PURO.EARTH OUTPUT AUDIT REPORT

Carbofex Oy

Puro Standard General Rules Edition 2024 (Version v4)

Audit Start - End date: 22.2.2024 – 22.2.2024

Project Number: PRJN-701042

DNV Team: Mari Tuomaala

CO_2 sink Sector (Puro Scheme): Biochar

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Introduction

This report summarises the results and conclusions from the performed 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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Whether certifying a company's management system or products, providing training, or assessing supply chains, and digital assets, we enable customers and stakeholders to make critical decisions with confidence.

We are committed to support our customers to transition and realize their long-term strategic goals sustainably, collectively contributing to the UN Sustainable Development Goals.

Production facility standing data

(PURO General rules Biochar methodology)

General information

Facility unique identity	VAT register number 2776845-8
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	1.3.2023
Volume of Output during the full calendar year prior to registration	382,39 dry metric tonnes (eligible for CORCs) during 1.3.2023-31.12.2023
Removal Method(s) for which the plant is eligible to receive CORCs	Biochar
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.

Base for calculations in Output report

E_{stored}	-3,46	mt CO2 eq / mt biochar (dry)
$E_{biomass}$	0,11	mt CO2 eq / mt biochar (dry)
$E_{production}$	0,12	mt CO2 eq / mt biochar (dry)
E_{use}	0,05	mt CO2 eq / mt biochar (dry)

Short description of facility and any exclusions from verification scope observed

Carbofex Nokia site pyrolysis process was in operation during auditing. No deviations as compared to normal operation were made.

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		
Formula: CORCs= Estored-Ebiomass-Eproduction-Euse		
E_{stored}	-1324,41	tonne CO2-eq
$E_{biomass}$	41,55	tonne CO2-eq
$E_{production}$	47,22	tonne CO2-eq
E_{use}	17,27	tonne CO2-eq
CORC FACTOR (net carbon sequestration over 100 years)	**-3,19**	**CORCs / tonne biochar**
Total number of CORCs	**-1 218,37**	**CORCs**

Positive indications

- Systematic way of maintaining production reports.

Recommendations for improvement

- NA.

Audit findings

Detailed findings requiring corrective actions:

NA.

Conclusion

Conclusion	
The company is found compliant towards CORC requirement, and a certificate can be issues	Yes
The company is found NOT to be fully compliant towards CORC requirement and corrective actions are needed before a certificate can be issued	

ATTACHMENT 1

Biochar Methodology

Requirements and verification results

Company:	Carbofex Oy	
Facility address:	Kaarnakatu 1, 37150 Nokia	
Date:	22.2.2024	
Auditor:	Mari Tuomaala	3E Energy Oy / DNV
Participants:	Anna Yrjönen	Carbofex Oy
	Janne Kantero	Carbofex Oy
	Jussi Lemiläinen	Carbofex Oy

1.1. Requirements for activities to be eligible under the methodology		Verification method	Verification remarks	Compliace
1.1.1	Biochar must be used in applications that preserve its carbon storage property (e.g. greenhouse substrates, surface water barrier, animal feed additive, wastewater treatment, insulation material, landfill/mine absorber, soil additive). Biochar must not be used in applications that destroy its carbon storage, e.g. fuel or reductant uses.	Review of example invoice who uses substrates. Review of an example contract.	Customers of the CORC eligible biochar include those who manufactue and sell substrates and soil amendments that can be verified from their web pages.	yes
1.1.2	Biochar must be produced from sustainable biomass: sustainably sourced biomass, or waste biomass such as agricultural waste, biodegradable waste, urban wood waste or food waste.	Certificate review	Wood material deliverer is Metsänhoitoyhdistys Pohjois-Pirkka ry. Certificate issuing body is Kestävän Metsätalouden Yhdistys ry.	yes
1.1.3	The producer must demonstrate net-negativity with results from a life cycle assessment (LCA) or carbon footprint of the biomass production and supply, the biochar production process, and of the biochar use, including disaggregated information on the emissions arising at different stages and from different greenhouse gases.	Results of LCA identified in the CORC calculation Excel.	LCA calculations are produced by Puro. Puro delivers the results of the calculation to Carbofex to be used in CORC calculations. Carbofex has provided data for the basis of calculations.	yes
1.1.4	In the biochar production process, the use of fossil fuels (coal, oil, natural gas) for ignition, pre-heating, or heating of the pyrolysis reactor is permitted. However, the co-firing of fossil fuels and biomass in the same reaction chamber is not permitted, as fossil carbon may be mixed with the biochar product. The greenhouse gas emissions associated with use of these fuels must be included in the LCA (i.e. supply of fuel, combustion of fuel, fugitive emissions), as for any other energy and material input used during the production process.	Review of process diagam. Review of process during the factory visit.	Process diagram indicate that there is no fossil fuel streams into the reactor. During the factory visit it was discussed that fossil fuel is used as start up fuel and in fork lifts/ rigs.	yes
1.1.5	In the biochar production process, the pyrolysis gases must be combusted or recovered through an engineered process that either negates or makes negligible any methane emissions to the atmosphere. Bio-oil and pyrolysis gases can be stored for later use as renewable energy or materials.	Review of process diagam. Review of process and the side streams during the factory visit.	All gases are collected and led (back to the pyrolysis chamber and) to the boiler. In the malfunctioning situation, all gases are burned in the flare. Pyrolysis oil was collected and stored for later use.	yes
1.1.6	The molar H/Corg ratio must be less than 0.7. H/Corg ratio is an indicator of the degree of carbonisation and therefore of the biochar stability. Values exceeding 0.7 are an indication of non-pyrolytic chars or pyrolysis deficiencies (Schimmelpfennig and Glaser 2012).	Lab tests from two periods were reviews (both delvered to Puro/ DNV).	The ratios were 0,1 (03/-23) and 0,17 (10/-23)	yes
1.1.7	The biochar produced must meet any product quality requirements existing in the jurisdiction where biochar is used and for the specific applications considered. In other words, the biochar produced must be legal to use in the manner proposed.	As above.	The EBC certificate indentifies / covers several end-used, and this certificate was "EBC-FeedPlus".	yes
1.1.8	Measures must be taken for ensuring safe working environment, cleaner production principles (see section 5.3.6), and safe handling and transport of biochar, e.g. to prevent fire, dust and health hazards. Such safety measures include, but are not limited to, providing a Material Safety Data Sheet, post-production quenching and cooling of biochar, and appropriate flue gas treatment systems.	Safe working environment was discussed during the factory visit and in the meeting.	All new employeers are trained before starting and the health and safety issues are documented in "Turvallisuus- ja toimintaohjeistus biohiilen tuotantolaitteistolle". Pelastuslaitos reviewed the "pelastussuunnitelma" and the factory in 30.8.2023. Customers receive "Material safety data sheet". Post-production quenching and cooling of biochar are in place.	yes

1.2. Requirements for the Production Facility Audit		Verification method	Verification remarks	Compliance
1.2.1	The Production Facility Auditor checks the Production Facility against the Requirements for activities to be eligible under the general rules of Puro Standard and the specific requirement in this methodology (section 1.1.), and the Proofs and evidence needed from the CO2 Removal Supplier (section 5).	The Production Facility Audit is performed as new production facility is starting up its activity. Carbofex has performed this activity in 3/-23.	Puro.Earth Sharepoint audit files are entitled as "Carbofex Nokia 1 Output Audit 2024". Pre-documentation was delivered to Puro accordingly.	N/A
1.2.2	The CO2 Removal Supplier shall be able to demonstrate Environmental and Social Safeguards and that the Production Facility activities do no significant harm to the surrounding natural environment or local communities.	as above	as above	N/A
1.2.3	The CO2 Removal Supplier shall be able to demonstrate additionality, meaning that the project must convincingly demonstrate that the CO2 removals are a result of carbon finance. Even with substantial non-carbon finance support, projects can be additional if investment is required, risk is present, and/or human capital must be developed. To demonstrate additionality, CO2 removal Supplier must provide full project financials and counterfactual analysis based on Baselines that shall be project-specific, conservative and periodically updated. Suppliers must also show that the project is not required by existing laws, regulations, or other binding obligations.	as above	as above	N/A
1.2.4	The Production Facility Auditor checks that the Production Facility is capable of metering and quantifying the biochar output in a reliable manner, for the Quantification of CO2 Removal (section 4). This check also prepares the CO2 Removal Supplier for producing the periodic Output Report.	as above	as above	N/A
1.2.5	Collection of standing data of the Production Facility. The Production Facility Auditor collects and checks the standing data of the Production Facility and the CO2 Removal Supplier.	as above	as above	N/A

5.2. Biomass production and supply				
5.2.1	Proof of origin and sustainability of the biomass feedstock used must be kept in records, be submitted to Puro, and made available for Output audits.	Certificate review	Wood material deliverer is Metsänhoitoyhdistys Pohjois-Pirkka ry. Certificate issuing body is Kestävän Metsätalouden Yhdistys ry.	yes
5.2.2	Life cycle assessment data for the biomass production and supply must be provided and documented. In particular, climate change impact must be presented in a disaggregated way exhibiting the contribution of the different life cycle stages described in section 4.3, as well as the contribution of major greenhouse gases.	Results of LCA identified in the CORC calculation Excel.	LCA calculations are produced by Puro. Puro delivers the results of the calculation to Carbofex to be used in CORC calculations. Carbofex has provided data for the basis of calculations. Carbofex has provided: transportation distances, transported mass, density (for each batch), and ton-kilometers as well as transportation vehicle types for the basis of calculations all emission data cradle-to-grave.	yes
5.5. Proof of no double counting				
5.5.2	A statement is needed from the CO2 Removal Supplier that the underlying physical product (biochar) in which the CO2 is stored will not be sold or marketed as "climate positive" if the CO2 removal certificate associated with the underlying physical product (biochar) is removed from the underlying product and sold to another stakeholder not associated with the underlying physical product.	A review of a contract.	Contracts between majority of clients and Carbofex state that the product cannot be marketed as climate positive or for CO2 removal. In all offers, order confirmations and invoices it is mentioned that these marketing claims are prohibited.	yes
5.5.3	Check of the packaging of the product (how the product is branded) is needed, if CO2 removal certificate associated with the underlying physical product (biochar) is removed from the underlying product.	Review of packaging and discussions.	In the packaging there is statement a "climate positive for carbon credits go to Puro.Earth". The labelling has remained about the same since 2019. This issue has been brought up in the audit 3/-23, and discussed and accepted by Puro afterwards.	yes
5.5.4	No marketing and branding claims can be made by the end-user (user of biochar) that the underlying physical product (biochar) is a carbon sink, when the decoupled CO2 removal certificate has been sold to and accounted by another stakeholder not re-associated with the underlying physical product. The proof can be an offtake agreement, documentation of the sale or shipment of the product, indicating the procedures for claiming the CO2 removal certificate.	Review of an example invoice.	Template (and consequently the invoices) state clearly that "The biochar has been certified for CO2 removal. The CO2-certificate has been issued to the certification buyer".	yes

4.6 Calculation parameters			
	Biochar used (for which CORCs are claimed)	382,39	dry metric tonnes
	E_{stored}	-3,46	mt CO2 eq / mt biochar (dry)
	$E_{biomass}$	0,11	mt CO2 eq / mt biochar (dry)
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