Turning Carbon into Climate Action!

We make carbon removal transparent, credible, and impactful.



Carbon Standards

WHAT WE DO

Carbon Standards (CS) develops and operates:

Carbon Standards

Biochar Quality Standards

EBC – European Biochar Certificate

WBC – World Biochar Certificate

CDR-Standards

- ARTISAN C-SINK
- BIOCHAR C-SINK
- TREE C-SINK

Farm Services

farm standard @ WORLD-CLIMATE

Digital tools

- BIOCHAR TOOL
- Global C-Sink Tool

Strategic partnerships

- ithaka institute for carbon strategies
- BIOCHAR EUROPE
- International Biochar Initiative

Key figures

800 000+ issued t CO_2e

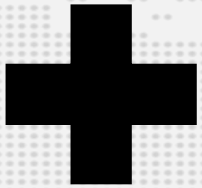
> 130 Projects

ICROA Endorsed

Industrial Biochar Standards

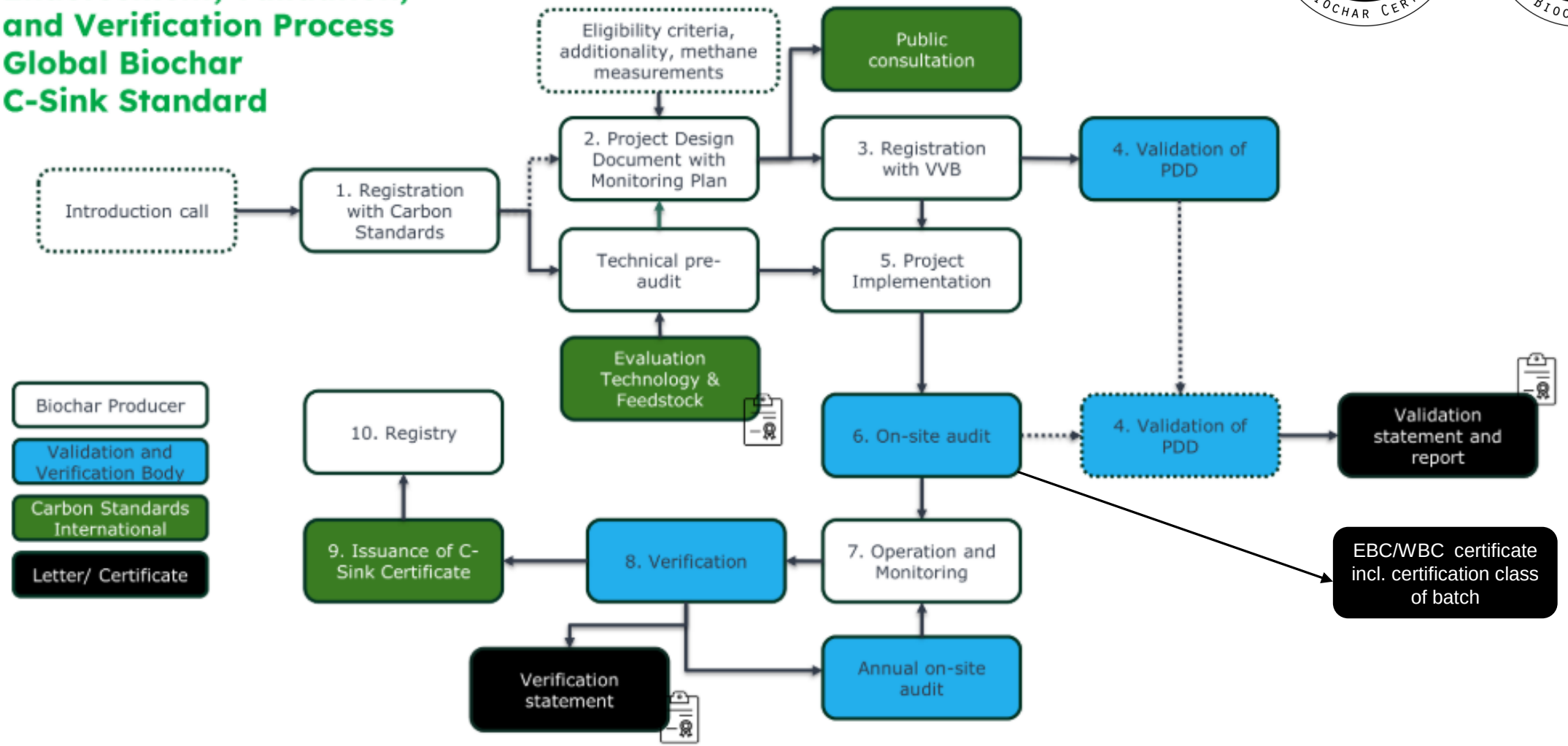




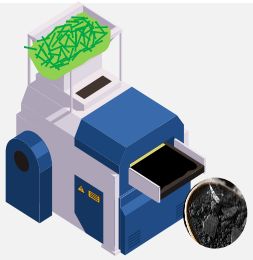




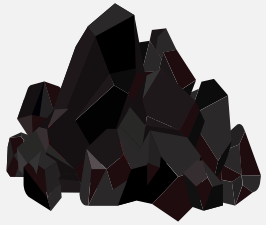
Endorsement, Validation, and Verification Process Global Biochar C-Sink Standard



Basic technical requirements



- Pyrolysis or Gasification technology >350°C
- Energy efficiency > 60% (based on mass balance on the educt and products)
- Homogenious Quality



- molar H/C_{org} ratio < 0.7
- 8 EFSA PAH <4 mg/kg

Sustainable Biomass

Permissible Biomass

- Feedstock must be listed on the
  EBC: **Positive list of permissible biomasses**
  WBC: **Positive list of permissible biomasses**
- Only biogenic carbon
- Depending on the feedstock, specific safeguards may be prescribed:
  - Sustainability (e.g. PEFC,FSC or SURE)
  - Hazard prevention (e.g. sterilization)
- Certification class feedstock limitations are based on scientific literature

Origin	Feedstock	ID	EBC-FeedPlus & EBC-Feed	EBC-AgroOrganic	EBC-Agro	EBC-Urban	EBC-Materials	EBC-Basic	Special requirements and notes
Agriculture: biomass from agricultural farms, including both residues and biomass deliberatly cultivated for biochar production.	Annual energy crops (e.g. corn, rape, sugar beets, sunflowers) grown specifically for energy or material biomass use.	Ag-01	✓	✓	✓	✓	✓	✓	For EBC-AgroOrganic only from organic cultivation. For C-sink certification, the amount of fertilizer used must be declared.
	Perennial energy crops (e.g. miscanthus, marbled silphyia, meadow cuttings) grown specifically for energetic or material biomass use	Ag-02	✓	✓	✓	✓	✓	✓	For EBC-AgroOrganic only from organic cultivation. For C-sink certification, the amount of fertilizer used must be declared.
	Woody biomass from short rotation plantations (SRC)	Ag-03	✓	✓	✓	✓	✓	✓	For EBC-AgroOrganic only from organic cultivation. For C-sink certification, the amount of fertilizer used must be declared.
	Tree, vine and shrub pruning	Ag-04	(✓)	✓	✓	✓	✓	✓	Particular attention to be paid to heavy metals from crop protection spraying. For EBC-Feed: only from defined and documented sources, biomass from municipal collection not allowed.
	Harvest residues such as straw, cabbage, leaves, stalks, husks	Ag-05	✓	✓	✓	✓	✓	✓	Particular attention to be paid to heavy metals from crop protection spraying.
	Old straw and grain dust	Ag-06		✓	✓	✓	✓	✓	Observe worker's protection in case of heavily dusty biomasses.
	Vegetables	Ag-07		✓	✓	✓	✓	✓	Only residual and waste materials that cannot or can no longer be used as animal feed. For EBC-AgroOrganic only from organic farming
	Seeds	Ag-08		✓	✓	✓	✓	✓	This only concerns expired seeds. For EBC-AgroOrganic only seeds from organic farming.
Forestry and wood processing: Natural bark and wood, untreated	Bark	F-01	✓	✓	✓	✓	✓	✓	Only from certified, sustainable forestry. Approved are the FSC PEFC ans SURE labels, others on request.
	Wood chips only from mechanically treated wood (pure firewood)	F-02	✓	✓	✓	✓	✓	✓	Only from certified, sustainable forestry. Approved are the FSC PEFC ans SURE labels, others on request.

Certification classes - WBC

WBC Premium

WBC-Premium is the highest achievable certification class. It provides a strong standard for the safe use of biochar in all sorts of agricultural and industrial applications.



WBC-Agro

WBC-Agro is considered safe for soil biology, crops, ground and surface water.



WBC-Material

WBC-Material is the basic and fundamental certification class. It’s designed for biochar to be used in the construction sector or chemical industry.



Analytical parameters – WBC

Good to know

- H/C_{org}-ratio is an indicator for temper-ature and stability
- Heavy metals content result from used biomasses
- Organic contaminants are dependent on the process engineering

WBC - Certification Class		WBC-Premium	WBC-Agro	WBC-Material
Elemental analysis	Declaration of Ctot, Corg, H, N, O, S, ash			
	H/Corg	< 0.4	< 0.7	
Physical parameters	Water content, dry matter, bulk density (@ < 3mm particle size), WHC, pH, salt content, electrical conductivity of the solid biochar			
TGA	Must be presented for the first production batch of a pyroylsis unit			
Nutrients	Declaration of N, P, K, Mg, Ca, Fe			
Heavy metals	Pb	120 g t^{-1} DM	300 g t^{-1} DM	*declaration, no limit values for certification*
	Cd	1,5 g t^{-1} DM	5 g t^{-1} DM	
	Cu	140 g t^{-1} DM	200 g t^{-1} DM (*)	
	Ni	50 g t^{-1} DM	100 g t^{-1} DM	
	Hg	1 g t^{-1} DM	2 g t^{-1} DM	
	Zn	420 g t^{-1} DM	1000 g t^{-1} DM (*)	
	Cr	100 g t^{-1} DM	200 g t^{-1} DM	
	As	13 g t^{-1} DM	20 g t^{-1} DM	
Organic contaminents	16 EPA PAH	6 g t^{-1} DM	declaration	declaration
	8 EFSA PAH	1 g t^{-1} DM	1 g t^{-1} DM	4 g t^{-1} DM
	PCB, PCDD/F	Once per pyrolysis unit for the first production batch. For PCB: 0.2 mg kg^{-1} DM, for PCDD/F: 20 ng kg^{-1} (I-TEQ OMS), respectively		

Certification classes - EBC

EBC FeedPlus

EBC-FeedPlus is considered safe for usage as feed. There are specific requirements for registration as a feed producer and additional parameters to be analyzed.



EBC-AgroOrganic, EBC-Agro, EBC-Urban

EBC-AgroBio and EBC-Agro is considered safe for agricultural applications and contact with food and feed production.

EBC-Urban is a specific class for Biochar application with urban ornamental applications and ornamtental (indoor) plants.



EBC-Materials, EBC-Basic

These classes are designed for biochar to be used in the construction sector or chemical industry.



Analytical parameters - EBC

Good to know

- H/C_{org}-ratio is an indicator for temperature and stability
- Heavy metals content result from used biomasses
- Organic contaminants are dependent on the process engineering

EBC -Certification Class		EBC-FeedPlus	EBC-AgroOrganic	EBC-Agro	EBC-Urban	EBC-Materials	EBC-Basic
Elemental analysis	Declaration of C_{tot}, C_{org}, H, N, O, S, ash						
	H / C_{org}	< 0.4	< 0.7				
Physical parameters	Water content, dry matter (as received and @ < 3mm particle size), bulk density (DM), WHC, pH, salt content, electrical conductivity of the solid biochar						
Major elements	Declaration of N, P, K, Mg, Ca, Fe						
Heavy metals	Pb	5 g t^{-1} (88%DM)	45 g t^{-1} DM	120 g t^{-1} DM	120 g t^{-1} DM	120 g t-1 DM	declaration, no limit values for certification
	Cd	0.5 g t^{-1} (88% DM)	0.7 g t^{-1} DM	1,5 g t^{-1} DM	1,5 g t^{-1} DM	1,5 g t-1 DM	
	Cu	70 g t^{-1}DM	70 g t^{-1}DM*	100 g t^{-1} DM*	100 g t^{-1} DM*	100 g t-1 DM	
	Ni	25 g t^{-1} DM	25 g t^{-1} DM	50 g t^{-1} DM	50 g t^{-1} DM	50 g t-1 DM	
	Hg	0.1 g t^{-1} (88% DM)	0.4 g t^{-1} DM	1 g t^{-1} DM	1 g t^{-1} DM	1 g t-1 DM	
	Zn	200 g t^{-1} DM	200 g t^{-1} DM*	400 g t^{-1} DM*	400 g t^{-1} DM*	400 g t-1 DM	
	Cr	70 g t^{-1} DM	70 g t^{-1} DM	90 g t^{-1} DM	90 g t^{-1} DM	90 g t-1 DM	
	As	2 g t^{-1} (88% DM)	13 g t^{-1} DM	13 g t^{-1} DM	13 g t^{-1} DM	13 g t-1 DM	
Organic contaminents	16 EPA PAH	6±2.4 g t^{-1} DM	6±2.4 g t^{-1} DM	6.0+2.4 g t^{-1} DM	CSI-declaration	CSI-declaration	CSI-declaration
	8 EFSA PAH	1.0 g t^{-1} DM					4 g t-1 DM
	benzo[e]pyrene benzo[j]fluoranthene	< 1.0 g t^{-1} DM for each of both substances					
	PCB, PCDD/F	See chapter 10	Only required if 8 EFSA PAH > 1.0 mg kg^{-1}. For PCB: 0.2 mg kg^{-1} DM, for PCDD/F: 20 ng kg^{-1} (I-TEQ OMS), respectively				

What fits your activity: WBC or EBC?

- Outside EU/EFTA
- Energy efficiency < 60% (exemption possible for 3 years)
- Higher analytical values possible for heavy metals and EPA PAH

- Worldwide
- Energy efficiency >60%
- Low analytical values for heavy metals and EPA PAH

Project flow – 1st Year

Introduction and Registration

Endorsement

- Evaluation of the Project
- Technical conformity: Technology must be in line with the requirements for EBC
- Feedstock must be sustainable and in line with EBC
- Biochar sampling plan & online sampling course
- First draft of the PDD

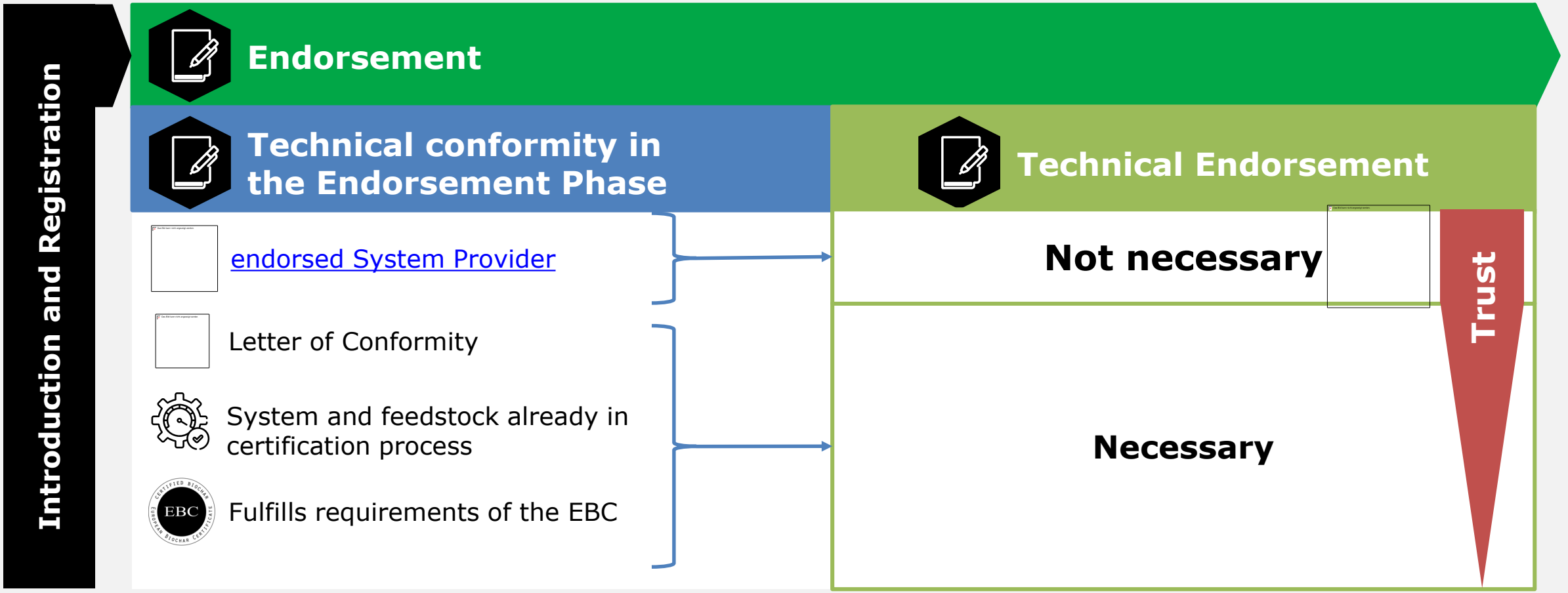
Project implementation

Validation

Verification

- On-site inspection
- EBC-Certification

Digression: technical conformity



Project implementation & operation

Endorsement

(old) Batch closing

Production of max 1 year

- Same feedstock blend
- Same parameters

Production parameters



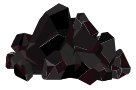
Quantities

(new) Batch registration

Production of max 1 year

- Same feedstock blend
- Same parameters

Batch parameters



Representative sample*

C-Sink potential attestation

Operation and Monitoring

Annual Verification

On-site inspection

EBC-Certification

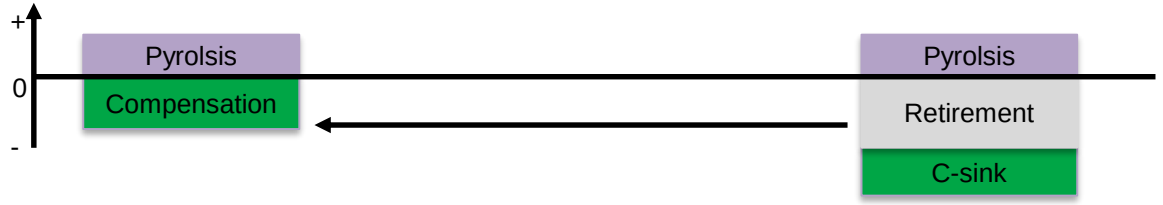
* Must be analyzed by an endorsed laboratory

C-Sink potential and emission portfolio

C-Sink potential attestation

- Forecast of all emissions from biochar production from cradle to gate, similar to LCA approach
- The predicted emissions must be compensated, usually by deduction from the C-sink itself.
- Comparison of emissions forecast with verified production emissions at end of monitoring period

Emission Portfolio





Attestation

CERES

Carbon sink attestation – for CO2e potential at factory-gate

ID of C-sink attestation cs000115

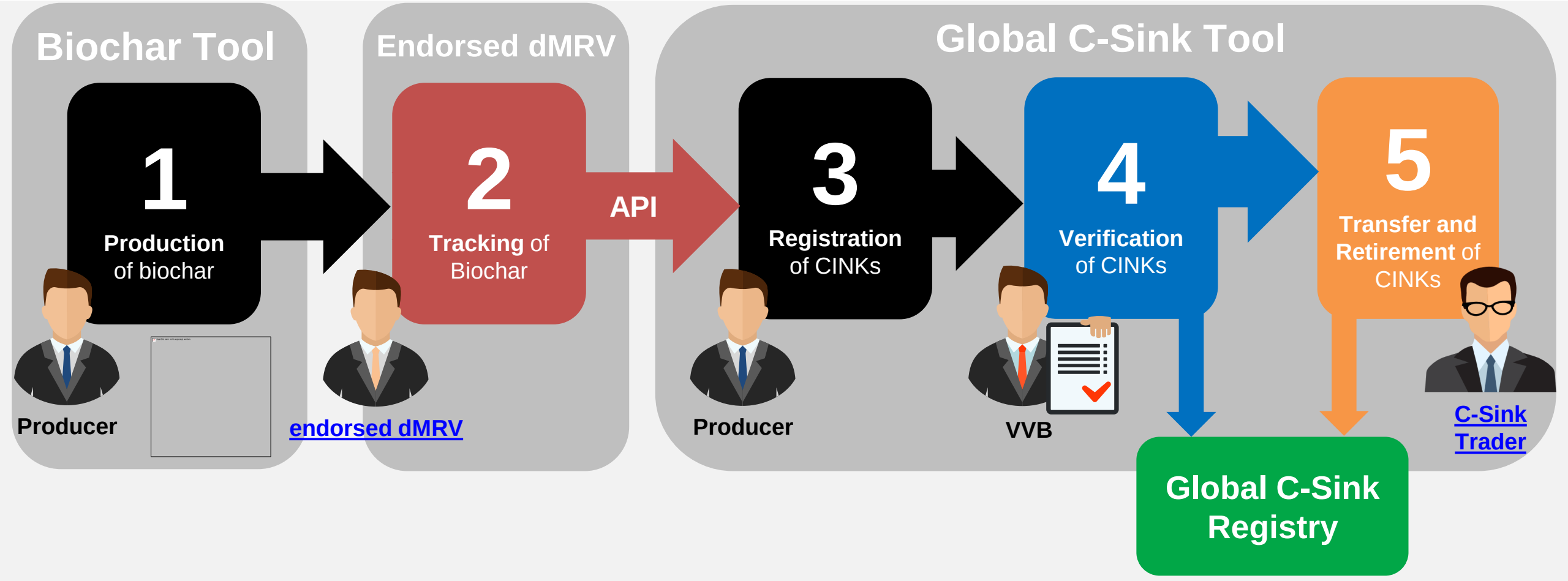
BIOCHAR C-SINK

GLOBAL BIOCHAR C-SINK

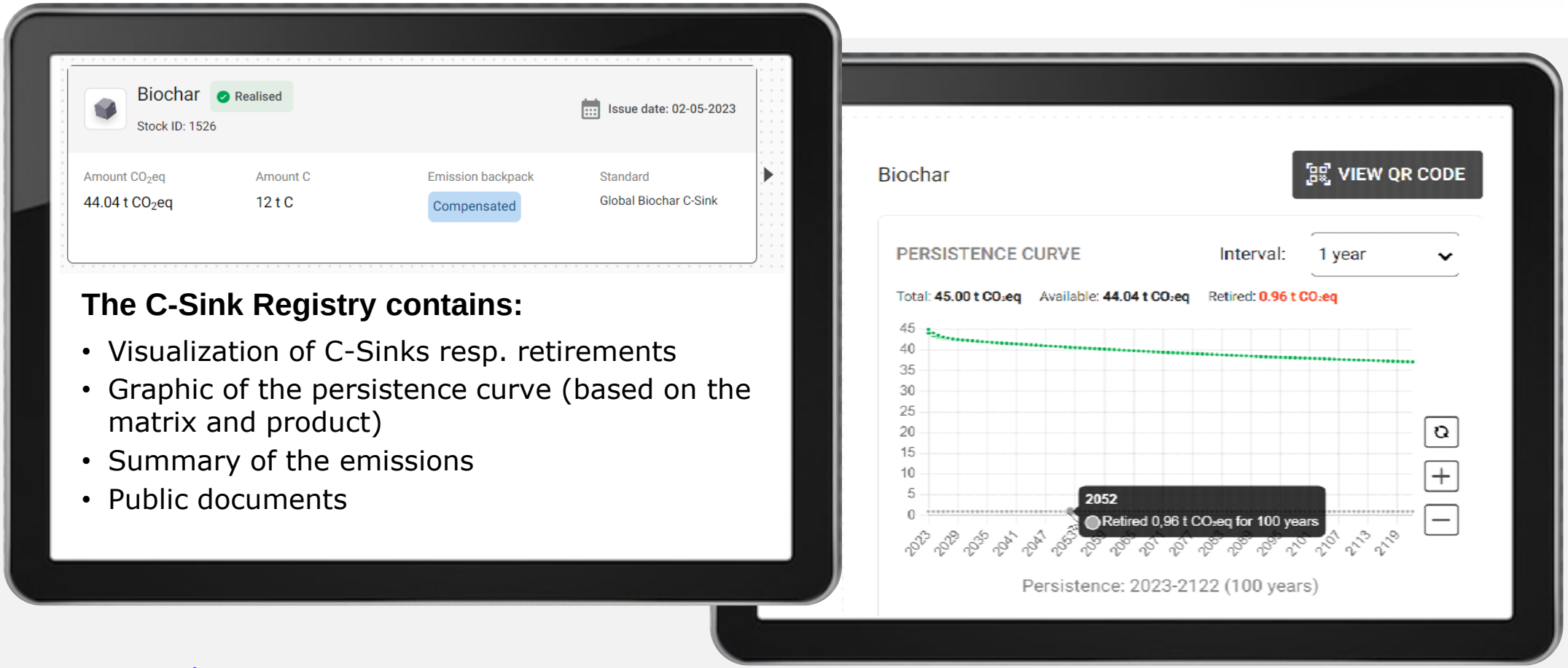
Summary of C-sink potential

Batch ID	ba000115
C-sink potential per ton of biochar (DM)	3.300 t CO2e / t BC (DM)
C-Content	90.000 % (w/w)
H/Corg ratio	0.220
Total fossil GHG emissions per ton of biochar (DM) at factory-gate	0.083 t CO2e / t BC (DM)
Total methane emissions per ton of biochar (DM) at factory-gate	70.000 kg CH4 / t BC (DM)
Absolute global warming potential of methane emissions per ton of biochar (DM) at factory-gate	88.900 t ACO2e / t BC (DM)
Energy Efficiency	90.136 %

Process flow – from Biochar to CINKs



Global C-Sink Registry



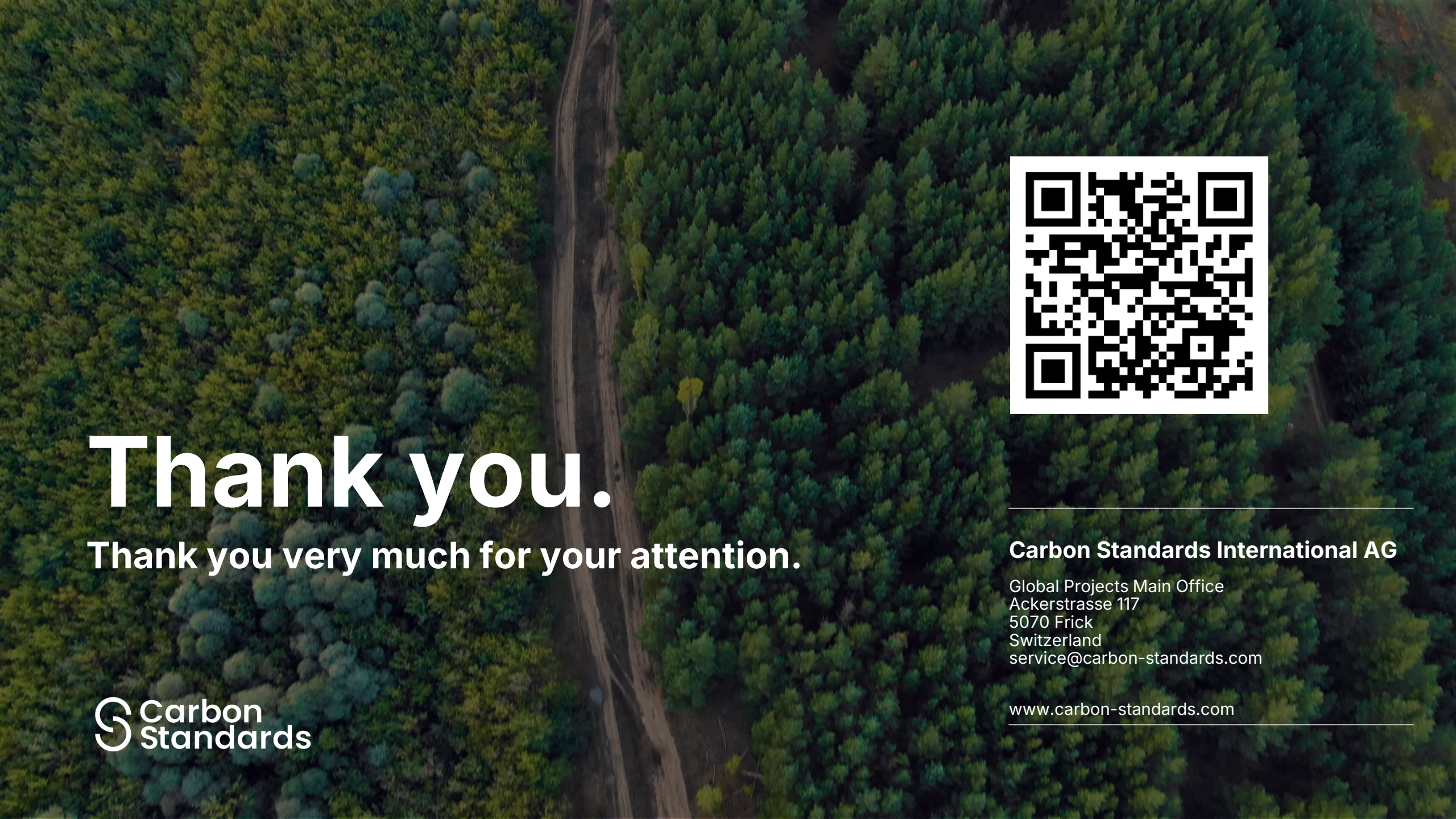
[LINK Registry]

Pricing & Costs

		Prices (EUR)
Annual fee	Annual fee: Producer, Processor, Biochar Trader	400.–
	Annual fee for additional operating units:	200.-
	Annual Biochar analysis is charged by the endorsed lab	ca. 1’500.-
Endorsement	Depending on technology and document check, price can vary. Lower costs if the pyrolysis unit is from an endorsed system provider	ca. 900.- *
	Preliminary analysis paid to the endorsed lab (not necessary with endorsed system)	ca. 1’000.-
Label fees EBC[1] & WBC[2]	1 to 5’000 tons Biochar	2.-
	> 5’000 tons Biochar	1.60
Label fees Global C-Sink[1] [2]	1 to 10’000 tons CO_2e	2.50
	> 10’000 tons CO_2e	2.-
Registry fee	Verification of CINK	0.60
	Transfer fee	0.80
	Retirement CINK[3] (1 to 30 years / > 30 years)	0.10/0.30

* may be higher in exceptional cases

[1] EBI Members receive a 10% price reduction (no accumulation possible) [2] IBI Members receive a 10% price reduction (no accumulation possible) [3] Retirement fees will be charged to the C-Sink Trader



Thank you.

Thank you very much for your attention.

Carbon Standards

Carbon Standards International AG

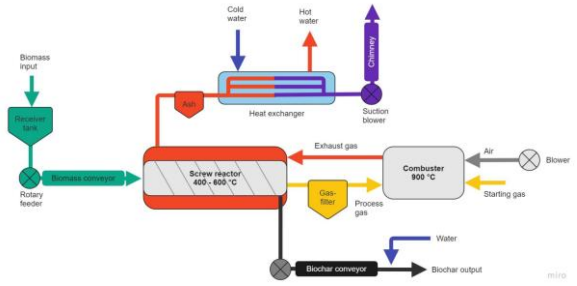
Global Projects Main Office
Ackerstrasse 117
5070 Frick
Switzerland
service@carbon-standards.com

www.carbon-standards.com

Required data for technical endorsement

Technical Drawing of Pyrolysis machine

- Processes
- Flows
- Temperature ranges



Biomass flowchart

- Origin of biomass
- Expected amount of produced biochar
- Pre- and post-treatment
- Heat recovery

Preliminary lab analysis

If equipment is not yet endorsed by CSI, need biochar testing for:

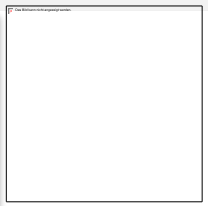
- Organic elemental analysis (CHONS)
- Ash, pH, heavy metals
- PAHs - EFSA / EPA
- bulk density
- electric conductivity

Please contact a
→ CSI endorsed laboratory

Company Description

- History
- Concept
- Employees
- Locations
- Goals for the next three to five years

!



Documents must be uploaded to the Biochar-Tool

→ Checklist for preparation of the technical endorsement

BIOCHAR C-SINK

C-Sink potential and emission portfolio

Pro-Rata approach

- Generally, all emissions are allocated to the produced biochar
- Pro-rata approach: GHG emissions distributed among output products
- **Only eligible if energy content for all non-biochar products is at least 30% of the total energy input.**



Pyro-oil, wood vinegar



Heat utilization



Electricity



Charcoal

SUCCESS STORY

Oxess

Biochar meets powder snow



They secure the World Champion title in St. Moritz (Switzerland): Elisa Caffont and Maurizio Bormolini win the team parallel.



SUCCESS STORY

Sonnenerde

Pioneering Biochar-Based Soil Enhancement

Sonnenerde, an Austrian company, is a leading example of how CSI-certified biochar can transform agricultural practices. By integrating biochar into their soil production, Sonnenerde has achieved:

➔ **Enhanced soil fertility:** Biochar improves water retention and nutrient availability, leading to higher crop yields.

➔ **Carbon sequestration:** Their operations store thousands of tons of CO_2 annually, contributing to long-term carbon removal.

➔ **Market leadership:** Sonnenerde has positioned itself as a key player in sustainable agriculture and carbon sequestration, supported by CSI's certification framework.



SUCCESS STORY

Zindel and others

Industrial Biochar Applications in Construction

CSI's certified partners have successfully implemented biochar in the construction sector, creating new pathways for carbon sequestration:

➔ **Biochar based construction materials:** These materials trap CO_2, making buildings long-term carbon sinks, and better buildings.

➔ **Temporary and permanent C-Sinks:** The building as a temporary Carbon Sink, as example CINK_60.

➔ **Regulatory alignment:** The project aligns with EU sustainability requirements, proving the scalability of CSI standards in industrial applications (CSRD, SBTI,...).



SUCCESS STORY

PlantVillage and Biochar Life



SUCCESS STORY

Openly

Our first Global Construction C-Sink Manager

