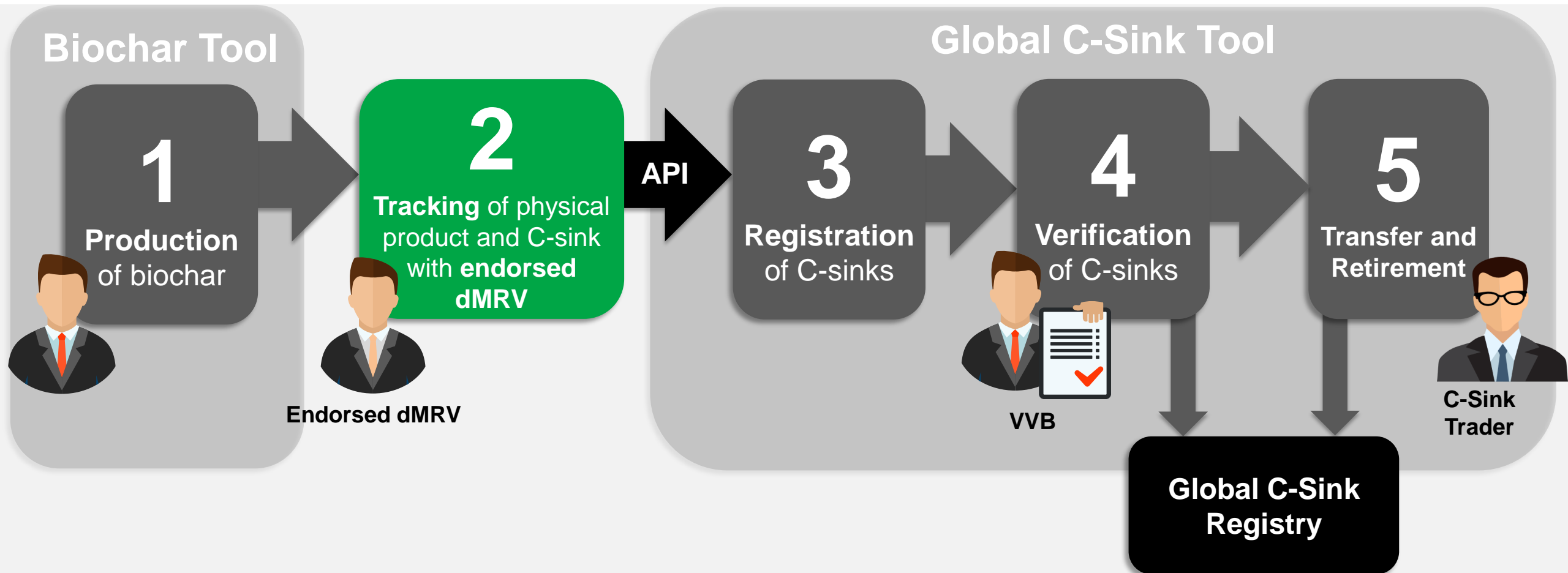


Global Biochar C-Sink certification




Global Biochar C-sink certification




Product: Certificate in Global C-Sink Registry






Biochar ✔ Realised

Stock ID: 1526


 Issue date: 02-05-2023

Amount CO ₂ eq	Amount C	Emission backpack	Standard
44.04 t CO ₂ eq	12 t C	Compensated	Global Biochar C-Sink

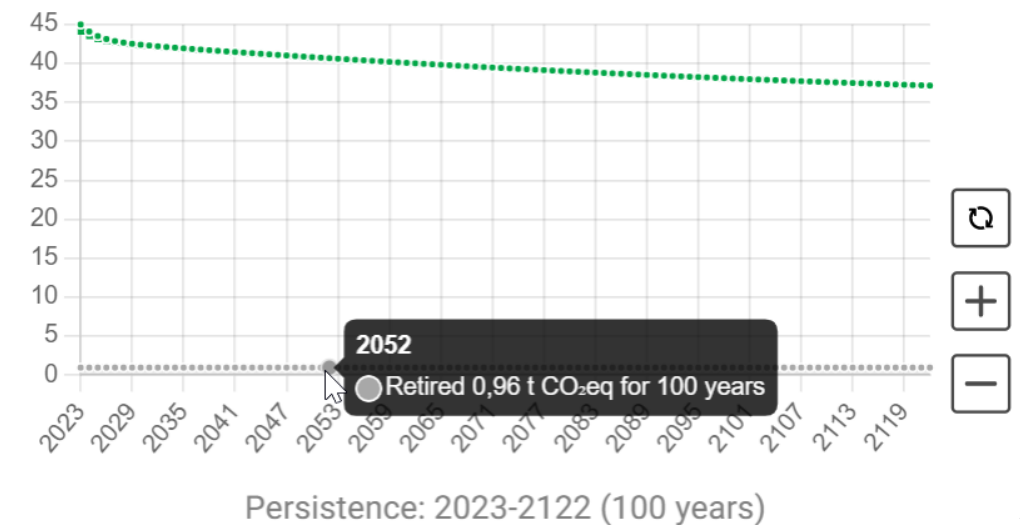
Biochar

 **VIEW QR CODE**

PERSISTENCE CURVE

Interval: 1 year 

Total: **45.00 t CO₂eq** | Available: **44.04 t CO₂eq** | Retired: **0.96 t CO₂eq**



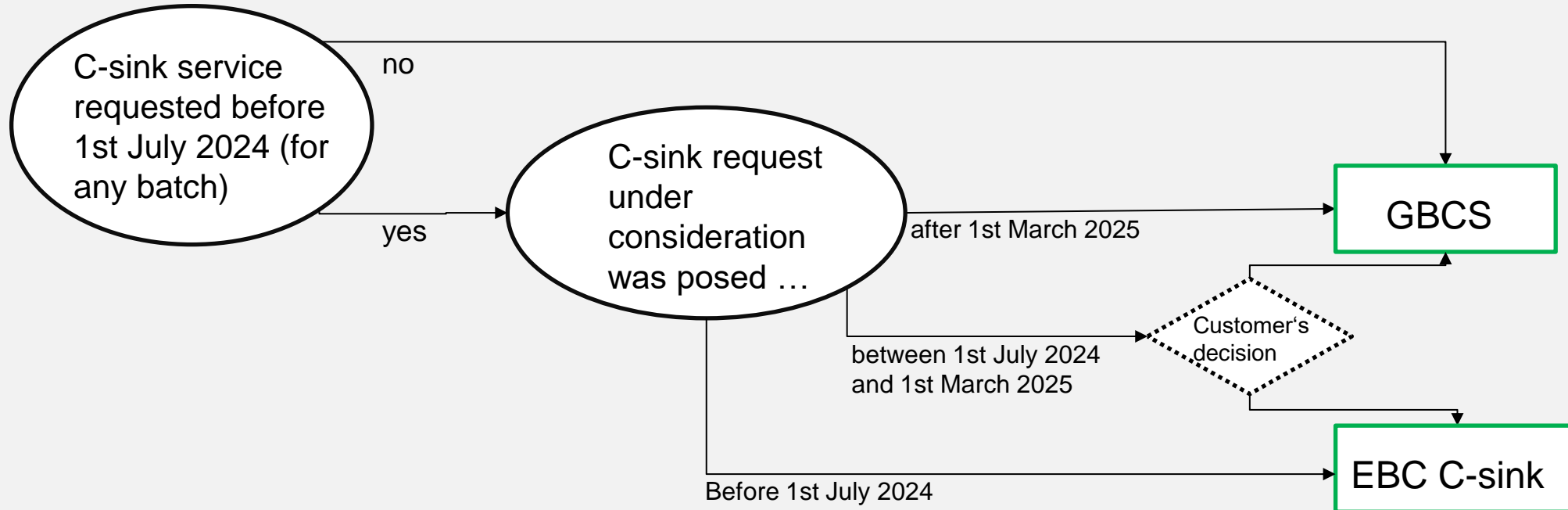
The C-Sink Registry offers...

- ... a visualization of C-Sinks resp. retirements
- ... a visualization of the persistence curve depending on the matrix and product
- ... a status about the emission backpack
- ... public documents

Transition from EBC C-Sink to Global Biochar C-Sink

Valid as of 1st July 2024

Transition period until 1st March 2025 for already certified companies



Transition from EBC C-Sink to Global Biochar C-Sink

What stays the same?

- General logic and approach
- Annual on-site visits
- EBC/WBC certification as a prerequisite and batch-based C-sink potential
- Restrictive Monitoring and checking of all emissions
- On-site check of C-Sink calculation

Most important news in the Global Biochar C-sink

Process:

- Public Project Documentation ([p.56, point 14](#))
- Cradle to grave emission documentation ([p.48, 10](#))
 - [Application matrix positive list](#)
 - Explicit mentioning of processor registration ([p.49, 10.2](#))
- Energy Efficiency limit ([p.42, 8.2](#))
- Report Carbon Efficiency ([p.42, 8.1](#))

Most important news in the Global Biochar C-sink

Product:

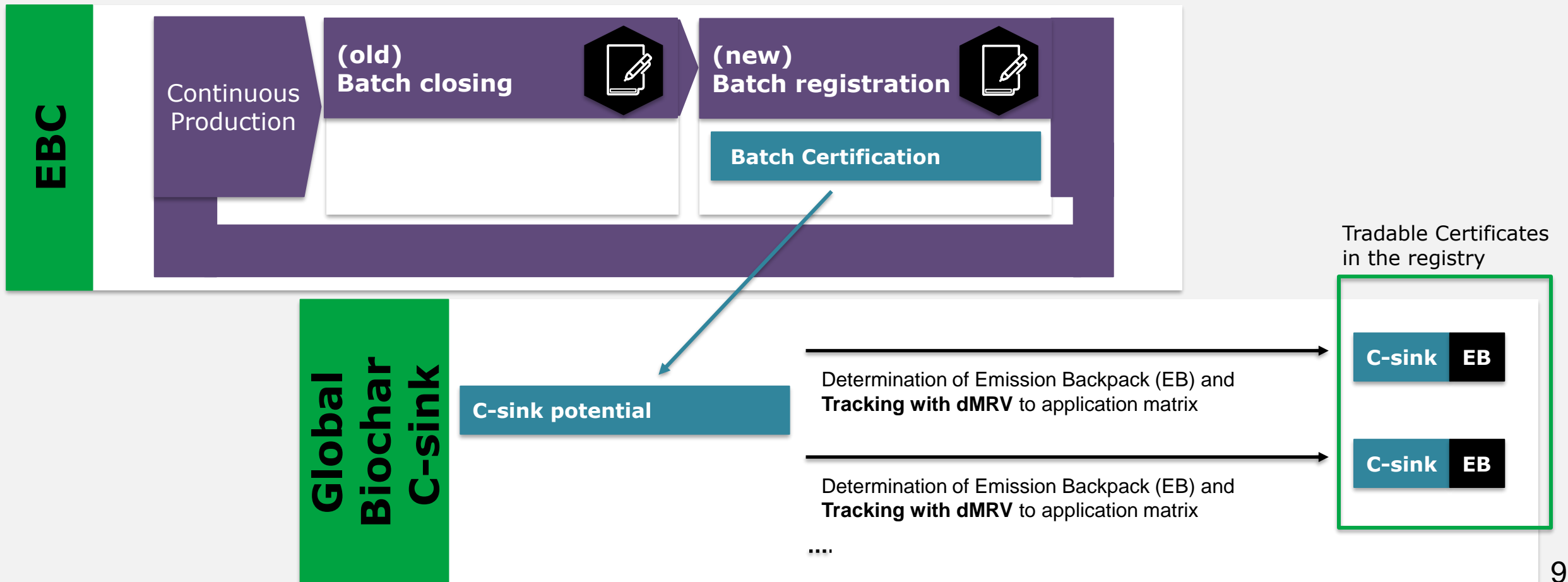
- Product definition ([p. 11, 2 & p.53, 12](#))
 - Geological C-sink, 1000+ years: C-Sink_1000+
 - Temporary C-sink, up to 100 years: C-Sink_xx
- Threshold value for diffuse C-sinks: 1tCO₂e ([p.51, 11.2](#))
- Emission portfolios ([ctrl-f portfolio](#))
- Methane offset with temporary C-sinks ([p.20, 4.3](#))
- Definition for allocation/pro-rata accounting ([p.22, 4.5](#))

Most important news in the Global Biochar C-sink

Process:

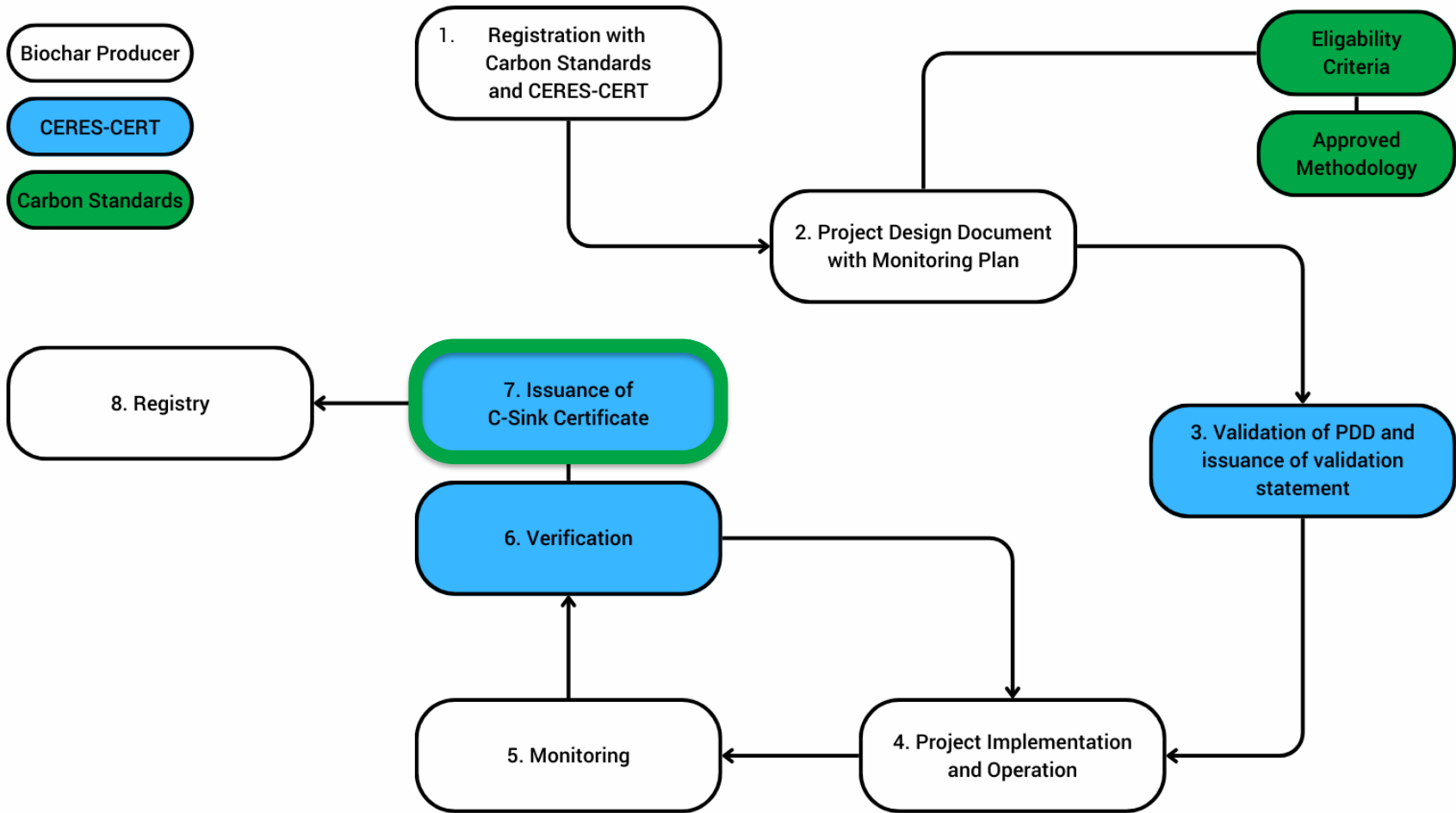
- Public Project Documentation ([p.56, point 14](#))
- Cradle to grave emission documentation (p.48, 10)
 - Application matrix positive list
 - Explicit mentioning of processor registration (p.49, 10.2)
- Energy Efficiency limit (p.42, 8.2)
- Report Carbon Efficiency (p.42, 8.1)

Relation between EBC/WBC and C-Sink – Certification Process



C-Sink Certification process

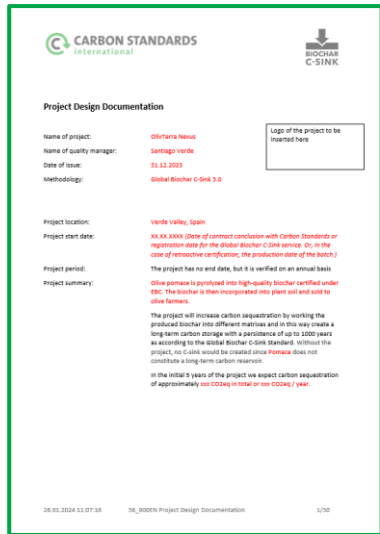
[Link to Flowchart](#)



Project documentation

→ Project Design Document template

Project Design Document



General:

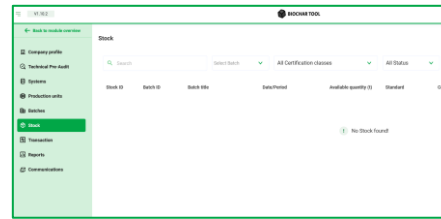
- Eligibility
- Additionality

Detail:

ensures public comprehensibility of the determination of the C-sink value

Monitoring & C-sink request

Biochar tool:



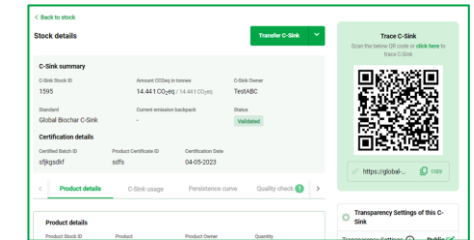
dMRV



Monitoring Report:



Global C-Sink tool:



→ Validation by Ceres-Cert

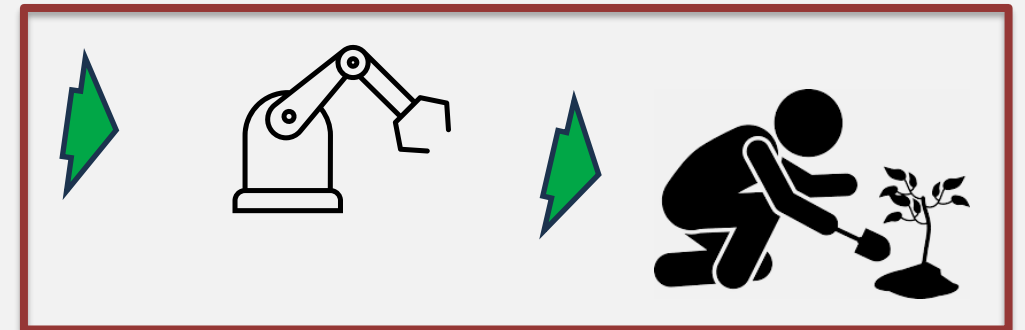
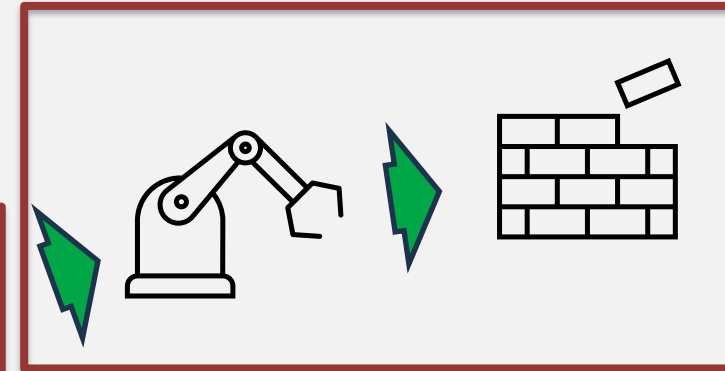
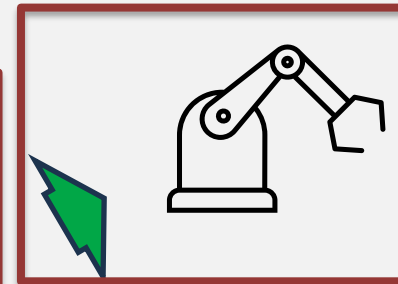
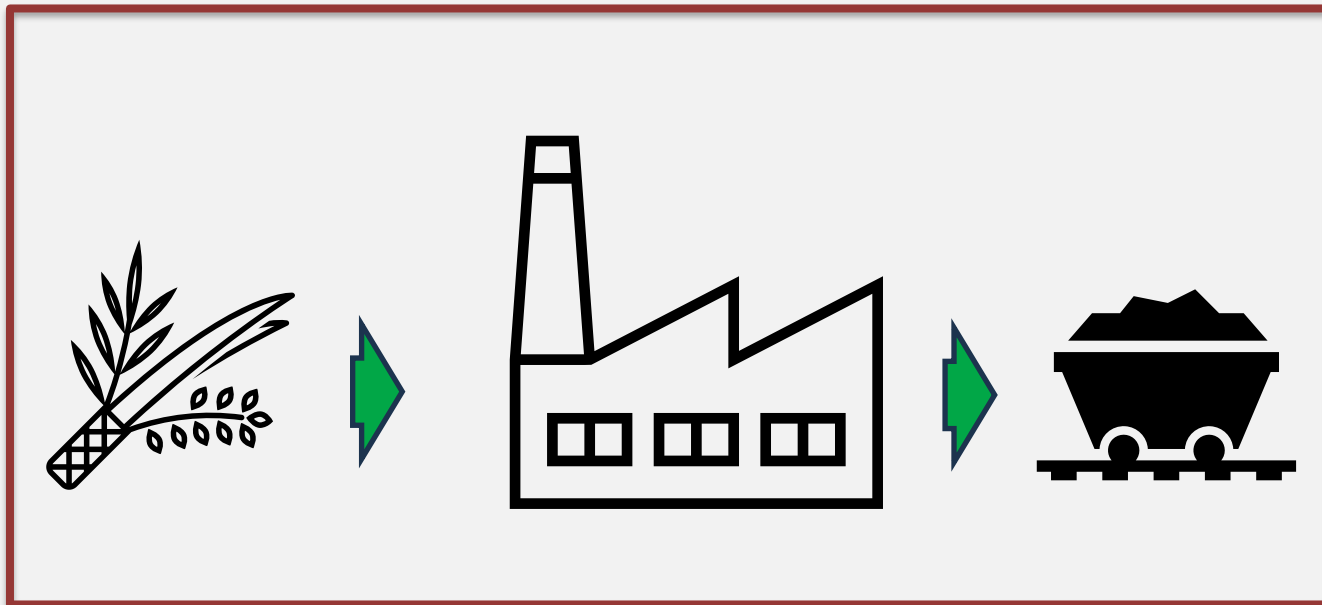


→ Verification by Ceres-Cert



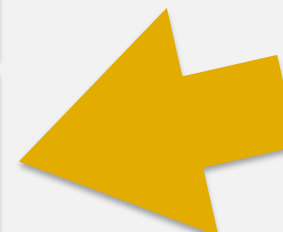
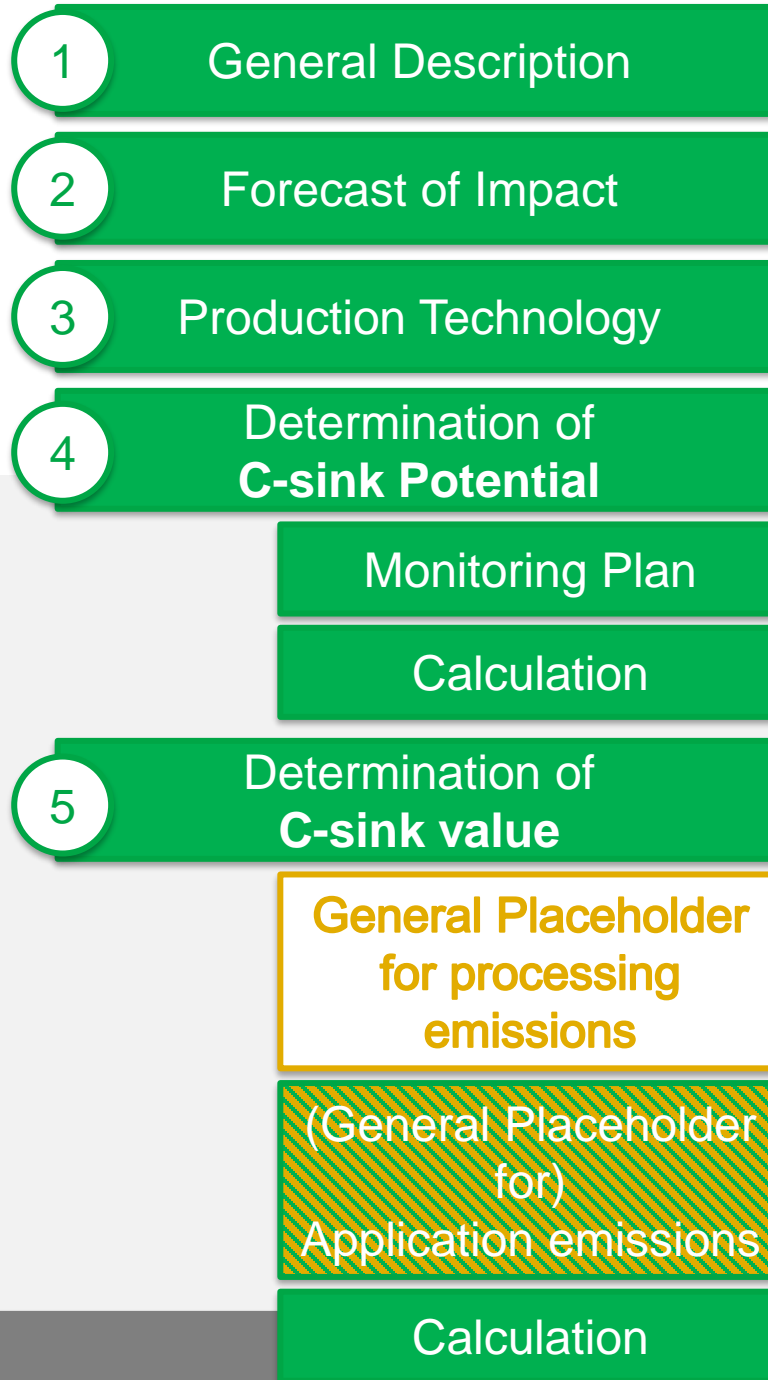
Project Documentation

- Every entity is responsible for their part to the PDD, reporting of the own emissions and the correct transfer of all information to the dMRV system.



PDD

Cradle to grave



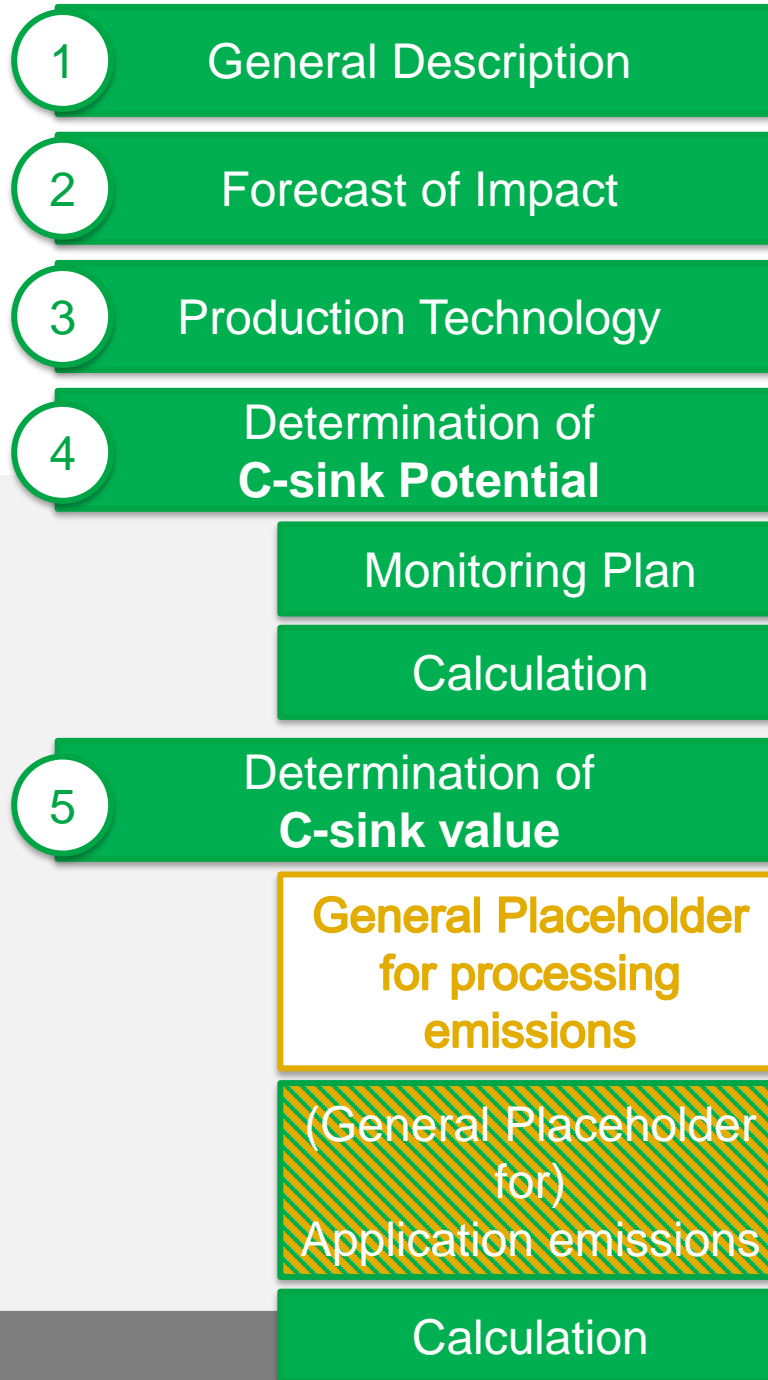
Processor Annex to PDD



Tradable C-sink certificate in Registry

PDD

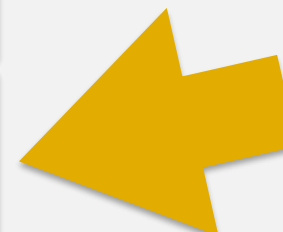
Cradle to grave



→ Validation by Ceres-Cert



1. Desk review
2. On-site confirmation



Processor Annex to PDD

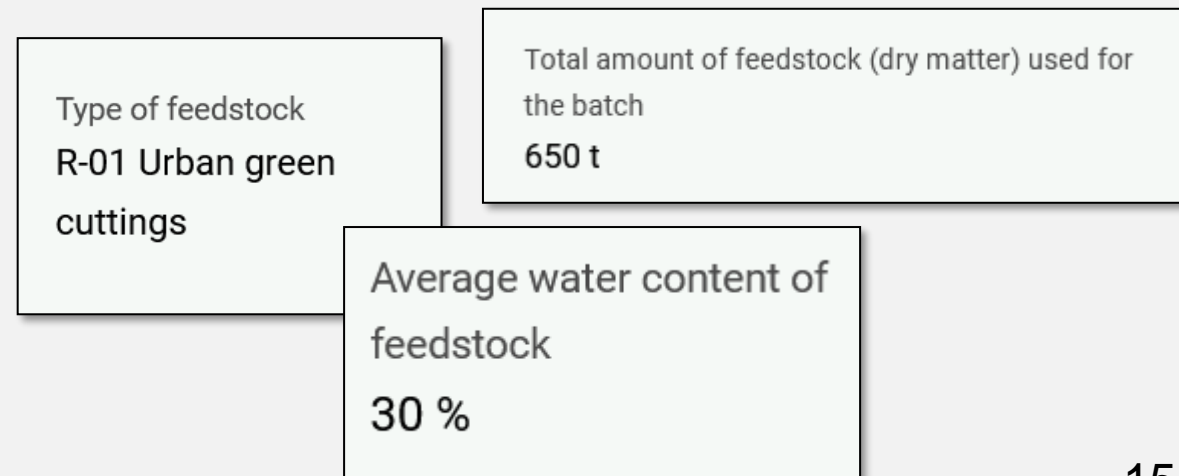


Tradable C-sink certificate in Registry

Monitoring Plan

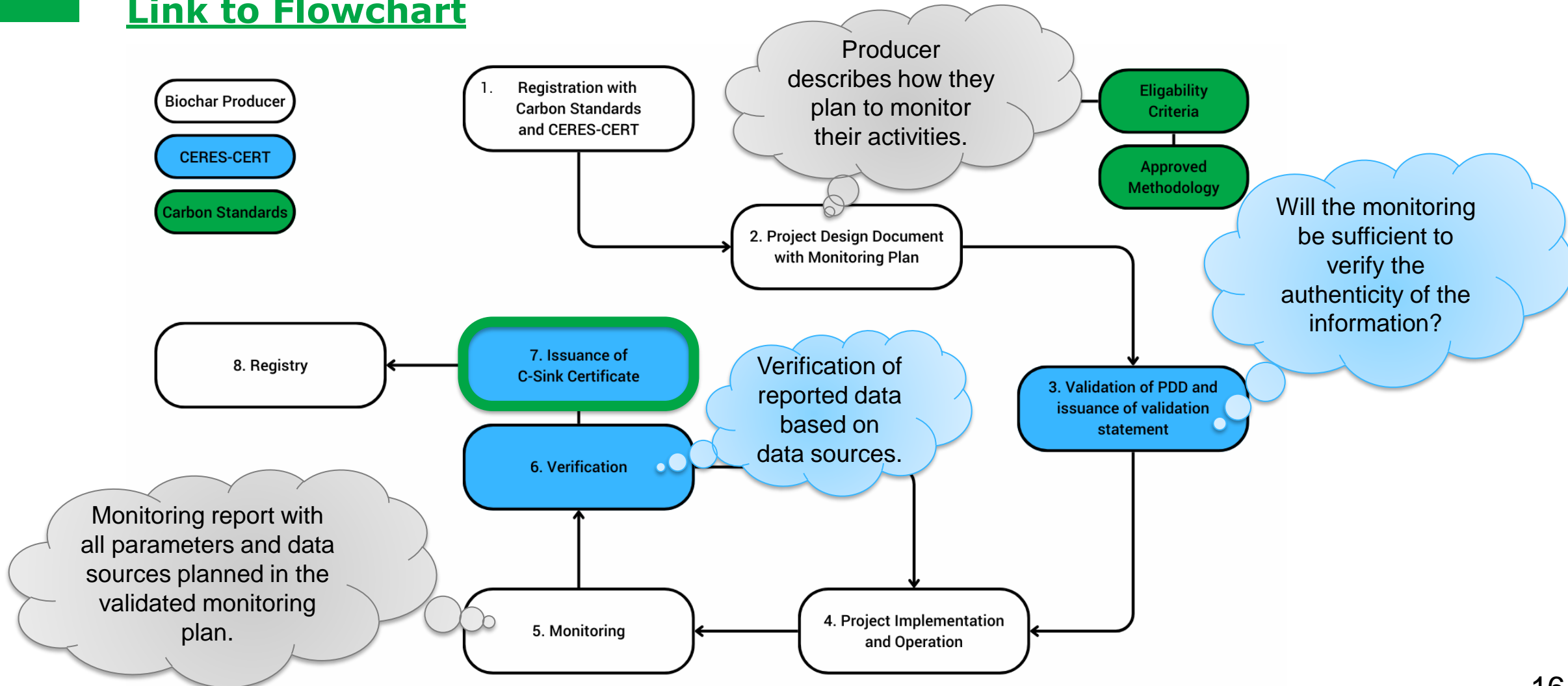
- The **monitoring plan** outlines future monitoring.
- The parameters are specified in the template according to the standard and represent an analogy of the fields from the biochar tool.
- Producers specify how often they plan to specify a value (**monitoring frequency**; often: per batch) and based on which data source the data is determined.

Parameter	Monitoring frequency	Source of data
Type of feedstock (with ID of EBC positive list)	continuous	purchase receipts and EBC positive list
Average water content of feedstock at delivery	per batch	documentation of frequent measurements
Amount of feedstock (DM) processed for the last batch	per batch	production protocols and operation recordings



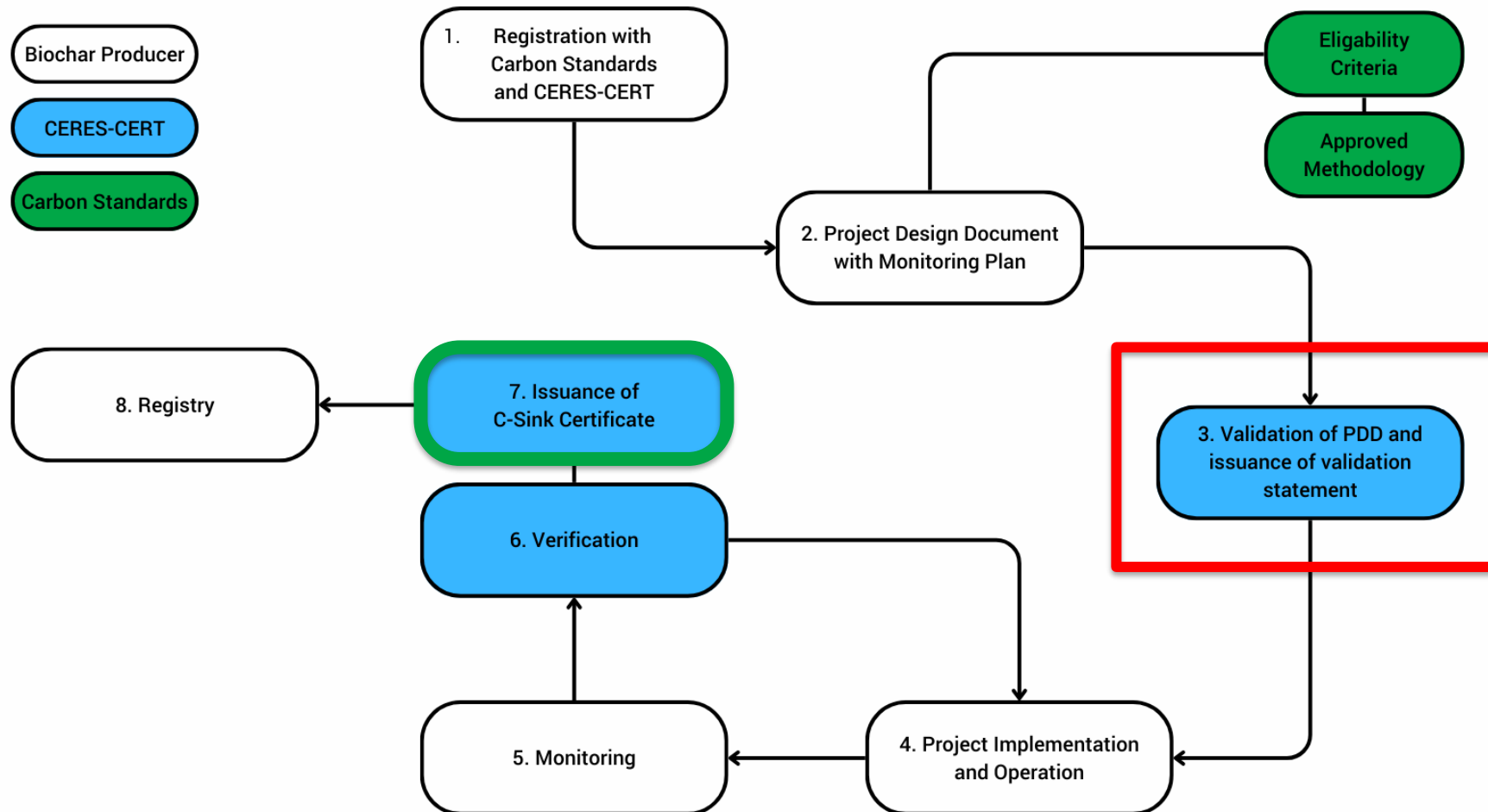
Monitoring in C-Sink Certification process

Link to Flowchart



C-Sink Certification process

[Link to Flowchart](#)



Validation: Final step during Initial Onsite Inspection (1st year)

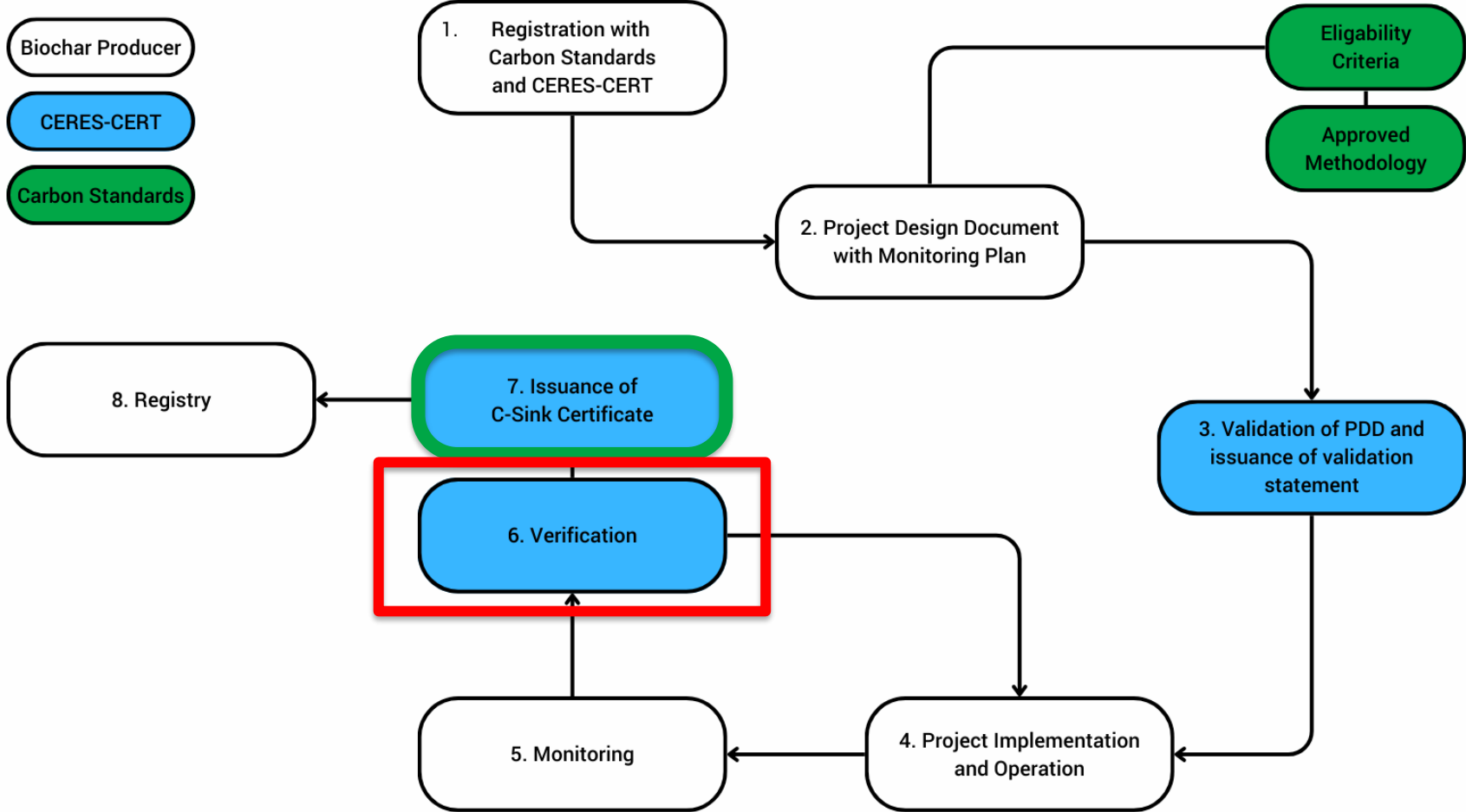
1. Descriptive part of PDD is compared after desk review with real conditions on site (chapters 1+3)
2. N/A parameters in the monitoring plan (chapter 4.2) are checked and confirmed if they`re really not relevant

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C-Sink Certification process

[Link to Flowchart](#)



Verification

Sources of data for all parameters in monitoring plan are checked (PDD chapter 4.1.)

Initial Onsite Inspection (1st year):

- data for the period since completion of TPA or batch start date until audit
- best practice: approx. 2 months

Annual Onsite-Inspection (2nd year onward):

- data for the period from last audited end month to full previous month from audit

4.1.2.2. Pyrolysis

For pyrolysis the following parameters will be monitored:

Parameter	Monitoring frequency	Source of data
Electricity consumption of pyrolyser for the entire batch (in kWh)	per batch	electricity bills + internal calculation
Source of electric energy for the pyrolysis plant	per batch	Cambodian National Grid
CO ₂ eq footprint of electricity used for the pyrolysis plant in g CO ₂ eq/kWh	per batch	IFI Dataset of Default Grid Factors - 2021
Energy source to preheat the pyrolysis reactor	per batch	Internal record of Diesel use
Amount of fuel which is used to preheat the pyrolysis reactor in t per batch	per batch	Operation recordings
CO ₂ eq of fuel used for the pyrolysis plant per t	per batch	Operation recordings

Initial Onsite Inspection (1st year):

- The Inspector extrapolates the data from a few months to the entire year and compares to the given values from the Biochar Tool
- If the annual extrapolation deviates by more than 10 % from the value in the Biochar Tool:
 - Producer must correct the value in the Biochar tool
 - Exception: comprehensible explanation (e.g. seasonal fluctuation)

Annual Onsite-Inspection (2nd year onward)

- The data for the period from last audited end month to full previous month from audit is verified by the inspector
- The correct data must be entered into the emission portfolio
- There is no correction of C-Sink-Potential certificate;
the emission portfolio must be offset before the final certification

Most important news in the Global Biochar C-sink

Process:

- Public Project Documentation (p.56, point 14)
- Cradle to grave emission documentation ([p.48, 10](#))
 - [Application matrix positive list](#)
 - Explicit mentioning of processor registration ([p.49, 10.2](#))
- Energy Efficiency limit (p.42, 8.2)
- Report Carbon Efficiency (p.42, 8.1)

Application Matrix Positive List

<https://www.carbon-standards.com/docs/transfer/4000078EN.pdf>

Positive list of permissible matrices for the establishment of biochar C-sinks

Global Biochar C-Sink

For biochars presenting an H to Corg ratio below 0.40. A new persistence evaluation system based on hydro-pyrololysis analysis is in preparation. The latter mainly concerns the proportions of the PAC and SPC fractions.

Matrix

Origin	Matrix	ID	Controlling period in years	Diffuse C-sink authorized	Leakage margin to be deducted before registration	C remaining during temporary C-sink	C remaining after > 1000 y	SPC* fraction with MRT of 50 years	Conditions
Biological Matrix - Only for diffuse C-sinks. For all packaging units > 0.5 m3 biochar, the biochar and its C-sink matrix must be tracked to the location of soil application.	Compost	B-01		✓			75%	25%	The use of compost as soil amendment must be proven. When used to produce potting soil, it has to be declared as matrix B-09.
	Solid Manure	B-02		✓			75%	25%	The use as soil amendment must be proven. It must not be pyrolysed, combusted, if the manure is treated by anaerobic digestion, non combusive use of the solid digestate must be guaranteed.
	Liquid Manure	B-03		✓			75%	25%	If the manure is treated by anaerobic digestion, non combusive use of the solid digestate must be guaranteed.
	Anaerobic Digestate	B-04		✓			75%	25%	The use as soil amendment must be proven, must not used as feedstock for pyrolysis
	Biochar Based Fertilizer	B-06		✓			75%	25%	The fertilizer does not reduce the permanence but biochar may increase emissions during manufacturing and storage. A GHG balance of the production must be provided.
	Animal feed	B-07		✓			75%	25%	Only livestock feed with guaranteed end-of-life as soil amendment. Horse and chicken manure are often used for energetic purposes. Tracking or reporting of manure to soil must be provided. Pet feed products are generally excluded as pet excreta end up mainly in waste treatment plants.
	Seed coating	B-08		✓	10%		75%	25%	An accounting for waste seed management must be provided and deducted from C-sink. 10% margin because expired seeds are often combusted.
	Potting soil / growing media / substrates for horticulture	B-09		✓	⇔ 20%		75%	25%	Life cycle data and statistics must prove that the end of life is in soil (e.g., via composting) for a relevant share of the total volume produced. This share defines the security margin.
		Concrete	Min-01	3 years			100%		
Cement mortar		Min-02	✓			100%			
Lime mortar & gypsum		Min-03	✓			100%			

Processor- and Trader registration

Chapter 10 makes explicit what has always been the case: processors and traders must be registered.

- A company that makes new biochar-based products from more than 10t biochar per year, must be EBC or WBC certified.
- Traders that trade C-sink units containing > 1 t CO₂e must be registered

Most important news in the Global Biochar C-sink

Process:

- Public Project Documentation (p.56, point 14)
- Cradle to grave emission documentation (p.48, 10)
 - Application matrix positive list
 - Explicit mentioning of processor registration (p.49, 10.2)
- Energy Efficiency limit ([p.42, 8.2](#))
- Report Carbon Efficiency ([p.42, 8.1](#))

Energy Efficiency

Energy efficiency must be at least 60%:

„For every batch of a certified pyrolysis unit, at least 60% of the sum of the energy contained in the biomass and all energy expenditures of the process must be used. Exemptions are possible on request to CSI.“

$$E_{eff} = \frac{E_{solid} + E_{thermal} + E_{drying} + E_{electric}}{E_{feedstock} + E_{expenditures}}$$

Energy Efficiency

Exemptions:

... can be granted for up to 2 years if some of the following points are fulfilled and proven:

- Pilot plant
- development of an unused biomass potential for which another, more energy-efficient use is not foreseeable. This can be seen, for example, in
- a technical idea for increasing energy efficiency must be planned, preferably creative

Carbon efficiency

$$\frac{\Sigma(\text{carbon content of products})}{\text{carbon content of feedstock}}$$

Biochar:	30-60%
Biochar and pyrolysis oil:	approx. 80%
Biochar, pyrolysis oil and CO ₂ :	>80%

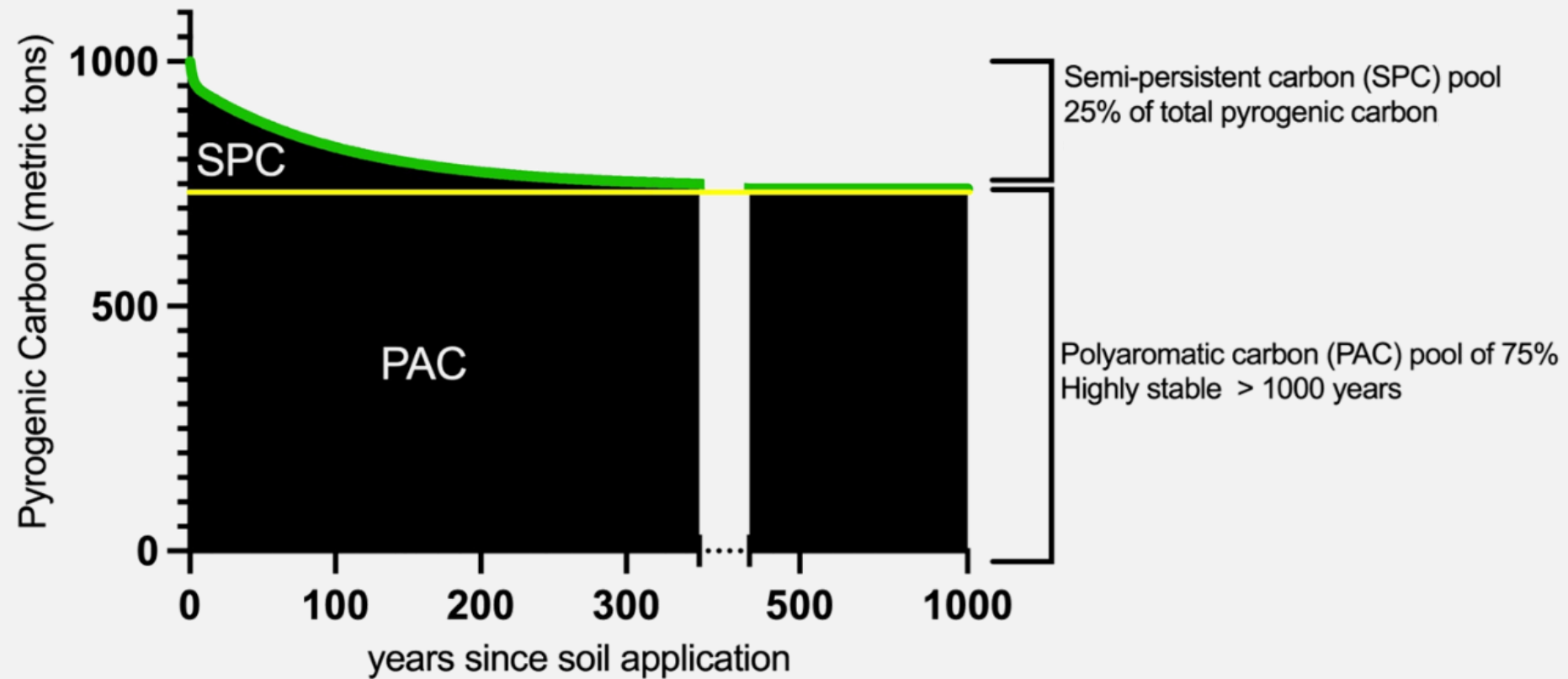
Most important news in the Global Biochar C-sink

Product:

- Product definition ([p. 11, 2 & p.53, 12](#))
 - Geological C-sink, 1000+ years: C-Sink_1000+
 - Temporary C-sink, up to 100 years: C-Sink_xx
- Threshold value for diffuse C-sinks: 1tCO₂e (p.51, 11.2)
- Emission portfolios (ctrl-f portfolio)
- Methane offset with temporary C-sinks (p.20, 4.3)
- Definition for allocation/pro-rata accounting (p.22, 4.5)

Geological C-Sink, C-Sink_1000+

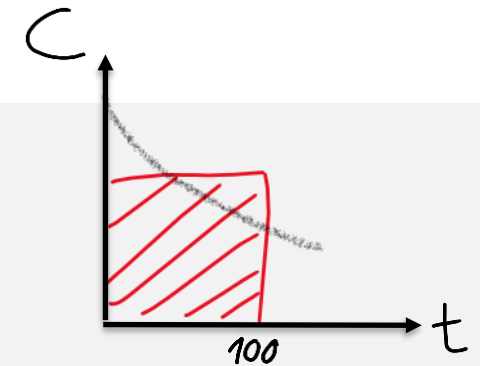
Soil application of biochar with $H/C_{org} < 0,4$



Temporary C-Sinks, C-Sink_{xx}

Biochars with $H/C_{org} > 0,4$ applied to soil:

- Only SPC fraction is present and completely degraded
- C-sink value from integral

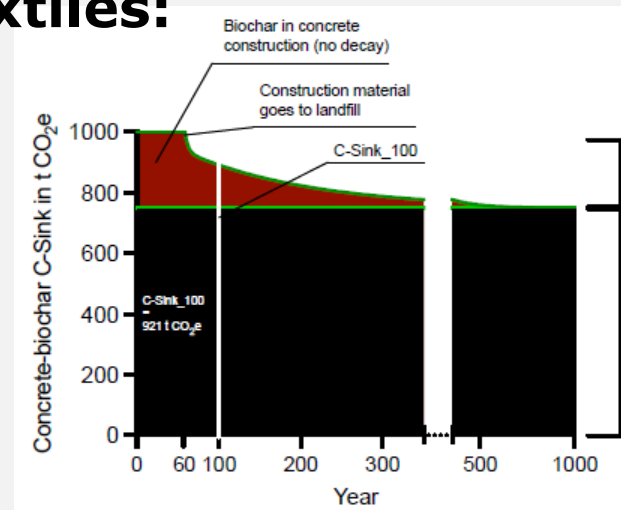


Biochar applied to materials as thermoplastics or textiles:

- 100% of the biochar carbon counted as C-Sink over the average lifetime of the product

Biochar applied to building materials:

- 100% of the biochar carbon for lifetime of the building
- Soil degradation curve afterwards
- Ownership and location is required



Most important news in the Global Biochar C-sink

Product:

- Product definition (p. 11, 2 & p.53, 12)
 - Geological C-sink, 1000+ years: C-Sink_1000+
 - Temporary C-sink, up to 100 years: C-Sink_xx
- Threshold value for diffuse C-sinks: 1tCO₂e ([p.51, 11.2](#))
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Geo-localized vs. diffuse C-sinks

Geo-localized:

Chapter 11.1: *„When biochar is applied to soil, the carbon sink must be registered with at least one GPS point situated within the land where the biochar is applied.“*

→ Tracking and detailed labeling required until the final destination in soil

Geo-localized vs. diffuse C-sinks

Diffuse:

Chapter 11.2: *„C-sink materials and packaging units containing biochar or biochar-based products representing less than 1 tCO₂e of biochar [...] may be registered as diffuse C-sinks“*

→ Tracking and detailed labeling required until mixing into C-sink matrix.

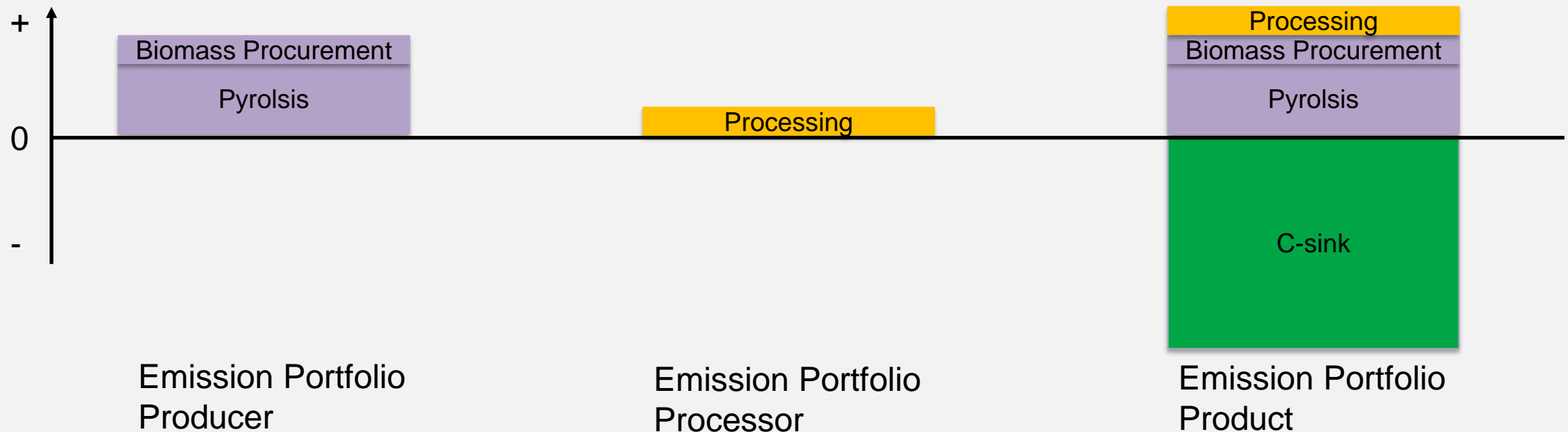
Most important news in the Global Biochar C-sink

Product:

- Product definition (p. 11, 2 & p.53, 12)
 - Geological C-sink, 1000+ years: C-Sink_1000+
 - Temporary C-sink, up to 100 years: C-Sink_xx
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- Emission portfolios ([ctrl-f portfolio](#))
- Methane offset with temporary C-sinks ([p.20, 4.3](#))
- Definition for allocation/pro-rata accounting ([p.22, 4.5](#))

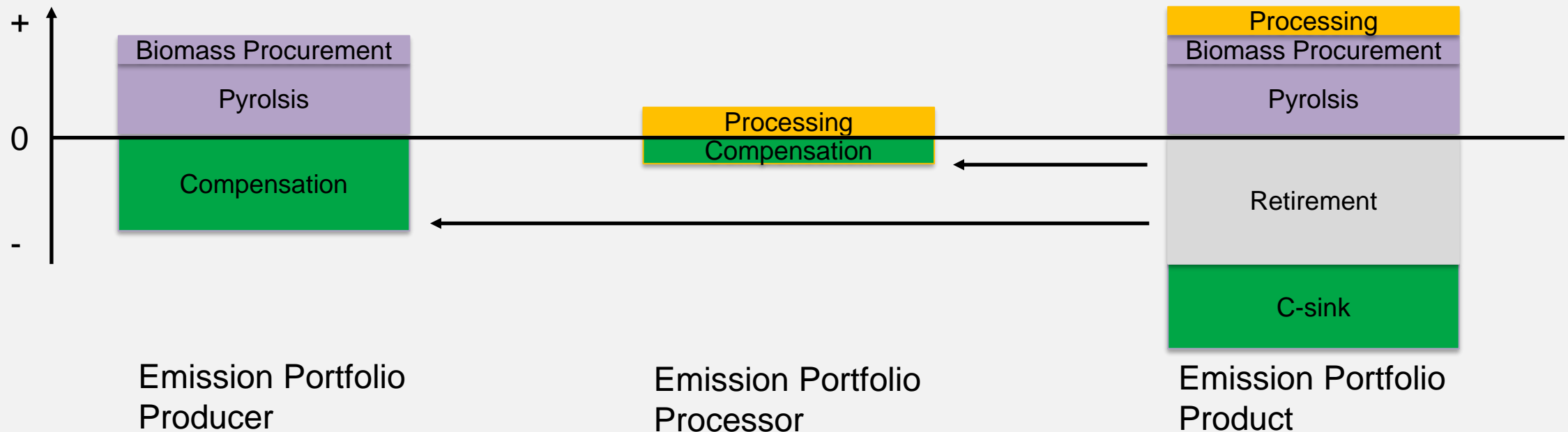
Emission Portfolios

Emission portfolios with all emissions that match an observation - e.g. all emissions from the manufacturer, or all emissions that occurred in connection with a bag of biochar.



Emission Portfolios

Emission portfolios with all emissions that match an observation - e.g. all emissions from the manufacturer, or all emissions that occurred in connection with a bag of biochar.



Producer: Methane emissions

Methane Calculator



- Methane has a mean residency time of 12 years and is degraded to CO₂ in the atmosphere.
- When degraded to CO₂ it can be considered carbon neutral if originated from sustainable feedstock.
- Effect of methane must be offset.
- Global warming effect of methane over 100 years must be offset with an equivalent sized temporary sink within 20 years after initial emission.

Methane Calculator Demonstration

Methane Calculator


Methane Compensation using :

The SPC fraction of biochar C-sinks

Certified tree growth curves

Information

PAC stands for the persistent fraction of a realized biochar C-sink.
SPC stands for the semi-persistent fraction of a realized biochar C-Sink.
AGWP(100) stands for the Accumulated Global Warming Potential of the methane emissions over 100 years.
AGCP(20) describes the Accumulated Global Cooling Potential of the SPC fraction of the Biochar C-Sink.


GLOBAL C-SINK

Methane compensation by biochar C-sinks using the SPC fraction

Calculate how much of the semi-persistent fraction of a realized and validated biochar C-Sink is needed to compensate for methane emissions.

Methane emissions in t CH₄

Biochar

Amount of Biochar in t (DM) ⓘ

C-content of biochar (%) ⓘ

H/Corg ⓘ

CALCULATE

AGWP(100) of CH₄ in t CO₂e : 647.7

Pro-rata

To be eligible to use the pro-rata GHG calculation, the producer must prove that the non-biochar products are regularly traded and generate >70% of the income or added value.

The emission allocation must be based on energy content of all products.



Contact us:

service@carbon-standards.com

