Final Audit Report

Audited Body	
Puro.earth Project Proponent	Aperam Bioenergia Ltda
Name of Contact for Puro.earth Project Proponent	Benone Braga
Production Facility Operator	Aperam Bioenergia Ltda
Name of Contact for Production Facility Operator	Benone Braga
Production Facility Location	Capelinha, Brazil

Audit Description	
Type of Audit	Output Audit
Reporting Period Covered by Audit	11 October 2022 to 30 April 2023
Objective of Audit Engagement	Provide assurance opinion against requirements of Puro.earth Rules v3.0 (Edition 2022)
Date of Auditor Engagement	15 March 2023
Date of Audit Report Submission	27 May 2023

Reporting Requirements	
Number of CORCs under Audit	15,490
Tonnes of Dry Biochar Produced	11,958
Calculation Method	Biochar Methodology

Auditing Body	
Auditor	EnergyLink Services Pty Ltd
Lead Auditor	Rodrigo PARDO PATRON
Additional Audit Personnel	Thais MONTEIRO VOLL
Peer Reviewer	Katherine SIMMONS

This document details the nature and scope of the services provided by a member of EnergyLink Services in respect of the eligibility of the CO_2 Removal Supplier Production Facility under the requirements of Annex A: Biochar Methodology to the Puro Standard General Rules v3.0 (Edition 2022).

This document is issued to Puro.earth detailing audit procedures conducted and the auditor's opinion in relation to the eligibility of the Production Facility. It should not be used for any other purpose.

Because of the inherent limitations in any internal control structure, it is possible that fraud, error, or non-compliance with laws and rules may occur and not be detected. Further, the audit was not designed to detect all weakness or errors in internal controls so far as they relate to the requirements set out above as the audit has not been performed continuously throughout the period and the procedures performed on the relevant internal controls were on a test basis. Any projection of the evaluation of control procedures to future periods is subject to the risk that the procedures may become inadequate because of changes in conditions, or that the degree of compliance with them may deteriorate.

The audit opinion expressed in this report has been formed on the above basis.

Copies of relevant documentation are available on the Puro.earth website: puro.earth

COMMERCIAL AND CONFIDENTIAL

Version Control Record

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Document File Name	Date Issued	Version	Lead Auditor	Peer Reviewer
20230527 Final Audit Report Aperam Output 2023 vF.0	27 May 2023	vF.0	Rodrigo PARDO PATRON	Katherine SIMMONS

Contents

Abbreviation	Description
'H'	Hydrogen
'O'	Oxygen
CO_2	Carbon Dioxide
CORC	CO_2 Removal Certificate
C_{org}	Organic Carbon
GHG	Greenhouse Gas
LCA	Life Cycle Assessment
OC	Overcalculation
UC	Undercalculation
The Puro Rules	the Puro Standard General Rules v3.0 (Edition 2022)
The Biochar Methodology	Edition 2022 v2 Annex A: of the Puro Rules

PART A: Auditor's Report

To: Puro.earth

Dear Sir / Madam,

EnergyLink Services Pty Ltd (EnergyLink Services) was engaged to perform a reasonable assurance audit of Aperam Bioenergia Ltda (Aperam) Production Output Facility's CO_2 Removal calculation from the production of biochar for the period 11 October 2022 to 30 April 2023 against the eligibility requirements of 'the Puro Standard General Rules v3.0 Edition 2022' (hereafter referred to as "the Puro Rules").

Details of Audited Body

Puro.earth Project Proponent	Aperam Bioenergia Ltda
Production Facility Operator	Aperam Bioenergia Ltda GSRN: 643002406801000527
Production Facility location	Rual Raul Coelho 725, Cidade Nova – Capelinha, Brazil

Responsibility of the Audited Body's Management

The management of the body (Aperam) is responsible for the application of the requirements of 'Annex A: Biochar Methodology of the Puro Rules Edition 2022 v2' (hereafter referred to as "the Biochar Methodology") in quantifying CO_2 Removal Certificates (CORCs) from the production of biochar, which is reflected in the proof provided to EnergyLink Services.

The management of the audited body is responsible for preparation and presentation of the evidence in accordance with Section 5 the Biochar Methodology. This responsibility includes the design, implementation, and maintenance of internal controls relevant to the preparation and presentation of proofs that are free from material misstatement, whether due to fraud or error.

Our independence and quality control

EnergyLink Services have complied with the relevant ethical requirements relating to assurance engagements, which include independence and other requirements founded on fundamental principles of integrity, objectivity, professional competence, due care, confidentiality, and professional behaviour. These include all the requirements defined in the *Fortum – Supplier Code of Conduct*[1].

Furthermore, EnergyLink Services maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards, and applicable legal and regulatory requirements, in accordance with *ISQC 1 Quality Control for Firms that Perform Audits and Reviews of Financial Reports and Other Financial Information.*

Our responsibility

EnergyLink Services' responsibility is to express an opinion on the audited body's quantification of CORCs and compliance with the *Puro Rules* based on the procedures we have performed and the evidence we have obtained.

[1] Fortum (2020), Fortum – Supplier Code of Conduct, available at: www.fortum.com/about-us/contact-us/suppliers/code-of-conduct

We have conducted a reasonable assurance engagement in accordance with the *Puro Rules* and relevant international standards, as listed below:

- International Standards on Assurance Engagements ISAE 3000 Assurance Engagements other than Audits or Reviews of Historical Financial Information; and
- ISQC 1 Quality Control for Firms that Perform Audits and Reviews of Financial Reports and Other Financial Information, and Other Assurance Engagement.

A reasonable assurance engagement in accordance with relevant international standards involves performing procedures to obtain evidence about the Production Facility process controls and quantification of CORCs in accordance with the Puro Rules. The nature, timing and extent of procedures selected depend on the assurance practitioner's judgement, including the assessment of the risks of material misstatement, whether due to fraud or error. In making those risk assessments, we considered internal controls relevant to the audited body's preparation of proofs. We believe that the assurance evidence we have obtained is sufficient and appropriate to provide a basis for our assurance conclusion.

Summary of procedures undertaken

The procedures we conducted in our reasonable assurance engagement included:

- reviewing evidence provided by the audited body;
- assessing the audited body against eligibility criteria;
- conducting interviews and a virtual site visit to validate the evidence provided;
- analysing procedures that the audited body used to gather data;
- testing of calculations that the audited body performed; and
- identifying and testing assumptions supporting the calculations.

Use of our reasonable assurance engagement report

This audit report has been prepared for use by the audited body and Puro.earth for the sole purpose of reporting on the audited body's quantification of CORCs and compliance with the *Puro Rules*. Accordingly, EnergyLink Services expressly disclaim and do not accept any responsibility or liability to any party other than Puro.earth and the audited body for any consequences of reliance on this report for any purpose.

Inherent limitations

There are inherent limitations in performing assurance audits - for example, assurance engagements are based on selective testing of the information being examined - and because of this, it is possible that fraud, error, or non-compliance may occur and not be detected. An assurance engagement is not designed to detect all misstatements, as an assurance engagement is not performed continuously throughout the period that is the subject of the engagement, and the procedures performed are based on a test basis. The conclusion expressed in this report has been formed on the above basis.

Additionally, non-financial data may be subject to more inherent limitations than financial data, given both its nature and the methods used for determining, calculating, and sampling or estimating such data.

Corrective Action Requests / Recommendations

During the audit process, the auditor issued one recommendation.

Recommendation 1: Laboratory test

EnergyLink Services recommends that Aperam Bioenergia consistently commissions lab tests to gage changes in results, so that the CORC calculation reflects the feedstock processed by the production facility for the reporting period.

Overall Conclusion

Positive Conclusion (Production Output Audit)

Production Output Audit

The auditor has assessed the evidence provided by the audited body and verified that the calculation of CO_2 removal is compliant and has been calculated in accordance with the Puro.earth Biochar Methodology achieved through the production of biochar in this facility for the period 11 October 2022 to 30 April 2023.

In view of the above, the lead auditor is able to express a reasonable assurance opinion that, in all material respects, the quantification of 15,490 CO_2 Removal Certificates (CORCs) by the audited body for the period 11 October 2022 to 30 April 2023 was correct.

Sincerely,

Rodrigo PARDO PATRON | Principal – EnergyLink Services Pty Ltd
Lead Auditor
27 May 2023

Part B: Detailed Findings

Audit Findings and Conclusions

Table 1 to Table 4 summarises the findings from the Production Output Audit. As part of the audit procedures, the auditor performed interviews with site representatives and a virtual site visit to the Production Facility. Where possible, the findings from these procedures were used to validate that the eligibility criteria under the methodology had been met, that the proofs and evidence provided by the audited body were accurate, and that the metering used to quantify the Output was appropriate and correctly calibrated (for details refer to Appendix A).

Eligibility Assessment

Table 1: Eligibility Assessment

Requirement	Requirement Met?	Verification Remarks	Corrective Action Request / Recommendations
Confirm that the biochar is used in applications other than energy.	Y	Aperam is responsible for every aspect of the life cycle of the biochar produced, from seeding nursery to end use. The charcoal produced within the site is separated into two categories: coarse and fine char. The coarse char and a portion of the fine charcoal are used by Aperam Bioenergia to produce energy in the blast furnace of Aperam South America (ASA) steel mill. Whereas the fine char is applied and incorporated to the soil of Aperam Bioenergia eucalyptus crops. The auditor confirmed that the portion of biochar produced that is under audit was used by Aperam Bioenergia in applications applied to the eucalyptus plantations as fertilizer and not used for energy purpose.	N/A.
Confirm that the biochar is produced from sustainable forest or waste biomass raw materials.	Y	The auditor confirmed that the Biochar is produced from sustainable sourced biomass. The feedstock is composed of eucalyptus wood cropped by Aperam Bioenergia. Aperam Bioenergia crops and operations are FSC Forest Management Certified and FS Chain of Custody Certified.	N/A.

Requirement	Requirement Met?	Verification Remarks	Corrective Action Request / Recommendations
Confirm that the producer demonstrates net-negativity with results from a LCA that shows: – carbon footprint of the biomass production and supply. – emissions from the biochar production process. – carbon footprint of the biochar end use. – cradle to grave.	Y	The auditor confirmed that the LCA provided by Aperam Bioenergia included all information on the emissions of the different stages of the biochar cradle to grave life cycle.	N/A.
Confirm that the biochar production process meets requirements 1.1.4 to 1.1.6 of the Biochar Methodology, namely that: – no fossil fuel is used for heating the pyrolysis reactor. – the pyrolysis gases are recovered or combusted. – the molar H/C_{org} ratio is less than 0.7.	Y	The kilns used to generate the char are designed with lateral oxygen entrances and underground ducts that provide access to the kiln's floor, also known as combustion chambers. At the combustion chambers, pieces of wood are placed to ignite the kilns, starting the wood carbonization process. Notably, the LCA showed that biomass was used for ignition of the various kilns, and this was confirmed during the virtual site visit.	N/A.

Requirement	Requirement Met?	Verification Remarks	Corrective Action Request / Recommendations
Confirm that the biochar production process meets requirements 1.1.4 to 1.1.6 of the Biochar Methodology, namely that: – no fossil fuel is used for heating the pyrolysis reactor. – the pyrolysis gases are recovered or combusted. – the molar H/C_{org} ratio is less than 0.7. (Cont.)	Y	The auditor confirmed that the biochar was produced in four of the six charcoal production facilities, namely UPER São Bento, UPER Pontal, UPER Palmeiras and UPER Lagoa. Each facility has a different number of kilns, which pyrolysis gases of the several kilns within the facilities are captured by underground ducted system(s) and combusted at high temperatures in a centralised gas burner. The auditor noted that due to maintenance or other operating factors, the gas burner may often be out of service. Aperam Bioenergia measures the time the burners are out of service and records this utilisation factor. This value, internally called the 'burner efficiency', was used to calculate the upper limit of the quantity of biochar produced that is eligible for CORC creation (i.e. the char produced when pyrolysis gases were recovered or combusted). Under this approach, as long as the quantity of biochar applied to land is below the total eligible biochar production it is considered that clause 1.1.5 of the Biochar Methodology has been met and CORCs can be claimed. As such, the auditor confirmed via the LCA report, the virtual site visit, conversations undertaken with Puro.earth personnel during previous audits and remaining project evidence that the biochar production process had met requirements 1.1.4 to 1.1.6 of the Biochar Methodology.	N/A.
	Partial	Aperam Bioenergia has informed that the laboratory tests were requested from the University, but the results were not available for the audit. The previous laboratory analysis results from the period of 08 February 2022 to 14 February 2022 were used for the CORC calculation (the reporting period covered by this audit was 11 October 2022 to 30 April 2023). Aperam Bioenergia considered a molar H/C_{org} ratio of 0.667. The auditor recommends that Aperam Bioenergia consistently commissions lab tests to gage changes in lab results, ensuring that the CORC calculation reflects the feedstock processed by the production facility for the reporting period.	Recommendation 1

Requirement	Requirement Met?	Verification Remarks	Corrective Action Request / Recommendations
Confirm that measures are taken for safe handling and transport of biochar to prevent fire and dust hazards.	Y	Aperam Bioenergia's charcoal production operations are batch-based. As such, kilns are filled up with wood, the combustion chamber sealed, and the pyrolysis process undertaken in each kiln. During the cooling phase, heat is dissipated through the walls and the top of the kiln, which is left to cool down. Once cooled, the combustion chamber is open and the char is handled for transportation. As such, the auditor confirmed that cooling procedures were carried out within the operation to ensure the biochar produced is not hazardous for handling and transport.	N/A.

Confirmation of Production Facility Eligibility

Table 2: Production Facility assessment

Requirement	Requirement Met?	Verification Remarks	Corrective Action Request / Recommendations
Confirm the Production Facility Eligibility under the general rules of Puro Standard.	Y	The auditor confirmed that the audited body has already gone through a Production Facility Audit in 2022 and achieved a positive outcome.	N/A.
Confirm that the quantity of biochar produced and sold is documented via appropriate processes.	Y	The auditor confirmed during the virtual site visit that an appropriately calibrated weighbridge was used to quantify the production output, as well as the biochar sent to soil incorporation. This data was documented and tracked using a management software and internal database.	N/A.

Quantification of CO_2 Removal

Table 3: Quantification of CO_2 Removal - Calculation Methodology

Requirement	Requirement Met?	Verification Remarks	Corrective Action Request / Recommendations
Confirm that the quantification of CO_2 removal is calculated using the Calculation formula of CO_2 removal.	Y	The auditor examined the CORC calculator provided by the audited body and confirmed that the formula applied in the quantification of CO_2 removal was as per the *Puro.earth CO_2 Removal Marketplace General Rules v3.0.*	N/A.
Confirm that the inputs to the Calculation formula of CO_2 removal are appropriate and consistent with the evidence provided.	Partial	The previous laboratory analysis results from the period 08 February 2022 to 14 February 2022, which were not for the biochar produced during the reporting period covered by the Audit (i.e. 11 October 2022 to 30 April 2023). Except where noted above, the auditor confirmed that the calculation formula of CO_2 removal are appropriate and consistent with the evidence provided.	Recommendation 1

Verification of Proofs

Table 4: Verification of proofs and documentation

Requirement	Requirement Met?	Verification Remarks	Corrective Action Request / Recommendations
Confirm that the standing data for the Production Facility meets the requirements of the Biochar Methodology and is consistent with other evidence.	Y	The auditor reviewed and validated the standing data provided by the audited body and confirmed it was consistent with other evidence and tested during desktop testing and the virtual site visit.	N/A.
Confirm that the necessary proof and evidence documents are maintained by the Production Facility as per Section 5 of the Biochar Methodology[2].	Y	The auditor confirmed appropriate processes were in place to collect and maintain proofs as per Section 5 of the Biochar Guidelines. The auditor also confirmed that there was no double counting or carbon positive marketing of biochar produced at this facility.	N/A.

[2] Information in Section 5 of the Biochar Methodology includes:

Peer Reviewer Conclusion

Name of the peer reviewer	Katherine Simmons
Peer reviewer's credentials	• Bachelor of Engineering (Honours) in Polymer Engineering (minoring in Chemical Engineering). • Category 1 Registered Greenhouse and Energy Auditor with the Clean Energy Regulator (Australia). • Climate Active Registered Consultant. • Integrated Management Systems Lead Auditor ISO 19011, ISO 9001:2015, ISO 14001:2015, ISO 45001:2018.
Peer reviewer contact details	Email: katherine.simmons@kreaconsulting.com.au Phone: +61 431 612 950
Outcome of the evaluation undertaken by the peer reviewer	Minor amendments to the report.

- Proof of sustainability of raw material for forest and/or waste biomass.
- LCA data for biomass and biochar production.
- Justification on the soil temperature used for the calculation of the biochar sequestration.
- Proof of product quality, production volume, sales and end use of biochar.
- Proof of no double counting/C positive marketing.

Appendix A: Table of Site Visit Findings

Table 5: Site visit summary table

Requirement	Requirement Met?	Verification Remarks	Corrective Action Request / Recommendations
Check that the raw material is of eligible type and sustainably sourced.	Y	The raw material used was sustainably sourced and met eligibility requirements, as it consisted of feedstock from non-native forests.	N/A.
Check that the LCA provided is consistent with observations on site.	Y	The auditor confirmed during the virtual site visit that the LCA specifics and emissions boundary were consistent with the on-site observations.	N/A.
Confirm that no fossil fuel is used for heating the pyrolysis reactor, and the pyrolysis gases are recovered or combusted.	Y	The kilns had lateral oxygen entrances and underground ducts that provide access to the kilns floor, also known as combustion chambers. In the combustion chambers, pieces of wood are placed to ignite the kilns, starting the wood carbonization process. The LCA showed that biomass was used for ignition of the various kilns, and this was confirmed during the virtual site visit.	N/A.
Check that the Production Facility's documentation system is accurate and reliable for recording the quantity of biochar produced and sold.	Y	The auditor confirmed that Aperam Bioenergia had appropriate documentation systems in place to accurately and reliably document the quantity of biochar produced and used for soil application.	N/A.
Check that appropriate metering infrastructure is in place and calibrated correctly to quantify the Production Facility output and the energy use of the Production Facility.	Y	The auditor confirmed that appropriate metering infrastructure was present to quantify the Production Facility output. Furthermore, the auditor confirmed based on the evidence provided and additional discussions with Aperam Bioenergia personnel that robust procedures were in place to ensure that the production input and output, as well the quantity of biochar applied on soil were appropriately quantified. The auditor sighted during the virtual site visit that an appropriately calibrated weighbridge was used for the process.	N/A.

Requirement	Requirement Met?	Verification Remarks	Corrective Action Request / Recommendations
Check that appropriate processes are in place to quantify the inputs to the Calculation formula of CO_2 removal for the purpose of Preparing the Output Report and calculating CORCs.	Partial	The previous laboratory analysis results from the period 08 February 2022 to 14 February 2022, which were not for the biochar produced during the reporting period covered by the Audit (i.e. 11 October 2022 to 30 April 2023). Except where noted above, the auditor confirmed that appropriate processes are in place to quantify the inputs to the Calculation formula of CO_2 removal for the purpose of preparing the Output Report and calculating CORCs.	Recommendation 1