PURO.EARTH OUTPUT AUDIT REPORT

Carbofex Oy

Puro Standard General Rules (v3.1)

Audit Start - End date: 12.3.2025 - 21.3.2025

Project Number: PRJN-918414

DNV Team: Heidi Käkelä, Line Telje Høydal

Carbon removal method: Biochar

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ATTACHMENT 1_Carbofex 2025 requirements and verification results

Introduction

This report summarises the results and conclusions from the performed production facility and output audit. The audit is performed as a formal part of the Puro.earth certification process. The key objective is to determine the compliance of the operations with the Puro requirements.

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Production facility standing data

(PURO General Rules Version 3.1)

General information

Facility unique identity	507468
CO2 Removal Supplier registering the Production Facility	GSRN number 643002406801000763
Name	Carbofex Oy
Location	Kaarnakatu 1, Nokia, Finland
Date on which the Production Facility became eligible to receive CORCs	01.09.2022
Volume of Output during the full calendar year	362,48 dry metric tonnes (eligible for CORCs) during 1.1.2024-31.12.2024
Removal Method(s) for which the plant is eligible to receive CORCs	Biochar, Durability 100+ years
Production Facility has benefited from public support	No
Removal Method specific information as may be specified in the relevant Removal Method specific Methodology	Biochar, Pyrolysis process
Does the Production Facility Audit documentation fulfil the minimum criteria set in 2.2.4.2 in Puro Standard General Rules Version 4.0?	N/A
Validity of LCA	1.1.2024 - 31.12.2024
Has the CO2 Removal Supplier attested to the accuracy of the information provided by its signature as required in 2.2.4.3 in Puro Standard General Rules Version 4.0?	N/A
Monitoring period for Output Audit	1.1.2024 - 31.12.2024

Base for calculations in Output report

Reporting period & Facility		
Reporting period start	1/1/2024	
Reporting period end	12/31/2024	
Facility name	Nokia 1	

Totals over reporting period			Remarks
Biochar records			
Biochar in stock at period start	0.00	**dry metric tonnes**	
Biochar produced	362.48	**dry metric tonnes**	
Biochar in stock at period end	0.00	**dry metric tonnes**	
Biochar used (for which CORCs are claimed)	362.48	**dry metric tonnes**	
Life cycle greenhouse gas emissions, totals over reporting period			
$E_{biomass}$	37.96	**tonne CO_2-eq**	A
$E_{production}$	48.81	**tonne CO_2-eq**	A
E_{use}	25.89	**tonne CO_2-eq**	A
E_{stored}	1210.13	**tonne CO_2-eq**	B
CORCs issued	1097.48	**CORCs**	
Life cycle greenhouse gas emissions, scaled per tonne of biochar used			
$E_{biomass}$	0.10	**tonne CO_2-eq / tonne biochar**	A
$E_{production}$	0.13	**tonne CO_2-eq / tonne biochar**	A
E_{use}	0.07	**tonne CO_2-eq / tonne biochar**	A
E_{stored}	3.34	**tonne CO_2-eq / tonne biochar**	B
CORC factor	3.03	**CORCs / tonne biochar**	
Calculations details of E_{stored}			
Organic carbon content (average over period, min, max)	91.7%	91%	95%
Hydrogen content (average over period, min, max)	1.25%	0.80%	1.60%
Molar H/C_{org} ratio (average over period, min, max)	0.163	0.10	0.21
Soil temperature (average over period, min, max)	10.01	10.0	20.0

Short description of facility and any exclusions from verification scope observed

The Carbofex Nokia site pyrolysis process was in operation during auditing.
No deviations as compared to normal operation have been recorded.

Statement of confidentiality

The contents of this report, including any notes and checklists completed during the audit will be treated in strictest confidence, and will not be disclosed to any third party without the written consent of the customer, except as required by the appropriate accreditation authorities.

Disclaimer

An audit is based on verification of a sample of available information. Consequently, there is an element of uncertainty reflected in the audit findings. An absence of nonconformities does not mean that they do not exist in audited and/or other areas. Prior to awarding or renewing certification this report is also subject to an independent DNV internal review which may affect the report content and conclusions.

Audit results

Detailed output removal verified

SUMMARY AND OUTPUT CALCULATION		
Period	1.1.2024-31.12.2024	
Shipped eligible production volume	3050	m3
E_{stored}	-3.34	mt CO2 eq / mt biochar (dry)
$E_{biomass}$	0.10	mt CO2 eq / mt biochar (dry)
$E_{production}$	0.13	mt CO2 eq / mt biochar (dry)
E_{use}	0.07	mt CO2 eq / mt biochar (dry)
CORC factor	-3.03	mt CO2 eq / mt biochar (dry)
TOTAL number of CORCS	**1,097.48**	CORCs

Positive indications

Recommendations for improvement

One qualified positive finding was noted with regards to the findings:

- The logic of the production data documentation is not clear throughout, particularly where hard-coded values are used to generate aggregated production figures. There is an increased risk of misstatement, although the production figures in scope were found to be consistent with the CORC reporting.

In addition to the one qualified positive finding, the auditor notes three observations:

- Energy consumption figures are metered centrally. Submetering of energy consumption figures adds granularity to the data and increases accuracy.
- Evidence of end-use makes use of the Supplier's own process of knowing the customer. There has been no dedicated risk assessment with regards to the use of this practice. Conducting a risk assessment allows for dedicated preventative and mitigative measures to be identified in advance of any risks materializing.
- The process of selection and justification of the soil average temperature for areas other than the Nordics is not fully clear based on the methodology employed or on the supplier's side.

Audit findings

Detailed findings requiring corrective actions:

None

Conclusion

Conclusion	
The company is found compliant towards CORC requirements set in Puro Standard General Rules Version 3.1 and the Biochar Methodology, and CORCs can be issued to the Output during the Monitoring period	Yes
The company is found NOT to be fully compliant towards CORC requirements set in Puro Standard General Rules Version 3.1 and the Biochar Methodology and corrective actions are needed before CORCs can be issued to the Output during the Monitoring period	

ATTACHMENT 1

Biochar Methodology

Requirements and verification results

Company:	Carbofex Oy Kaarnakatu 1 37150 NOKIA
Facility address:	Finland
Date:	12.3.2025
Auditor:	Heidi Käkelä
Participants:	Anna Yrjönen, Janne Kantero, Jussi Lemiläinen

Module	Evidence piece	Associated requirements	Verification method & source	Verification remarks	Compliance
01. Records of biomass used	Sustainability certificates of biomass	['r1.1.2', 'r5.2.1']	Metsäsertifikaatti_Kouhintila; PEFC_LÄNSI_ARY_2023-06	Certificates for Kouhin Tila and Metsänhoitoyhdistys Pohjois-Pirkka ry are covered by valid PEFC certificate for the year 2024; there is a single batch of raw material bought from Stora Enso Oyj whose sustainability has not been evidenced, but it accounts for 1.6% of the entire purchases over the year. Carbofex is requested to elaborate on the purchase from Stora Enso and whether it should be accounted into the raw materials considered under the reporting period. **03/19/2025: Carbofex response 3/18/2025 confirms that the Stora Enso shipment is not included in the scope of the CORCs, but is rather for a separate customer project. The auditor considers this reponse to be sufficient in the light of the other submitted audit materials and has closed the finding as positive.**	Positive
	Records of biomass used	['r5.2.1']	Audit interview and Puun hankinta raportointikaudella	The purchases are as reported, all from the same PEFC certified group with the small divergence for one batch from Stora Enso Oyj, described under the criterion "Sustainability certificates of biomass". There is barely any storing of raw materials at the site, so a mass balance of ingoing or outgoing balance is deemed largely irrelevant.	Positive
02. Records of biochar produced	Production data for entire audited period	['r5.3.1']	Tuotantoraportti 1-12.2024	Some small discrepancies between the calculations, non-material level misstatements with regards to the sold quantities of biochar **outside of the CORC sales. As these errors are not material to the claim, this part is assessed to be a qualified positive.** The supplier is requested revise the calculations for the next audit and to ensure that the totals reported on a separate aggregate table correspond with the reported production totals for the months. **Observation: The logic of the calculations is not clear everywhere, especially where instead of live formulas hard-coded figures have been reported in the aggregate.**	Qualified positive
	Biochar environmental quality analysis	['r1.1.7', 'r5.3.4']	EBC certificate 2024; Product list EN	The supplier is covered by a valid EBC certificate for the year 2024.	Positive
	Biochar elemental analysis	['r1.1.6', 'r5.3.3']	EBC lab analyses: AR-23-FR-012882-01; AR-23-GQ-006421-01; AR-24-FR-060085-01; AR-24-GQ-005203-02; AR-25-GQ-000076-01; EX-23-FR-003185-01	AR-23-GQ-001614-01 missing from the audit package, but is referred to in the CORC calculations. Carbofex is requested to account for the missing elemental analysis. **03/19/2025: Carbofex has submitted the missing documentation on 03/18/2025, the finding is closed as positive.**	Positive
	Calibration certificates for measuring devices	['r1.2.4', 'r5.3.1', 'r5.3.5']	(None deemed relevant in scope)	There is a scale that is not used for the CORC biochar in scope for the audit, metering is done on a high level, necessitating assumptions regarding the allocation of consumption. **Observation: Submetering adds granularity to the data and allows for the supplier to follow trends in the production process better - leading to more accurate LCA results, among other things. However, efforts should be scaled to the size of the supplier's organization and - as such - the measures are deemed sufficient.**	Positive
03. Records of biochar used	Sales invoices with explicit mentions about CO2 removal claims	['r5.5.3']	Invoices no: 3240115; 3240029; 3240008; 3240081; 3240076 Quotations to two customers and an agreement with a long-standing customer were also sighted and their content was confirmed.	Carbofex runs three different sets of documentation in commercial transactions that emphasize the requirement for CO2 claims not to be made by the biochar purchaser (unless these are specifically requested).	Positive
	Evidence that end-use has taken place	['r1.1.1', 'r5.4.2']	CORC-biochar use cases with transportation distances	Puro-approved solution to the requirements is a table implemented for the follow-up reporting for the ongoing issuance rights that shows the destination and the purpose of biochar purchases from customers. These are based on dialogue during the purchasing and based on Carbofex's knowledge of their customers. The EBC also lists permissible uses of the end-product, the risk of fraudulent behavior is assessed to be low (although no risk assessment exists). **Observation: A risk assessment performed at the level of the supplier's organization allows for dedicated mitigative measures to be identified in advance of risks materializing.**	Positive
	Branding claims on packaging, product data sheets, website	['r5.5.2b']	Claims on materials: Biochar packaging.jpg; Carbofex biochar product properties 2025; carbofex_sakkiteksti 2025 (003)	Claims on packaging make it clear that the biochar is meant for use as soil additive and conditioning, and that any CO2 claims are made through Puro.earth.	Positive
04. Updated LCA calculations & supporting data	Updated life cycle assessment data for Output Audit	['r1.1.3', 'r3.1', 'r3.2', 'r3.3', 'r5.2.2', 'r5.3.2b', 'r5.4.1']	LCA Calculation Tool for Output Audit 2025 - Carbofex Nokia (for Auditor)	The LCA is made into the Puro base, assumptions have been checked and are based on a diligent analysis of the life-cycle emissions of Carbofex's products. Where figures given through other actors have been deemed to be low, Carbofex implements conservative measures.	Positive
	CORC Report Summary	['r5.3.2b']	CORC Report Summary for Output Audit 2025 - Carbofex Nokia (for Auditor)	Soil temperature assumptions on the first row of the report were based on an average soil temperature of 20 celsius for Austria, which has been deemed somewhat high. The figure was corrected during the audit from the high assumption to a lower one. First row in the report was traced back to data successfully. The finding was closed based on the Supplier's action. **Observation: The impact of the error is not material for the claim, but the justification process behind the selection of temperatures is not currently clear based on the methodology and, hence, from the supplier's side either.**	Positive