodologies, tools and the other applied methodological regulatory documents, of the appropriateness of formulae and accuracy of calculations.
- Telephone, teleconference and/or e-mail interviews for the implementation of the project activity and the elaboration of project's documents.

- Cross checks between information provided by interviewees to ensure that not relevant information has been omitted.

2.5 Resolution of Findings

All documentation provided by the PP was assessed against the applicable version of the relevant VCS guidance document. Several observations (OBS) and No Conformities (NCs) were raised and submitted to the PP, which addressed them either by providing to the audit team the requested information or by making the appropriate corrections. Updated versions of the documentation were submitted by the PP and the audit team reassessed them against the guidance documentation. This process was repeated iteratively until all OBS and NCs were fully closed. Specifically, 5 OBS and 4 NCs were raised.

All findings issued by the AENOR audit team during the verification process have been closed. In accordance with Section 4.1.13 of the VCS Standard, all findings issued during the verification process, and the inputs for their closure, are described in Appendix 2 of this report.

2.5.1 Forward Action Requests

No FARs were raised to the PP during the verification process.

2.6 Eligibility for Validation Activities

AENOR holds accreditation for validation for the relevant sectorial scope under which this project activity is classified.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The verification team is not aware of project involvement in other forms of environmental credits from its activities. The project has not been registered, and is not seeking registration, under any other GHG programs.

3.2 Methodology Deviations

Three methodology deviations were applied during the monitoring and quantification of VCU for this monitoring period although they were applied during the previous monitoring period too. A detailed description of the methodology deviations can be found below and in Section 3.2.1 Methodology Deviations of the MR:

1. Biogas production

The amount of biogas is not measured but calculated by the amount of electricity produced. The reason is that no flow meter is installed to measure the biogas volume that is utilized in the CHP. This calculation, based on a reference method described by the CCX Agricultural Methane Gas Project Guidelines, has already been assessed in the last monitoring period and estimated as a conservative way to calculate the amount of biogas produced.

The electricity measurement can be considered as very accurate because it is also the basis for the accounting with the utility. No negative influence on the amount of emission reductions can be expected as the calculated value is expected to be very close to the actual value as it was demonstrated in the previous verification process.

2. Conservativity factor

The application of an overall deduction factor of 0.5 on the emission reductions due to methane recovery. This conservativity factor covers the uncertainties due to the fact, that the project owner has to deal with a lot of organic waste streams of different type and only default values are used instead of local values for waste specific parameter. Furthermore, the project was developed at a time when the methodological approaches and guidelines were not yet mature. Following the conservativeness principle prescribed by the VCS methodology as well as ISO 14064, the application of an additional security factor of 0.5 (conservativity factor) is appropriated to highly compensate the risk of an over-estimation of the emission reductions.

This factor has already been assessed and verified for the previous monitoring periods in 2007 and 2012.

The conservativity factor 0.5 in the current monitoring have been applied only on the emission reductions from methane recovery in order to stay consistent with the purpose of application of this factor on the source of uncertainties.

3. Methodologies

The methodologies AMS II.F and AMS I.C were not applied to the project during the actual monitoring period. This is due to the fact that the irrigation pump system has not been implemented as described in the PDD (AMS II.F) and no emission reductions are considered for the substitution from fossil fuel for the use of renewable heat (AMS I.C).

Therefore, due to all the information detailed before, the VVB considers that the deviations meet with the criteria and specifications for permitted methodology deviations stated by the VCS Standard v 4 because they are related to data and parameters monitored and do not negatively impact the conservativeness of the quantification of GHG emission reductions.

3.3 Project Description Deviations

Eight Project Description Deviations have occurred during this monitoring period are detailed below:

1- Increase of manure quantities

Higher amounts of manure generally and of manure with a dry matter content have been treated than initially planned and estimated in the validated PDD. This development is attributed to the higher manure surpluses that the Netherlands have been experiencing in the last decade and that could not have been anticipated.

The audit team has verified that the deviation does not impact to:

- a) The applicability of the methodologies applied because the project activity comprises:
 - methane recovery from manure and wastes from agricultural or agro-industrial activities,
 - the annual emission reductions achieved by the project activity are less than or equal to 60 kt CO₂.
 - Biomass-based cogenerating systems that produce heat and electricity.
 - Generation capacity is less than 15 MW_{el} or 45 MW_{th}.
- b) Additionality, and the investment barriers are still valid, and the production of biogas is not an economically attractive business in the Netherlands.
- c) The appropriateness of the baseline scenario, because there are no legal requirements to change the current manure handling system in The Netherlands.

The deviation has been appropriately described and justified by the PP in the MR and evidences provided to the audit team, and VVB considers that the project remains in compliance with the VCS rules.

2- Amount of emission reductions

The amount of emission reductions is higher than the estimated amounts in the PDD. This is partly due to the larger amounts of manure that are processed in the biogas plant, as described above. But it is also due to the fact, that only the baseline methane emissions released from stored manure are calculated in the PDD and not the one from waste management. Hence, the yearly estimated methane emissions reductions written down in the PDD do not correspond to the entire methane emissions that are reduced through the project activity. Furthermore, the Global Warming Potential of CH₄ has been adapted from 21 to 25 according to the Fourth Assessment Report and VCS Requirements, which also leads to higher emission reductions.

The audit team has verified that the deviation does not impact to:

- a) The applicability of the methodologies applied because the annual emission reductions achieved by the project activity are less than or equal to 60 kt CO₂.
- b) Additionality, and the investment barriers are still valid, and the production of biogas is not an economically attractive business in the Netherlands.
- c) The appropriateness of the baseline scenario, because there are no legal requirements to change the current manure handling system in The Netherlands.

The deviation has been appropriately described and justified by the PP in the MR and evidences provided to the audit team, and VVB considers that the project remains in compliance with the VCS rules.

3- Carbon Consultant

From the last Monitoring in 2012, the company of the Carbon Manager has changed from GES Biogas GmbH to GES Energie GmbH, but this company and its employees belong to the same company group as the GES Biogas GmbH. This has no impact on the quality of the Monitoring Report and the resulting emission reductions, since the actual Carbon Consultant has big experience working in the carbon sector. The deviation has been appropriately described and justified by the PP in the MR and evidences provided to the audit team, and VVB considers that the project remains in compliance with the VCS rules.

4. Project Proponent

The person responsible for collecting all data relevant for the monitoring of GHG emission reductions was originally Teun Smits, managing director at B.V. Landgoed de Princepeel, as described in the PDD. Since 2012, Pieter Smits, director of the company, has taken over the responsibility for monitoring and recording all data with Jos van Heugten supporting him between 2012 and 2017 as commercial manager

of the company. This presents a deviation from the PDD information from 2012 on. Since the data collected for this Monitoring has also to be collected by the company as basis for accountancy and feed-in tariffs, and is verified by external authorities, negative impacts on the quality of the documentation provided for the calculation of emission reductions is excluded.

The deviation has been appropriately described and justified by the PP in the MR and evidences provided to the audit team, and VVB considers that the project remains in compliance with the VCS rules.

5. Heat meter

No heat meter has been installed to measure the heat used externally during the current monitoring period, so no emission reductions are claimed for the substitution of fossil fuel, and therefore, this deviation has no impact on the amount of emission reductions.

The audit team considers the deviation to be valid and has been appropriately described and justified by the PP in the MR and evidences provided to the audit team, and the project remains in compliance with the VCS rules.

6. Biogas flow meter

No flow meter has been running during the present monitoring period. Practice shows that the flow meter was unable to deliver reliable measurements, due to contaminations like moisture (condensation) or Sulfur (H_2S). Therefore, the measurements could not be used as accurate values for calculation the emission reductions.

Hence, the biogas flow has been calculated following a reference method described by the CCX Agricultural Methane Gas Project Guideline, based on the electric energy produced, the efficiency of the CHPs and the calorific value of biogas. The calculation of the biogas amount bases on the electricity production measured by an electric meter with an accuracy $<1\%$. Since the accuracy of the electric meter is highly precise and the method described by CCX is conservative, as it was already demonstrated in the previous monitoring report, using the CCX method have a conservative effect on the quantity of emission reductions.

The audit team has verified that the deviation does not impact to the applicability of the methodologies applied and the project still complies with all the applicability criteria, the investment barriers used to justify the additionality of the project are valid too, and the baseline scenario identified in the validated PDD is appropriated currently because there are no changes in the legal requirements of the current manure handling system in the country.

The deviation has been appropriately described and justified by the PP in the MR and evidences provided to the audit team, and therefore, VVB considers that the project remains in compliance with the VCS rules.

7. Irrigation pumps

The fuel switch from fossil fuels to biogas in the irrigation pumps has not been implemented during the monitoring period. This deviation has a conservative impact on the emission reductions since these are not claimed for the substitution of diesel fuel.

The deviation has been appropriately described and justify, and do not affect the applicability of the methodology, the additionality of the project nor the appropriateness of the baseline scenario. Thus, the audit team considers the deviation to be valid and that the project remains in compliance with the VCS rules.

8. CHP engines

The validated PDD indicates that first were installed 2 CHP motors of 1064 kWel, one of 475 kWel and one of 550 kWel, with a total capacity of 3153 kWel, and an extension of the capacity by another 1416 or 2128 kWel was planned. Therefore, the total capacity of the project could be a maximum of 5281 kWel.

The project operation started in May 2007 with 4 CHP engines indicated in the validated PDD, with a total capacity of 3159 kWel, with an individual capacity of 475 kWel, 550 kWel and 2 x 1067 kWel. Another 2 CHPs with 1415 and 1489 kWel were commissioned in 2008 and 2014. Therefore, during the present monitoring period, a total of 6063 kWel were installed on the plant's site.

The increase of available manure in the near vicinity of the biogas production project was not foreseeable at the time the project was planned, however, in order to treat the available manure surplus and the resulting increased biogas quantities after the register of the project, the new CHPs were installed over the past years. This presents a deviation from the indications in the PDD about the total installed electric capacity and increase the amount of emission reductions, since more manure has been treated. Nevertheless, the project capacities to treat biomass in the plant has been planned to process substrate amounts of 100000 t/a, so that the capacity to treat biomass during the monitoring period corresponds to the planned treatment capacities as defined in the PDD. The substrate treatment capacity of the plant determines the projects capacity to capture and destroy methane, which is the basis for the calculation in the Monitoring.

The audit team has verified that the deviation does not impact to:

- a) The applicability of the methodologies applied because the project activity comprises:
 - Biomass-based cogenerating systems that produce heat and electricity.
 - Generation capacity is less than 15 MWel or 45 MWth.
- b) Additionality, and the investment barriers are still valid, and the production of biogas is not an economically attractive business in the Netherlands.
- c) The appropriateness of the baseline scenario, because there are no legal requirements to change the current manure handling system in The Netherlands.

The deviation has been appropriately described and justified by the PP in the MR and evidences provided to the audit team, and VVB considers that the project remains in compliance with the VCS rules.

9. Manure from own farm

The amount of liquid manure coming from the own farm is calculated based on the amounts of manure transported by trucks instead of being measured, as required in the PDD. As required by law, the amount of manure coming from the own farm is based on animal numbers in case the manure does not have to be transported. Otherwise, it is based on truck transports. For the project Princepeel, each delivery is first listed on a document and then saved electronically. However, the emission reductions are calculated based on the total amount of CH₄ minus the amount of CH₄ from non-waste co-substrates. Therefore, the amount of manure has no significant impact on the amount of emission reductions. Hence, this deviation does not impact the accuracy and quantity of emission reductions.

3.4 Grouped Project

N/A. The project is not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The MR provides in its Section 3.1 a detailed description of the activities implemented by the project since its start. During this verification process, AENOR has not detected project changes in regards of the project title, its purposes and objectives. As such, the project activity accurately reflects the proposed project which reduces the GHG emissions by reducing uncontrolled methane emissions out of manure and organic wastes, but also contributes to an improved ecological sustainability. Additionally, renewable energy is produced to be fed in the local power grid.

During the verification process, the audit team checked the actual implementation of project activities through the analysis of evidences provided by the PP and through interviews to project staff. No discrepancies have been found between the gathered evidence and the implemented activities reported in the MR, as well between the MR and the planned activities in the PD, except to the methodology deviations and project description deviations detailed in the MR and in previous sections of this report.

After the review of the MR, spreadsheet calculations and the other document to support calculations, AENOR deems that project status is in compliance with applicable methodologies and implementation is in support of the VCS principles of Conservativeness and Accuracy.

Related to the compliance with the Monitoring Plan, section 4.3 of the MR provides information about the monitoring plan and actions carried out for the current monitoring period. AENOR reviewed the procedures put in place to perform the different parameters and data monitored and deems that they are in accordance with the procedures described in the validated monitoring plan. AENOR checked the monitoring plan contained in the validated PD and compared it with the MR to verify whether there was any difference that would cause an increase in estimates of the GHG emission removals in the current monitoring period. AENOR has confirmed that all discrepancies between the actual monitoring system and the monitoring plan set out in the project description and the applied methodologies have been described and justified properly in sections 3.2. and 3.3. of the MR and do not impact to the applicability of the methodologies and the conservativeness of the quantification of GHG emission reductions. Also, the project proponent effectively monitors the required parameters to determine the project's emissions by sources as required by the monitoring plan and the applicable methodologies.

The parameters reported, including source, frequency and review criteria as indicated in the monitoring plan were verified to be correct and in line with the monitoring plan of the validated PD. Necessary management system procedures including responsibility and authority of monitoring activities have been verified to be consistent with the PD. Knowledge of personnel associated with the project activity was also found to be satisfactory.

Regarding leakage emission, they account 0. In this regard, AENOR has checked evidence provided which confirms the information included in the MR.

There is no evidence of double counting or that the project has participated nor been rejected under any other GHG programs. GHG emission reductions or removals generated by the project are not included in an emission trading program or any other mechanism that includes GHG allowance trading. The project has not received or sought any other form of environmental credit.

After a complete review of the different documents provided and the information gathered through the remote audit process, AENOR is able to confirm that the project implementation is in accordance with the validated PD and the deviations described in the MR.

4.2 Safeguards

4.2.1 No Net Harm

The project has been formally and finally approved by the responsible regional authorities of the Netherlands in accordance to 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 covers the installation and operation of the biogas power plant including all components such as storage, feeders, fermenters, CHP modules, etc.

The project activity contributes to a significant higher ecological sustainability compared to a reference scenario without manure's treatment by using biogas plants.

Hence, the 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.

4.2.2 Local Stakeholder Consultation

Since the biogas installation impacted positively the region on an economical, environmental and a social level, the stakeholders still give till today positive feedback and consider the project as an example that can motivate other communities to generate renewable energies using the local manure and reducing this way the GHG emissions as well as odor. No formal complains or litigations have taken place during the entire monitoring period of the project. However, some verbal complaints about odour during the slaughterhouse transports and about the traffic have occurred from time to time in the past. To solve the problem, the company has almost stopped the transportation of slaughterhouse to the biogas plant since 2015 and has changed the routing for the trucks.

No special meetings have been organized since the communication with the stakeholders takes place in the day-to-day life due to the neighborhood or a working relationship and the impact of the installation in operation on the stakeholders is only positive.

Furthermore, the company organized an open day event at the biogas plant in 2015 to explain the activities on the biogas site to the neighbourhood. This gave the frame to react on potential complaints of stakeholders and to explain the source of the problems and how the company deals with it. Since then, the complaints have stopped.

4.3 AFOLU-Specific Safeguards

N/A. The project is not an AFOLU project.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

Procedures for quantifying the baseline emissions were conducted in accordance with the methodology applied (AMS III.D, “Methane recovery in agricultural and agro-industrial activities” version 11). The verification team performed an intensive review of all input data, parameters, formulas, calculations, conversions, statistics and resulting uncertainties and output data to ensure consistency with the VCS documentation, methodology and associated documents, and the PD and MR. Further, the verification team reproduced calculations for selected samples to ensure accuracy of the results. Conversion factors, formulas, and calculations were provided by project proponents in spreadsheet format to ensure all formulas were accessible for review. The verification team recalculated subsets of the analysis to confirm correctness. Project proponent also provided a step-by-step overview of select calculations to ensure the verification team understood the approach and could confirm its consistency with the methodology, PD and MR. Where applicable, references for analysis methods or default values were checked against relevant scientific literature for best practice.

Baseline emissions

Section 5.1 of the MR and the calculation spreadsheet submitted to AENOR provide information related to the baseline emissions calculations. The total baseline emissions are due to the Manure management systems and agricultural/ food wastes.

The methane emission reduction through the project activity is calculated according to the small-scale Methodology AMS III D, as per the validated PDD Section D with the following equation:

$$GHG_{red, I\&D} = AF \cdot (BGP \cdot MC - \sum BGC_{O_i} \cdot MCCO_i) \cdot D \cdot GWP_{CH_4}$$

With:

$$AF = 1 - dm_{nw, i} / (dm_{manure} + \sum dm_{nw, i} + \sum dm_{w, j}) \cdot 0.1$$

Where:

$GHG_{red, I\&D}$	is the annual emission reduction through methane recovery, in t CO _{2e}
BGP	is the total annual biogas produced by the project activity BGP, in Nm ³
AF	is an adjustment factor, which ensures a conservative estimation of the realized emission
$dm_{nw, i}$	is the dry matter of the proceeded quantity of non-waste co-ferment i
dm_{manure}	is the dry matter of the proceeded quantity of manure
$dm_{w, j}$	is the dry matter of the proceeded quantity of waste co-ferment j

BGCO _i	is the annual biogas portion of the total biogas amount produced, caused by a digested non-waste co-ferment i if applied, to be determined by the appropriate input amount (MCOFi) and the specific gas productivity of the non-waste co-ferment i, in m ³
MC	is the average annual methane content in the biogas, in Nm ³ methane / Nm ³ biogas
MCCO _i	is the average methane content arising in the biogas through digesting a non-waste co-ferment i, in Nm ³ methane / Nm ³ biogas
D	is the density of methane, set to 0.7168 kg CH ₄ / Nm ³ CH ₄ according to ACM0001
GWP _{CH4}	is the Global Warming Potential of methane, set to 25 t CO _{2e} / t CH ₄ according to UNFCCC

Since the biogas flow BGP could not be directly recorded, BGP is calculated following a reference method described by the CCX Agricultural Methane Gas Project Guidelines and used in different similar climate protection projects. The produced electricity and methane content of the biogas are used to calculate the biogas flow as follows:

$$BGP = \frac{EEP}{(ETA_{CHP-el}) * HV_{Biogas}}$$

with:

BGP:	Biogas produced [m ³]
EEP:	Electricity energy produced [MWh]
ETACHP-el	Electric efficiency of the CHP engines [%]
HVBiogas	Caloric value biogas [kWh/m ³]:

$$HV_{Biogas} = 0,01 \frac{MWh}{m^3} \cdot x_{CH4}$$

with:

x_{CH4} : = CH₄ volume content of biogas flow [%]

AENOR has checked the calculations provided and confirmed that the amount of baseline emissions is in conformance and have followed the methodology in the validated PD.

Project emissions

Section 5.2 of the MR describes the calculations for the project emissions.

The oil-fired emergency boiler has not been installed on the plant's site, so that no emissions by this source of the project activity occurred during the actual monitored period from 2013 to 2017.

The project emissions from transport of biomass due to the combustion of fossil fuels is not considered, since the emissions from transportation are below 1 % of total baseline emission by the project and do not exceed the criterion for significance as described in the PDD.

CH₄ emissions from physical leakage of biogas in the manure management systems, which includes production, collection and transport of biogas to the point of combustion or gainful use of the anaerobic digester have been considered and calculated in accordance with the CDM Methodology AMS III.AO "Methane recovery through controlled anaerobic digestion", Version 01, suggests estimating these project emissions using a default factor of 0.05 m³ biogas leaked/m³ biogas produced.

AENOR has checked the calculations provided and confirmed that this amount of project emissions is in conformance and have followed the methodology in the validated PD.

Leakage

As reported in Section 5.3 of the MR, according to the PDD section E.2., no leakage has to be considered.

Net GHG Emissions Reductions and Removals

As indicated in Section 5.4 of the MR, the following table summarized the GHG emissions of the project calculated for the current monitoring period.

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2013	64092	7973	0	56120
Year 2014	59429	8022	0	51407
Year 2015	62539	8015	0	54524
Year 2016	65094	8100	0	56994
Year 2017	25353	3247	0	22105
Total	276507	35357	0	241150

The net anthropogenic GHG reduction due to the project activity for the monitoring period amount 241150 t CO₂e.

AENOR reproduced the calculations to achieve the same results and deems they are depicted clearly and correctly in the provided sheets. AENOR verification team was able to trace calculations directly from the data sources of measurements. Formulae used are in compliance with MR, PD and methodology, like the

default values used to determine the parameters, are appropriate. Thus, the net amount of VCUs to be issued is accurate and realistic.

AENOR verified for the parameters available at validation, the values reported or the references to the documents where they are used or explained by reviewing, reproducing and crosschecking the evidence provided by the PP. AENOR checked the values of these parameters to be appropriate and correctly used in equations. Data and parameters available at validation are the ones stated in section 4.1 of the MR. The data and parameters monitored to calculate the VCUs to be issued are the ones stated in section 4.2 of the MR. AENOR checked that the list of parameters to be monitored was complete and consistent with information in the monitoring plan of the PD.

Regarding the accuracy of spreadsheet, formulae, conversions and aggregations and consistent use of data and parameters, the PP elaborated a complete procedure to assure the accuracy and appropriateness of data. During the verification process, AENOR not only verified the spreadsheet calculation, data and parameters but also the AENOR team could verify that the PP conducted a rigorous QC/QA procedure of its measurements and an assessment of uncertainty. Thus, AENOR deems the PP performed good practices in this assessment and concludes that GHG reductions were quantified correctly in accordance with the project description and applied methodology.

AENOR verified the consistency and accuracy of each parameter detailed in Section 4 of the MR by crosschecking the information in the MR with the information in PD as well as checking values and reproducing the calculations in the spreadsheet calculation package (see Appendix 1) and did not find inconsistencies. Therefore, AENOR deems that values reported for the parameters are accurate and consistent.

The following tables summarize the data and parameters used by the PP to calculate the GHG emission reductions, which has been assessed by AENOR.

Data/Parameter available at validation	Value	Assessment procedure and result
Density of Methane (D_{CH_4})	0.0007168	Value is consistent with validated PD. Correctly inputted in the calculation spreadsheets.
Global warming potential of methane (GWP_{CH_4})	25	The GWP value set in the PDD has been adapted to the second commitment period with value from the fourth assessment report according to UNFCCC and VCS Requirements. Correctly inputted in the calculation spreadsheets.

Data/Parameter monitored	Value		Assessment procedure and result
Biogas produced (BGP)	Year	Biogas (m3)	As it is explained in the deviation 6 included in section 3.3. of this report, the values of this parameter are higher than the estimated in the PDD due to the increase of available manure. Moreover, as it is
	2013	15852797	

Data/Parameter monitored	Value		Assessment procedure and result											
	2014	16288210	explained in the deviation 1 of section 3.2., the amount of biogas is calculated by the amount of electricity produced instead of being directly measured. Calculation reproduced. Correctly inputted in the calculation spreadsheets.											
	2015	16614734												
	2016	16635677												
	2017	6521947												
Methane content of the biogas (MC)		Weighted average MC [%]	A gas analyzer is used to measure daily the amount of methane in the biogas.											
	Year													
	2013	56.13	Two different gas analyzers have been used to monitor the parameter during the monitoring period.											
	2014	54.97												
	2015	53.84												
	2016	54.34												
	2017	55.57	<table><tr><td>Devices</td><td>S/N</td><td>Operation period</td></tr><tr><td>Sewerin Ex-Tec SR2-DO</td><td>4701000064</td><td>2013-2014</td></tr><tr><td>BIOGAS 5000</td><td>G502097</td><td>2014-2017</td></tr></table> Both devices have been calibrated annually. Values correctly inputted in the calculation spreadsheets.			Devices	S/N	Operation period	Sewerin Ex-Tec SR2-DO	4701000064	2013-2014	BIOGAS 5000	G502097	2014-2017
	Devices	S/N				Operation period								
	Sewerin Ex-Tec SR2-DO	4701000064				2013-2014								
BIOGAS 5000	G502097	2014-2017												
Fraction of time			Several values for CHP unit and year, included in the spreadsheet.											
Thermal energy production for external utilization (ETP)			This parameter is not used.											
Thermal energy produced for hygienisation unit (ETHY)			This parameter is not used.											
Electrical energy produced (EEP)	Year	kWh	The electric meters are sealed and maintained by the grid operator. Calibration is done by authorized service providers. Values correctly inputted in the calculation spreadsheets.											
	2013	35151462												
	2014	35876009												
	2015	35842927												
	2016	36221393												
	2017	14521875												

Data/Parameter monitored	Value		Assessment procedure and result
Electric energy imported (EEI)	Year	kWh	The electric meters are sealed and maintained by the grid operator. Calibration is done by authorized service providers. Values correctly inputted in the calculation spreadsheets.
	2013	2425191	
	2014	3139824	
	2015	3430699	
	2016	4094420	
	2017	1533905	
Mass of each co-ferment i fed into the digester (MCOFi)	Annual value of each co-ferment is included in the spreadsheet.		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 Values correctly inputted in the calculation spreadsheets
Volume of manure fed into digester (MANURE)	Annual value of each type of manure (pig or cattle) is included in the spreadsheet.		Manure is weighed like co-ferments when delivered on the weighing scale. Manure from the own farm is estimated based on the number of truck transports. The daily amounts of manure are recorded in the electronic database. Values correctly inputted in the calculation spreadsheets
Oil consumed in emergency boiler (OIL)	0		Emergency boiler has not been used during the monitoring years.
Diesel consumed in emergency generator (DIESEL)	0		An emergency generator was installed end of 2015 but not was not used till the end of monitoring period in 2017, so that no significant amounts of diesel were used during that period.
Biogas used in irrigation pumps (GASPROP)	0		No fuel switch has been implemented during the monitoring years

AENOR did not find inconsistencies between the PD, monitoring report and spreadsheet calculation. After a deep and thorough review and reproduction of calculations and the corresponding tracks to the other spreadsheets, AENOR deems the parameters monitored and available at validation are correct, reliable, and consistent. Information in the monitoring report is in compliance with the PD, the calculations provided and the applicable methodology. Then, the results showed in the monitoring report are reliable, consistent, and accurate.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

The data and parameters used to determine GHG emission are listed in Section 4 of the MR.

During AENOR's verification, the evidence provided by the PP was enough in both quantity and quality to support the determination of GHG emission reductions reported by the project.

Quality assurance and control is an essential part of company procedures to assure the accuracy of data. Quality assurance procedures are done to minimize and correct any potential data transcription, calculation, or formatting errors that may result in inaccurate results.

In accordance with VCS, the PP is committed to storing all project data in a secure and retrievable manner for at least two years after the end of the project crediting period.

Roles and responsibilities are clearly identified in the MR. QA/QC procedures were developed by the PP for maintaining consistency and quality of information over time. Interviews with the PP and inspection of data and results demonstrated that the PP possess all of the competencies required for reporting of GHG emissions reductions on accurate way.

Data presented to the audit team were clear and coherent and processing steps could be traced to the corresponding sections of the methodology and monitoring plan with transparency.

Above procedures to ensure this are described in Section 4 of the MR, in terms of general QA/QC of the monitoring plan and specific QA/QC procedures applied to data and parameters monitored.

Throughout the verification, the PP demonstrated a commitment toward conservativeness and took all measures appropriate to ensure the reliability of evidence provided. Interviews conducted (oral evidence) are outlined in Section 2.4, and the final documents received from the PP supporting the determination of GHG reductions can be viewed in Appendix 1.

AENOR deems that the PP performed good practices in this assessment and concludes that GHG reductions were quantified correctly in accordance with the PD and applied methodology, and that the that evidence is sufficient in quantity and appropriate in quality to determine the GHG reductions of the project.

4.6 Non-Permanence Risk Analysis

N/A. The project is not an AFOLU project.

5 VERIFICATION CONCLUSION

AENOR has verified that the “Methane Recovery Project Princepeel Wilbertoord, North Brabant, the Netherlands” is in compliance with the VCS Standard v4.0 and has been implemented in accordance with the validated PD and the project description deviations.

The verification assessment covers the monitoring period from 01-January-2013 to 31-May-2017 and verifies that calculated emission reductions and/or removals were achieved during the monitoring period with a reasonable level of assurance. Therefore, AENOR is able to issue a positive verification opinion for the 241150 tCO₂e, as reported in the Monitoring Report version 2 dated on 3 February 2021, corresponds to the emission reductions achieved during the monitoring period from 01/01/2013 to 31/05/2017, as the following table:

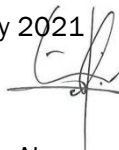
Year	BE (tCO ₂ e)	PE (tCO ₂ e)	LE (tCO ₂ e)	VER (tCO ₂ e)
2013	64092	7973	0	56120
2014	59429	8022	0	51407
2015	62539	8015	0	54524
2016	65094	8100	0	56994
2017	25353	3247	0	22105
Total	276507	35357	0	241150

AENOR is able to confirm that all deviations validated in this verification event complies with all validation criteria for projects set out in VCS Version 4 without any qualifications or limitations.

Date: 22 February 2021

Lead Auditor

Luis Javier Arribas Alonso



APPENDIX 1: LIST OF EVIDENCES PROVIDED

General documents
Monitoring report: - Final version: VCS Monitoring Report_Princepeel_v03 dated on 25/03/2021 - VCS Monitoring Report_Princepeel_v02 dated on 03/02/2021 - 20210118_VCS Monitoring Report_Princepeel_v001_2013-2017 Previous monitoring report: Report ID GES-10901 dated on 20/01/2014 Previous verification report: - VERIFICATION REPORT 21224010 dated on 22/03/2018 Project description: - PD v5 on 18/08/2007
MONITORING PLAN DOCUMENTATION (Appendix D)
- Accuracy of methane measurement device from Sewerin "Gas analyzer Sewerin_Prüfprotokoll SR2-DO" - Photo of the specification plate of the gas analyzer from Geotec named "Gas analyzer Geotech_Technical specifications_Photo" - Inaccuracy of CHP runtime counters under "Runtime counter - Accuracy - Jenbacher" - Report containing information about electricity (and heat) production, their technical description, the monitoring methods as well as calibration reports named "Meetprotocol elektriciteit en warmte - Princepeel - 2018" - Technical specification of weighing scale "Weighing scale_Technical specifications" - Monthly electricity production rates are recorded and evaluated in excel files named "Overzicht volasturen Princepeel BV [year]" - Monthly electricity production rates sent from CertiQ named "CQ_BIN_Meetwaarden_per_installatie_2013-2017" - Email information about operation, maintenance and calibration of electric meters complying with MID according to Fudura adviser named "Fudura_Electric meters" - Runtime hours from the CHPs recorded via on e-mail as pdf document named "Bedrijfsuren motoren_2012-2016" and "Bedrijfsuren motoren_2017" - Calculation of annual runtime hours of each CHP in questionnaire named "20210114_VCS_Data Inquiry_Princepeel" - Daily records of methane content in excel files named "[year] Controle gasmetingen" - Accuracy of methane measurement device from Geotec "Biogas 5000 - Datasheet" - Annual calibration reports of gas analyzer named "Gas analyzer - Calibration reports_2010-2017" - Electronical records of co-substrates entering the biogas plant exported from Wincc to excel files named "Overzicht productleveringen Princepeel BV [year]" - Manure records from external farms "Overzicht aan- en afvoer mest [year]" - Daily manure records from own farm "Aanvoer mest eigen bedrijven [year]"
Carbon Accounting
Spreadsheets: - App C - Calculation_Emission Reductions_VCS_v002_Princepeel_MR 2013-2017 - App C - Calculation_Emission Reductions_VCS_v001_Princepeel_MR 2013-2017
Technical evidences

- Nameplates of CHP 1-6. - “Kalibratierapport GA5000 bij aanschaf” - “FW_ Landis+Gyr Dialog 7x” - “FW_ Weegbrug”
Supporting documents • “Screenshot_Substrate list from Ökostrom Schweiz” • “Records own manure_Handwritten” • “Screenshot Wincc_Electricity production” • “Appendix E_GES Energie_Monitoring gap year_ID 334-335-336-337-338” • “PRC_24209_4_DB Revisievergunning BV Landgoed de Princepeel” • “Omgevingsvergunning V57 29-06-2011” • “AANKONDIGING RELATIEDAGEN” • “Organization chart” • “FW_ jaarproductie 2013 tm 2017” • “Invoice generator” • “Adressen mest” “Analyse of emission reductions amounts” “Invoice flare” “Barriers analysis”
Remote Audit Evidences - Remote interview notes. - Pictures of the main equipment of the project, such as CHPs, electrical meters, weighing scale, etc.

APPENDIX 2: OBSERVATIONS AND NO CONFORMITIES

Observations (OBS)

OBS ID:	01	Date: 26/01/2021
Description of OBS		
The PP shall provide evidence of the following issues: • The appendix E of the MR. • Installation date of the different CHPs, and nameplates pictures or any other evidence of their technical features (serial number, branch, model, type, capacity, etc.). • Approval of the extension of the permit to use more than 30 t of manure. • The project has been formally and finally approved by the responsible regional authorities of the Netherlands in accordance to the Dutch building law “Wet op de Ruimtelijke Ordening”. • Complaints received from the stakeholders regarding to the odour during the slaughterhouse transports or any other issue. • Records of the open day event at the biogas plant in 2015 (invitations of stakeholders, information provided to explain the activities on the biogas site, attendance list, etc). • The calculation of the annual average values of the parameter MC from the daily records provided. • The 2015 calibration certificate of the gas analyser. • The change of the gas analyser in 2014. • The fraction of time of the different CHPs during 2017. • The technical features of the electrical meters indicated in the MR (serial number, inaccuracy, brand, etc) to monitor the net and gross electricity production. • Picture of the weighing scale shown the serial number, manufacturer, etc. • Organization chart indicated that Pieter Smits is the managing director and Jos van Heugten is the commercial manager. • Email sent by CertiQ with the monthly electricity production. • Installation of the diesel-fired emergency generator in 2018 • Distance from track transportation for manure indicated in table 5.		
Country participant response		Date: 3/02/2021

- The appendix E of the MR has been attached to this document.
- The installation dates of both Waukesha and Jenbacher 320 engines CHPs are 01/05/2007. The installation date of the first Jenbacher 420 is 01/10/2008 and of the other Jenbacher 420 is 11/09/2014. Pictures of the nameplate of the CHPs have been attached as email copy "FW_Type Jenbacher [no]" and "FW_Type Waukesha [no]".
- The approval of the extension of the permit to use more than 30 t of manure has been attached to this document (PRC_24209_4_DB Revisievergunning BV Landgoed de Princepeel). Because of the increasing manure amounts, the company has adapted the request for approval to 50 t/year of manure instead of 30 t/year.
- The formal approval of the project according to the Dutch building law has been attached as "Omgevingsvergunning V57 29-06-2011".
- Generally, the complaints received from the stakeholders regarding the odour or other issues are communicated orally and not in writing, so that no evidence can be provided for this issue. The company has never received written complaints, suggesting that the measures taken by the company's employees to reduce the odour and the explanations given to the stakeholders were carried out to their satisfaction.
- The invitation to the open day event has been attached as "AANKONDIGING RELATIEDAGEN".
- The annual average values of the parameter MC have been calculated using the arithmetic mean of the daily records. The calculation can be found on the provided excel file App D - 11 - at the end of the annual records for each year (for example App D - 11a -, Blad1, cell C371).
- The calibration report of the gas analyser from 2015 has been attached as "Kalibratierapport GA5000 bij aanschaf".
- The Biogas 5000 gas analyser has been bought in 2014, so that both gas analysers were running from 2014 on till 2015. In 2015, the company decided to use only the new gas analyser Biogas 5000. The methane measurements were carried out continuously with accurate gas analysers, so that the change of gas analyser unit has no influence on the emission reductions.
- The fraction of time of the CHPs in 2017 has been attached as "App D - 9b - Bedrijfsuren motoren_2017".
- Pictures from the net and gross electrical meters, on which the technical features can be read, have been attached as "FW_Landis+Gyr Dialog 7x" and correspond to the technical features described in the MR under section 4.2.
- Pictures of the weighing scale, on which the technical features can be read, have been attached as "FW_ Weegbrug".

- The responsibilities of Pieter Smits and Jos van Heugten are explained in the attached email “Organization chart”.
- The email sent by CertiQ with the monthly production is attached as “FW_ jaarproductie 2013 tm 2017”.
- The purchase invoice for the emergency generator was attached as evidence (“Invoice generator”). The generator has not been running during the current monitoring period. The generator is started once a month for 5 minutes for reasons of security, to be sure that, in case of an emergency, the generator is ready for operation.
- The addresses from the substrate suppliers as well as the distance between those suppliers and the biogas plant are listed in the document attached named “Adressen mest”.

Documentation provided by the Country Participant

- „Appendix E_GES Energie_Monitoring gap year_ID 334-335-336-337-338“
- “FW_Type Jenbacher [no]” and “FW_Type Waukesha [no]”.
- “PRC_24209_4_DB Revisievergunning BV Landgoed de Princepeel”
- “Omgevingsvergunning V57 29-06-2011”
- “AANKONDIGING RELATIEDAGEN”
- “Kalibratierapport GA5000 bij aanschaf”
- „App D - 9b - Bedrijfsuren motoren_2017“
- „FW_ Landis+Gyr Dialog 7x”
- “FW_ Weegbrug”
- “Organization chart”
- “FW_ jaarproductie 2013 tm 2017”
- “Invoice generator”
- “Adressen mest”

VVB Assessment

Date: 08/02/2021

The PP has provided the requested evidences or provided properly clarification.

Therefore, the observation has been clarified.

OBS ID:

02

Date: 26/01/2021

Description of OBS

The PP shall provide additional information and evidence to clarify that the annual average of emission reductions achieved by the project are very higher than the estimated in the PDD due to the reasons described in section 3.2.2 of the MR (larger amount of manure, the baseline methane emissions considered and the different value of the GWP of CH₄).

Country participant response	Date: 3/02/2021
The discrepancy between the quantity of emission reductions estimated in the PDD and the quantity achieved through the project activities is mainly due to the fact, that the baseline emissions from waste disposal were not calculated at all in the PDD. If one takes as example the spreadsheet “ER 2016” copied in the attached excel file named “Analyse of emission reductions amounts” and examines the “Methane potential from substrate [x]” (column L) or rather the methane production from non-waste, waste and manure (cells E25-E27), it becomes clear that, using the validated equation in the PDD, most of the methane is emitted by waste substrates (around 70%) whereas only 11% of the methane comes from manure. This shows the strong impact of the total amount of emissions from waste disposal. Accordingly, if the emissions from waste substrates were not calculated in the PDD even though they caused the largest share of emissions, a comparison of the estimated emissions from the PDD with the actual emission reductions is neither possible nor useful.	
Documentation provided by the Country Participant	
“Analyse of emission reductions amounts”	
VVB Assessment	Date: 08/02/2021
The additional information and evidence provided by the PP clarify that the annual average of emission reductions achieved by the project are very higher than the estimated in the PDD due to the reasons described in section 3.2.2 of the MR (larger amount of manure, the baseline methane emissions considered and the different value of the GWP of CH4). Therefore, the observation has been clarified.	

OBS ID:	03	Date: 26/01/2021
Description of OBS		
The PDD indicates that the produced methane can be burned in a flare and that the biogas burned in the flare must be known. Please, clarify if the project has installed a flare and how the biogas burned is monitored.		
Country participant response	Date: 3/02/2021	

A flare was purchased and installed in 2015 (see attached “Invoice flare”) but has not been used during the monitoring or to date. The reason for this is that the installation of a flare is legally required. However, on a biogas site with more than 1 CHP, it never happens that all CHPs are out of operation at the same time. Therefore, if 1 CHP for example is serviced and cannot process the biogas produced, the biogas will first be stored in the biogas membrane and then, in case of full storage, will be sent to another CHP on site. The value of biogas produced for the project owner is too high to be flared.	
Documentation provided by the Country Participant	
“Invoice flare”	
VVB Assessment	Date: 08/02/2021
The justification and evidence provided are considered adequate. Therefore, the observation has been clarified.	

OBS ID:	04	Date: 26/01/2021
Description of OBS		
The PP shall clarify that the project description deviation of the increase of manure quantities does not impact the applicability of the methodology, additionality or the appropriateness of the baseline scenario, specially the barrier due to prevailing practice indicated in the PDD as consequence of the Dutch policies have been developed to reduce the amounts of manure and the requested adaptations of the biogas plants in the Netherlands.		
Country participant response		Date: 3/02/2021
The increase of manure does not impact the applicability of the methodology, since the baseline scenario is still the most plausible scenario: manure is stored in anaerobic lagoons and emits uncontrolled methane emissions into the atmosphere. Till now, there is no regulation in place to capture and destroy the methane emissions from manure storage. A barrier analysis with an overview of plausible baseline scenarios is attached to this document as “Barrier analysis”. Hence, the increase of manure does not impact the applicability of the methodology and the appropriateness of the baseline. The increase of the manure does also not impact the additionality of the project: manure consist of over 90% of water. Consequently, the biogas production from additional manure is low, while its treatment means higher costs of transport and substrate processing. Because the agricultural biogas sector has been economically a difficult business in the Netherlands		

(<https://www.fedarene.org/biogasaction-the-netherlands-intervention-report-21654>, which gives an overview over the development of the biogas sector in the past years), one way to avoid bankruptcy and keep the project going was to treat more co-ferments with higher biogas potential. However, since at least 50% of manure is required by law to become the subsidies for the electricity production, an increase of the quantities of co-ferments means an increase in the manure. This is a reason why the manure amounts treated in the plant have increased in the past years. Another motivation for the project owner from Princepeel to treat more manure is the ability to generate additional income from the sale of emission reductions, as the project has been validated as GHG offset project. The project owner has always kept in mind the possibility to valorise the emission reductions in that way.

Hence, there is no significant impact on the financial viability of the project resp. additionality.

Documentation provided by the Country Participant

<https://www.fedarene.org/biogasaction-the-netherlands-intervention-report-21654>

“Barriers analysis”

VVB Assessment

Date: 08/02/2021

The justification and evidence provided are considered adequate.

Therefore, the observation has been clarified.

OBS ID:	05	Date: 26/01/2021
Description of OBS		
The PP shall clarify how the annual values of amount of Co-fermert substrates and manures, dry matter, organic DM and Biogas production from ODM of the spreadsheet “App C - Calculation_Emission Reductions_VCS_v001_Princepeel_MR 2013-2017” are obtained from evidence provided (“Overzicht productleveringen Princepeel BV [year]”, “Overzicht aan- en afvoer mest [year]” and “Aanvoer mest eigen bedrijven [year]”)		
Country participant response		Date: 3/02/2021
In a first step, the carbon consultant (CC) has sent a questionnaire as excel file (see App D - 10) to the project proponent (PP), who filled the different tables for each parameter to be monitored for each year, based on the corresponding evidence. The CC will take the year 2016 to explain how the values are obtained from evidence provided. <u>For the co-ferments:</u>		

- Evidence is App D -14d -: in spreadsheet “Draaitabel”, each co-ferment treated in the plant is listed in column B.
- the PP has copied the values corresponding to the amounts of each co- ferment treated in the plant in the questionnaire (App D - 10 “Data input 2016, cells C39 - C114).
- the PP has deduced the manure coming from external farms from this list to cross-check the total amount of co-ferments (App D - 14d -, spreadsheet “Draaitabel”, cell B76)
- the CC has copied the values from the questionnaire in the calculation file (App C) under “ER 2016”, cells D6 - D18. The CC has taken out the iron sludge (“IJzerslib”, “IJzerwater vloeibaar”) for each year, which is only fed into a biogas plant to process the sulphur but not to produce biogas.

For the manure coming from external farms:

- Evidence is App D - 15d -: in spreadsheet “Draaitabel”, the total amount of each manure type is given in column B (cells B16 - B20).
- the PP has copied the values corresponding to the amounts of each manure type treated in the plant in the questionnaire (App D - 10 “Data input 2016, cells C19 - C27).
- the CC has copied the values from the questionnaire in the calculation file (App C) under “ER 2016” cells D20 - D23.

For the manure coming from the own farm:

- Evidence is App D - 16d -: in spreadsheet “Draaitabel”, the total amount of each manure type is given in cell B18 and C18.
- the PP has copied the values corresponding to the amounts of each manure type treated in the plant in the questionnaire (App D - 10 “Data input 2016, cells C15 - C16).
- the CC has copied the values from the questionnaire in the calculation file (App C) under “ER 2016” cell D19.

As explained in the MR under section 5.1.1, the values for dm, odm and biogas production from odm are calculated with the data provided by literature.

Documentation provided by the Country Participant

VVB Assessment

Date: 08/02/2021

The justification and evidence provided are considered adequate.

Therefore, the observation has been clarified.

No Conformities (NC)

NC ID:	01	Date: 26/01/2021
Description of NC		
The auditing team has found the following issues that are not consistent with the information of the previous monitoring periods and the PD: • The project was set into operation in May 2007 instead of June, when was the starting date of the crediting lifetime of the project. • The date of the PDD version 05 submitted by ARA Carbon Finance GmbH. • The total electric capacity installed is 6.1 MW instead of the 3.153 Mw indicated in the PDD. If it is considered the extension of the capacity of 2.128 MW indicated in the PDD, in any case, the total capacity planned in the PDD would be 5.281 MW, a 15.5% lower. • The electric capacity of the CHP 3 and 4 is 1067 kWel instead of 1064 kWel, and the CHP 5 and 6 is 1489 kWel. Instead of 1416.		
Country participant response		Date: 3/02/2021
• The date of operation was in May 2007 and has been corrected in the MR under section 3.1. • The date of the PDD version 05 has been corrected in the MR under section 1.1. • The deviation from the PDD description regarding the total electric capacity installed has been added in the MR under 3.2.2. • The electric capacity of CHPs 3 and 4 as well as CHPs 5 and 6 is correct in the current MR. There was an error in the last MR.		
Documentation provided by the Country Participant		
Updated MR		
VVB Assessment		Date: 08/02/2021
The updated in the MR includes now information consistent with the previous monitoring periods and the PD. Therefore, the NC is closed.		

NC ID:	02	Date: 26/01/2021
Description of NC		
According to the instructions for completing the MR template, section 1.8 shall provide the title, reference and version number of the methodology or methodologies applied to the project, but		

the methodologies AMS II.F and AMS I.C indicated in the PDD are not applied in the monitoring period. It shall be indicated in section 3.2.1 of the MR.	
Country participant response	Date: 3/02/2021
The information concerning the methodology deviation has been added under section 3.2.1 of the MR.	
Documentation provided by the Country Participant	
Updated MR	
VVB Assessment	Date: 08/02/2021
The information included in section 3.2.1. of the updated MR describes and justifies the methodology deviations applied during this monitoring period because the irrigation pump system has not been implemented as described in the PDD (AMS II.F) and no emission reductions are considered for the substitution from fossil fuel for the use of renewable heat (AMS I.C). Therefore, the NC is closed.	

NC ID:	03	Date: 26/01/2021
Description of NC		
The information of some parameters is not correct: • The source of the value of methane content of "Sugar water/ Fruit waste liquid" is not provided in the spreadsheet (the web link of "ÖS Schweiz" is not included). • The operation hours of some CHP units indicated in the MR and sheet "CHP" of the spreadsheet "App C - Calculation_Emission Reductions_VCS_v001_Princepeel_MR 2013-2017" are different to the value indicated in the evidence provided. • The parameter ETHY of the PDD is not included in the MR. • The source of data of the parameter EEI indicated in the MR of the previous monitoring periods was the "invoices of utility", indicated that "the biogas plant received invoices for the own electricity demand from the local utility" instead of the "power meter" and the calculation method used to calculate the values of the parameter indicated in the MR of the current monitoring period.		

- The manure from the own farm is estimated based on the number of truck transports instead of measured by scales as is required by the PD.

Country participant response
Date: 3/02/2021

- The source of values for methane content from ÖS Schweiz (Ökostrom Schweiz) has not been provided to the VVB in the Appendix of the MR since the corresponding document is strictly confidential. The carbon consultant asked now ÖS the permission to send the original document as evidence to the VVB and received the authorization to send a screenshot of the co-substrate and his values needed (see attached the answer of the email from ÖS on the second page of the word document "Screenshot_Substrate list from Ökostrom Schweiz"). The carbon consultant made a screenshot of the values for Sugar water to provide the evidence to the VVB (see attached as "Screenshot_Substrate list from Ökostrom Schweiz").
- The operation hours of the CHP units have been corrected in the excel file App C for the year 2014 and in the MR according to the evidence provided.
In 2014, CHP 6 has been bought second hand with already 8.456 h of operation (11.119 h – 8.456 h = 2.663 h). The value is correct.
In the course of 2016, the CHP 3 and 4 engines has been renewed, which is common practice with engines after 60.000 hours of operation and which is why their counters were reset to 0. The operation hours in App C are correct with CHP 3: (67.055 - 63.575) + 4.311 = 7.791 h and CHP 4: (65.483 - 63.099) + 5.201 h = 7.585 h (see App D -10 - under "Data Input 2016").
- The parameter ETHY has been included in the MR under section 4.2.
- In the PDD, the source of the data of the parameter EEI is mentioned to be the power meter. For this reason, the carbon consultant has chosen to use the values from the gross and net power meters to calculate the own consumption of electricity of the plant. However, since the invoices for the own electricity demand from the local utility are based on the power meters, both type of evidence are equally accurate.
- The manure from the own farm is calculated based on the amounts of manure per truck transport. Each delivery is listed on a document (see attached "Records own manure_Handwritten") and then saved electronically (see App D -16 -). The accuracy of the manure amounts from the company's own farm, that are delivered to the biogas plant, can be specified as very precise, since the transport volume of the trucks is known. In addition, the company is keen to make as few transports as possible in order to save money and time. Therefore, transports without full manure tanks can be excluded.
As can be seen from other biogas projects, flow meters are never installed on a biogas plant just to measure the amounts of manure coming from their own farm. Since biogas projects are usually hardly economically viable, investments in technologies that are of no use or not prescribed by law are avoided. Usually, the amount of manure coming from the own farm is based on animal numbers in case the manure does not have to be transported. Otherwise, it is based on truck transports. Here, the manure coming from own and external farms is mixed in a silo on weighing rods, that measure the input in

kilograms. When the mixture in this silo is ready, it goes to a storage silo and then to the digester, where the quantities of manure are there measured with a flowmeter.	
Documentation provided by the Country Participant	
• "Screenshot_Substrate list from Ökostrom Schweiz" • "Records own manure_Handwritten" • Updated MR and the excel file App C	
VVB Assessment	Date: 08/02/2021
The information of the parameters included in the updated MR is correct and complete, and the evidence provided clarify properly the information included in the updated MR and the excel file App C. Therefore, the NC is closed.	

NC ID:	04	Date: 26/01/2021
Description of NC		
The MR include some information that is not correct or complete: • The MR indicates that the total electric capacity installed during the monitoring period was 4648 kWel although the sum of the electric capacity of the six installed CHP is 6137 kWel. • Section 3.2.2 indicates that the plant capacity has stayed the same as described in the initial project documentation although the total electric capacity has changed. Several data of table 6 and table 8 of the PDD are not consistent with the technical features of the project indicated in the MR. • The purpose of data indicated in tables of several parameters is not consistent with the information required by the instructions of the MR template. • The accuracy of the BIOGAS 5000 gas analyser G502097 indicated in the page 16 of the MR is different to the value indicated in the page 25. • The amount of manure indicated in table 5 of the MR is different from the values indicated in the spreadsheet "App C - Calculation_Emission Reductions_VCS_v001_Princepeel_MR 2013-2017" • The value of the 2017 electricity produced indicated in the sheet "Biogas Production" is different from the sum of the electricity produced by each CHP indicated in the sheet "CHP" of the spreadsheet "App C - Calculation_Emission Reductions_VCS_v001_Princepeel_MR 2013-2017". • Some values of the electricity produced by each CHP indicated in the sheet "CHP" are different from the values provided in the spreadsheets "App D - 6a - Overzicht vollaasturen Princepeel BV [year]".		

Country participant response	Date: 3/02/2021
• The total electric capacity installed during the monitoring period has been corrected in the MR under section 3.1. • In section 3.2.2 of the MR, the term plant capacity is related to the capacity of the plant to treat substrates (given in Figure 6 of the PDD with 100.000 t/a) and not to the total electric capacity. In the project activity, the maximal amount of substrates that are treated in the biogas plant is around 100.000 t/a of substrates. • The data from the PDD is not consistent with the technical features of the project indicated in the MR, which is mainly due to the increase of manure, as explained in detail under section 3.2.2, point 1 of the MR. This deviation has been added under section 3.2.2, point 8 of the MR. • The required information by the instructions of the MR template have been corrected or added to the different parameters under section 4.1 and 4.2. • The information about the accuracy of the BIOGAS 5000 gas analyser has been completed. • The amount of manure indicated in table 5 of the MR is 50.514 t in 2016 and is equal to the amount of manure indicated in the App C (50.514 t in 2016). • The values of the electricity produced in 2017 has been adapted to the monitoring period (01.01.2017 - 31.05.2017) under the spreadsheet "CHP". • The values of the electricity production in the excel calculation file App C differ from some values of App D - 6 - because the values of the electricity production used for the emission reduction calculation are based exclusively on the measurements provided by CertiQ (see App D - 7 -), while the values in App D - 6 - (7 first spreadsheets) both are coming from the company's own records via their Wincc programm (see attached as "Screenshot Wincc_Electricity production") and values from official records made by Enexis/Fudura for each EAN Code (spreadsheet "Maandoverzichten Enexis data"). • In 2017, the values of the electricity production of the CHPs in App C "CHP" from App D - 6e - do not correspond to 100% to the electricity measured recorded in App D -7 - (as explained above). Therefore, the production value for 2017 has been entered directly in the spreadsheet "Biogas production" of App C, so that the measured and accurate value is used for the calculation according to App D - 7 -. In 2017, the electricity production in App C under "CHP" was adjusted to the monitoring period (01.01.2017 - 31.05.2017).	
Documentation provided by the Country Participant	
"Screenshot Wincc_Electricity production"	
VVB Assessment	Date: 08/02/2021
The updated MR includes information that is correct and complete. Therefore, the NC is closed.	