



CPD for Educational professionals

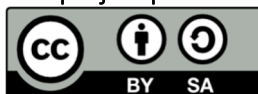
Deliverable 3.2



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1. Executive Summary

The **B4C Continuing Professional Development (CPD) Programme** was developed to equip vocational education and training (VET) professionals with the knowledge, skills and pedagogical approaches required to introduce **biochar and the Circular Carbon Economy (CCE)** into their educational practice. Rather than focusing solely on technical knowledge, the programme prepares teachers, trainers, programme developers and facilitators to design, deliver and validate competence-oriented learning that addresses real sustainability challenges.

The programme responds to the growing demand for educational approaches that combine climate action, bioeconomy and vocational education. It therefore integrates domain-specific knowledge on biochar with learner-centred pedagogies, including **Competence-Oriented Learning and Validation (COL&V)**, **Design-Based Collaborative Learning (DBCL)** and **Design-Based Collaborative Research (DBCR)**. The aim is not only to increase knowledge about biochar, but also to enable educational professionals to facilitate collaborative innovation processes within their own institutions and regions.

The CPD was implemented as a highly blended learning programme consisting of three interconnected phases. A preparatory online phase combined two synchronous webinars with asynchronous self-study through the B4C Moodle platform and the open-access Biochar Course. This was followed by a five-day face-to-face training in Göttingen, Germany, combining expert inputs, practical workshops, excursions and collaborative project development. During the subsequent piloting phase, participants transferred the acquired approaches into their own organisations by designing and implementing learning projects, supported by two online follow-up sessions and peer exchange within the B4C community.

A major innovation of the programme is the **B4C Learning Suite**, which combines a Moodle-based learning management system with a publicly accessible online Biochar Course, Open Educational Resources, practical toolboxes, templates and methodological guidance. Together, these resources provide a flexible learning environment that supports both structured qualification programmes and independent self-directed learning.

The CPD is embedded within European reference systems for vocational education and competence development. Learning outcomes are described using the **LEVEL5 competence framework** and linked to the **European Qualifications Framework (EQF)** and the principles of **ECVET**, enabling transparent competence descriptions and facilitating recognition and transfer between educational contexts. The programme also introduces practical validation methods that allow educational professionals to document competence development in formal, non-formal and work-based learning environments.

Beyond the development of individual competences, the programme establishes a transferable educational model that can be adapted to different vocational sectors and institutional settings. Participants are encouraged to develop authentic learning projects based on regional Circular Carbon Economy challenges, thereby linking education directly with innovation, stakeholder collaboration and sustainable regional development.

The CPD programme was successfully piloted with more than twenty educational professionals from vocational and adult education organisations across Europe. The high level of participant engagement, the quality of the developed learning projects and the successful transfer into accredited pilot courses demonstrate the effectiveness of the learning concept. The programme has subsequently become one of the core educational offers of the B4C Learning Suite and forms the basis for accredited Erasmus+ KA1 mobility courses and future capacity-building activities within the growing **THREE C network**.

2. Introduction

2.1. Structure

The B4C programme has been developed based on the ECVET specification, based on the idea that the programme and the teaching/learning modules can be used:

- As a whole (as “CPD-programme” which can be delivered in educational institutions to train their staff members in all programme topics) and
- In modules (which can be delivered individually and, in connection with a respective validation)
- The programme modules can be validated according to ECVET which makes them transferrable also in other CPD context to achieve utmost transferability
- Eventually to make them fit to all kinds of learning technology which is based on LOM (learning object metadata) standards which makes the units portable from one LMS to the other.

The B4C learning modules are built and described according to transferrable competence levels based on the LEVEL5 taxonomy, which has been created to facilitate Competence oriented Learning and Validation (COL&V). They are arranged in three subsequent levels of difficulty and complexity which allows a reasonable integration into the learning processes in different contextualised learning fields.

This way, B4C achieves a highly flexible and modular learning approach in those learning phases, that can be standardised.

2.2. Terminology and Specification

For the avoidance of uncertainties and misunderstandings we include a short explanation on terms and terminology and specifications that we use.

ECVET Specification

The B4C learning approach is based on a couple of specifications that are consciously applied to facilitate utmost transfer and usability.

The quality instrument ECVET (European Credit System for Vocational Education and Training) established in Europe is the basis for such a "common language". The basis for comparability of educational pathways is the concept of learning outcome orientation (outcome orientation independent of learning location, learning duration and learning context).

The ECVET system is a logical, hierarchical structure which has, as smallest common denominator, the learning outcomes, described in knowledge, skills and competences.

A qualification (or a CPD) consists of:

- **Learning Modules** containing
 - **Learning Units** consisting of
 - **Learning objects** that are
 - described by their envisaged **outcomes**
 - clustered along *knowledge, skills and competences* (ECVET/EQF)) or (in variation for rather not-formalised

contexts **attitudes** (LEVEL5) instead of the “competence” column.

LOM Specification

The second system that we refer to is relating to the question how educational elements should be organised to make them transferrable to blended learning modalities and re-usable in different LMS. To achieve this, we use the basics of the LOM model (Learning Object Metadata). Learning Object Metadata is a data model, usually encoded in XML, used to describe a learning object and similar digital resources used to support learning. The purpose of learning object metadata is to support the reusability of learning objects, to aid discoverability, and to facilitate their interoperability, usually in the context of online learning management systems (LMS).

The IEEE 1484.12.1 – 2002 Standard for Learning Object Metadata is an internationally recognised open standard and describes Learning Objects as smallest units

- **Information** (media/text etc) and
- **Assignments** including
 - **Tasks to take Actions** and
 - **Assessments**

Planning Tool Terminology

Eventually we use the LEVEL5 planning methodology¹ which has been developed over the last decade to:

- To plan, deliver competence-oriented learning,
- To facilitate the assessment and validation of competences on professional quality,
- To apply this methodology also in less formal learning context, e.g. on the job or in social, ecological projects, civic collaboration context and in capacity building projects and eventually
- To enable also non-academic professionals and citizens to develop good quality educational offers

Instruments used in this approach in hierarchical order:

1. Learning programme (the “whole”)

- a. Didactic pattern: an overview of contents, objectives, participants resources, methods (Didactic Frame)
- b. Action field: describes the context and what a learner has to do in his/her context (here the Facilitators)
- c. Learning field: describes what the B4C facilitators has to know and to be able to (as well as the affective competence dimension) in a defined learning scenario based on the action field (in terms of expected learning outcomes within a LEVEL5 reference system)

2. List of content related modules

- a. = clusters of contents to be delivered within the programme
 - i. Based on the LOM specification² (“learning module” consisting of “learning units” and learning objects (information+assignment) and ordered along the EQF/ECVET and to fit in KSA / KSC Taxonomy)³

¹ The LEVEL5 System is added to this document

² [IMS LD Standard to Describe Learning Designs](#)

³ [Impact-eu.net](#)

3. **Learning pathway:**

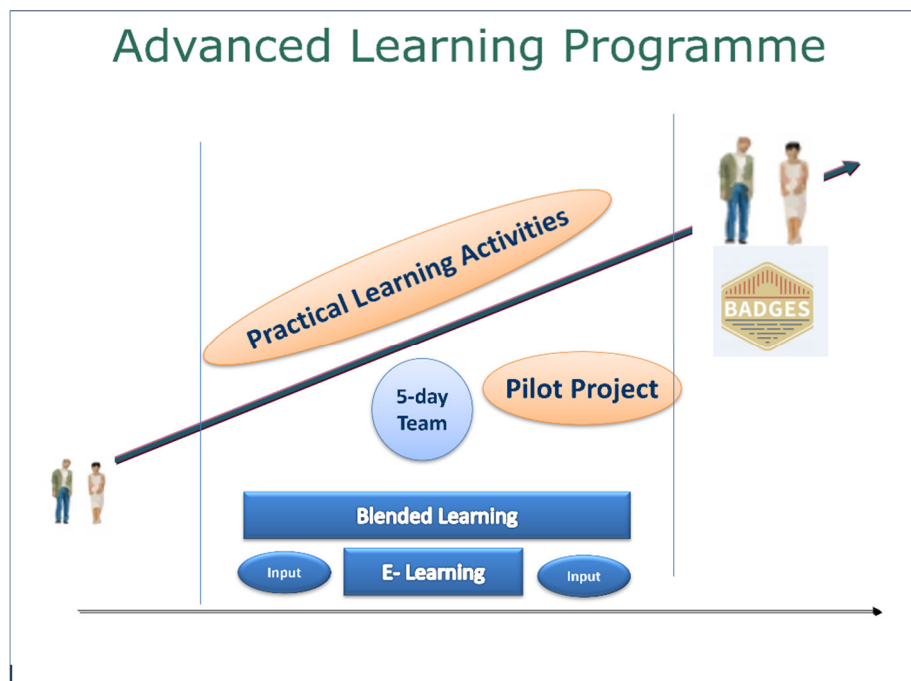
- a. List of learning modules (titles)
- b. Sequence of connected learning modules within the learning field
- c. If needed clustered in thematic areas

3. The B4C Continuing Professional Development Programme

3.1. Phases and Modalities

The CPD consists of the following phases:

1. Pre-Phase: to get familiar with own and partners' open VET projects and with theory on:
 - Biochar and Circular Carbon Economy
 - DBCL (Design Based Collaborative Learning) in Theory, especially
 - Competence Oriented Learning (in projects) and
 - Design Thinking
 - DBCR (Research in different Scientific areas,) connection to STEM)
 - Sustainable Development and Carbon Balances
 - Competence Validation
2. In the F2F phase they
 - receive further theory inputs and
 - create their joint projects on Biochar and Circular Carbon Economy
 - create interfaces for the follow-up phase
3. In the following pilot phase, they apply their knowledge in their own VET domains and organisation with the aim to convert the B4C training in their courses and learning projects.
4. The CPD ends with a self-reflection on the own projects, a self- and expert-assessment of the competence development and a LEVEL5 certification.



4. Applied Instruments and Materials

4.1. Didactic Framework Pattern

Summary

The B4C programme is a CPD for educational personal which aims at introducing approaches for the biochar based Circular Carbon Economy in their institutions and in their educational offers. Hence the target groups are at the firstly teacher and staff members and in the end also their learners as final beneficiaries.

The programme has been delivered in blended learning modality.

The main underlying idea is grounded on the results of the stocktaking (desk research and interviews) which suggest that it is not very helpful to “teach” Circular Carbon Economy⁴ or to offer courses / learning offers which exclusively aim at the acquisition of theoretical understanding of the Circular Carbon Economy.

Instead, following the idea of COL – Competence-Oriented Learning the B4C partnership has chosen an approach which “contextualises” the acquisition of sustainability literacy and competences. Hence the competences are a kind of side-effect from the learning – they are acquired like other “cultural skills and competences” (Belshaw, 2014) without being formal learning objectives.

This means that the applied didactic framework aims rather at a facilitation and a learner centred, constructive and collaborative (“team”) approach (DBCL). This approach can be also transferred in online or blended learning modality, however, it needs professionals who are “Facilitators of Design Based Collaborative Learning”, who have specific knowledge and skills and openness towards the critical use of online resources.

Action Field

Target group

The target groups are at the firstly staff members of educational institutions:

- Teachers and trainers
- Programme planners
- Mentors and coaches
- Learning assistants

As the programme is designed to support the integration of sustainability literacy and culture across higher and adult education, it welcomes professionals from all disciplinary and functional backgrounds—ranging from academic teaching staff to administrators, programme coordinators, and support personnel. Adult education organisations working with university-level learners are equally encouraged to participate.

⁴ In the meaning of “Bioeconomy Literacy”

The final beneficiaries are the learners within higher education institutions and adult learning settings, as well as those engaged in collaborative projects with societal actors, businesses, and public administrations.

Hence, the target group is intentionally diverse in terms of roles, sectors, and professional backgrounds. This diversity is regarded as a strength, particularly during the design thinking phases, where varied perspectives enrich collaboration and stimulate innovative thinking.

Topics/Themes (content area)

The B4C- Qualification (CPD) for facilitators relates to 3 content areas:

Topic 1. Biochar and the Circular Carbon Economy

- This main content block delivers the domain specific knowledge which is required to facilitate and collaborate in educational courses and projects which deal with the biochar-based bioeconomy. It offers a comprehensive self-learning structure for both trainers and learners which presents all biochar related contents for the physico-chemical and biological properties and the production and application scenarios of biochar. Additional courses relate to the sector specific bioeconomy scenarios in agriculture, horticulture and construction. “Biochar course” retrievable in the open learning suite section.

Topic 2. Competence-Oriented Learning and Validation (COL&V)

- This topic introduces the principles and methods of competence-oriented learning and validation, with a focus on fostering sustainability competences in both formal and non-formal settings. It includes training in the LEVEL5 system and guidance on how to plan, facilitate, and assess learning outcomes in the context of the CCE accessible via the B4C moodle

Topic 3. Design Thinking foundation of Design-Based Collaborative Learning and Design-Based Collaborative Research

- This topic explores the design thinking process as a structured, iterative method for addressing complex sustainability challenges. It includes practical tools and creative techniques for each step of the process, and positions design thinking as a core methodology within B4C’s learner-centred, collaborative approaches to teaching and research. accessible via the B4C moodle

Learning objectives

- **Knowledge:**
 - Theoretical knowledge on
 - Biochar properties and application areas
 - Bioeconomy theory and specifications of the CCE
 - Synchronous/Asynchronous online learning
 - Collaborative Tools and platforms
 - Design Thinking methodology
 - Competence oriented Learning and Validation
 - Learning Platforms

- **Skills:**
 - *Ability to...*
 - Develop blended learning offers to bring about skills and competences on the biochar based CCE for various target groups in Vocational Education.
 - Design thinking skills: developing visions for demand driven learning projects (in the region), spotting ideas and opportunities, creativity techniques and prototyping.
 - Facilitating Competence Oriented Learning
 - Creation of learning units with open-source platforms
- **Attitudes:**
 - Positive attitude towards the development of ideas in the team.
 - Tolerance of ambiguity as a guiding person in relation to the developments in the teams
 - Positive appreciation of all design thinking phases and iterative processes
 - Positive appreciation of the contributions of all team members
 - Openness, curiosity and motivation to use mixed learning forms

Resources

The CPD makes use of a variety of practical and transferable resources that support both online learning and in-person facilitation:

- Online self-learning modules
- OER Repository with sustainability-related teaching materials
- Design thinking worksheets and facilitation templates
- LEVEL5 validation tools (e.g. reference system, cube model)
- DBCL Concept (Design Based Collaborative Learning (blended & collaborative design thinking))
- DBCR Concept (Design Based Collaborative Research)
- Catalogue of assessment methods
- Workshop presentation slides and printed handouts for group tasks
- Planning templates for course or project design

Activities

The CPD focuses on context development, helping participants design CCE learning formats tailored to their own teaching environments. Through practical exercises, participants identify biochar and CCE related topics relevant to their sector region or institution, define their target groups, and outline suitable learning objectives and activities. They also explore how to adapt facilitation methods and validation tools to support diverse learners in real-world settings.

4.2. Learning Field

Reference System on Reference System: Facilitating Design based Collaborative Learning and Research for the biochar based Circular Carbon Economy (CCE)

	KNOWLEDGE		SKILLS		ATTITUDES	
L	Level Titles	Level description	Level Titles	Level description	Level Titles	Level description
5	Knowing where else (strategic transfer)	Knowing how to transfer design based collaborative learning and research into new and different contexts and situations	Developing, constructing, transferring	Adapting and developing DBCL/DBCR into education offers about sustainable development in an education institution.	Incorporation	Being determined to transfer the own teaching and training to the new approach. Inspiring others to apply concepts of DBCL/DBCR.
4	Knowing when (implicit understanding)	Knowing when and how to interact in design based collaborative learning and research process and to apply certain methods	Discovering, acting independently	Co-Facilitating a DBCL/DBCR project to for CCE development with appropriate tools in a teamwork on a given case	Commitment	Being determined to explore and improve the own competence regarding the facilitation of DBCL/DBCR for CCE.
3	Knowing how	Knowing the essential concepts on design based collaborative learning and the roles and required competences of a facilitator	Deciding/ selecting	Applying a set of DBCL/DBCR-instruments in education/training settings in relation to sustainable development	Motivation/ appreciation	Being motivated to incorporate CCE elements in existing education offers using the design based collaborative learning and research concept
2	Knowing why (distant understanding)	Understanding why planning & delivering of the B4C methodology has its benefits for implementing CCE development	Using, Imitating	Exercising and trying out singular DBCL/DBCR tools provided by others	Perspective taking	Being curious and interested about planning and delivering designed collaborative learning and research
1	Knowing what	Knowing that the B4C learning and research approach (DBCL/DBCR) is different from traditional education	Perceiving	Recognising that the education of sustainable development (ESD) requires new training / facilitation approaches	Self-orientation	Perceiving new design based collaborative learning and research without relating it to the own context

4.3. Training structure

4.3.1. Preliminary Phase (Online)

A preparatory phase consisting of two synchronous online sessions and self-directed learning activities delivered through the B4C Moodle platform.

This phase introduces key concepts and sets the foundation for the face-to-face training.

The developed materials are available in the following B4C Learning suite sections

- CPD course modules and trainers materials via moodle LMS: <https://b4c-moodle.threec.eu/>
- General biochar course for domain specific knowledge on the biochar based circular carbon economy (CCE) via the “biochar course”: <https://b4c.threec.eu/biochar-course/>

The online phase is designed to prepare (trainers) for the in-person workshop.

4.3.2. In person workshop/training (5 days)

An intensive, five-day in-person workshop focused on applying design-based collaborative learning (DBCL), facilitation methods, and competence-oriented approaches for the biochar based CCE. Participants engage in hands-on activities, exchange practices, and co-develop modules that support CCE learning within their institutional contexts.

During this workshop, participants explore how to implement active and learner-centred approaches—such as design thinking—to support climate-negative learning projects with the VET learners as final beneficiaries.

Biochar related theoretical inputs and an excursion day to a biochar production piloting centre incl. Pyrolysis plant accomplish the 5 day programme.

4.3.3. Follow-up Phase and Piloting:

A continuation phase supported by online sessions. During this period, participants implement B4C-inspired pilots at their institutions and document their learning and facilitation.

- The realised (and accredited) pilot courses developed by the CPD participants are described in D 3.3. and published in the learning suite section under: <https://b4c.threec.eu/b4c-courses-and-learning-opportunities/>
- The concrete projects, realised by the participants of these courses are exhibited in the virtual market place in <https://b4c.threec.eu/biochar-applications-tool/>

4.4. Asynchronous Online Learning Modules

Learning Module Structure within B4C:

Online Modules add to the preparatory phase of the B4C CPD programme but can be accessed over and beyond the lifetime of the CPD. These modules aim to build foundational competences in facilitating the biochar based Circular Carbon Economy by introducing core pedagogical concepts, tools, and methods relevant to competence-based teaching.

Structured into self-learning modules, the online component offers a flexible and accessible learning format that allows participants to engage with key topics at their own pace.

The modules cover areas such as competence-oriented learning and validation, facilitation strategies, sustainability frameworks, and practical tools for designing and assessing learning in diverse educational settings as well as B4C - Competence Framework.

The biochar resource box – contains a toolbox for practical biochar exercises for VET trainers and other templates, approaches, and additional material for the B4C courses.

In the moodle section, also the resources for the Carbon Management Course can be accessed as they require a registration.

4.4.1. Format 1 – Moodle-based Learning Management System

The Moodle-based LMS forms the structured, methodological and qualification-oriented part of the B4C Learning Suite. It provides learning modules, background documents, assessment tools and project resources for teachers, trainers and facilitators.

Its main purpose is to support educational professionals in planning and facilitating B4C-related learning activities. The LMS helps users understand how biochar and Circular Carbon Economy topics can be translated into competence-oriented, collaborative and learner-centred education.

At the current stage, the LMS includes the following modules and resource areas:

- Competence-Oriented Learning and Validation
- Facilitation of Design Thinking Workshops
- The LEVEL5 Approach
- B4C Competence Framework
- Carbon Management Course
- B4C Resource Box

Some modules are already structured as learning units, while others are designed as expandable resource areas. This allows the Learning Suite to grow as further project materials, pilot experiences and reusable tools become available.


[Home](#)
[Courses](#)
[Website](#)
Log in

B4C Moodle

Available courses



The Carbon Management Course

This course complements the Carbon Management Course and aims, amongst other things, to provide support and advice on the introduction of a local CO₂ management system as part of a practice-oriented and participatory bioeconomy.



B4C - Competence Framework

The B4C Competence Framework has been developed as part of the B4C project to describe the competences that learners, professionals, teachers and facilitators may need when working with biochar, the Circular Carbon Economy and Education for Sustainable Development.



Facilitation of Design Thinking Workshops

Design thinking is a problem-solving approach that emphasizes empathy, creativity, and innovation. It involves a user-centered approach to problem-solving, where the needs and desires of the end-users are at the forefront of the process. In a sustainable context, design thinking can be a powerful tool for creating innovative and effective solutions to complex environmental challenges.



The LEVEL5 Approach

LEVEL5 is not just about validation, it is a holistic validation and learning system. Therefore, it is designed to plan and deliver competence oriented learning - especially in informal and non-formal contexts where no pre-written learning plans are available.



Competence Oriented Learning and Validation

This course is designed to improve your own competences regarding COL&V. It is divided into 4 learning units with different focuses, which can be worked through individually. The course is based on the reveal publication which is therefore deposited on the main page.



B4C - A resource box

In this module, you will find the templates, approaches, and additional materials developed over the course of the B4C project. Some of the content is included as draft versions so that you can follow the development process behind them.



The B4C Helpdesk

The Helpdesk is the final support component of the B4C Support Hub. It has been developed as an FAQ and guidance section for platform users. The Helpdesk summarises the most important questions that have arisen during the development and use of the platform. It covers both technical and content-related queries.

You are not logged in. ([Log in](#))
[Data retention summary](#)
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Powered by Moodle



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In parallel an **open** biochar course provides the domain specific knowledge on the biochar based Circular Carbon Economy via the B4C learning suite. Hence this part is a completely open online resource which is easily accessible for learners and for trainers.

4.4.2. Format 2 – Open-Access Biochar Course on WordPress

In addition to the Moodle-based LMS, the B4C Learning Suite includes an open-access Biochar Course directly integrated into the WordPress environment.

This course provides a thematic introduction to the Circular Carbon Economy and the biomass-to-biochar value chain. It is designed to be accessible for a broad audience, including students, teachers, trainers, practitioners, municipalities, businesses, policymakers and interested individuals.

The open-access format allows users to explore the topic without entering the full LMS environment. It can therefore serve as a first entry point into B4C and as a bridge between public awareness, self-guided learning and more structured training activities.

The course is structured around four interconnected modules:

- Biomass
- Biochar
- Bioproducts
- Bioeconomy

Together, these modules guide users from the origin of biomass to biochar production, product applications and regional Circular Carbon Economy development.



4.5. CCE Contents provided in the Learning Suite

4.5.1. Biomass

The Biomass module introduces residual biomass as the starting point of biochar-based value chains.

Users learn that biomass includes materials such as wood, crop residues, grasses, organic waste, manure or algae. The module explains why different biomass types have different properties and how feedstock choice can influence biochar yield, quality, stability and application potential.

Reflection tasks invite learners to analyse biomass streams in their own region or everyday environment. This helps users understand where biomass originates, how it is currently handled and where carbon is released or retained.

The screenshot displays the B4C Learning Suite interface. At the top, a navigation bar includes 'Home', 'The Project', 'LearningSuite', 'Virtual Market Place', and 'News'. The main content area is titled 'BIOMASS' and features an 'INTRODUCTION' section. This section defines biomass as organic matter from living or recently living organisms, listing examples like wood, crop residues, grasses, organic waste, manure, and algae. It explains that biomass is the primary carbon source for biochar. The text further details the composition of biomass (carbon, hydrogen, oxygen) and how different types (woody vs. grasses) affect biochar properties. A list of factors influencing biochar quality is provided: biochar yield and carbon stability, physical and chemical properties of the biochar, and suitability for specific applications. Below the text is a video player titled 'B4C - What is Biomass? Introduction' with a thumbnail showing a plant and a YouTube logo. To the right of the video is a 'TASKS' section with a 'Reflection' task. The task asks users to think about biomass streams in their region or everyday environment, choose one or two examples, and follow their pathway. It lists three reflection questions: 'Where does the biomass originate?', 'How is it collected or handled?', and 'What happens to it after collection (e.g. composting, incineration, disposal, reuse)?'. The task concludes with a prompt to reflect on how these biomass streams are currently used. At the bottom of the page, a navigation bar shows four tabs: 'BIOCHAR CHAIN', 'BIOMASS SOURCES & PROPERTIES', 'BIOMASS PREPARATION', and 'LOCAL/REGIONAL INVESTIGATION', with 'BIOMASS SOURCES & PROPERTIES' currently selected.

BIOCHAR FOR COMPETENCE DEVELOPMENT FOR THE CIRCULAR CARBON ECONOMY

B4C

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COURSE OVERVIEW

Introduction

Your Bioeconomy Journey

Module Overview

Biochar-based Circular Carbon Economy

Biomass

Introduction

Biochar Chain

Biomass Sources & Properties

Biomass Preparation

Local/Regional Investigations

Biochar

Introduction

Biochar Properties

Conversion to Biochar

Pre-treatment

Post-treatment

Quality

Bioproducts

Introduction

Bioproducts Gallery

Bioeconomy

Introduction

Analysis

Project Ideas

CCMS

Stakeholders

Course: Biochar in Construction

Course: Biochar in Ornamental Horticulture & Landscape

Course: Biochar in Agriculture

Course: Biochar, Climate Action & Active Participation

BIOMASS

INTRODUCTION

Biomass is organic matter derived from living or recently living organisms. It includes materials such as wood, crop residues, grasses, organic waste, manure or algae. Biomass is the primary source of carbon for biochar and therefore the starting point of every biochar-based value chain.

All biomass consists mainly of carbon, hydrogen and oxygen, bound together in complex organic structures known as fibres. These fibres are typically composed of cellulose, hemicellulose and lignin. The relative proportions of these components differ significantly between biomass types — and this has a direct influence on how biomass behaves during conversion and on the quality of the resulting biochar.

For example, woody biomass generally contains a higher proportion of lignin. This makes it more structurally stable and typically results in biochar with higher carbon content, greater stability and a more rigid pore structure. Grasses and agricultural residues, on the other hand, usually contain more cellulose and hemicellulose and often higher mineral (ash) content. This can lead to biochar with different surface properties, nutrient content and reactivity, which may be advantageous for certain applications but less suitable for others.

Understanding these differences is essential. Biomass is not interchangeable, and the choice of feedstock strongly affects:

- biochar yield and carbon stability,
- physical and chemical properties of the biochar, and
- suitability for specific applications, such as soil improvement, construction materials or technical uses.

B4C - What is Biomass? Introduction

INTRODUCTION What is biomass?

All biomass are fibers bound in combinations of:

C H O

Carbon Hydrogen Oxygen

Cellulose Hemicellulose Lignin

CHO's composition is unique for each species

Influence on the output product

biochar

Ansehen auf YouTube

TASKS

Reflection

Think about biomass streams that are part of your region or your everyday environment, such as garden waste, food waste, crop residues, wood offcuts or green waste from public spaces. Choose one or two examples and follow their pathway:

- Where does the biomass originate?
- How is it collected or handled?
- What happens to it after collection (e.g. composting, incineration, disposal, reuse)?
- At which point is the carbon released or retained?

Reflect briefly on how these biomass streams are currently used. Note down your observations and reflections.

BIOCHAR CHAIN **BIOMASS SOURCES & PROPERTIES** **BIOMASS PREPARATION** **LOCAL/REGIONAL INVESTIGATION**

4.5.2. Biochar

The Biochar module introduces biochar as a stable, carbon-rich material produced from biomass under low or no oxygen conditions.

The module explains how biochar properties are influenced by feedstock, production process, pre-treatment, post-treatment and quality requirements. It introduces key aspects such as carbon stability, porosity, mineral content, surface characteristics and safety-related parameters.

This module provides the technical foundation for understanding why biochar can be used in different application fields and why quality matters for responsible use.

BIOCHAR FOR COMPETENCE DEVELOPMENT FOR THE CIRCULAR CARBON ECONOMY

B4C

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COURSE OVERVIEW

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- Biochar**
- Bioproducts**
 - Introduction
 - Bioproducts Gallery
- Bioeconomy**

BIOCHAR

INTRODUCTION

Biochar is a **stable, carbon-rich material originating from biomass that is thermally treated under low or no oxygen conditions**, typically through pyrolysis or gasification. As such, it forms a key link between raw biomass and a wide range of carbon-based products and applications.

This module focuses on understanding how biochar is formed, how its properties emerge, and how these properties can be influenced and assessed. Biochar is not defined by a single characteristic; instead, its behaviour and performance are shaped by a sequence of decisions along the production chain—from feedstock selection to conversion conditions and further processing steps.

The module is structured to build this understanding step by step:

- You begin by exploring the key **properties** of biochar, such as carbon stability, surface characteristics, mineral content and safety-related parameters.
- You then examine **conversion**, with a focus on pyrolysis, to understand how process conditions influence product yields and material properties.
- The module continues with **pre-treatment**, using IFBB as an example of how residual biomasses can be upgraded into more suitable feedstocks for biochar production.
- In **post-treatment**, you explore how biochar properties can be further modified, for example through steam activation, and what this means for material performance and process outcomes.
- Finally, the learning unit on **quality** integrates all previous steps and introduces frameworks for assessing biochar along the dimensions of safety, functionality and sustainability.

Together, these learning units provide a coherent view of biochar as a carbon material shaped by feedstock, processing and quality requirements. This understanding forms the foundation for the next module, **Bioproducts**, where the application and use of biochar in different product systems are addressed.

BIOCHAR PROPERTIES CONVERSION TO BIOCHAR PRE-TREATMENT POST-TREATMENT QUALITY

Previous Module Next Module

4.5.3. Bioproducts

The Bioproducts module shifts the focus from biochar as a material to biochar as part of real-world applications.

Users explore how biochar can be used in sectors such as agriculture, horticulture, construction, waste management and water purification. The module presents examples of biochar-based products and projects and encourages learners to reflect on the problem each product addresses and the role biochar plays within the solution.

The module follows a design-oriented logic. Learners are encouraged to identify opportunities, imagine future applications and develop first ideas for biochar-based products or services in their own environment.

The screenshot displays the B4C website interface for the 'Bioproducts' module. The header includes the B4C logo and navigation links: Home, The Project, LearningSuite, Virtual Market Place, and News. A left sidebar lists the course overview, including sections for Introduction, Biochar-based Circular Carbon Economy, Biomass, Biochar, Bioproducts, and Bioeconomy. The main content area is titled 'BIOPRODUCTS' and features an 'INTRODUCTION' section explaining the module's focus on real-world applications. Below this, 'THE SECTORS' are listed: Agriculture, Building Industry, Horticulture, Waste Management, and Water Purification, each with a brief description of biochar's role. At the bottom, a 'GALLERY OF EXAMPLE PRODUCTS & PROJECTS' is shown, featuring images of various biochar-based products like Gant Lights, Seed Coating, Rainwater Vials, EcoLat, Chicken Manure, Enhanced 3D Printing, GRETA, and Natural Fertilizer.

4.5.4. Bioeconomy

The Bioeconomy module introduces the wider Circular Carbon Economy perspective.

It focuses on how residual biomass, biochar production, product development and regional value chains can be connected in local or regional carbon management strategies. Users are encouraged to think beyond single products and to consider the wider system of actors, resources, carbon flows and application opportunities.

This module helps learners understand how biochar can become part of regional development, climate action and circular value creation.

BIOCHAR FOR COMPETENCE DEVELOPMENT FOR THE CIRCULAR CARBON ECONOMY

B4C

Home The Project Learning Suite Virtual Market Place News

COURSE OVERVIEW

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Your Bioeconomy Journey

Module Overview

Biochar-based Circular Carbon Economy

Biomass

Introduction

Biochar Chain

Biomass Sources & Properties

Biomass Preparation

Local/Regional Investigations

Biochar

Introduction

Biochar Properties

Conversion to Biochar

Pre-Treatment

Post-Treatment

Quality

Bioproducts

Introduction

Bioproducts Gallery

Bioeconomy

Introduction

Analysis

Project Ideas

CCMS

Stakeholders

Course: Biochar in Construction

Course: Biochar in Ornamental Horticulture & Landscape

Course: Biochar in Agriculture

Course: Biochar, Climate Action & Active Participation

BIOECONOMY

INTRODUCING A CIRCULAR CARBON ECONOMY AT REGIONAL LEVEL

Decisions about biomass are already part of regional infrastructure — from agricultural residues and green waste to forestry by-products and organic municipal waste. These materials are central to the bioeconomy, yet the way they are used often determines whether carbon is retained in the region or released quickly back into the atmosphere.

The bioeconomy broadly aims to replace fossil resources with biological ones. However, not all bio-based pathways deliver the same climate benefits. Many still lead to rapid carbon release, for example through short-lived products or energy use. This learning module therefore approaches the bioeconomy through a more specific lens: the Circular Carbon Economy.

A Circular Carbon Economy focuses explicitly on carbon management. It asks not only which biological resources are used, but how carbon flows through regional value chains — and how long it remains in productive use. The goal is to retain, stabilise and reuse carbon as part of coordinated regional systems, rather than allowing it to escape quickly as CO₂.

This perspective represents a clear shift:

- from linear biomass use to circular carbon value chains,
- from carbon as a problem to carbon as a measurable and manageable resource, and
- from isolated bio-based projects to integrated regional strategies.

For regional stakeholders — including agriculture, construction, horticulture, waste management and municipalities — this approach creates concrete opportunities. Residual biomass can be converted into long-lasting carbon-based products, such as biochar applications in construction materials, soils, landscaping or technical systems. In doing so, regions can reduce emissions, create durable carbon sinks and strengthen local economies at the same time.

Introducing a Circular Carbon Economy requires collaboration across sectors and shared tools for decision-making. Stakeholders need a common basis to assess carbon impacts, compare options and develop solutions that make sense under real regional conditions.

Building on the previous modules, this learning unit guides you step by step from understanding regional carbon potential to developing a concrete bioeconomy project — turning climate objectives into practical, region-specific action.

BIOMASS AND CARBON POTENTIAL ANALYSIS

Understanding the Carbon Sink Potential of Your Region

5. The face-to-face B4C course for VET professionals

5.1. Programme and Concept

Introduction

The B4C Continuing Professional Development (CPD) programme is a capacity building course for Practitioners and Vocational Education professionals working in the fields of Agriculture/Horticulture, the building industries and the environmental sector.

It provides an innovative approach to introduce biochar as a learning and development resource to promote sustainable local & regional development and the bio-economy – we call this the “Circular Carbon Economy”.

The main part of the training is delivered face-to-face over period of five days from 7th to 11th April in Göttingen, Germany.

During the 5-days factual inputs on biochar change with Design Thinking project workshops in which joint work groups develop innovative biochar prototypes. 2 excursions will provide state of the art biochar projects for diverse (agri/horticultural and building applications).

After the face-to-face phase, the participants shall transfer the approach in their practical learning & developing projects. In this phase they are accompanied via the virtual helpdesk, provided on Friday afternoon on one day per month. During these occasions the professionals exchange on their experiences while planning and delivery of their open learning projects.

This way, the B4C programme transfers innovative learning contents into concrete local development projects, which are supported by our European network.

The week-long training was attended by 20 participants representing VET institutions and adult education organisations across Europe, also extending the original country distribution by also involving participants from IE and NL.

The training combined short theoretical inputs with applied group work, field-based research, and peer exchange. A diverse set of didactic formats were used—including design thinking tasks, plenary reflection, and collaborative prototyping—structured around the following recurring elements:

- Morning Input Sessions – Introduced facilitation tools and methods relevant to biochar and CCE.
- Applied Group Exercises – Focused on place-based sustainability challenges, often conducted off-site.
- Facilitation Observation – Participants reflected on the trainer’s techniques and classroom dynamics.
- Peer Collaboration – Teams worked on defining and co-developing sustainability learning formats or interventions.
- Reflection and Feedback Rounds – Provided space for structured exchange and group reflection on the learning process.

Learning Objectives of the In-Person Training

The in-person training was designed to meet the following key learning objectives:

Apply facilitation techniques for CCE with a focus on learner-centred, competence-oriented methodologies.

Experience and reflect on creative and collaborative learning approaches, including methods from design thinking and open learning.

Translate biochar based CCE concepts into local learning contexts, using field-based research to explore real-life challenges.

Observe and critically assess facilitation practices, including group process management, inclusive participation, and formative validation.

Initiate the design of personal CCE learning formats or courses to be implemented post-training, drawing on workshop insights in the own VET sector.

Key Considerations When Designing the In-Person Workshop

When planning an in-person B4C training workshop, organisers should take into account the following design considerations:

Balance between Input and Practice

Limit theoretical inputs to concise sessions, ensuring the majority of time is devoted to participatory, experiential activities. Inputs should introduce a method or concept that participants can directly apply in structured exercises.

Contextualisation through Place-Based Learning

Incorporate field visits or community-based research (e.g. markets, neighbourhoods, public spaces) to allow participants to explore sustainability challenges in local contexts. This supports systems thinking and strengthens the real-world relevance of CCE.

Learning by Facilitating

Create opportunities for participants to step into the role of facilitator—for instance, leading warm-ups, guiding group tasks, or presenting interim results. Observing and practising facilitation builds confidence and deepens understanding of group dynamics.

Foster Collaborative Course Design

Reserve dedicated time for participants to co-develop or outline their own CCE learning formats. These planning sessions should be supported with templates (e.g. learning design canvases, stakeholder mapping tools) and facilitation coaching.

Build Community and Continuity

Encourage informal exchange, peer mentoring, and joint visioning throughout the week to strengthen the cohort. Introduce participants to the online follow-up phase and encourage continued collaboration through shared documentation tools and digital platforms.

5.2. Programme of the B4C Course Week

A core component of the B4C Facilitator Course is the in-person workshop, which serves as a crucial learning space following the online module phase. This workshop is designed to immerse participants in practical, collaborative, and experiential learning, with a strong focus on facilitation techniques and the application of Competence Oriented Learning principles.

The in-person phase enables participants to apply theoretical knowledge, observe and practise facilitation strategies, and co-develop solutions to real-world sustainability challenges with a focus on the biochar based Circular Carbon Economy. It also fosters peer learning and exchange, while modelling diverse pedagogical approaches in support of learner-centred, competence-based education.

The in-person training held in Göttingen (April 2025) was attended by 20 participants and also involved participants of the THREE C network and a parallel Interreg project (CASCADE) to achieve utmost transferability and dissemination. This serves as a reference example for future implementations of the B4C CPD workshops in different institutional and regional contexts, for instance as KA1 courses, which are offered through the B4C market place. Importantly, the workshop also acts as a springboard for participants to develop and deliver their own B4C learning modules or projects, which marks the final phase of the facilitator course.



B4C/CASCADE CPD Programme
A One-Week Course on Biochar & the Circular Carbon Economy

 Göttingen, Germany

 7. - 11. April 2025

 Face-to-face with preparatory online sessions

The **B4C/CASCADE** Continuing Professional Development (CPD) programme is a capacity-building course designed for practitioners and vocational education professionals working in agriculture, horticulture, construction, and environmental sectors.

This training provides an innovative approach to integrating biochar into sustainable local and regional development, supporting the transition to a Circular Carbon Economy (CCE) and the bio-economy.

Participants will explore the environmental, economic, and practical applications of biochar, gaining the knowledge and skills needed to apply it in their professional fields.



Course Structure

Preliminary Online Phase (March 2025)



Before the in-person training, participants will engage in 1-2 online sessions via Zoom, providing:

- An introduction to biochar and its role in sustainability.
- A chance to share backgrounds and expertise to create a common knowledge base.
- Training on basic learning technologies and an introduction to Design-Based Collaborative Learning (DBCL).
- Access to learning materials on biochar and the Circular Carbon Economy via an online platform.

Face-to-Face Training (7. - 11. April 2025 | Göttingen, Germany)



The main part of the programme takes place over five days in Göttingen, Germany, combining expert knowledge, hands-on experience, and collaborative project work:

- Expert-led sessions on biochar applications in agriculture, horticulture, and construction.
- Hands-on Design Thinking workshops, where participants work in groups to develop innovative biochar prototypes.
- Two guided excursions showcasing real-world biochar projects in different application fields.
- Networking opportunities with professionals and experts from across Europe.

The face-to-face training is designed to be highly interactive, allowing participants to apply their knowledge immediately in practical projects.

Post-Training Support & Application



After the in-person phase, participants will apply what they have learned in their own practical learning and development projects. To support this process, the programme offers:

- Monthly virtual helpdesk sessions (Fridays) where participants can receive guidance, discuss their experiences, and exchange ideas.
- Ongoing support from a European network of experts and professionals.
- Resources and mentoring to help integrate biochar into real-world projects.

By the end of the programme, participants will have the skills, tools, and network needed to implement sustainable biochar solutions in their respective fields.

Preliminary Programme for Course Week in Göttingen, Germany

07.04. - Day 1	08.04. - Day 2	09.04. - Day 3	10.04. - Day 4	11.04. - Day 5
Morning Arrival Afternoon Get together Biochar Input 1: Introduction to biochar products and value chains Project Development 1: • Workgroup foundation • Setting the scene for a project (challenge)	Morning Biochar Input 2: Residual Biomass Input Biochar Input 3: Conversion Theory & Technology Afternoon Excursion 1: Urban Applications, Göttingen Project Development 2: • Ideation (creating ideas on local biochar projects and value chains) • Idea refinement and workgroup project definition	Morning Excursion 2: Biochar Techlab of Kassel University with a parcours of different pre-treatment and conversion technologies and practical experiments, Eichenberg • Conversion, pre-treatment • Agricultural and Horticultural applications • Products and value chains for construction Afternoon Project Development 3: • Prototyping 1 (groups start developing a prototype) based on selected ideas	Morning Biochar Input 4: Conversion to bio-economy (the „CASCADE approach“ to develop local/regional circular carbon economy projects) Project Development 4: • Prototyping 2 (groups finalise the prototypes and prepare for a pitch in the afternoon) Afternoon International conference with group project presentations and award ceremony (Regional and international experts are being invited to attend the conference)	Morning • Conclusion • Evaluation • Next Tasks Afternoon Departure

6. B4C embedded in European Reference System (EQF)

As described in the first chapters, the CPD is designed along two specifications:

- The ECVET specification to facilitate the validation of competences and
- The LOM specification to facilitate the transfer of (open) Educational Resources, here learning units and materials in a meaningful way to other LMS

The following chapters describe the theoretical groundworks and the concrete connections to the ECVET system as an instrument from the European Skills Agenda to validate learning outcomes of learners (in this case educational professionals) in the B4C CPD.

These references are also part of the training and provided as learning materials on the trainers' LMS.

6.1. Validation

Competence Taxonomies

The increasing level of control (management) over a particular competence can also be called a 'competence level'. This implies that a 'competence' is a dynamic concept – competences grow while learning. The question on how to measure and document different competence levels is as old as it is complex. It has probably challenged generations of educationalists on practical, administrative and political levels; in formal education but also in professional development domains, such as in Human Resources.

The problem in measuring competences is not only a certain ambiguity in the term 'competence', caused for instance by different connotations in different languages, but also by different cultural views on competence and learning theory.

Additional complexity comes in as competences are – unlike (school) subjects – always dependent on their contexts. Teamwork competences are (among others) dependent on the team composition and the task; leadership competences are dependent on the group and the environment in which it is applied and teaching competences relate to the learning environment, the students and their familiarity with the learning schemes – among many other contextual aspects.

In order to operationalise competences, one needs certain reference points against which competences can be described.

Taxonomies are such reference systems.

They are the major instruments to classify, and later to measure and document competence levels.

Bloom's Taxonomy

One of the best-known taxonomies was developed by Benjamin Bloom in 1956 as Taxonomy of Learning Objectives. He differentiates 3 main areas:

- Taxonomy for the area of cognitive behaviour
- Taxonomy for the area of affective behaviour
- Taxonomy for the area of psycho-motor behaviour



Fig. 5: Taxonomy according to Bloom

Bloom's taxonomy has been constantly further developed by his followers (Anderson/Krathwohl and others) and describes cognitive objectives, psycho-motor objectives and affective objectives along a number of quality levels.

EQF Taxonomy

A second, well known taxonomy is for instance the European Qualification Framework and the related Credit Transfer Systems (ECTS and ECVET).

	Knowledge ^[1]	Skills ^[2]	Competences ^[3]
LEVEL 1	basic general knowledge	basic skills required to carry out simple tasks	work or study under direct supervision in a structured context
LEVEL 2	basic factual knowledge of a field of work or study	basic cognitive and practical skills required to use relevant information in order to carry out tasks and to solve routine problems using simple rules and tools	work or study under supervision with some autonomy
LEVEL 3	knowledge of facts, principles, processes and general concepts, in a field of work or study	a range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information	take responsibility for completion of tasks in work or study >adapt own behaviour to circumstances in solving problems
LEVEL 4	factual and theoretical knowledge in broad contexts within a field of work or study	a range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study	exercise self management within the guidelines of work or study contexts that are usually predictable, but are subject to change >supervise the routine work of others, taking some responsibility for the evaluation and improvement of work or study activities
LEVEL 5	comprehensive, specialised, factual and theoretical knowledge within a field of work or study and an awareness of the boundaries of that knowledge	a comprehensive range of cognitive and practical skills required to develop creative solutions to abstract problems	exercise management and supervision in contexts of work or study activities where there is unpredictable change >review and develop performance of self and others
LEVEL 6	advanced knowledge of a field of work or study, involving a critical understanding of theories and principles	advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study	manage complex technical or professional activities or projects, taking responsibility for decision making in unpredictable work or study contexts >take responsibility for managing professional development of individuals and groups
LEVEL 7	highly specialised knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking and/or research >critical awareness of knowledge issues in a field and at the interface between different fields	specialised problem solving skills required in research and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields	manage and transform work or study contexts that are complex, unpredictable and require new strategic approaches >take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams
LEVEL 8	knowledge at the most advanced frontier of a field of work or study and at the interface between fields	the most advanced and specialised skills and techniques, including synthesis and evaluation, required to solve critical problems in research and/or innovation and to extend and redefine existing knowledge or professional practice	

Fig. 6: EQF-Taxonomy

Both taxonomies not only differ in structure (EQF is clustered in Knowledge, Skills and Autonomy/Responsibility and has 8 levels while Bloom distinguished Cognitive, Psycho-Motor and Affective traits on 4-6 levels).

The main difference between these taxonomies – and this is often forgotten – is their purpose.

While 'learning' was in the focus of Bloom's taxonomy, 'qualification' is the main driver for the establishment of the EQF.

What all taxonomies have in common is that they aim to describe competence dimensions (the vertical columns) and competence levels (the horizontal competence qualities) with the help of learning outcome descriptors. These learning outcome descriptors have to be precise and consistent in order to facilitate distinguishing between different competence quality levels.

There are several other competence models and taxonomies which try to explain and describe competences and try to operate them for different purposes.

LEVEL5 Taxonomy

The REVEAL group has developed its own taxonomy (LEVEL5) based on the post-Bloom taxonomy in a blend with a derivate of the emotional intelligence taxonomy. It consists of Knowledge, Skills (capabilities) and Attitudes (emotions/values) on 5 levels. This taxonomy facilitates assessing, documenting but also planning competence developments in highly context-dependent environments such as learning in mobility or learning on the job or in leisure time activities.

LEVEL	KNOWLEDGE	SKILLS Capabilities	ATTITUDES Emotions/Values
5	Know where else... (Transfer Knowledge, <i>Strategic Knowledge</i>)	Transferring Developing/ Constructing <i>Versatility</i>	Incorporation (Internalising) <i>„Unconscious“ Competence</i>
4	Know when... Practical (Procedural knowledge)	Discovering/ acting independently (disturbed systems)	Commitment <i>Affective self-regulation (Willing)</i>
3	Know how... Theoretical knowledge	Deciding/ selecting (Known systems)	Appreciation Motivation
2	Know why... (Distant understanding)	Applying Imitating (Exercising)	Perspective taking (Curiosity)
1	Know-that... Basic Perception	Perceiving Listening	Self orientation Neutral

Fig. 7: LEVEL5 Taxonomy

As Fig. 7 shows, the LEVEL5 taxonomy comes with general descriptors ('level titles') which are derived partly from Bloom's systems and partly from other taxonomies and concepts, like levels of 'emotional intelligence' and 'affective competence' and affective self-regulation.

The LEVEL5 taxonomy is the basic system for so called 'reference systems' in which the taxonomy is transferred to distinctive competences.

In the reference systems competences are contextualised with the help of specific learning outcome descriptors for each of the cells.

L	Level Titles	Level description	Level Titles	Level description	Level Titles	Level description
5	Knowing where else (strategic transfer)	Knowing how to enhance team processes in different teams. Knowing how to help other people act successfully in teams and to assign specific responsibilities to people keeping in mind their relevant skills.	Developing, constructing, transferring	Leading a team in a way that members are able to contribute to the best of their abilities, supporting them to do so. Being able to strategically develop a team.	Incorporation	Having internalised the "culture" of constructive team work and to accomplish goals through mutual support. Inspiring others to improve their teamwork skills.
4	Knowing when (implicit understanding)	Having substantial knowledge on how and when to join/form a team. Understanding strength and weaknesses of team members. Knowing the importance of communication and how to coordinate workflows.	Discovering acting independently	Being able to assign and coordinate specific tasks and roles to team members on the basis of their strengths and weaknesses. Monitoring team processes. Trying out new roles for one-self.	Self-regulation, determination	Feeling the importance to refrain from own preferences (e.g. in regard to procedures, own solution strategies, methods etc.) for the sake of the team and the teamwork. Being determined to be a good team worker.
3	Knowing how	Knowing the basic dynamics and demands of teamwork. Knowing how to engage in a coordinated work flow where the skills, qualities and limits of each member are taken into account in order to work efficiently.	Deciding/ selecting	Actively reaching out to join a team or help create a team. Contributing to the team process according to own strengths and needs for reaching the shared goal.	Motivation/ appreciation	Having a positive attitude towards working together in a team and to appreciate team diversity. Finding it important to have a 'team spirit'. Being motivated to develop own competence to successfully work in a team.
2	Knowing why (distant understanding)	Knowing that teamwork is a more effective way to achieve results. Knowing it demands from individuals to coordinate their work considering individual competences and abilities.	Using, imitating	Contributing to team work when being invited or instructed to. Fulfilling assigned tasks in a team by following the example of others.	Perspective taking	Being interested in the potentials of team work and to learn more about it.
1	Knowing what	Knowing that teamwork is collaborating with others to reach a shared goal.	Perceiving	Recognising situations in which teamwork is feasible to reach goals.	Self-orientation	Seeing teamwork as something positive, but without considering developing own team work competence

Fig. 9: LEVEL5 Reference system with general descriptors on teamwork

With the help of the reference systems each competence can be described properly on 5 quality levels along their three basic dimensions: the knowledge, skills (capabilities) and affective (value) competence components.

6.2. Validation Purposes

Prior to the transfer of the professionals' competences into the European EQF and ECVET systems we find it useful to start with a brief introduction to validation purposes in order to find out for whom and why this transfer might be useful (for more detailed information see also the chapter on validation in the BADGES toolbox and Valorisation)

Validation purposes can firstly be clustered along organisation levels:

- EUROPEAN level (European Commission)
- Transparency of qualifications
- Mobility
- Comparability
- European economic growth and stability
- INSTITUTIONAL level (enterprises, public institutions, schools)
- Finding personnel
- Providing evidences of own capacities
- Organisational development
- INDIVIDUAL level
- Showing potentials and competences
- Finding jobs
- Collecting evidences in CV
- Sharing competences for private projects/purposes

One can differentiate two main purposes

1. Professional Formal Qualification:

Purpose: 'profiling', identifying levels of competences and measuring 'performances'

Means: -> summative assessments and high level of formality, certification

2. Personal development:

Purpose: incentive for civic engagement, showing potentials of learners

Means:-> identification, formative assessment and low level of formality

Between those two poles there are a large number of different scenarios ready and waiting for competence validation:

- Continuing professional education and training for people working at cultural sites,
- Learning in leisure time (maybe even without a learning goal)
- Training on social/personal competences like teamwork, communication, customer orientation etc.,
- Orientation projects for young (unemployed) adults,
- Mobility projects for those Not in Employment Education or Training (NEETs) to develop their potentials and to bridge to the working life or formal education again,
- Self-learning arrangements, to give evidence to competences acquired in rather informal learning contexts, e.g. in volunteering n cultural or nature projects

just to name a few.

In REVEAL and the professionalisation of educators we probably encounter different expectations and functionalities related to validation:

1. a formative (learning process oriented) and
2. a summative (qualification oriented) assessment and documentation.

Hence the idea to connect to the formal system of EQF and ECVET is relevant only for those who intend to convert their competences into something “professional” or who might be interested in collecting evidence/proofs of these competences in their portfolios.

The transfer of our competence frameworks to EQF and ECVET is only meaningful in the professional context. ECVET for instance is literally connected to a system which is a cascade of

- Qualification
- Learning Units
- Knowledge, skills and competences (relating to responsibility and autonomy)

6.3. B4C Qualification Programme

The B4C CPD (qualification) is a continuing professional development for trainers to promote the biochar based Circular Carbon Economy in their VET courses and projects.

Target groups are educational professionals, like trainers, teachers, semi-professionals who plan and deliver informal and non-formal learning and also those who develop and design biochar based Circular Carbon Economy projects, or work in rather informal learning settings, but also professionals from other educational fields.

It is a blended learning system consisting of four learning units related to the competence areas of

- Planning,
- Delivering,
- Evaluating innovative, competence-oriented learning and
- Validation of learners' competence developments.

Competences to be acquired in the Programme

The trainers' competence inventory gives an overview of 24 identified key competences for educational professionals. These competences are clustered into 5 competence areas: planning competences, competences related to the delivery of training, competences related to evaluation and validation and generic competences.

		Overall B4C Competence; Facilitating Design Based Collaborative Learning	
1	A	Comprising all planning and delivery competences listed below, to be used to create: ○ learning fields (in projects for facilitators) ○ validation designs (competence oriented assessments)	
	B	Field-Competence	
2		Being Competent in the biochar based Circular Carbon Economy	
	C	Facilitation Sub-Competences	
		1. Planning competences (incl. competence oriented learning)	
3	P1	Planning, preparation	Assessing learners' needs and motivations
4	P2	Planning, preparation	Designing and constructing trainings and programmes
5	P3	Planning, preparation	Planning and designing the learning process
6	P4	Planning, delivery	Deploying different learning methods, styles and techniques
7	P5	Planning, delivery	Creating competence-oriented learning offers:
8	P6	Planning, delivery	Creating an open learning environment
		2. Competences when delivering training/learning	
9	D1	Delivery	Facilitating ICT based learning
10	D2	Delivery	Facilitating (open) learning processes
11	D3	Support	Advising/counselling on career and further life planning
12	D4	Support	Mentoring an intern/trainee/apprentice
		3. Evaluation of the learning process	
13	E1	Evaluation, QM	Designing an evaluation process
14	E2	Evaluation, QM	Define and apply the right indicators/instruments for evaluation
		4. Validation of competence developments	
15	V1	Validation	Assessing competences and competence developments
16	V2	Validation	Evidencing competence developments as learning outcomes
17	V3	Validation	Integrating validation concepts promoted by the EU
18	D	Generic Competences	
19	G1	Personal/delivery	Being an expert in the content matter
20	G2	Self/personal	Lifelong learning
21	G3	Social/delivery	Motivating/empowering learners
22	G4	Social	Communication
23	G5	Social	Team work
24	G6	Social	Networking
25	G7	Social	Managing diversity

26	G8	Social	Intercultural communication
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6.4. Transfer to ECVET and EQF System

The starting point of the qualification is an accomplished EQF level 3 and a LEVEL5 level 2.

It is not intended that the “qualification” (in ECVET terms) will end up at the research level.

Hence the scope of development will reach from ECVET level 4 to a maximum of ECVET level 6 which would bridge 3 levels and result in LEVEL5 level from level 2-5.

EQF level7 would be similar to master which would require a master thesis. This is something which could be offered in connection with a university but probably not in a CPD for professionals in VET.

The lower boundary (Level 3) is presented below as a starting point:

Starting level(EQF:3 / LEVEL5:4)

	Knowledge ⁵	Skills ⁶	Competences ⁷
EQF Level 3	knowledge of facts, principles, processes and general concepts, in a field of work or study	a range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information	take responsibility for completion of tasks in work or study >adapt own behaviour to circumstances in solving problems
In the following we put together the ECVET levels and their meta-descriptions with the LEVEL5 levels. This is relatively easy as far as the knowledge and skills dimensions are concerned. In the case of the competences/attitudes we will in a first step stick to the LEVEL5 descriptors and bring in the “responsibility/autonomy –aspects after that. To wrap up: This file outlines a first attempt to create a “qualification” for potential professionals according to the ECVET taxonomy. It is based on the 4 units related to the development, delivery, and validation processes. A qualification range of ECVET levels 4-6 is envisaged The sub-competences (of the 4 units) will be assigned to each level by using the LEVEL5 descriptors For this purpose the descriptors from LEVEL5 taxonomy Level3-5 will be applied			

⁵ In the context of EQF, knowledge is described as theoretical and/or factual.

⁶ In the context of EQF, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) and practical (involving manual dexterity and the use of methods, materials, tools and instruments).

⁷ In the context of EQF, competence is described in terms of responsibility and autonomy.

Basic qualification level (EQF:4 / LEVEL5:3)

EQF	Knowledge	Skills	Competences
4	Factual and theoretical knowledge in broad contexts within a field of work or study	A range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study	Exercise self management within the guidelines of work or study contexts that are usually predictable, but are subject to change >supervise the routine work of others, taking some responsibility for the evaluation and improvement of work or study activities
Unit	Unit 1: Planning – Knowledge on:	Unit 1: Planning – Skills on:	Unit 1: Planning – Attitudes on:
L5 Level⁸ 3	LEVEL5->Level3 / “Theoretical Knowledge – know how” To theoretically know how to create learning offers based on Learner and Competence Orientation. e.g. through multiple perspectives and concrete individual experiences involving authentic problems etc.	LEVEL5->Level3 / “Deciding/Selecting” To use existing learner and competence oriented training formats for the planning of courses/training offers. To select and try out appropriate formats.	LEVEL5->Level3 / “Appreciation” To value the planning of open and competence oriented learning as an/the appropriate format for learners to develop competences.
CD⁹	Ability to apply knowledge in known contexts (e.g. in protected case studies without disturbances)		
LO¹⁰	Knowledge on different learners needs Knowledge on Programme development Theoretical knowledge on learning process design	Assessing and evaluating learners needs Designing learning programmes accordingly Designing the Learning process accordingly Applying known learning methods, approaches and	Appreciating and valuing learners needs analysis Positive attitude towards known programme development Appreciating and valuing known learning process design

⁸ Corresponding LEVEL5 level

⁹ Common Denominator: Central, transferrable level descriptor fitting both EQF and LEVEL5

¹⁰ Learning Outcome Description

	Broad Theoretical knowledge on learning methods, approaches techniques Theoretical knowledge on Open learning environments	techniques from the own repertoire Using known tools and instruments for Open learning environments (known OER)	Openness and positive attitude towards known learning methods, approaches techniques and Open learning environments
Ass¹¹	• Self/Tandem assessment with the LEVEL5 grid • Questionnaires • Knowledge tests or reports • Participants' feed-back	• Self/Tandem assessment with the LEVEL5 grid • Learning diary • Observations in the learning situation	• Self/Tandem assessment with the LEVEL5 grid • Learning diary • Observations in the learning situation • Observing level of autonomy and responsibility

Advanced level (EQF:5 / LEVEL5:4)

EQF	Knowledge	Skills	Competences
5	Comprehensive, specialised, factual and theoretical knowledge within a field of work or study and an awareness of the boundaries of that knowledge	A comprehensive range of cognitive and practical skills required to develop creative (new) solutions to abstract problems	Exercise management and supervision in contexts of work or study activities where there is unpredictable change >review and develop performance of self and others
Unit	Unit 1: Planning – Knowledge on:	Unit 1: Planning – Skills on:	Unit 1: Planning – Attitudes on:
L5 Level¹² 4	LEVEL5->Level3 / “Theoretical Knowledge – know how” To have a very brought theoretical <i>and practical</i> background in order to transfer Learner and Competence Orientated Planning.(LCP) to other contexts and help other people to apply the approach as well	LEVEL5->Level3 / “Deciding/Selecting” To build knowledge and expertise, to construct related theory and practice regarding Learner and Competence Orientated planning. To help other trainers apply the right approaches.	LEVEL5->Level3 / “Appreciation” To have an incorporated reflex to plan the training in a learner and competence oriented way. To feel the need to help other trainers applying

¹¹ Possible assessment methods

¹² Corresponding LEVEL5 level

CD¹³	Ability to apply knowledge in unknown (disturbed) contexts (e.g. in direct contact with learners in reality)		
LO¹⁴	• Knowledge on how to combine and to transfer • innovative assessment methods into new contexts • new programme design components for a consistent programme in an unknown situation • innovative appropriate learning process design in an unknown situation • innovative (unknown) instruments and approaches of LCP into new contexts • open learning environments fit appropriately to specific learning contexts, target groups and aspired competences	• To develop and transfer new methods to assess and evaluate learners needs • Designing learning programmes with unknown elements. To innovate learning programmes • To innovate learning processes, to transfer this in other contexts, to help others to apply it • Developing new methods, approaches and techniques (which were not even available in other repertoires) • Integrating those innovative tools and elements in new Open learning environments (known OER)	• Targets/Level descriptors • To feel the need transfer LCP in new situations and to help other personal to apply: • learners needs analysis • on programme development • Learning process design • methods, approaches techniques • Open learning environments
Ass¹⁵	• Self/Tandem assessment with the LEVEL5 grid • Participants' feed-back	• Essay • Learning diary • Observations in the learning situation	• Observing during discussions and self-reflections

¹³ Common Denominator: Central, transferrable level descriptor fitting both EQF and LEVEL5

¹⁴ Learning Outcome Description

¹⁵ Possible assessment methods

Expert level (EQF:6 / LEVEL5:5)

EQF	Knowledge	Skills	Competences
6	advanced knowledge of a field of work or study, involving a critical understanding of theories and principles	advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study	manage complex technical or professional activities or projects, taking responsibility for decision making in unpredictable work or study contexts >take responsibility for managing professional development of individuals and groups
Unit	Unit 1: Planning – Knowledge on:	Unit 1: Planning – Skills on:	Unit 1: Planning – Attitudes on:
L5 Level ¹⁶ 5	LEVEL5->Level5: Transfer Knowledge To have a very brought theoretical <i>and practical</i> background in order to transfer Learner and Competence Orientated Planning (LCP) to other contexts and help other people to apply the approach as well.	LEVEL5->Level 5: Developing/Transferring To build knowledge and expertise, to construct related theory and practice regarding Learner and Competence Orientated planning. To help other trainers apply the right approaches.	LEVEL5->Level5 / “Internalisation” To have an incorporated reflex to plan the training in a learner and competence oriented way. To feel the need to help other trainers applying
CD ¹⁷	Ability to transfer competences in a versatile way to new contexts (e.g. to other cultural heritage domains)		
LO ¹⁸	• Knowledge on how to combine and to transfer • innovative assessment methods into new contexts • new programme design components for a consistent programme in an unknown situation • innovative appropriate learning process design in an unknown situation • innovative (unknown) instruments and approaches into new contexts	• To develop and transfer new methods to assess and evaluate learners needs • Designing learning programmes with unknown elements. To innovate learning programmes • To innovate learning processes, to transfer this in other contexts, to help others to apply it • Developing new methods, approaches and techniques (which were not even available in other repertoires)	• To feel the need transfer in new situations and to help other personal to apply: • learners needs analysis • on programme development • Learning process design • methods, approaches techniques • Open learning environments

¹⁶ Corresponding LEVEL5 level

¹⁷ Common Denominator: Central, transferrable level descriptor fitting both EQF and LEVEL5

¹⁸ Learning Outcome Description

	• open learning environments fit appropriately to specific learning contexts, target groups and aspired competences	Integrating those innovative tools and elements in new Open learning environments (known OER)	
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For the avoidance of doubt:

Please take into account that these EQF levels refer to the trainers only.

The learners' programme (the piloting programmes) are supposed to reach EQF level 4 for the apprentices and max level 5 in case of complex learning projects.

7. Annex: Planning Tools and Templates

7.1. Action Field Template

Please give a short description on the action field (the context) related to your project:

What is the environment, the specific challenges and the overall objectives of the stakeholders

• Name of your project	
• Context	
• Target Group	
• Aims	
• Resources	
• Activities	

7.2. Learning Fields Template

Before designing the learning pathway it might be necessary to determine (after some thorough reflections) some basic “ingredients” of your learning offer.

You should do that in rather rough format -

Name of your project	
Competences needed/fostered	Problem solving Creative thinking
(Content) Themes tackled	List of relevant contents Context related themes
Competence dimensions	Knowledge Skills: Activities, Capabilities Attitudes: Emotions, Values

7.3. Reference System Template

	COGNITIVE/KNOWLEDGE		ACTIVITY		AFFECTIVE	
L	Level Titles	Individual description/ explanatory statement	Level Titles	Individual description/ explanatory statement	Level Titles	Individual description/ explanatory statement
5	Know where else (knowledge for transfer)		Developing/ Constructing Transfer		Incorporation Internalisation	
4	Know when (Implicit understanding)		Discovering/acting independently		Commitment Volition	
3	Know how		Deciding/ selecting		Appreciation Motivation	
2	Know why (Distant understanding)		Application, Imitation		Curiosity Perspective taking	
1	Know-what/know that		Perceiving		Self oriented, neutral	

7.4. Sequencing table

Learning pathways

Please describe the learning pathway of your learning project. Learning pathways are sequences of learning steps or learning units. To fill the table, you need to break down your learning project in chronicle steps/units.

Please also add your reference systems.

Step No.	Title	Content	Learning objective	Method Activity	Media/Resources	Duration/ Time	Competence column <i>Please indicate if the unit targets knowledge, skills or attitudes and if the difficulty is rather easy, medium or hard.</i>

7.5. Trainers' Certificate

The following certificate is an example of the LEVEL5 validation certificate issued to the participants at the end of the CPD on completion of:

1. The preliminary asynchronous programme delivered via moodle
2. The preliminary synchronous programme delivered via DBCL
3. The Face-to Face programme, delivered in April in Göttingen
4. The learning projects incl. the essay (pilot project report) designed, delivered and documented by each participant.

Trainer Certificate
B4C
Continuing Professional Development

Biochar and the Circular Carbon Economy

Participant:
Heide Reimer

B4C Continuing Professional Development
Project start: 7 Apr 2025
Project end: 11 Apr 2025
Institution: DEULA
Location: Göttingen, Germany

Learning activities:
The course relates to the introduction of biomass to Biochar value chain and Learning and development approaches for the Circular Carbon Economy (CCE) in the own contexts.

Evaluated competences:
Implementing Biochar enhanced Circular Carbon Economy actions

Assessment methods:
Self- and Expert Assessment: Combination of self- and expert assessment, aiming at self-reflection of what participants have learnt (formative) but providing a rather high level of objectivity (external) and validity (based on both Course Concept and LEVEL5 taxonomy).

Assessors/Evaluators:
blinc Experts

Competence profile at the beginning
Knowledge: 2: Strong VET and agricultural background, but biochar and CCE value chains were not yet fully connected to structured competence-oriented learning design.
Skills: 3: Experienced in planning agricultural training, but still developing specific methods for biochar-based ideation, prototyping and CCE project design.
Attitudes: 3: Showed clear interest in sustainability and innovation within agricultural VET and was open to testing biochar as a new learning field.

Competence profile at the end
Knowledge: 4: Can connect biochar, slurry management, nutrient cycles and CCE with agricultural VET and translate them into practical learning contexts.
Skills: 4: Contributed to a structured pilot using Design Thinking, farm analysis, experimentation, group work and learner presentations.
Attitudes: 4: Demonstrated strong commitment to learner-centred facilitation and future integration of biochar and CCE into DEULA training practice.

Competence development on each dimension

Knowledge	Skills	Attitudes
5: Know where else (knowledge for transfer)	5: Developing/constructing/ transferring	5: Incorporation/ internalisation
4: Know when (implicit understanding)	4: Discovering/ acting independently	4: Self-regulation/ determination
3: Know how	3: Deciding/ selecting	3: Motivation/ appreciation
2: Know why (explicit understanding)	2: Using/ initiating	2: Perspective taking/ interest
1: Know what/ know that	1: Perceiving	1: Self-orientation

Description of Progress:
Heide helped transfer the CPD input into a structured DEULA pilot, linking biochar, slurry management and CCE with practical agricultural VET.

Reference system: Knowledge
5: Know where else (knowledge for transfer)

The LEVEL5® validation system is courtesy of the REVEAL Network for Learning, Validation and Capacity Building
Funded by the European Union