

Playbook for Biochar Producer and Wholesaler: How to get Compensated through carbonfuture



Table of Contents

Overview	2
Why carbonfuture?	2
What is carbonfuture and What's in it for You as Biochar Producer and Wholesaler?	2
The Biochar Production Certificate	3
The carbonfuture Coupon	3
Linking production and sink certificates in the cf-Certificate	4
Cash-Flows	4
Step 1: Biochar Producer	5
Registration of the production certificate on carbonfuture	5
Step 2: Wholesaler / Sink Registrar	7
Overview of the Calculation of the CO2 Equivalent Value of Biochar-Based Sinks	10
Appendix: carbonfuture Coupon	11

Overview

Why carbonfuture?

In order to limit global warming below catastrophic levels, significant emission reductions are essential but by no means sufficient. There is already too much CO₂ in the atmosphere, and we must capture and safely store billions of tons over the next decades. That is, we need carbon sinks. Carbon sinks are fundamentally different to emission reductions. Scalable and readily available nature-based technologies are rare but available:

- Carbon forestry
- Soil organic carbon
- Biochar

Many emission compensation schemes realized in various carbon markets already exist. However, very few strictly distinguish between carbon sinks from emission reduction projects (e.g. renewable energy). In addition, all existing schemes are vague on the duration of carbon sequestration. Third, the measurability, verifiability of carbon credits is weak and therefore may create a lack of trust. Many of them are oversupplied and require additionality which seems irrelevant for negative emission technologies (NET) and true carbon rebalancing. The carbonfuture platform was created to address these shortcomings of existing schemes. In contrast to other carbon markets, carbonfuture offers:

- True carbon sinks only
- Carbon sink stability over 100 years¹
- Guaranteed unalterable documentation and end-to-end auditability on the carbonfuture Blockchain²³

What is carbonfuture and What's in it for You as Biochar Producer and Wholesaler?

The carbonfuture platform provides both a registry and a trading platform for carbon sinks. Each individual carbon sink is represented and unalterably documented on the carbonfuture blockchain by a **cf-Certificate**.

Biochar-based sinks are the starting point and first use-case for carbonfuture. In reimbursing them, carbonfuture injects money into the biochar value chain and fosters the creation of an additional revenue stream for biochar applications.

¹ If a sink cannot be guaranteed to be fully stable over 100 years, e.g., through decomposition processes, more carbon must be stored initially in order to guarantee 1 ton over 100 years on average (a physicist would speak of "100 ton years")

² The applied blockchain technology is IBM Hyperledger, a non-energy intensive technology

³ We use a permissioned blockchain and guarantee data confidentiality; accordingly, we do disclose sensitive sink details only to admitted auditors and not to the general public

For biochar-based sinks, the cf-Certificates are based on two elements described below, the **Production Certificate** and the sink documentation as evidenced by the **carbonfuture Coupon**.

The Biochar Production Certificate

The **biochar producer** registers the production certificate of the pyrolysis facility. The production certificate assesses the percentage of a mass unit of biochar which can be considered as a carbon sink, net of emissions related to feedstock preparation and pyrolysis. There are two aspects to the production certificate:

- The pyrolysis plant must be certified. This includes in particular an assessment of the emissions and energy consumption of the pyrolysis process. The manufacturer of your pyrolysis plant must provide the required information on this to the reviewer.
- The individual production process must be certified. This includes an assessment of the feedstock production and preparation process and the energy used. It will become part of the general EBC⁴ certification beginning in Q2 2020.

Currently, the EBC is the only issuer of eligible production certificates. Carbonfuture may also accept production certificates by other issuers if they adhere to comparable standards. We encourage alignment and collaboration between the respective national, regional and global standards and the EBC in order to ensure comparability and a level playing field.

The carbonfuture Coupon⁵

Biochar as a raw material comes in a huge variety of qualities and respective price levels. In addition, biochar has a vast range of potential applications ranging from filtration material, construction additive to agricultural use. Not all of these applications lead necessarily to a stable carbon sequestration and hence to not qualify as a stable carbon sink.

Therefore, the key to creating an accurately quantified carbon sink based on biochar lies in confirmation and documentation of the actual carbon preserving application of the material. To ensure that the biochar is used in a manner that does actually sequester the carbon, the **biochar wholesaler** together with the end user must document the use of the material on the carbonfuture platform.

This documentation validates the actual sinks in a very granular way. For each shipping of biochar from the wholesaler to the end user, an individual carbonfuture Coupon, filled out and signed by the end user of the biochar, provides the required evidence. Furthermore, with this document, the end user warrants to transfer all rights that come with the respective carbon sink creation.

⁴ EBC stands for E

⁵ An example of the carbonfuture Coupon is provided in the Appendix

Linking production and sink certificates in the cf-Certificate

The Production Certificate and the carbonfuture Coupon are linked on the carbonfuture platform. After validation of both documents, carbonfuture issues a cf-Certificate for each individual sink. This cf-Certificate represents the claim on the climate service provided by the sink and therefore has value. After issuance, it is assigned to the registrar of the sink (which is typically the wholesaler or the end user), who is then the registered owner of the cf-Certificate.

Cash-Flows

The owner of the cf-Certificate may sell it to any entity which acts as Broker on the carbonfuture platform. Initially, carbonfuture GmbH will act as the primary Broker and will buy cf-Certificates from the sink registrar (e.g., the wholesaler). As the marketplace evolves, we expect and encourage new Brokers to join.

In summary, carbonfuture only compensates the sink registrar in exchange of the cf-Certificate. However, both the biochar producer and the end user are key contributors to the climate service. The producer sells certified biochar, and the end user signs the Coupon, providing relevant data and substantiating the claim related to the climate service (i.e. carbon sequestration). These two parties deliver their service to the wholesaler and, strictly speaking, the monetary compensation is subject to the respective contractual relations. Together with our pilot partners we currently have a model where the sink registrar reimburses the end user in exchange of a signed carbonfuture Coupon. In this model, the sink registrar keeps a handling margin and the end user receives a fair share. The biochar producer benefits as the demand for the certified product is strengthened and better prices can be realized.

In buying the cf-Certificates from the wholesaler, carbonfuture injects money into the biochar value chain and fosters the creation of an additional revenue stream.

Step 1: Biochar Producer

Registration of the production certificate on carbonfuture

Once the Biochar Producer has been certified and a carbon sink value has been calculated for their biochar production facility, an account will be set up on the carbonfuture platform. Production certificates can be registered in a simple web-form on the carbonfuture platform. This has to be done only once for each production certificate. The current EBC⁶ production certificates on our platform are typically valid for the duration of one year.

demo.carbonfuture.earth/producer/certificates/add

carbonfuture

REGISTERED PRODUCTION CERTIFICATES

+ ADD CERTIFICATE

NEW ENTRY

DUMMY EBC BIOCHAR PRODUCER AG 2020

Certificate ID	5dc900b1-4718-4daa-8293-03f4d1073e33
External ID	AT0011
Status	Published
Start Date	1 Sep 2019
End Date	31 Aug 2020

REGISTER PRODUCTION CERTIFICATE

SUMMARY

Production Certificate Name*

Production Certificate Issuer*

External ID*

Batch Start Number*

Batch End Number*

CANCEL

SUBMIT

⁶ EBC stands for “European Biochar Certificate” by the Ithaka institute. Currently, the EBC sink certificate is the only eligible production certificate on carbonfuture

In order to register a sink based on the biochar produced under your production certificate, the ID of your production certificate will be needed. This ID is generated automatically by the carbonfuture platform. Accordingly, you need to provide this information to the wholesaler of your biochar. Clicking on the ID (top of detail view) on copies it into your clipboard and you can just paste it into an email:

demo.carbonfuture.earth/producer/certificates/view/5dc900b1-4718-4daa-8293-03f4d1073e33

carbonfuture

REGISTERED PRODUCTION CERTIFICATES

+ ADD CERTIFICATE

DUMMY EBC BIOCHAR PRODUCER AG 2020

Certificate ID

5dc900b1-4718-4daa-8293-03f4d1073e33

External ID

AT0011

Status

Published

Start Date

1 Sep 2019

End Date

31 Aug 2020

DUMMY EBC BIOCHAR PRODUCER A...

SUMMARY

Certificate ID

5dc900b1-4718-4daa-8293-03f4d1073e33

The Certificate ID is needed for the Sink Registrar to refer to your Production Certificate. Click on the ID to copy the value to your clipboard.

Certificate Name

Dummy EBC Biochar Producer AG 2020

Certificate Issuer

Dummy Institute, Zertihausen

External ID

AT0011

Step 2: Wholesaler / Sink Registrar

Biochar sold for use in soils, feed additives, building materials or other uses that will sequester carbon, can proceed to the next step in the cf process. Required information includes:

- Production certificate ID number
- Relevant post production data including gross and dry weight of the material, transport means (e.g. truck, train) and transport distance
- Upload the carbonfuture Coupon, which is filled out and signed by the end-user; with this document, the end-user confirms the application of the biochar in a carbon preserving manner, and the client confirms to transfer all rights related to the climate service provided by the biochar application (including but not limited to getting public or private funding for the same climate service, or using it for the own sustainability report⁷)

[←](#)
[→](#)
[↺](#)

demo.carbonfuture.earth/registrar/sinks/add

[🔑](#)
[🔍](#)
[☆](#)
[☰](#)

carbonfuture

Berta Brecht (Biochar Producer AG)
 Sink Registrar

MY SINKS

MY CF-CERTIFICATES

PAST TRADES

+ REGISTER SINK

↺

NEW ENTRY

BIOCHAR DELIVERY JANUARY

External ID

LS0001

cf-Certificate Name

CF-Biochar delivery January

Certification Status

Certified

Production Certificate ID

5dc900b1-4718-4daa-8293-03f4d1073e33

BIOCHAR DELIVERY DECEMBER

External ID

LS0000

cf-Certificate Name

CF-biochar delivery december

Certification Status

Certified

Production Certificate ID

5dc900b1-4718-4daa-8293-03f4d1073e33

BIOCHAR DELIVERY FEBRUARY

External ID

LS0002

cf-Certificate Name

Certification Status

Pending

Production Certificate ID

5dc900b1-4718-4daa-8293-03f4d1073e33

BIOCHAR DELIVERY MARCH

External ID

LS0003

cf-Certificate Name

Certification Status

Production Certificate ID

5dc900b1-4718-4daa-8293-03f4d1073e33

REGISTER NEW SINK

SUMMARY

Sink Name*

Production Certificate ID

Batch Nr*

Description

External ID

Sink Type*

Biochar

Gross Weight (t)

Humidity (%)

Volume (m³)

CANCEL

REGISTER

⁷ For the avoidance of doubt: Referencing to participation in carbonfuture climate services in own marketing activities is possible, provided it is clear that the carbon balance is sold and the claim on it is made by a third-party. This is to prevent explicit and implicit double counting.

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 79106 Freiburg
 Deutschland
<https://carbonfuture.earth>

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 VAT-Reg. No.: DE328231744

Bank details
 Sparkasse Freiburg Nördlicher Breisgau
 IBAN: DE13 6805 0101 0014 0154
 BIC: FRSPDE66XXX

Once the sink registration is complete, it is eligible for purchase by the Broker. For this, the sink registrar must request cf-Certification by carbonfuture:

BIOCHAR DELIVERY MARCH



SUMMARY

Sink Name	Biochar Delivery March
External ID	LS0003
Sink Type	Biochar
Gross Weight (t)	3
Humidity (%)	30
Transport	100km by means of truck
Production Certificate	5dc900b1-4718-4daa-8293-03f4d1073e33
Description	This time, it's really Beert (not Michael) and he applies the biochar to liquid manure
Production Chain	Delivery from Kohlau AT to Spargelhausen DE

SINK LOCATION

Street	Erdbeerstr. 1
City	12345 Spargelhausen
Country	Germany



RESPONSIBLE PERSON

Name	Beert Vingaard
Company Name	Beerwein AG
Email	michael.beerwein@beerwein.ag
Street	Erdbeerstr. 1
City	12345 Spargelhausen
Country	Germany

ATTACHED DOCUMENTS

Document name	uploaded on
Demo_Coupon_3.pdf	22 Mar 2020, 13:17

ADD DOCUMENT

REQUEST CF-CERTIFICATION

Carbonfuture will then validate the information and issue a **cf-Certificate**. This cf-Certificate represents the rights on the climate service provided. Accordingly, this is the certificate which actually has value.

The owner of the cf-Certificate can offer this certificate for sale to a broker on the carbonfuture platform. Once the broker has ordered your cf-Certificate, you see the open order.

The screenshot shows the carbonfuture web application interface. At the top, there's a navigation bar with the carbonfuture logo and a user profile for Berta Brecht (Biochar Producer AG) with a checkmark. Below the navigation bar, there are three tabs: MY SINKS, MY CF-CERTIFICATES (which is active and has a red notification bubble with the number 1), and PAST TRADES. Under the MY CF-CERTIFICATES tab, there's a table with one row of certificate data:

Name	Timeframe	Sink	cf-Certifier	Certification date	Open Orders
CF-Biochar Delive...	2020 - 2120	Biochar Delivery Fe...	Carbonfuture GmbH	24 Mar 2020, 20:13	1

To the right of the table, there's a section titled "CF-BIOCHAR DELIVERY FEB..." and "OPEN ORDERS". The "CF-BIOCHAR DELIVERY FEB..." section contains a "SUMMARY" box with the following details:

- Certificate Name: CF-Biochar Delivery February
- Certification date: 24 Mar 2020, 20:13
- Start Year: 2020
- End Year: 2120
- Sink: Biochar Delivery February
- Amount (ta): 376

Below the summary is a "CF-CERTIFIER" section with the following details:

- Name: Carbonfuture GmbH
- Email: info@carbonfuture.earth

At the bottom of this section is a "SEQUESTRATION CURVE" graph showing the Gross Amount CO₂e(t) on the y-axis (ranging from 0 to 5) against time on the x-axis (ranging from 2020 to 2120). The curve is a blue area that starts at approximately 4.5 in 2020 and decreases linearly to 0 by 2120.

The "OPEN ORDERS" section shows a table with two columns: Broker and Order ID. There is one row with the following data:

Broker	Order ID
Carbonfut...	1d270079-9...

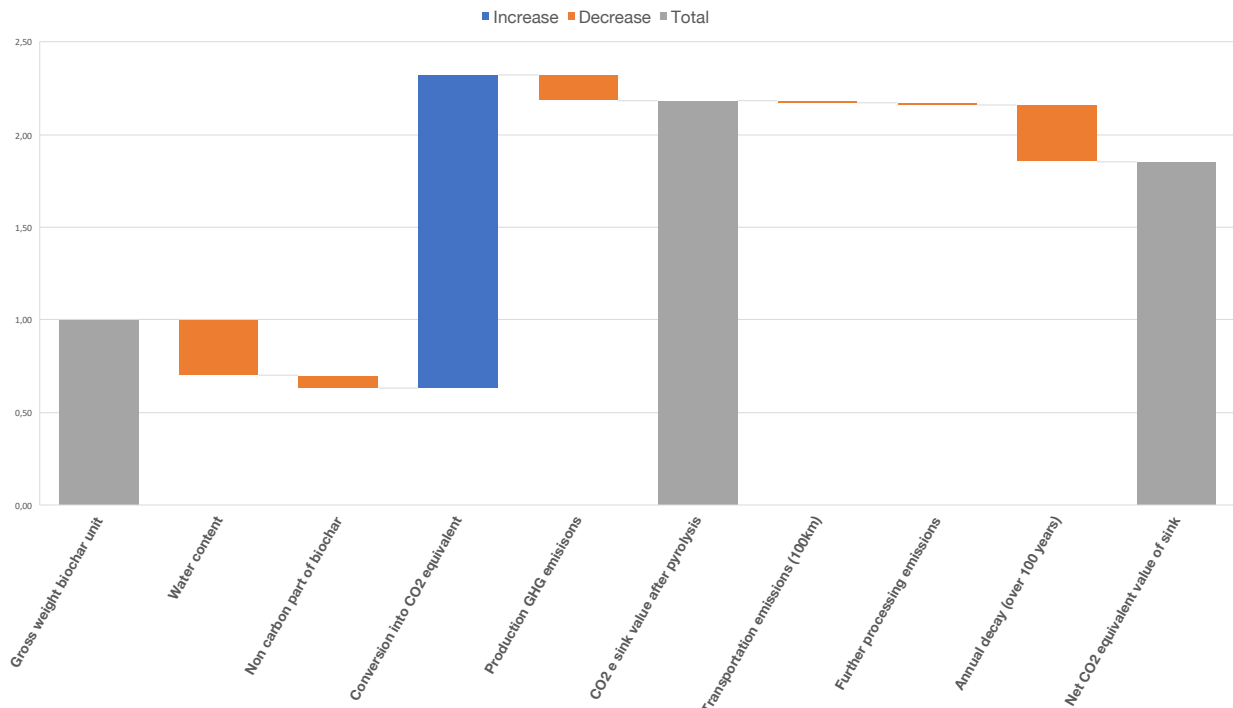
Next to the Order ID, there are two status icons: a red 'x' and a green checkmark.

After you accepted the broker's buy order, ownership of the cf-Certificate will be transferred to the broker⁸.

⁸ In the currently established workflow with carbonfuture acting as broker, we are reimbursing the selling party through a self-billing note (so we need the selling party's bank details and VAT-Reg. No. as applicable).

Overview of the Calculation of the CO2 Equivalent Value of Biochar-Based Sinks

Calculation of net CO2 equivalent value of biochar-based carbon sinks



In order to calculate the net CO2 equivalent value of a biochar-based sink, the following calculation steps are performed.

- All deductions based on dry mass biochar which are made to come up with the net CO2 sink value after pyrolysis (i.e., at production site), are provided by the (EBC) production certificate, namely the non-carbon part of the biochar and the production emissions
- The conversion of the gross weight of a unit biochar into dry mass needs to be provided by the sink registrar, either based on individual measurement of moisture content (the protocols must be stored and disclosed upon request) or based on bulk density measurements.
- Further deductions for transport and processing are based on data provided by the sink registrar on the carbonfuture platform. The respective calculations are performed by carbonfuture. The annual decay is determined to be 0.3% provided the production certificate asserts $H/C_{org} < 0.4$. This decay rate is a conservative estimation based on Lehmann, Johannes & Abiven, Samuel & Kleber, Markus & Pan, Gen-Xing & Singh, Bhupinder Pal & Sohi, Saran & Zimmerman, Andrew. (2015). Persistence of biochar in soil. Biochar for Environmental Management: Science, Technology and Implementation. 235-282. (see Figure 10.5).

Appendix: carbonfuture Coupon


CO₂-Sink Certificate
carbonfuture Coupon

To be filled out by the biochar wholesaler / sink registrar		
Name/firm		
Date		
Shipping Note ID (external ID)		
Gross weight (t)		

To be filled out by the end client / biochar user		
Name/firm		
Address	Head office	Address or location of sink (if different)
Street		
City, ZIP		
Country		
Type of application	<input type="checkbox"/> Direct soil application <input type="checkbox"/> Compost <input type="checkbox"/> Liquid manure treatment <input type="checkbox"/> Bedding for farm animals <input type="checkbox"/> Feeding off arm animals <input type="checkbox"/> Silage additive <input type="checkbox"/> Additive for anaerobic digestion <input type="checkbox"/> Organic biochar based fertilizer	

☐ The biochar user confirms that the manure (in case of biochar application as bedding or feeding) and the digestate (in case of anaerobic digestion) will be brought into soil and will not be burnt or pyrolyzed.

☐ The biochar user explicitly warrants that the claim on the carbon sink service provided is transferred to the wholesaler / sink registrar indicated above. He or she will not claim any rights related to this service. In particular, he or she will not claim any such rights in relation to any private or public subsidy or support program in the context of soil organic carbon, in his or her own sustainability report or for the purpose of own marketing (reference to the carbonfuture program for marketing purposes is eligible if is explicitly and unmistakably made evident that the rights related to the climate service provided are sold and may be claimed by a third-party).

☐ The biochar user explicitly agrees that his or her data which is registered and stored in relation to the referenced sink may be used by carbonfuture. They will be made public in an anonymized way, e.g. as part of statistics on the carbonfuture platform. In addition, they will be disclosed in complete and not anonymized form for control and audit purposes to persons who are authorized for this by carbonfuture or under the EBC certificate.

Place and date _____	Signature biochar user _____	
carbonfuture GmbH Paul-Ehrlich-Str. 7 79106 Freiburg Deutschland	CEO Dr. Hannes Junginger-Gestrich VAT-Reg. No.: DE328231744	Bank details Sparkasse Freiburg Nördlicher Breisgau IBAN: DE13 6805 0101 0014 0154 38 BIC: FRSPDE66XXX