



COMPOSTING PROJECT IN SANTA CATARINA



Document Prepared by by Earthood Services Private Limited

Project Title	Composting Project in Santa Catarina
Version	1
Report ID	VCS.VER.19.118

Report Title	Verification + Social Carbon Report – Composting Project in Santa Catarina
Client	Sustainable Carbon – Projetos Ambientais Ltda.
Pages	43
Date of Issue	16-March-2020
Prepared By	Earthood Services Private Limited
Contact	424A, Tower B3, Spaze I-Tech Park, Sector 49, Sohna Road, Gurgaon-122018, India; kaviraj.singh@earthood.in ; www.espl-india.com
Approved By	Kaviraj Singh

**Work Carried
Out By**

Marcelo Sebben (Team Leader)
Sergio Cruz (Technical Reviewer)

Summary:**Brief summary of the project activity**

The project activity involves replacement of Animal Waste Management System (AWMS) in 13 confinement swine farms in Brazil. The common practice for AWMS is the use of anaerobic lagoons for the manure treatment. These lagoons are high CH₄ emitters. The project activity consists in the installation of mechanized composting units for the manure treatment, which consist in an aerobic treatment, thus, reducing the CH₄ emissions.

During the current monitoring period, only 6 out of 13 swine farms monitored their parameters, and consequently, only these are part of this monitoring period. And they are:

- Altenor Farm
- Baccin Farm
- Granja Silva Farm
- Ramella Farm
- Secco Farm and
- Tomazi Farm

The project applies the CDM approved methodology AMS-III.F. – “Avoidance of methane emissions through composting”, version 10 for ER calculations and AMS-III.D. – “Methane recovery in animal manure management systems”, version 18 for baseline emission calculations.

Scope of verification

Sustainable Carbon – Projetos Ambientais Ltda. has contracted ESPL to conduct the 3rd verification of the project “Composting Project in Santa Catarina” for the period from 01/07/2015 to 30/04/2019 (both days included).

The scope of the verification is to establish/verify that:

- the latest available MR template was used and correctly filled up;
- the project activity has been implemented and operated as per the registered PD and that all physical features (technology, project equipment and monitoring and metering equipment) of the project are in place;
- the monitoring report and other supporting documents provided are complete in accordance with the latest applicable version of the completeness checklist for requests for issuance of VCUs, verifiable, and in accordance with applicable VCS Version 3 requirements;
- the actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan, the approved methodology including applicable tool(s) and/or, where applicable, the approved standardized baseline;
- the data are recorded and stored as per the monitoring methodology including applicable tool(s) and, where applicable, the standardized baseline.

In addition, ESPL has also been contracted to conduct the verification of SOCIALCARBON Standard of the project activity at Point Two (2), with regard to its relevant requirements, for the same monitoring period.

Conclusion

ESPL has performed the verification of the VCS project “Composting Project in Santa Catarina”, with VCS Project ID 1144, for the monitoring period from 01/07/2015 to 30/04/2019 (both days included).

During the present VCS verification, 03 CARs and 02 CLs were raised and successfully closed. For the SOCIALCARBON verification, also 1 CAR was raised and successfully closed. Also, one FAR has been closed which was raised during the previous verification

The verification team has confirmed the implementation of the project as per description in the VCS-PD, the monitoring plan of the PD and the application of the monitoring methodology (AMS-III.F – version 10 and AMS-III.D version 18). In addition, it was confirmed that the monitoring system is in place and the emission reductions are calculated without material misstatements.

The verified emission reductions amount to **29,826 tCO_{2e}** in the above mentioned monitoring period.

- In addition, the verifier states that project meets all relevant requirements established by the SOCIALCARBON Standard. The SOCIALCARBON report identifies the social economic and environmental impacts of the project activity and presents the results obtained by meeting the “Santa Catarina Composting Project Indicators” – version 1.1.

CONTENTS

1	INTRODUCTION	6
1.1	Objective.....	6
1.2	Scope and Criteria.....	6
1.3	Level of Assurance	6
1.4	Summary Description of the Project	7
2	VERIFICATION PROCESS	7
2.1	Method and Criteria	7
2.2	Document Review.....	7
2.3	Interviews.....	8
2.4	Site Inspections	9
2.5	Resolution of Findings.....	10
2.6	Eligibility for Verification Activities.....	11
3	VERIFICATION FINDINGS	11
3.1	Participation under Other GHG Programs	11
3.2	Methodology Deviations	11
3.3	Project Description Deviations.....	12
3.4	Grouped Projects	12
4	VERIFICATION FINDINGS	12
4.1	Project Implementation Status	12
4.2	Safeguards	14
4.3	Accuracy of GHG Emission Reduction and Removal Calculations	15
4.4	Quality of Evidence to Determine GHG Emission Reductions and Removals	19
4.5	Non-Permanence Risk Analysis.....	19
4.6	SOCIALCARBON Results.....	19
5	ANALYSIS OF SOCIALCARBON RESULTS	31
5.1	Current Performance	31
5.2	Historical Performance.....	31
5.3	Performance Hexagon	32
6	VERIFICATION CONCLUSION	33

APPENDIX I: REFERENCES	36
APPENDIX II: REFERENCES SOC. CARB.	38
APPENDIX III: ABBREVIATIONS	39
APPENDIX IV: FINDINGS	40
APPENDIX V: FINDINGS – SC.....	43
APPENDIX VI: TEAM COMPETENCE.....	44

1 INTRODUCTION

1.1 Objective

Sustainable Carbon – Projetos Ambientais Ltda. has contracted ESPL to conduct the verification of the 3rd verification of the project “Composting project in Santa Catarina” for the period from 01/07/2015 to 30/04/2019 (both days included) according to the requirements of the Verified Carbon Standard Version 4.

1.2 Scope and Criteria

The scope of the verification is to establish/verify that:

- the project activity has been implemented and operated as per the registered PD and that all physical features (technology, project equipment and monitoring) of the project are in place;
- the monitoring report and other supporting documents provided are complete in accordance with the latest applicable version of the completeness checklist for requests for issuance of VCUs, verifiable, and in accordance with applicable VCS Version 3 requirements;
- the actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan, the approved methodology including applicable tool(s) and/or, where applicable, the approved standardized baseline;
- the data are recorded and stored as per the monitoring methodology including applicable tool(s) and, where applicable, the standardized baseline.

The verification of this monitoring period is based on the registered VCS-PD, MR and GHG emission reduction calculation spreadsheet and supporting documents.

In addition, the scope of the SOCIALCARBON verification is to establish/verify that:

- to have an independent third party assessment in order to evaluate the accuracy and consistency of the SOCIALCARBON Standard – version 5.0 and “*Santa Catarina Composting Project Indicators*” – version 1.1, for this specific point in time – Point two; and
- to verify the consistency of these Indicators and their evolution since last evaluation, with the established criteria to maintain the designation as SOCIALCARBON, following the SOCIALCARBON Standard.

1.3 Level of Assurance

The verification of this monitoring period achieved a reasonable level of assurance. 100% of the parameters were monitored.

1.4 Summary Description of the Project

The project activity involves replacement of Animal Waste Management System (AWMS) in 13 confinement swine farms in Brazil. The common practice for AWMS is the use of anaerobic lagoons for the manure treatment. These lagoons are high CH₄ emitters. The project activity consists in the installation of mechanized composting units for the manure treatment, which consist in an aerobic treatment, thus, reducing the CH₄ emissions.

The project is listed at VCS and can be accessed by the following link:
https://www.vcsprojectdatabase.org/#/project_details/1144

Apart from the GHG emission reductions, SOCIALCARBON Methodology is being applied as a sustainability tool. It monitors the social and environmental performances of projects and their long-term improvement.

2 VERIFICATION PROCESS

2.1 Method and Criteria

The verification process is conducted as per internal CDM Quality Manual and in accordance with criteria laid down by VCS. It includes the following steps:

- contract with PP for the scope and appointment of verification team and technical review team;
- completeness check of Monitoring Report;
- desk review of Monitoring Report and corresponding ER sheet by verification team and planning of onsite audit as well as applied methodologies and tools;
- physical on-site inspection by verification team;
- follow up activities e.g., interviews;
- reporting and closure of findings (CARs/CLs/FARs) and preparation of draft verification report;
- independent technical review of the draft verification report and final/revised documentation (e.g., Monitoring Report, corresponding ER sheet and evidences);
- reporting and closure of TR comments/findings (CARs/CLs/FARs) and final approval for the decision made;
- issuance of final verification report to contracted PP (or authorized representatives).

2.2 Document Review

A desk review was conducted by the verification team that included:

- a review of the data and information presented to verify its completeness;
- a review of the registered monitoring plan, the monitoring methodology including applicable tool(s) and, where applicable, the applied standardized baseline, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures;
- an evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions;
- supporting documents.

A complete list of documents/evidences reviewed is included as Appendix I.

A complete list of documents/evidences reviewed for SOCIALCARBON purposes is included as Appendix II.

2.3 Interviews

#	Interviewee		Date	Subject	Interview	Team member
	Name	Affiliation and Role				
1.	Lenize Tomazi	Colonia Suspiro Farm / farmer	21/10/2019	Farm Operation, monitoring and social carbon aspects	Site visit / Direct questions	Marcelo Sebben
2.	Renato Baccin	Baccin Farm / farmer	21/10/2019 22/10/2019	Project activity main aspects Farm Operation, monitoring and social carbon aspects	Site visit / Direct questions and evidences presentation	Marcelo Sebben
3.	Guilherme Prado	Sustainable Carbon / Analyst	21/10/2019 22/10/2019	ER calculations, MR description, social carbon information	Site visit / Direct questions and evidences presentation	Marcelo Sebben
4.	Arlei Basso	Basso Farm / Farmer	21/10/2019	Farm Operation, monitoring and social	Site visit / Direct questions	Marcelo Sebben

				carbon aspects		
5.	Antonio Ramella	Ramella Farm / Farmer	21/10/2019	Farm Operation, monitoring and social carbon aspects	Site visit / Direct questions	Marcelo Sebben
6.	Clodoaldo Secco	Santa Lucia Farm / Farmer	22/10/2019	Farm Operation, monitoring and social carbon aspects	Site visit / Direct questions	Marcelo Sebben
7.	Willian da Silva	Silva Farm / Farmer	22/10/2019	Farm Operation, monitoring and social carbon aspects	Site visit / Direct questions	Marcelo Sebben

2.4 Site Inspections

Duration of on-site inspection: 21 and 22/10/2019				
#	Activity performed on-site	Site location	Date	Team member
1.	Opening Meeting: Introduction, scope and objective of work, roles and responsibilities of audit team, resources required, and timetable of the onsite audit including venue for closing meeting and any concerns from PP.	Chapecó	21/10/2019	Marcelo Sebben
2.	Fazenda Altenor Site visit to installations (facilities, technology) Visit measurement equipment Project Activity (Technology, Location and Implementation) Physical inspection of the site Checking parameters to be monitored Evidences of monitoring	Nova Erechim/S C	21/10/2019	Marcelo Sebben
3.	Fazenda Colônia Suspiro (Nova Erechim/SC) Site visit to installations (facilities, technology) Visit measurement equipment Project Activity (Technology, Location and Implementation) Physical inspection of the site Checking parameters to be monitored Evidences of monitoring	Iranduba	21/10/2019	Marcelo Sebben

4.	Fazenda Ramela Site visit to installations (facilities, technology) Visit measurement equipment Project Activity (Technology, Location and Implementation) Physical inspection of the site Checking parameters to be monitored Evidences of monitoring	Herval d'Oeste/SC	22/10/2019	Marcelo Sebben
5.	Sítio Santa Lúcia Site visit to installations (facilities, technology) Visit measurement equipment Project Activity (Technology, Location and Implementation) Physical inspection of the site Checking parameters to be monitored Evidences of monitoring	Jaborá/SC	22/10/2019	Marcelo Sebben
6.	Fazenda Granja Silva Site visit to installations (facilities, technology) Visit measurement equipment Project Activity (Technology, Location and Implementation) Physical inspection of the site Checking parameters to be monitored Evidences of monitoring	Concórdia/SC	22/10/2019	Marcelo Sebben
7.	Fazenda Baccin Site visit to installations (facilities, technology) Visit measurement equipment Project Activity (Technology, Location and Implementation) Physical inspection of the site Checking parameters to be monitored Evidences of monitoring	Concórdia/SC	22/10/2019	Marcelo Sebben

2.5 Resolution of Findings

The findings may be of following types: CAR – Corrective Action Request, CL – Clarification Request and FAR – Forward Action Request.

During the present verification, 03 CARs and 02 CLs were raised and successfully closed. No FAR has been raised.

For the SOCIALCARBON verification, also 01 CAR was were raised and successfully closed. No FAR has been raised.

The list of findings and their resolution are presented at Appendices IV and V of this report.

2.5.1 Forward Action Requests

During the previous verification period, one FAR has been raised. The FAR was successfully closed during this monitoring period. For further details, please refer to Appendix IV below.

2.6 Eligibility for Verification Activities

ESPL holds the accreditation for verification of the sectoral scope.

3 VERIFICATION FINDINGS

3.1 Participation under Other GHG Programs

The project activity has no participation under any other GHG program.

3.2 Methodology Deviations

The project applies the CDM approved methodology AMS-III.F. – “Avoidance of methane emissions through composting”, version 10 for ER calculations and AMS-III.D. – “Methane recovery in animal manure management systems”, version 18 for baseline emission calculations.

The project participants have applied the following deviations from the applied methodology (AMS-III.D):

- **Parameter $N_{LT,y}$** (Annual average number of animals of type LT in year y): In order to determine the parameter, the project participants used data from third parties (integrators which are companies that manage the complete meat production cycle) instead of direct monitoring. This measure is considered accurate as the data from integrators is commercial and, consequently, reliable.
- **Parameter $EC_{P,j,y}$** (Quantity of electricity consumed by the project electricity consumption source j in year y): for determining this parameter, instead of direct monitoring as required by the methodology, the project participants monitored the parameter by manually registering the operational hours of the manure pump and the UMAC equipment which are the equipment used for the compost project. Then, the total electricity consumption is estimated. In case the PPs do not register the parameter, a default value given by the equipment provider (LPC) with a 125% correction factor is applied. This measure is considered reliable considering that is not feasible for the farmers to monitor separately only the electricity from the composting project. Moreover, as observed during site visit, the farmers have a routine of using the manure pump and

- the UMAC equipment and it would make no sense to use it longer than estimated by equipment provider.
- **Parameter Q_y** (Quantity of manure treated in the year y) and **Parameter $Q_{y,Treatment}$** (Quantity of compost produced in the year y): the methodology establishes that the parameters shall be monitored by weighbridges. However, this equipment is not viable nor available in the farms location. Moreover, the farmers do not transport these residues. The manure is pumped to the buffer tanks to be sprinkled over the compost and the compost is spread mainly in their own farm, being used as fertilizer. Thus, in order to estimate the amount of manure treated, the project proponents applied default values of maximum manure production per animal based on literature^{/9-2/}. The applied value is considered conservative as it was taken from studies made specifically at this region, being considered an accurate estimative, and maximizing the project emissions. Regarding the compost quantity ($Q_{y,treatment}$), values are informed directly by the farmers, by manual spreadsheets. This measure is considered reliable, also considering that this parameter does not affect the ER calculations.

3.3 Project Description Deviations

- Not applied as there is no Project Description deviations during this MP.

3.4 Grouped Projects

The project activity is not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The project activity involves replacement of Animal Waste Management System (AWMS) in 13 confinement swine farms in Brazil. The common practice for AWMS is the use of anaerobic lagoons for the manure treatment. These lagoons are high CH₄ emitters. The project activity consists in the installation of mechanized composting units for the manure treatment, which consist in an aerobic treatment, thus, reducing the CH₄ emissions.

During the current monitoring period, only 6 out of 13 swine farms monitored their parameters, and consequently, only these are part of this monitoring period.

There is no material discrepancies between the actual monitoring system, and the monitoring plan set out in the project description and the applied methodology apart from the ones mentioned in sections 3.2 and 3.3 above.

In addition, the GHG emission reductions generated by the project have not become included in any emissions trading program or any other mechanism that includes GHG allowance trading. Moreover, the project has not received nor sought any other form of environmental credit, and neither has become eligible to do so since validation or previous verification. Finally, the project has not participated nor been rejected under any other GHG programs since validation or previous verification.

Some of the features of the project activity are described below:

- **Project Proponents:** Sustainable Carbon – Projetos Ambientais Ltda, Fazenda Sítio Pickler¹, Fazenda Altenor, Fazenda Ramela, Sítio Santa Lúcia, Fazenda Helena¹, Fazenda Gilmar¹, Fazenda Suruvy¹, Fazenda Granja Silva, Fazenda Colônia Suspiro, Fazenda Colônia Zuffo¹, Fazenda Pissaia¹, Fazenda Baccin and Fazenda Andretta¹;
- **Project Category:** project ($\leq 300,000$ t CO₂e/y);
- **Methodology:** AMS-III.F. – “Avoidance of methane emissions through composting”, version 10 for ER calculations and AMS-III.D. – “Methane recovery in animal manure management systems”, version 18 0 for baseline emission calculations;
- **Start Date:** 21/05/2010 – date on which the first farm began reducing GHG emissions by applying the composting unit under full operation;
- **Crediting Period:** 1st Crediting Period – from 01/01/2011 to 31/12/2020 – 10 years – renewable;
- **Project Location (referring only to the farms participating of this monitoring peirod):**

Farm Name	Address	Town	Global Positioning System ²	
			S	W
Fazenda Altenor	Linha Pinheirinho, S/N	Nova Erechim	-26.913729°	- 52.932355°
Fazenda Ramela	Linha Barreiros, S/N	Herval d'Oeste	-27.187098°	- 51.395069°
Sítio Santa Lucia	Linha Banhado Grande, S/N	Jaborá	-27.128526°	- 51.688554°
Fazenda Granja Silva	Linha Gomercindo, S/N	Concórdia	-27.293422°	- 51.900758°
Fazenda Colônia Suspiro	Linha Pinheirinho, S/N	Nova Erechim	-26.903279°	- 52.931321°
Fazenda Baccin	Linha 24 de Fevereiro, S/N	Concórdia	-27.169646°	- 52.103517°

- **Technical Data:** all farms that are being considered in this monitoring period have installed the followign equipment

¹ All these Farms did not monitor their parameters and did not participate of this monitoring period

² All GPS coordinates were taken near the location where the composting machines are installed.

- Manure pump that collects the manure from the swine confinement and transfer it to buffer lagoons.
- Mechanized composting units where liquid wastes are incorporated with dry solid substrate which are then mixed for the anaerobic decomposition.
- Additional information
 - This project is a non-AFOLU project.
 - There is no commercially sensitive information that could not be included in this report
- The main sustainable development contributions are:
 - a. Reduction of the risk of the underground water contamination due to management of composting unit;
 - b. Reduction from odors from the anaerobic lagoons
 - c. Reduction in the pathogenic vectors related to swine manure
 - d. Improvement of swine manure as fertilizer

4.2 Safeguards

4.2.1 No Net Harm

The impacts observed during the site visit are positive due to improvement of farm conditions when it comes to odors, potential risk of leakage in the anaerobic lagoons and accumulation of vectors. Moreover, there are also the possibility of income increase due to commercialization of compost, which is not yet a common practice in all farms.

The negative impact is said to be the slightly higher costs of compost when compared to anaerobic lagoons which are mitigated by the reduction of risks stated in the paragraph above.

The positive social, environmental and economic impacts are being evaluated by SOCIALCARBON standard.

4.2.2 Local Stakeholder Consultation

The formal local stakeholder consultation was carried out during the validation of the crediting period. Regarding communication with stakeholders, the project participant has a good relationship with local community and has open channels in order to receive comments from local stakeholders. Thus, the project activity has a stakeholder communication access in place and working.

4.2.3 AFOLU-Specific Safeguards

Not applicable as it does not comprehend an AFOLU project

4.3 Accuracy of GHG Emission Reduction and Removal Calculations

- the approved methodology AMS-III.F. – “Avoidance of methane emissions through composting”, version 10 determines the ER calculations whereas the methodology AMS-III.D. – “Methane recovery in animal manure management systems”, version 18 is used for the baseline emission calculations;
- project emissions associated to the project activity are the following:
 - o Project emission due to Electricity consumption ($PE_{y,power}$)
 - o Project emissions from compost ($PE_{y,compost}$)
- no leakage is considered for this kind of project, in accordance with the applied methodology as there is no transference of equipment:
- all methods and formulas used in the calculations of emission reductions have been followed in accordance to the applied methodology and monitoring plan of the validated at VCS-PD;
- all monitored data is traceable.

Fixed parameters (as per Section 4.1 of VCS-PD):

- Annual average temperature: 18°C as per National Institute of Meteorology (INMET)
- GWP_{CH_4} (Global warming potential of methane): as per section 3.3 above, the value applied is in accordance with Decision 4/CMP.7, paragraph 5 as equal to 25 tCO_2/tCH_4 for the 2nd commitment period.
- D_{CH_4} (Density of CH_4): value applied is equal to 0.00067 t/m^3 as per AMS-III.D
- UF_b (Correction factor to account for model uncertainties): value applied is equal to 0.94 as per AMS-III.D
- MCF_j (Annual methane conversion factor for the baseline animal manure management system j): value applied for uncovered anaerobic lagoon equal to 77% as per 2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 4, chapter 10, table 10.17.
- $B_{o,LT}$ (Maximum methane producing potential of the volatile solid generated for animal type LT) - value applied for market swine equal to 0.29 m^3CH_4/kg dm (dry matter) and breeding swine equal to 0.45 m^3CH_4/kg dm (dry matter) as per 2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 4, chapter 10, table 10A-7 and 10A-8
- $MS\%_{oBL,y}$ (Fraction of manure handled in baseline animal manure management system j): the value applied is 100% as in the baseline all waste was used in anaerobic lagoons.
- $W_{default}$ (default average animal weight of a defined population): value applied for market swine equal to 28 kg and breeding swine equal to 198 kg as per 2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 4, chapter 10, table 10A-7 and 10A-8
- $VS_{default}$ (Default value for the volatile solid excretion rate per day on a dry-matter basis for a defined livestock population): value applied for market swine equal to 0.3 kg

dm/animal/day and breeding swine equal to 0.46 kg dm/animal/day as per 2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 4, chapter 10, table 10A-7 and 10A-8

- $EF_{\text{composting}}$ (Emission factor for composting of manure): value applied is 4 g CH_4/kg waste treated on a wet basis as per 2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 5, chapter 4, table 4.1
- $TDL_{j,y}$ (average technical transmission and distribution losses for providing electricity to source j in year y): value applied equal to 10% as per AMS-III.F.
- MD (Manure density): value applied equal to 1,016 kg/m^3 ;

Monitored parameters:

- VS_{LT} (Volatile solids for livestock LT entering the animal manure management system in year y) – This parameter is calculated as per applied methodology based on data provided by the Integrators. Refer to Section 4.2 of the MR
- $n_{d,y}$ (number of days in year y where the animal manure management system is operational) – this parameter is provided directly from integrators as it is considered as the number of days which there are live animals in the farm. The calculations were made available to the verification team. Refer to Section 4.2 of the MR
- W_{site} (Average animal weight of a defined livestock population at the project site (kg) - this parameter is provided directly from integrators. The calculations were made available to the verification team. Refer to Section 4.2 of the MR
- $N_{da,y}$ (Number of days animal is alive in the farm in the year y) - this parameter is provided directly from integrators. The calculations were made available to the verification team. Refer to Section 4.2 of the MR
- $N_{p,y}$ (Number of animals produced annually per type of LT for the year y) - this parameter is provided directly from integrators. The calculations were made available to the verification team. Refer to Section 4.2 of the MR
- $N_{LT,y}$ (average number of animals type LT in year y) - this parameter is provided directly from integrators. The calculations were made available to the verification team. Refer to Section 4.2 of the MR
- $Q_{y,\text{treatment}}$ (quantity of compost produced in year y) – These values are monitored by manual records provided by the farmers. This parameter is not directly applied in the ER calculations. Refer to Section 4.2 of the MR
- $EC_{PJ,j,y}$ (quantity of electricity consumed by the project activity electricity consumption source j in year y). This parameter is not directly measured (see section 3.2) This parameter is either based on the available information provided by the farmers or by estimated electricity consumption provided by the equipment manufacturer. The most conservative value is applied. The comparison is provided in the calculations spreadsheet.

- $EF_{EL,j,y}$ (Emission factor for electricity generation source j in year y) – These values are published yearly by Brazilian DNA which are calculated in accordance with applied version of CDM TOOL07. Refer to Section 4.2 of the MR
- Q_y (quantity of manure treated in year y) – This value is estimated based on the amount of animals that are being raised in the farm. The parameter is an estimative per animal given by technical literature^[xx]. Refer to Section 4.2 of the MR
- Conditions of the composting process – This parameter is continually monitored by the farmers, who manually record it. The evidences were provided to the verification team. Refer to Section 4.2 of the MR
- Soil application of the compost for agricultural purposes - The parameter is controlled by manual recordings. However, most of farms apply it directly in their own farm. Refer to Section 4.2 of the MR

The emission reduction spreadsheet is transparent, traceable and correct, with no manual transposition errors.

Baseline emissions (BE_y)

The baseline emissions are calculated as follows:

$$BE_y = GWP_{CH_4} * D_{CH_4} * UF_b * \sum_{j,LT} MCF_j * B_{0,LT} * N_{LT,y} * VS_{LT,y} * MS\%_{BL,j}$$

Where:

BE_y :	Baseline emissions during the year y ;
GWP_{CH_4} :	Global warming potential of methane;
D_{CH_4} :	Density of CH_4 ;
UF_b :	Correction factor to account for model uncertainties;
MCF_j :	Annual methane conversion factor for the baseline animal manure management system j .
$B_{0,LT}$:	Maximum methane producing potential of the volatile solid generated for animal type LT
$N_{LT,y}$:	Average number of animals type LT in year y
VS_{LT} :	Volatile solids for livestock LT entering the animal manure management system in year y
$MS\%_{BL,y}$:	Fraction of manure handled in baseline animal manure management system j

So, $BE_y = 36,109 \text{ tCO}_2\text{e}$.

Project emissions (PE_y)

Project emissions associated to the project activity are the following:

- Project emission due to Electricity consumption ($PE_{y,power}$)

$$PE_{y,power} = \sum_j EC_{PJ,j,y} \times EF_{EL,j,y} \times (1 + TDL_{j,y})$$

Where

$EC_{PJ,j,y}$	Quantity of electricity consumed by the project activity electricity consumption source j in year y
$EF_{EL,j,y}$	Emission factor for electricity generation source j in year y
$TDL_{j,y}$	average technical transmission and distribution losses for providing electricity to source j in year y

- Project emissions from compost ($PE_{y,compost}$)

$$PE_{y,comp} = Q_y * EF_{composting} * GWP_{CH_4}$$

Where

$Q_{y,treatment}$	Quantity of compost produced in year y
$EF_{composting}$	Emission factor for composting of manure
GWP_{CH_4}	Global warming potential of methane

Thus, $PE_y = PE_{y,power} + PE_{y,compost} = 6,283 \text{ tCO}_2\text{e}$

Leakage emissions (LE_y)

No leakage is associated to the project activity

Thus, $LE_y = 0 \text{ tCO}_2\text{e}$

Emission Reductions

Therefore, according to the applied methodology, ER_y are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y :	Emission reductions in year y;
BE_y :	Baseline reductions in year y;
PE_y :	Project reductions in year y;
1) LE_y :	Leakage reductions in year y.
2)	

Thus, $ER_y = BE_y$. So, $ER_y = 29,826 \text{ tCO}_2\text{e}$.

4.4 Quality of Evidence to Determine GHG Emission Reductions and Removals

- records were submitted by the project proponent as evidences to determine emission reduction;
- the records, data and information provided were found valid for the current verification period. The documents were verified during site visit and when possible, were checked directly from its source;
- interviews were performed during site visit with involved personnel and PP’s representatives;
- the GHG emission reduction calculations were check step by step with PP’s representatives;
- the quality of evidences was found of adequate level by the verification team to ensure an accurate quantification of the emission reductions.

4.5 Non-Permanence Risk Analysis

Not applicable for this project type

4.6 SOCIALCARBON Results

4.6.1 Social Resource

Indicator	1. Association and Cooperatives
Situation	<p>Four of the six swine farmers showed active involvement with local associations and cooperatives. Almost all swine farmers believe that associations and cooperatives generate some benefit to the farm.</p> <p>The main organizations that have some involvement with the swine farmers are:</p> <ul style="list-style-type: none"> - Cooperalfa: Promotes economic development in the agricultural sector; - Cooperative Eletrif Rural Vale Araçá: Promotes electric rural development; - CERAÇÁ: Cooperative that promotes infrastructure development and energy distribution; - CIDASC: Cooperative that promotes agricultural development in the state of Santa Catarina; - Núcleo de Suinocultores de Nova Erechim; - SINTRAF: The syndicate of family agriculture workers aims to guarantee family rural workers’ rights and to improve working conditions in agriculture; - SICOOB Crediauc: Provides financial assistance to members; - Local agriculture associations: Aim to solve local agriculture issues.

Absence of associations or cooperatives; individualism is predominant	There are associations and cooperatives in the region, though the swine farmer is not involved in any of them.	The swine farmer is involved in associations or cooperatives, though it was observed internal conflicts and/or lack of structure among these organizations.	The swine farmer is involved in associations or cooperatives, though his participation is not active.	The swine farmer is actively involved in associations and cooperatives.	In addition to the last item, the participation in associations or cooperatives resulted in positive benefits for the farmer's business.
Score	5 (five) – this score is the average of the 6 farms considered in this MP. The rationale is presented in the SCR Spreadsheet.				
Justification	It is a common practice in the region the swine farmers to be associated with association or cooperatives				
Evidence	Interviews performed with farmers.				

Indicator	2. Economic Dependency				
Situation	<p>Even though it generates profit, the swine farmers do not rely just on the swine activity. Two of them rely on more than two economic activities, and the other four either practice subsistence or depend on other economic activities that generate income, such as:</p> <ul style="list-style-type: none"> - Milk Production; - Cattle; - Aviary; - Agribusiness sales representation; - Treasuring at a credit cooperative system of Brazil; - Trading; - Salami Production; - Compost sale. 				
The farmer relies only on the swine production and this activity brought him injuries.	The farmer relies only on the swine production and this activity brought him financial instability (some months the performance brought injuries)	<p>The swine production is not generating profit and carries on:</p> <ul style="list-style-type: none"> - Subsistence activities; OR <p>Depend on another economic activity.</p>	<p>The swine farmer relies on swine production, which is not generating profit and carries on:</p> <ul style="list-style-type: none"> - Subsistence activities; AND 	The swine farmer relies on swine production, which is generating profit, and carries on:	The swine farmer relies on more than two economic activities (in addition to the swine production).

	and others, incomes).		- Depend on another economic activity.	- Subsistence activities; OR - Depend on another economic activity.	
Score	5.33 (five point thirty three) – this score is the average of the 6 farms considered in this MP. The rationale is presented in the SCR Spreadsheet.				
Justification	It is a common practice in the region the swine farmers to be associated with association or cooperatives				
Evidence	Pictures and interviews performed during site visit.				

Indicator	3. Farmer Satisfaction				
Situation	All swine farmers are satisfied with the composting activity. The main reason is due to the fact that the proposed technology is a solution to the swine waste and reduces the environmental impacts, so they can still practice their profession while preserving it for future generations. Another benefit is that it adds economic value to their properties				
The swine farmer is not satisfied at all and is planning to quit: - The composting activity, AND - The carbon markets.	The swine farmer is not satisfied at all and is planning to quit: - The composting activity, OR - The carbon markets.	The swine farmer is indifferent to the composting and/or the carbon Project.	The swine farmer is satisfied with composting, but it was observed difficulty to apply to carbon markets.	The swine farmer is satisfied with the carbon Project and composting.	In addition to the last item, the swine farmer shares his experience and support with other farmers to use the same technology.
Score	5.83 (five point eighty three) – this score is the average of the 6 farms considered in this MP. The rationale is presented in the SCR Spreadsheet.				
Justification	The implementation of the project brought socio-economic and life quality benefits to the farmers				
Evidence	Interviews and site visit.				

4.6.2 Human Resource

Indicator	Control of microorganisms
------------------	----------------------------------

Situation	The swine farms used to have biological analysis of the compost undertaken. However, after having all tests' results negative for these parameters for some time, they stopped in order to save money.					
There is no concern in undertaking biologic analysis of the compost.	The swine farmer is looking for resources to undertake the biologic analysis of the compost; currently barriers, such as prices, hinder this possibility	The biologic analysis is undertaken sporadically, though it presents irregularities regarding the patterns recommended by Public Health Agencies.	The biologic analysis is undertaken periodically, but the parameters analyzed do not accomplish Public Health Official Standards all the time.	The biologic analysis is undertaken periodically and the parameters analyzed accomplish Public Health Official Standards all the.	In addition to the last item, the analysis results are available for the public.	
Score	1 (one) – this score is the average of the 6 farms considered in this MP. The rationale is presented in the SCR Spreadsheet.					
Justification	These analysis have a high cost to be done periodically and it is known that once it is done and the parameters gave good results, the farm will maintain its results throughout the time. Therefore, the farmers carried out analysis at the start of the project but did not keep analyzing it.					
Evidence	Interviews and site visit.					

Indicator	Diseases Agents					
Situation	All swine farms presented some control of diseases agents. Among the possibilities to control such diseases, the chemical one was the most used, being five out of the six producers that undertake this action, i.e. using disinfectants. As mechanical control, two farmers mentioned isolating the compost, mainly through fences. And a bait holder; tube type 100mm, was used by a producer as biological control.					
There is no concern regarding the control of diseases agents.	The swine farmer is trying to overcome barriers to undertake control of diseases agents (i.e. obtaining financial resources).	There are some initiatives to control diseases agents, though they are not sufficient; since presence of diseases agents was observed.	The control of diseases agents includes one of the following actions: mechanical, chemical or biologic.	The diseases agents control uses at least two kinds of actions: mechanical, chemical and biologic.	There is a structured program for controlling diseases agents, with Performance Indicators and/or Monitoring Plan.	
Score	5 (five) – this score is the average of the 6 farms considered in this MP. The rationale is presented in the SCR Spreadsheet.					

Justification	The procedure adopted is the common practice within swine farms
Evidence	Pictures, interviews with farmers and site visit

Indicator	Health and Safety Practices					
Situation	All producers carried out actions to promote hygiene in the swine farm (since most of them follow requirements from integrators) such as washing, blower sweep and disinfection. The swine farms operate within the norms that regulate this category, thus complying with workers' regulation and providing PPEs, as much as searching to maintain the work environment as healthy as possible. However, regarding safety practices, most safety equipment is available, though it is used inadequately (i.e. only two farmers have control of use and withdraws).					
	Safety equipments are not available. There are no hygiene and health practices regarding the swine unit.	Safety equipments are not available OR there are no hygiene and health practices regarding the swine unit.	The safety equipments are available, though they are used inadequately (i.e. there are no control of the use and withdraw).	The safety equipments are available, though they are used inadequately (i.e. there are no control of the use and withdraw).	The swine unit undertakes a program for disinfection and cleaning in order to guarantee a healthy environment OR all the safety equipments are available and are used correctly.	The swine unit undertakes a program for disinfection and cleaning in order to guarantee a healthy environment AND all the safety equipments are available and are used correctly.
Score	4.33 (four point thirty three) – this score is the average of the 6 farms considered in this MP. The rationale is presented in the SCR Spreadsheet.					
Justification	The farmers are controlled by the integrators to apply hygiene and health and safety measures. However it is not common practice to report the application of these measures.					
Evidence	Equipment control data sheet, interviews and pictures.					

4.6.3 Financial Resource

Indicator	Number of animals
------------------	--------------------------

Situation	<p>Two out of the six swine farms had an increase in the number of animals, the other farms kept their swine numbers the same as when the project started.</p> <p>Producers have expectation that the correct swine waste management will make possible to increase the number of pigs allowed by the operational license.</p>				
There is no control of the amount of animals in the swine farm.	There was a significant decrease in the number of animals.	There was an insignificant decrease in the number of animals.	Amount of animals is the same as project baseline.	The amount of animals increased insignificantly after the project implementation.	The amount of animals increased significantly after the Project implementation.
Score	4.67 (four point sixty seven) – this score is the average of the 6 farms considered in this MP. The rationale is presented in the SCR Spreadsheet.				
Justification	The farmer can opt to increase or decrease its production based on their operational license. They also can request by Environmental Agency an increase of their upper limit by changing their licensing.				
Evidence	Records from integrators.				

Indicator	Generation and commercialization of the compost:				
Situation	<p>Amongst the six swine farms, four commercialize the compost, with an average commercialization rate in the market about 50% of the total compost produced. The other two swine farms utilize all the compost in their own crops.</p> <p>All producers affirm that there is demand for the compost; however, the price is very low, so they prefer to use it in their farms. The average price of compost varied in a range of R\$250 to R\$400 reais per ton, so the price fluctuated between R\$0.25/kg and R\$ 0.40/kg.</p>				
There was no generation of compost.	The compost generated was not commercialized, since its characteristics were not adequate.	The compost was generated but it was not commercialized due to lack of buyers, or because it was used to supply internal demand.	A part of the compost was commercialized.	More than 50% of the compost was commercialized.	In addition to last item, demand for the compost increased.
Score	4.33 (four point thirty three) – this score is the average of the 6 farms considered in this MP. The rationale is presented in the SCR Spreadsheet.				

Justification	Depending on their distance from city and their other activities in the farm, the farmers decide to sell or use the compost in their own land.
Evidence	Interviews to the representatives.

Indicator	Commercialization of carbon credits					
Situation	All carbon credits generated during the second monitoring period were sold. In addition, future credits that will be generated during the third monitoring period (which the present SOCIALCARBON Report - Point 02 corresponds to) are already in process of negotiation.					
	During current period, no credits were commercialized.	During current period, credits were already negotiated, though no sales were concluded.	During current period, less than 50% of the credits were sold.	During the current period, more than 50% of the credits were commercialized.	During the current period, all the credits were sold.	In addition to last item, the Project has its future credits already in process of negotiation.
Score	6 (six) – this score is the average of the 6 farms considered in this MP. The rationale is presented in the SCR Spreadsheet.					
Justification	The credit's commercialization is fundamental for the viability and continuation of the project.					
Evidence	Receipts of payment of the VCUs and spreadsheet with total received and total invested.					

4.6.4 Natural Resource

Indicator	Environmental management					
Situation	All swine farms have environmental management systems established by the integrating companies, which comprise nutrition, water use, installations, energy and waste disposal. The majority of them has around three or so procedures regarding environmental management. The main activities carried out by farmers are related to nutrition, energy, water control and correct waste disposal.					
	None of the environmental aspects of the swine farm are considered in the management plan.	Less than 50% of the environmental aspects of the swine farm are considered through the implementation	More than 50% of the environmental aspects of the swine farm are considered through the implementation	There is a management system, though it is difficult to implement the actions.	There is an environmental management system efficient with periodic reports.	There is an environmental management system certified by third part.

	of some actions, but with no documentation.	of some actions, but with no documentation.			
Score	3.83 (three point eighty three) – this score is the average of the 6 farms considered in this MP. The rationale is presented in the SCR Spreadsheet.				
Justification	It was evidenced by the performed interviews with farmers’ representatives and at the site visit that the farms have implemented some environmental management measures.				
Evidence	Interviews, documents provided by the integrators and site visit.				

Indicator	Environmental Legislation				
Situation	All six swine farms have operational licenses. They also accomplish Forestry Code and all Brazilian environmental standards, as legislation predicts.				
The entrepreneur is not aware of the Brazilian environmental legislation.	The entrepreneur is aware of his legal duties, though he has no License, or the License was suspended since the demands were not accomplished.	During the period analyzed, the swine farm needs to accomplish a Term for Conduct Adjustment (in Portuguese, TAC); this means that the farm has some pre-defined deadline for accomplishing the environmental legislation.	There is an environmental license, though the entrepreneur faces difficulties to accomplish the demands. The License does not accomplish, temporarily, the demands.	There is an environmental license and all the demands are accomplished, though the entrepreneur faces difficulties to accomplish other Brazilian legislations (i.e. forest code).	The swine farmer accomplishes all Brazilian environmental rules and legislation.
Score	6 (six) – this score is the average of the 6 farms considered in this MP. The rationale is presented in the SCR Spreadsheet.				
Justification	All licenses are up to date and all conformity conditions to require their renovations are in place.				
Evidence	Licenses.				

Indicator	Chemical and Physical Analysis of the Compost
------------------	--

Situation	Among all swine farms, one did physical and chemical analysis of the compost; however, the technical report is not available. In addition, most of those analyses are carried out sporadically by farmers.					
There is no concern in regard with chemical and physical analysis of the compost.	The swine farmer faces difficulties to obtain resources to undertake chemical and physical analysis of the compost. The farmer is looking for possible alternatives.	Either a chemical or a physical analysis of the compost is undertaken.	Chemical and Physical Analysis of the compost are undertaken sporadically.	Physical and Chemical analysis of the compost are undertaken periodically.	In addition to this, information regarding chemical and physical parameters analyzed are available to the public.	
Score	1 (one) – this score is the average of the 6 farms considered in this MP. The rationale is presented in the SCR Spreadsheet.					
Justification	These analysis have a high cost to be done periodically and it is known that once it is done and the parameters gave good results, the farm will maintain its results throughout the time. Therefore, the farmers carried out analysis at the start of the project but did not keep analyzing it.					
Evidence	Interviews and site visit.					

4.6.5 Biodiversity/Technology Resource

Indicator	Compost quality					
Situation	<p>The compost is considered an organic fertilizer mixed of Classe “A”, which means an organic fertilizer from animal or vegetal source without the use of toxic material, resulting in a product of safe use in agriculture.</p> <p>Among all the six producers, just two evaluated the compost quality in their own crops and stated that the result was positive. The swine farmers used to evaluate things such as dry matter, presence of heavy metal and concentration of nutrients, which indicated that they had around 1.5mg/L for N, 2.5 to 3mg/L for P 2.5mg/L for K and between 30% and 40% of organic matter but, after having all tests’ results turn out the same for these parameters for some time, they stopped in order to save money.</p>					
The quality of the compost was never assessed.	The quality of the compost was not assessed by laboratorial tests, however it was tested in	The compost is not in accordance with the specifications of water levels and levels of nutrients (C, N,	The compost is not in accordance with the specifications of water levels OR levels of nutrients (C, N,	The compost is in accordance with the specifications of water levels AND levels of nutrients (C, N,	In addition to this, information regarding quality of compost is available to the public.	

	crops and it was positive.	P2O5, K2O, Ca e Mg).	P2O5, K2O, Ca e Mg).	P2O5, K2O, Ca e Mg).	
Score	1.33 (one point thirty three) – this score is the average of the 6 farms considered in this MP. The rationale is presented in the SCR Spreadsheet.				
Justification	These analysis have a high cost to be done periodically and it is known that once it is done and the parameters gave good results, the farm will maintain its results throughout the time. Therefore, the farmers carried out analysis at the start of the project but did not keep analyzing it.				
Evidence	Interviews and site visit.				

Indicator	Maintenance of the composting site				
Situation	Most producers stated that they have no difficulties in carrying out the maintenance of the composting site. Occasionally the maintenance is also carried out by a specialized company. However, the financial cost of the maintenance is very high, which was highlighted by the farmers.				
	The swine farmer carries on practices towards the maintenance of the composting site, though he faces difficulties, for instance: bad smell due to lack of water or problems during aeration.	The swine farmer carries on practices towards maintenance of the composting site, with no difficulties.	The swine farmer carries on practices towards maintenance of the composting site, and sporadically, the maintenance is made by a specialized company.	The maintenance of the composting site is made regularly by a specialized Company.	In addition to last scenario, the equipments are calibrated according to established deadlines.
Score	4 (four) – this score is the average of the 6 farms considered in this MP. The rationale is presented in the SCR Spreadsheet.				
Justification	It is the common practice the own farmers carry out their maintenance of composting site. In case needed, the composting unit provider carry out more complex maintenance.				
Evidence	Interviews with machine provider, with farmer and site visit.				

Indicator	Technology Diffusion				
Situation	Five farmers have just informally explained the composting technology to neighbors and friends, at cooperatives and associations, events and by distributing pamphlets. And one farmer formally contributed to the technology diffusion, by distributing information about the composting project, the use of the compost, and the carbon credit project holding a				

	lecture along with a slideshow during the monitored period to present the project and its results at fairs i.e. agronomy week, as well as through his website.				
The swine farmer is not committed with technology diffusion.	The swine farmer would commit to support technology diffusion, though he is not aware which procedures should be undertaken.	The technology diffusion approaches are informal.	Project contributes for technology diffusion through knowledge transfer, through formal methods.	Besides contributing with knowledge transfer, it also contributes for technology diffusion through the implementation of Technologies which differs from baseline scenario.	In addition to previous scenario, the project contributes for the technical capacitating and implementation of these technologies.
Score	3.17 (three point seventeen) – this score is the average of the 6 farms considered in this MP. The rationale is presented in the SCR Spreadsheet.				
Justification	In general, only informal approaches are used for technology diffusion.				
Evidence	Interviews and site visit.				

4.6.6 Carbon Resource

Indicator	Project Performance				
Situation	<p>Comparing the estimates from VCS PD and the 3rd Monitoring period, it is possible to affirm that the performance of the project was great, as the emission reductions achieved during the current monitoring period were between 76 to 95% from those estimated in the VCS PD.</p> <p>The main reasons of this difference were:</p> <p>Seven farm owners (Sítio Pickler, Pissaia Farm, Fazenda Andretta, Fazenda Colônia Zuffo, Fazenda Gilmar, Fazenda Helena and Fazenda Suruvy) decided not to participate in the current monitoring period.</p>				
0% of emission reductions were verified.	Very Low. From 1 to 25% of the emission reductions during the period were verified.	Low. From 26 to 50% of the emission reductions of the period were verified.	Reasonable. From 51 to 75% the emission reductions of the period were verified.	Great. From 76 to 95% of the emission reductions of the period were verified.	Excellent. More than 95% of emission reductions were verified.
Score	5 (five) – this score is the average of the 6 farms considered in this MP. The rationale is presented in the SCR Spreadsheet.				

Justification	The performance of the farmers that decided to carry out the monitoring is very good. However there are several farms that decided not to continue the project.
Evidence	Interviews and ER calculations spreadsheet.

Indicator	Stakeholders Consultation					
Situation	<p>Before implementing any farm or composting unit, a consultation with the environmental agency is carried out and only with the release of the licenses is the project undertaken.</p> <p>Stakeholders were informally informed and were not given the opportunity to make or send comments and suggestions.</p>					
Stakeholders are not aware of the project activities.	Stakeholders were informally communicated, though they did not have access to send comments and suggestions for the project developers.	Stakeholders were communicated through formal letters, and they had opportunity to send comments and suggestions to the Project developers.	In addition to the letters, other methods were carried out for engaging stakeholders, such as lectures, group activities, and others.	In addition to previous scenario, the project provides permanent channels for stakeholder's consultation.	There are evidences that the stakeholder's 'suggestions and comments were considered and realized by the project developer.	
Score	2 (two) – this score is the average of the 6 farms considered in this MP. The rationale is presented in the SCR Spreadsheet.					
Justification	Due to the farms decentralization, it was not given access to the farms to send comments of suggestions for the project developers.					
Evidence	Interviews.					

Indicator	Validation and Verification					
Situation	The Composting Project in Santa Catarina was validated and verified by a third part accredited by the UNFCCC. Currently, this project is under verification by another third part accredited by the UNFCCC.					
The Project was not validated/verified by a third part.	Only some aspects of the Project were validated/verified.	The Project was validated/verified by a third part, which is not accredited to UNFCCC.	The Project was validated by a third part, but it is registered in more than one GHG Program.	The validation and verification are made by a DOE, accredited by the UNFCCC.	The validation and verification are made by DOE, using methods and procedures	

					recognized internationally.
Score	6 (six) – this score is the average of the 6 farms considered in this MP. The rationale is presented in the SCR Spreadsheet.				
Justification	Apart from the accreditation, the VVB (DOE) applies the VCS and CDM procedures and standards for .				
Evidence	Interviews, site visit, VCS-PD, MR from previous periods, etc.				

5 ANALYSIS OF SOCIALCARBON RESULTS

5.1 Current Performance

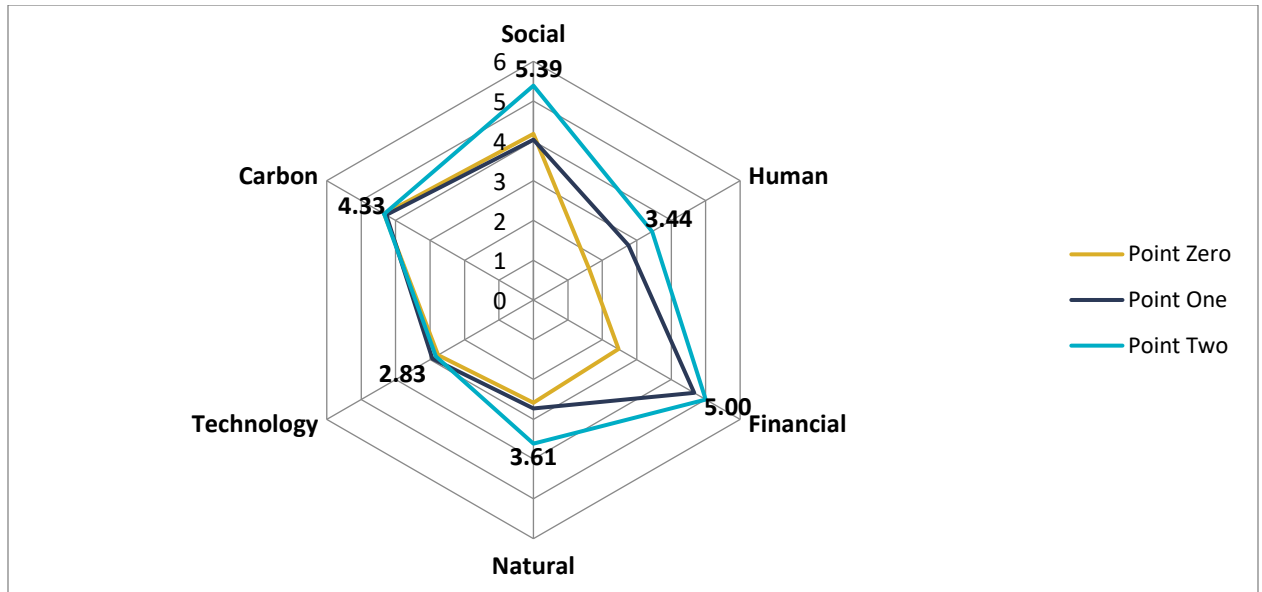
Resource	Critical	Satisfactory	Sustainable	Average Score	Performance
Social	0.0%	33.3%	66.7%	5.39	Sustainable
Human	33.3%	66.7%	0.0%	3.44	Satisfactory
Financial	0.0%	66.7%	33.3%	5.00	Satisfactory
Natural	33.3%	33.3%	33.3%	3.61	Satisfactory
Biodiversity/Tech	33.3%	66.7%	0.0%	2.83	Critical
Carbon	33.3%	33.3%	33.3%	4.33	Satisfactory

5.2 Historical Performance

Social	Point Zero	Point One	Point Two
	4.18	4.03	5.39
Historic Analysis: the increase corresponds to the diversification of activities for generation of profit.			
Human	Point Zero	Point One	Point Two

	1.61	2.76	3.44
Historic Analysis: The increase corresponds to the application of control of diseases agents.			
Financial	Point Zero	Point One	Point Two
	2.47	4.67	5.00
Historic Analysis: the increase corresponds especially to the commercialization of carbon credits and increase of compost commercialization.			
Natural	Point Zero	Point One	Point Two
	2.58	2.73	3.61
Historic Analysis: the increase corresponds especially need of complying with environmental legislation.			
Biodiversity	Point Zero	Point One	Point Two
	2.77	2.94	2.83
Historic Analysis: There was a small decrease especially due to the lack of technology diffusion approaches.			
Carbon	Point Zero	Point One	Point Two
	4.33	4.27	4.33
Historic Analysis: The increase corresponds especially due to project performance, where the ERs achieved from 76 to 95 % of estimated in PD.			

5.3 Performance Hexagon



6 VERIFICATION CONCLUSION

ESPL, contracted by Sustainable Carbon – Projetos Ambientais Ltda., has performed the independent verification of the emission reductions of the VCS project “Composting Project in Santa Catarina”, with VCS Project ID 1144, for the monitoring period 01/07/2015 to 30/04/2019 (both days included).

Sustainable Carbon – Projetos Ambientais Ltda. is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity.

ESPL commenced the verification based on the baseline and monitoring methodologies AMS-III.F. – “Avoidance of methane emissions through composting”, version 10 for ER calculations and AMS-III.D. – “Methane recovery in animal manure management systems”, version 18 for baseline emission calculations, the monitoring plan contained in the VCS-PD and draft Monitoring Report.

ESPL’s verification approach is based on the understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. ESPL planned and performed the verification by obtaining evidence and other information and explanations that ESPL considered necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

The verification team confirms that:

- the project activity was found completely implemented as per the description given in the registered VCS-PD; and
- the actual operation conforms to the description in the VCS-PD.

3) Thus, the GHG emissions reductions reported for the project activity for the period from 01/07/2015 to 30/04/2019 (including both days) are fairly stated in the final version of the Monitoring Report. The GHG emission reductions were calculated correctly based on the approved baseline and monitoring methodology AMS-III.F – version 10.0, AMS-III.D version 18 and the monitoring plan contained in the VCS-PD.

Therefore, ESPL is able to certify that the emission reductions from the VCS project “Composting project in SC”.

In addition, as a result of the SOCIALCARBON verification, the verifier confirms that:

- the indicators and reports are in accordance with SOCIALCARBON Standard and “Santa Catarina Composting Project Indicators” – version 1.1;
- the project is being periodically monitored and Point Zero is being used as the baseline;
- there are perspectives of improvement and the efforts to seek for this improvement are being done. However, a decrease in the performance have been verified in the following resources for this monitoring period: biodiversity/technology.
- the report has been validated by an accredited entity, an on-site visit has been carried out and this verification report has been issued.

In addition, the verifier confirms that the indicators for “Santa Catarina Composting Project Indicators” – version 1.1 are accurate and the calculations are correct. The SOCIALCARBON template and SOCIALCARBON Guidelines were correctly used.

ESPL herewith states that the project is in line with SOCIALCARBON. All applicable criteria for the verification are in accordance with applicable rules and requirement.

The characterization of the Point Three for the project as “SATISFACTORY”, as described in the referenced documents, is accurate.

Verification period: From 01/07/2015 to 30/04/2019

SOCIALCARBON verification period: From 01/07/2015 to 30/04/2019

Verified GHG emission reductions and removals in the above verification period:

Year	Baseline emissions or removals (tCO2e)	Project emissions or removals (tCO2e)	Leakage emissions (tCO2e)	Net GHG emission reductions or removals (tCO2e)
2015	4,099	901	0	3,198
2016	9,095	1,789	0	7,306
2017	16,726	1,682	0	15,044
2018	4,990	1,541	0	3,449

2019	1,199	370	0	829
Total	36,109	6,283	0	29,826

Approved by



Kaviraj Singh

Managing Director

Dated 19/03/2020

APPENDIX I: REFERENCES

To be provided in the final version of the FVR (oculto)

No.	Title	References
1.	<u>Methodologies</u> AMS-III.F. - “Avoidance of methane emissions through composting” AMS-III.D. - “Methane recovery in animal manure management systems”	version 10.0 version 18.0
2.	<u>Production report</u> - Altenor Farm: Integrators report - Ramella Farm: Integrators report - Secco Farm: Integrators report - Granja Silva Farm: Integrators report - Tomazi Farm: Integrators report - Baccin Farm: Integrators report	From 2015 to 2019
3.	<u>Licenses</u> - Altenor Farm: LO swine creation (Finishers) # 3204/2017 issued on 08/05/2017 by FATMA - Ramella Farm: LO swine creation (Finishers) # 9224/2018 issued on 21/11/2018 by FATMA - Secco Farm: LO swine creation (Finishers) # 8123/2014 issued on 11/11/2014 by FATMA - LO Renewal protocol Secco Farm FCEI # 491119, process IMA #SUI/64583/CRP issued on 12/07/2018 issued by IMA (former FATMA) - Granja Silva Farm: LO swine creation (piglet) # 7206/2015 issued on 28/10/2015 by FATMA - Tomazi Farm: LO swine creation (Finishers) # 581/2015 issued on 12/02/2015 by FATMA - Baccin Farm: LO swine creation (Finishers) # 1045/2015 issued on 12/03/2015 by FATMA	Validity: 07/05/2021 Validity: 20/11/2020 Validity: 10/11/2018 Validity: 27/10/2019 Validity: 11/02/2019 Validity: 11/03/2019
4.	MR – draft	version 01 – 16/10/2019
5.	MR – revised / final	version 02 – 06/02/2020 Version 03 27/02/2020 Version 04 12/03/2020
6.	ER Spreadsheet – draft (apart from consolidated spreadsheet, spreadsheet from each farmer was provided, where the fine calculations are available)	version 1
7.	ER Spreadsheet – revised / final (apart from consolidated spreadsheet, spreadsheet from each farmer was provided, where the fine calculations are available)	version 2 / version 3 / Version 4
8.	VCS-PD (Registered)	version 06.1 – 10/01/2014
9.	Embrapa – Brazilian Agricultural Research Company	Oct/1987

	<ol style="list-style-type: none"> 1. Study regarding the performance and quality of swine – This report was used to evaluate the proportion of carcass from the whole swine weight. 2. Article regarding average daily production of swine manure - OLIVEIRA, Paulo Armando V. de. Produção e manejo de dejetos de suínos. Concórdia: Embrapa, 2003. 83 p. Information taken from Table 1. Value adopted to the current monitoring for the amount of solid waste (in kilogram): average daily production of swine manure, including manure and urine, according to animals weight. 	
10.	IPCC publications	www.ipcc-nggip.iges.or.jp
11.	UNFCCC	http://cdm.unfccc.int
12.	VCS	http://www.v-c-s.org/

APPENDIX II: REFERENCES SOC. CARB.

To be provided in the final version of the FVR (oculto0)_

No.	Title	References
1.	SOCIALCARBON Report (draft)	version 01 – 01/10/2019
2.	SOCIALCARBON Report (revised/final)	version 02 – 06/02/2020 version 03 – 11/03/2020
3.	<u>Social Resource:</u> - List of cooperatives and association of swine farmers - Interviews with farmers regarding extra income/other activities	2015 to 2019 for all evidences
4.	<u>Human Resource:</u> - Pictures of diseases agents control obtained during site visit - Personal protection equipment (PPE) control (when available)	2015 to 2019 for all evidences
5.	<u>Financial Resource:</u> - Records of animals provided by integrators - Interviews regarding application of compost - Spreadsheet with control of payment of the VCU	2015 to 2019 for all evidences
6.	<u>Natural resources</u> Licenses - Altenor Farm: LO swine creation (Finishers) # 3204/2017 issued on 08/05/2017 by FATMA - Ramella Farm: LO swine creation (Finishers) # 9224/2018 issued on 21/11/2018 by FATMA - Secco Farm: LO swine creation (Finishers) # 8123/2014 issued on 11/11/2014 by FATMA - LO Renewal protocol Secco Farm FCEI # 491119, process IMA #SUI/64583/CRP issued on 12/07/2018 issued by IMA (former FATMA) - Granja Silva Farm: LO swine creation (piglet) # 7206/2015 issued on 28/10/2015 by FATMA - Tomazi Farm: LO swine creation (Finishers) # 581/2015 issued on 12/02/2015 by FATMA - Baccin Farm: LO swine creation (Finishers) # 1045/2015 issued on 12/03/2015 by FATMA	Validity: 07/05/2021 Validity: 20/11/2020 Validity: 10/11/2018 Validity: 27/10/2019 Validity: 11/02/2019 Validity: 11/03/2019
	<u>Biodiversity/technology resource</u> - Interviews with farmers and with equipment provider regarding maintenance plans - Interviews regarding technology diffusion	2015 to 2019 for all evidences
7.	<u>Carbon Resource:</u> - Comparison between MR and PD regarding performance - Contract between VVB and PP for conducting the verification	2015 to 2019
8.	Santa Catarina Composting Project Indicators	version 1.1
9.	Guidance for Completing SOCIALCARBON Reports	version 4.0
10.	SOCIALCARBON Standard	version 5.0
11.	SOCIALCARBON	http://www.socialcarbon.org/

APPENDIX III: ABBREVIATIONS

Abbreviations	Full texts
BE	Baseline Emission
CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CO ₂	Carbon dioxide
CO _{2e}	Carbon dioxide equivalent
CL	Clarification Request
DOE	Designated Operational Entity
DOF	Document of Forest Origin
ER	Emission Reduction
ESPL	Earthood Services Private Limited
FAR	Forward Action Request
GHG	Greenhouse gas(es)
MP	Monitoring Plan
MR	Monitoring Report
PA	Project Activity
PE	Project Emission
PP	Project Participant
PPE	Personal Protection Equipment
QA/QC	Quality Assurance / Quality Control
SC	SOCIALCARBON
SCR	SOCIALCARBON Report
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
VCS-PD	VCS – Project Description
VCU	Verified Carbon Unit
XLS	Emission Reduction Calculation Spread Sheet

APPENDIX IV: FINDINGS

Table 1. CL from this verification

CL ID	01	Section no.	3.1	Date:	15/03/2019	
Description of CL						
Section 3.2.2: deviation related to Helena Farm is not applicable to this monitoring period as this farm did not monitor its parameters.						
Project participant response					Date:	13/01/2020
The deviation related to Helena Farm was withdrawn from section 3.2.2 of the VCS-MR – Version 02.						
Documentation provided by project participant						
VCS MR v.2						
DOE assessment					Date:	11/02/2020
The information was duly excluded from the MR as this farm was not monitored during this monitoring period.						
CL is closed						

CL ID	02	Section no.	3.1	Date:	15/03/2019	
Description of CL						
Section 3.1 - 2 last paragraphs: the MR is stating that in farms where anaerobic lagoons are still operative, the fraction of manure handled in baseline ($MS_{BL,i}$) is being determined. However, the farms referred in these paragraphs are not part of this monitoring period.						
Project participant response					Date:	13/01/2020
All information about the farms that are participating of this monitoring period has been updated at section 3.1 of the VCS-MR – Version 02.						
Documentation provided by project participant						
VCS MR v.2						
DOE assessment					Date:	11/02/2020
The information was updated in the MR. During site visit it has been observed that the farms that are currently operating their aerobic system are:						
<ul style="list-style-type: none"> - Altenor Farm - Baccin Farm - Granja Silva Farm - Ramella Farm - Secco Farm and - Tomazi Farm 						
CL is closed.						

Table 2. CAR from this verification

CAR ID	01	Section no.		Date:	22/11/2019	
Description of CAR						
Values of parameter $Q_{y,treatment}$ are not available unlike mentioned in section 4.2.						
Project participant response					Date:	22/01/2020

All values are available at Appendix 1, as per mentioned in section 4.2 of the VCS-MR – Version 02.	
<p>VCS MR v.2</p> <p>VCS MR Calculations Altenor Farm_period 03_01 07 2015_30 04 2019_v2</p> <p>VCS MR Calculations Baccin Farm_period 03_01 07 2015_30 04 2019_v2</p> <p>VCS MR Calculations Granja Silva Farm_period 03_01 07 2015_30 04 2019_v2</p> <p>VCS MR Calculations Ramella Farm_period 03_01 07 2015_30 04 2019_v2</p> <p>VCS MR Calculations Secco Farm_period 03_01 07 2015_30 04 2019_v2</p> <p>VCS MR Calculations Tomazi Farm_period 03_01 07 2015_30 04 2019_v2</p>	
DOE assessment	Date: 11/02/2020
The information is now duly evidenced to the verification team and it is reported correctly in the ER calculations and MR.	
CAR is closed	

CAR ID	02	Section no.		Date: 07/11/2019
Description of CAR				
<p>The following evidences were not provided to the verification team</p> <ul style="list-style-type: none"> - Licenses - Manual reports filled by farmers on a daily basis - Support spreadsheets used to calculate the ERs (if available) - Integrators spreadsheets - Social carbon evidences 				
Project participant response				Date: 23/01/2020
The evidences have been sent to the verification team.				
Documentation provided by project participant				
<p>Licenses and renewal protocol when applicable</p> <p>Integrators spreadsheets</p> <p>Supporting spreadsheets</p> <p>Manual reports</p> <p>Further evidences</p>				
DOE assessment				Date: 11/02/2020
The information has been duly provided to the verification team.				
CAR is closed				

CAR ID	03	Section no.		Date: 05/05/2020
Description of CAR				
<ul style="list-style-type: none"> - Section D.2: the value for EFOM and EFCM (EF_{EL}) for 2015 is not correct. In addition, the EF calculations were not presented at the Excel spreadsheet. 				
Project participant response				Date: 12/03/2020
The value for EFom and EFcm for 2015 was corrected and are available in each VCS MR calculation farm spreadsheet version 04. In addition, the EF calculation is available in tab “Emission Factor of the Grid”.				
Documentation provided by project participant				

VCS MR Calculations Altenor Farm_period 03_01 07 2015_30 04 2019_v4	
<u>VCS MR Calculations Baccin Farm_period 03_01 07 2015_30 04 2019_v4</u>	
<u>VCS MR Calculations Granja Silva Farm_period 03_01 07 2015_30 04 2019_v4</u>	
<u>VCS MR Calculations Ramella Farm_period 03_01 07 2015_30 04 2019_v4</u>	
<u>VCS MR Calculations Secco Farm_period 03_01 07 2015_30 04 2019_v4</u>	
<u>VCS MR Calculations Tomazi Farm_period 03_01 07 2015_30 04 2019_v4</u>	
DOE assessment	Date: 16/03//2020
The value of EFgridCM for 2015 was corrected. Moreover, the calculation was duly presented in the spreadsheets of each farm, which serves as source for the final ER calculations spreadsheet. The spreadsheets were provided to the verification team and will be provided to the VCS.	
<u>CAR is closed</u>	

Table 3. FAR from this verification

Not applicable.

Table 4. FAR from previous verification

FAR ID	01	Section no.	3.2.4	Date: 21/11/2019
Description of FAR				
During the onsite visit, Rina verified that the project proponents have not registered for a period of time the following parameters:				
- ECP,j,y				
- Qy				
- Conditions of the composting process.				
As a result, it was used conservative values for these parameters. The conservative values were determined using a declaration from a third part company that is responsible for the technology of the mechanized compost unit. Project participants shall present procedures to assure the correct monitoring of these parameters for the next monitoring period				
Project participant response				Date: 22/01/2020
Besides taking historical data into account, the parameters in question have been monitored and registered for the 3 rd Monitoring Period and are available at the VCS-MR – Version 02, as requested.				
Documentation provided by project participant				
VCS MR v.2				
VCS MR Calculations Altenor Farm_period 03_01 07 2015_30 04 2019_v2				
VCS MR Calculations Baccin Farm_period 03_01 07 2015_30 04 2019_v2				
VCS MR Calculations Granja Silva Farm_period 03_01 07 2015_30 04 2019_v2				
VCS MR Calculations Ramella Farm_period 03_01 07 2015_30 04 2019_v2				
VCS MR Calculations Secco Farm_period 03_01 07 2015_30 04 2019_v2				
VCS MR Calculations Tomazi Farm_period 03_01 07 2015_30 04 2019_v2				
DOE assessment				Date: 14/02/2020
Parameters have been monitored. However, a conservative approach has been carried out which takes the default values validated in the VCS PD for the three parameters when it generates more project emissions. The evidences can be observed in the ER calculations for each farm. The measure taken is conservative.				
<u>FAR is closed</u>				

APPENDIX V: FINDINGS – SC

Table 1. CL from this verification

CL ID	xx	Section no.	xx	Date: -
Description of CL				
Project participant response				Date: -
DOE assessment				Date: -

Table 2. CAR from this verification

CAR ID	01	Section no.	4.6	Date: 22/11/2019
Description of CAR				
The scores achieved by each indicator are not traceable in the Social Carbon spreadsheet (as the scores are for the six farms, it is not clear how each score was achieved). Moreover, not all scores are in accordance with information observed during site visit.				
Project participant response				Date: 13/01/2020
A table was added in the Social Carbon spreadsheet so the scores of each indicator for the six farms become traceable. The scores were adjusted accordingly to the information observed during the site visit and are available in the SCR – Version 2.				
Documentation provided by project participant				
SCR Spreadsheet v. 02 SCR MR v.02				
DOE assessment				Date: 17/02/2020
The scores are now traceable and the calculation is duly provided in the SCR spreadsheet. All evidences were provided to the verification team.				
CAR is closed				

Table 3. FAR from this verification

Not applicable.

APPENDIX VI: TEAM COMPETENCE

Competence Statement			
Name	Marcelo Sebben		
Country	Brazil		
Education	M.Sc. (Sustainable Energy System) B. Eng. (Chemical Engineering)		
Experience	+12.5 Years		
Field	Chemical process industry, CDM, Energy, Climate Change		
Approved Roles			
Team Leader	Yes		
Validator	Yes		
Verifier	Yes		
Methodology Expert	Yes (ACM0001, ACM0002, ACM0006, AM0065, AMS ID, AMS-I.E, AMS-I.C, AM0026, AMS-I.A, AMS-I.F, GS: Ecologically Sound Fuel Switch to Biomass with Reduced Energy Requirement, GS: Technologies and Practices to Displace Decentralized Thermal Energy Consumption)		
Local expert	Brazil, Chile, Honduras, Colombia		
Financial Expert	Yes		
Technical Reviewer	No		
TA Expert	Yes (TA 1.1, 1.2, 4.1, 5.1, 9.1, 13.1)		
Reviewed by	Shreya Garg	Date	02/09/2019
Approved by	Anshika Gupta	Date	02/09/2019

Competence Statement			
Name	Sergio Bonanno Cruz		
Country	Brazil		
Education	Post Graduate Diploma in Environment		
Experience	25 Years		
Field	Environmental Law, CDM, Energy, Climate Change		
Approved Roles			
Team Leader	Yes		
Validator	Yes		
Verifier	Yes		
Methodology Expert	Yes (ACM0001, ACM0002, AM0026, ACM0006, AMS ID)		
Local expert	Brazil, Chile		
Financial Expert	Yes		
Technical Reviewer	Yes		
TA Expert	Yes (TA 1.2, 13.1)		
Reviewed by	Abhishek Mahawar	Date	01/03/2018
Approved by	Ashok Kumar Gautam	Date	01/03/2018