GREEN-LOOP

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GREEN-LOOP

Sustainable manufacture systems towards novel bio-based materials

WP8 – Communication, Dissemination and Training

D8.8 – Training and social engagement report for three different manufacture cases

Version 2.1

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Consortium	17 organizations. 15 from EU Member States + 2 from UK

GREEN-LOOP Consortium Partners

	Partner	Acronym	Country
1	IDENER RESEARCH & DEVELOPMENT	IDE	ES
2	NATIONAL INSTITUTE OF CHEMISTRY	NIC	SI
3	SLOVENIAN NATIONAL BUILDING AND CIVIL E. I.	ZAG	SI
4	FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V	FHF	DE
5	LABRENTA SRL	LBRT	IT
6	MIXCYCLING SRL	MYX	IT
7	NERO SU BIANCO	NSB	IT
8	TERRE DI ZOE’	TDZ	IT
9	IRIS TECHNOLOGY SOLUTIONS, SOCIEDAD LIMITADA	IRIS	ES
10	GLOWNY INSTYTUT GORNICTWA	GIG	PL
11	AACHEN UNIVERISTY: PROCESS CONTROL ENGINEERING / AACHEN UNIVERISTY: INSTITUTE OF SOCIOLOGY	AAU	DE
12	AUSTRIAN STANDARDS INTERNATIONAL	ASI	AT
13	INSTITUTO DE SOLDADURA E QUALIDADE	ISQ	PT
14	AXIA INNOVATION UG	AXIA	DE

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	Partner	Acronym	Country
15	ASOCIACIÓN DE INVESTIGACIÓN METALÚRGICA DEL NOROESTE	AIMEN	ES
16	NATIONAL COMPOSITE CENTER	NCC	UK
17	UNIVERSITY OF BRISTOL	UBRIS	UK

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Executive Summary

Work Package 8, as the Dissemination and Communication Work Package of the Green-Loop project, also delves into the critical intersection of training and social engagement as applied to three distinct manufacturing cases.

The Green-Loop project, at the forefront of sustainable innovation, seeks to revolutionize traditional production processes by introducing circular economy principles and environmentally conscious practices.

Within the project's holistic framework, Work Package 8 assumes a pivotal role by focusing on the practical implementation of these principles through specialized training initiatives and fostering social engagement across various manufacturing scenarios.

As industries navigate an increasingly complex landscape of environmental concerns and resource limitations, the Green-Loop project recognizes that effecting tangible change requires technological advancement and a fundamental shift in how stakeholders interact with these innovations.

Work Package 8, therefore, takes a comprehensive approach to address these challenges by combining targeted training programs with social engagement strategies, all tailored to the unique dynamics of three different manufacturing cases.

Throughout this deliverable, we will propose certain training activities, and support future trainers to intensify the project's commitment to not only innovating manufacturing processes but also nurturing a sustainable culture of knowledge-sharing, collaboration, and responsible growth.

Furthermore, we will introduce a comprehensive structure comprising training activities, possible methodological approaches to multiple themes, target groups, learning outcomes, and evaluation, strategically designed to be implemented throughout the course of the project timeline. Each of these activities is meticulously crafted to address specific aspects of the Green-Loop project's mission, ensuring a multifaceted approach to fostering sustainable manufacturing practices and cultivating robust social engagement. These training initiatives stand as key pillars within Work Package 8, representing a proactive response to the evolving needs of the project and its overarching goals.

As the manufacturing landscape and sustainability challenges continue to evolve, the insights and strategies outlined in this report will not only inform about the immediate initiatives but also lay the foundation for

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ongoing adaptations and refinements. By fostering a culture of continuous improvement, this deliverable embodies the project's commitment to agility and responsiveness, ensuring that the training and social engagement activities remain aligned with the goals of the Green-Loop initiative.

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Abbreviations

- H&S: Health and Safety
- M: Month
- T: Task
- WP: Work Package
- EQF: European Qualifications Framework

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1. Introduction

Within the expansive canvas of the Green-Loop project, where sustainability converges with innovation, Work Package 8 emerges as an important stage of the project’s development. Settled within the broader ambit of the Dissemination and Communication Work Package, this phase is dedicated to resolving the interplay of training and social engagement within the context of the different cases. With a solid commitment to fostering circular economy principles and coordinating positive environmental change.

This document is the first part of Deliverable 8.8 and showcases the foreseen Green-Loop training activities to achieve the Work Package’s objectives and provides future trainers with materials and tips to carry the sessions. The second part of this deliverable (M36) will detail the already implemented training activities during the project lifetime and analyse the evaluation results of said activities.

Work Package 8 takes centre stage as a beacon of practical implementation, bridging the gap between visionary ideals and tangible actions. This phase is a response to the recognition that true transformation encompasses not only technological advancements but also a fundamental shift in the way stakeholders engage with these innovations.

By dissecting the intricacies of three different manufacturing cases, this deliverable delves into the tailored training initiatives designed to empower individuals at every level of the production chain. It simultaneously seeks to cultivate collaborative ecosystems that thrive on open dialogues, knowledge sharing, and collective responsibility. As the deliverable unfolds, each manufacturing case takes centre stage.

Various training activities, strategically embedded within the timeline, represent a commitment to sustainable evolution. This report lays the groundwork for future adaptations, as the project endeavours to correspond fluidly with the evolving needs of both the venture itself and the broader manufacturing landscape.

In the following section, we will delve into the strategic blueprint behind proposed training activities, each a vital thread in the intricate topics of the Green-Loop project's transformative journey.

In this document future trainers should find a guide for not only implementing their sessions but also evaluating them and improving their organization and training skills.

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Here trainers and trainees should find a handbook of guidelines, and support materials for the preparation of training sessions, as this document represents the first deliverable of two and it should come as a proposal of materials and training activities to be developed and implemented.

2. Planned social engagement activities

The social engagement activities are specifically designed to contribute to an exchange on novel bio-based technologies for green/smart manufacturing and to generate new knowledge to advance the related professional practice. The following section describes the interplay between the social engagement and training activities and provides strategies to promote social engagement before, during and after the training sessions to ensure that the workshops are delivered in the best quality.

2.1 Stakeholder analysis

To ensure the social engagement of all training activities, a stakeholder analysis should be carried out to filter the target groups for the planned workshops. This can be done through a brainstorming session within the project’s consortium. The communication strategies developed in D8.1 can be a means of reaching potential participants in training activities.

2.2 Needs assessment analysis

Furthermore, to ensure social engagement, it is crucial to carry out a needs assessment analysis, which should focus on the competences that trainers would need to teach about novel bio-based technologies for green/smart manufacturing in the context of a circular economy. In addition, this needs assessment analysis should also include the needs of the users by asking about knowledge, education and training gaps to tailor the workshops to the specific needs of the target groups.

The analysis can be done through two questionnaires, one for the trainer's needs and one for the user's needs. For both questionnaires a Likert-scale can be used, where respondents can score from low necessity (1) to high necessity (5) to identify the different needs. An open-ended question should be added to both questionnaires to allow respondents the opportunity to include further needs, interests, or training requirements. In this way, it is possible to determine the extent to which respondents agree or disagree with the suggested response categories, while at the same time giving them the opportunity to add their own ideas.

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2.3 Social engagement during the workshops

In addition, didactic methods can be used to promote social engagement during the workshops. The use of integrative didactic methods provides the opportunity to address new perspectives or possible problems from the trainees' point of view. This approach not only enriches the learning process and opens up new perspectives, but also encourages active participation and exchange during the workshops, thus promoting social engagement.

Different didactic methods can be found in Chapter 2.4.

2.4 Evaluation of the workshops

After each workshop, a questionnaire is used to evaluate the workshop and the learning objectives. The use of a Likert scale is also the most appropriate method for the subsequent evaluation. Respondents can rate the questions from strongly disagree (1) to strongly agree (5) or from does not apply at all disagree (1) to fully applies (5). Again, open response categories are provided at the end of the questionnaire to give respondents the opportunity to make comments and requests.

These evaluation questionnaires can also be used to find out how external trainees became aware of the workshops and what their specific interests were. The data can be used to improve future communication as well as future workshops.

All planned social engagement activities are essential to the success of the training sessions. Therefore, close cooperation between ISQ and AAU is required.

3. Planned training activities

The proposed training activities, strategically positioned to unfold over the course of the project's lifespan, consist of a carefully orchestrated set of workshops, and later webinars. By harnessing the power of knowledge dissemination and fostering collaborative engagements, these workshops are poised to be catalysts for reshaping the manufacturing landscape. The foreseen training activities are designed to give participants knowledge, skills, and insights crucial for embracing circular economy principles and fostering responsible manufacturing practices.

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These workshops are categorized as internal and external, depending on their themes and target groups. The internal workshops are aimed at nurturing the project's partners and internal stakeholders and empowering them with specialized expertise. We plan two internal workshops for each value chain and one with the theme of Health and Safety. According to Task 8.5, the H&S workshop will explicitly address the gender dimension. In this context, a checklist "On how to integrate the gender dimension in H&S" has already been prepared in advance. This checklist can be discussed during the workshop and made available to participants afterward.

The external workshops should work as a vessel for the exchange of ideas, inspire collaborative initiatives, and contribute to a positive social impact, enabling society to adapt to the changes that Green-Loop aims to. These events will attract a diverse spectrum of stakeholders, from industry leaders to local communities, all united by the shared goal of sustainable transformation. We anticipate an external workshop for each value chain, in order to disseminate the results of the project and have more companies tagging along the Green Loop journey.

For a figurative plan of these workshops please consult Annex 1 and Annex 2.

Before every workshop, a needs assessment exercise will be implemented among the correspondent target groups, and at the end of each workshop, an evaluation questionnaire will be distributed for participants to evaluate the workshop in all its dimensions. In this way, general topics, and perhaps even current issues from the perspective of the project partners can be integrated into structure of the workshop to tailor it accordingly. However, during the workshop there could also be room for the participants to shape it according to their needs by preparing several topics or splitting the group into sub-groups.

Social engagement will be set up to exchange on novel bio-based technologies for green/smart manufacturing and create new knowledge to advance the related professional practice. The results will be included in the GREEN-LOOP platform (T2.5). In particular, existing communication activities through various social media channels and networking activities at conferences and trade fairs can be used to promote the social engagement of appropriate target groups.

These workshops will be delivered in strategic moments, as the project's timeline unfolds. Through them, the Green-Loop project will not only impart skills but also foster a shared sense of purpose, catalysing the transition toward a manufacturing landscape that embodies sustainable values. With each workshop acting

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as a steppingstone, the project's trajectory becomes a transformative journey where theory evolves into actionable change, in the backdrop of a dynamic and ever-evolving field.

2.1 Training themes

In order to achieve the objective established in this project as the implementation of 3 courses per pilot site, we intend to create 10 workshops with various themes.

Starting with a general approach to the pilot sites we should organize a workshop based on the work done in WP 8.6 regarding the theme “Health And Safety Issues”, this workshop should be internal, especially for the staff of partner companies. The expectation of this training activity is to avoid exploitation problems of the three products in terms of standard regulations.

After this activity, six other internal training sessions will occur, focusing on the three materials, its processes, the value chain and the final result. The leading partners for these internal sessions should be partners within the consortium that have expertise focused on a certain need nominated by the consortium.

Although leading partners, and themes should only be decided after the results of the needs assessment exercise (Annex 1 and 2).

On the external front, there will occur three workshops radiating beyond the project's immediate boundaries, casting a wider net of impact. These workshops will each focus on one pilot site and stand as examples, attracting a diverse spectrum of stakeholders, from industry leaders to local communities, all united by the shared goal of sustainable transformation. By extending beyond the project's confines, these external workshops will foster the exchange of ideas, inspire collaborative initiatives, and contribute to a positive social impact, enabling society to adapt to the changes that Green-Loop aims to. These workshops should be recorded and later turned into webinars, posted on the Green-Loop website for public consultation.

2.2 Target groups

The blueprint of the proposed training activities delineates a thoughtful approach that encompasses both internal and external dimensions, each tailored to specific target groups within the Green-Loop project's ecosystem. The workshops, strategically placed within the project timeline, act as pivotal bridges, enabling the exchange of knowledge, insights, and collaborative endeavors.

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For the external workshops (Annex 2), the spotlight falls on a diverse spectrum of stakeholders, spanning from industry luminaries to the fabric of local communities. This expansive target group encapsulates the very essence of the Green-Loop project's impact aspirations. Industry leaders, driven by a commitment to sustainable innovation, converge to share best practices, exchange ideas, and catalyze cross-industry collaborations. Simultaneously, local communities, nestled within the geographical footprint of the project, are invited to join this transformative dialogue. Their participation is instrumental, as they provide contextual insights, ground-level perspectives, and an invaluable lens through which the project's impact is measured. Together, these external workshops cultivate a sense of shared responsibility, fostering connections that transcend traditional boundaries and resonating with a vision of sustainable manufacturing that touches lives and landscapes.

On the other hand, the internal workshops (Annex 1) are meticulously tailored to resonate with the project's partners and internal stakeholders. These individuals are the driving force behind the Green-Loop project's intricate machinery, invested not just in its success but in its essence. The internal workshops serve as a space for knowledge enrichment and skill enhancement among those directly involved in the project's evolution. These workshops provide a platform to seamlessly cascade information, insights, and strategies, ensuring that the project's heartbeat aligns with a shared rhythm of understanding. By focusing inward, these workshops magnify the collective capacity of the project's core team, nurturing a collaborative spirit that underpins effective execution and sustained impact.

Internal workshops	External Workshops
Project's partners and internal stakeholders	Stakeholders, industry leaders, and local communities

Table 1- *Target groups for the two types of workshops*

2.3 Approach to Setting Learning Outcomes (Guideline)

The focus on learning outcomes supports dialogue between education and training and labour market actors in the different education and training subsystems. While qualifications frameworks provide a general reference for comparing qualifications and distinguishing between levels, learning outcomes-based curricula and assessment specifications should be defined and written in a way that "speaks to" trainees and trainers and adds value to the learning process.

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They must be tangible for:

2.3.1 Trainees

Learning outcomes statements clarify what a learner is expected to know and be able to do and understand, having completed a learning sequence, a module, a programme, or a qualification. They can support the initial choice of education and training, help orient the learning process, and clarify what to expect during assessment or validation.

2.3.2 The trainer

For the trainer, the learning outcomes approach helps orient teaching, select methods, and support the individual trainee throughout the learning process. Learning outcomes statements, by indicating the scope of knowledge and skills to be addressed and the level of performance to be achieved, are crucial for planning and organising teaching and learning.

2.3.3 The assessor

For the assessor, the learning outcomes should clarify the criteria for success/ failure and performance. The gradual introduction of validation of non-formal and informal learning in European countries illustrates the role of learning outcomes for assessment.

2.3.4 The education and training provider

Learning outcomes provide a common language allowing different stakeholders in education and training, as well as the labour market and society at large, to clarify skills needs and to respond to these in a relevant way. This can allow the dialogue between education and work, identifying skill needs and reflecting on the learning outcomes acquired with a specific qualification as realised in the workplace.

Learning outcomes are perceived as adding value for several purposes. However, they are not to be taken for granted: any benefits eventually depend on how learning outcomes are defined, written, and applied. The EQF guidance notes on using learning outcomes states that the definition and writing of learning outcomes refer to taxonomies of learning based on a hierarchy of conceptual stages of learning processes that learning outcomes can be used to describe. Bloom’s taxonomy is one of the essential theoretical influences on thinking about learning outcomes and progression (Cedefop, 2022). At the same time, learning outcomes statements need to capture the depth and complexity of learning. Addressing the depth of learning requires agreeing on the criteria for levelling and complexity.

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The proposed matrix of learning outcomes structure for the GREEN-LOOP curriculum with a brief explanation of concepts and terms involved in the matrix development, but first, let's look at some basic rules when defining and writing the learning outcomes:

- When writing learning outcomes to guide a learning programme or a learning unit/course, careful consideration must be given to the number of statements used. When defining a lesson or unit, it is generally recommended to limit the number of statements depending on the complexity of the educational programme. In the GREEN-LOOP Curriculum, we suggest selecting four to six statements. The aim should be to identify the overall scope and profile, not to list all the technical details.
- When writing a learning outcomes statement, it should be learner-centred and start with an action verb, followed by the object of the verb, as well as statements that specify the depth/ breadth of the learning to be demonstrated and complete with an indication of the context (which can be related to education, work, or other relevant social contexts).
- In general, there should not be more than one action verb for each learning outcome.
- Learning outcomes should be externally verifiable - the learning outcome description should enable the evaluation process to determine if the learner has achieved the learning outcome.
- Learning outcomes refer to the day of testing, e.g., to what the learner knows and can do.
- The same learning outcomes can be achieved in various learning contexts.

Figure 1 below shows the basic structure of the learning outcomes.

The basic structure of learning outcomes statements should:			
• address the learner	• use an action verb to signal the level of learning expected.	• indicate the object and scope (the depth and breadth) of the expected learning.	• clarify the occupational and/ or social context in which the qualification is relevant.
Examples			
The student…	• is expected to present …	• …in writing the results of the risk analysis	• …allowing others to follow the process replicate the results.
The learner…	• is expected to distinguish between…	• …the environmental effects…	• …of cooling gases used in refrigeration systems.

Source: Cedefop.

Figure 1 *The basic structure of learning outcomes statements*

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The choice of action verbs frequently refers to the taxonomies developed by Bloom and colleagues from 1956 and onwards. Writing precise learning outcomes requires ambiguous verbs to be avoided. See the following Figure 2 and Figure 3.

Ambiguous		Precise	
• Know • Understand • Enjoy • Determine • Appreciate	• Grasp the significance of • Become familiar with • Believe • Be aware of • Comprehend	• Distinguish between • Differentiate • Assemble • Adjust • Identify • Solve	• Write • Recite • Construct • Contrast • Compare • List

Source: Cedefop.

Figure 2 *Ambiguous and precise verbs*

	The learner	The action	The object	The context
Creating ambiguity	The learner is expected to	• understand • be aware of	• the tools and methods • problems related to tools and methods	applied in CNC milling
Reducing ambiguity	The learner should	• be able to describe	• the basic principles	applied in CNC milling
		• be able to solve	• a problem related to tools and methods	

Source: Cedefop.

Figure3 *The issue of ambiguity*

Verbs must be able to indicate the relational character of knowledge and skills between theory and practice, pointing to the growing complexity of the context in which the learner must operate. The verbs used in the descriptors are also related to the domain of learning and the level of "sophistication" or depth implied, as indicated in the following Figure 4.

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Domain of learning	Levels of sophistication	Common verb associations
Cognitive (knowledge) What will students know?	Remembering, understanding, applying, analysing, evaluating, creating	Define, identify, describe, differentiate, explain, apply, analyse, resolve, justify, recommend, judge, create, design
Psychomotor (skills) What will students be able to do?	Imitation, manipulation, precision, articulation, naturalisation	Adapt, arrange, build, calibrate, construct, design, deliver, demonstrate, display, dissect, fix, mimic, operate, sketch, use, perform
Affective (attitudes, values or habits of mind) What will students value or care about?	Receive, respond, value, organise, characterise	Ask, challenge, demonstrate, discuss, dispute, follow, justify, integrate, practise, judge, question, resolve, synthesise

Sources: Marzano and Kendall (2007); Kennedy et al. (2006); Anderson et al. (2001); Bloom et al. (1956; 1964).

Figure 4
Domains of learning, with example levels of sophistication and common verb association

It is important to stress that the active verb must be specified and contextualised, just as the learning outcomes must be determined and contextualised. It is, therefore, essential to indicate what the learners' knowledge and competences refer to and the type of performance involved. As shown in Table 1.

e.g.: Be able to develop research designs.	👎 Too general
e.g.: Be able to develop a research design using scientific methods.	👍
e.g.: Identify that the tires of a bicycle are made of natural and synthetic rubber, chemicals, oils, resins, carbon, black, silica, steel, nylon, and cord.	👎 Too detailed
e.g.: Identify the composition of the tires and name their components.	👍

Table 2
Contextualization and specification examples

Please use the template in Annex 3 for the creation of the learning outcomes.

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2.4 Methodologies to be used

When teaching a workshop, using a variety of methodologies can help keep participants engaged, enhance learning outcomes, and create a dynamic and interactive learning experience. Here are different methodologies you can consider incorporating into your workshop:

1. **Lecture and Presentation:** Begin with a clear and organized presentation of the main topics. Use visuals, slides, and multimedia to enhance understanding. Break down complex concepts into digestible segments and provide real-world examples to illustrate key points.
2. **Q&A Sessions:** Intersperse your presentation with designated question and answer sessions. Encourage participants to ask questions and address them during these breaks, fostering engagement and clarifying doubts.
3. **Polls and Surveys:** Incorporate interactive polls and surveys to gather participants' opinions, preferences, and knowledge levels on specific topics. Use the results to guide discussions and tailor content.
4. **Case Studies:** Share real-life case studies relevant to the topic being discussed. Analyze the case together with participants, encouraging them to apply theoretical knowledge to practical situations.
5. **Group Discussions:** Divide participants into virtual breakout rooms or tables for small group discussions. Assign specific topics or questions related to the workshop content and have groups share their insights with the larger audience afterward.
6. **Interactive Whiteboards:** Use interactive whiteboard tools to draw diagrams, mind maps, or flowcharts in real-time, allowing participants to visualize concepts as they're explained.
7. **Demonstrations and Simulations:** If applicable, demonstrate software, tools, or processes in real-time. Participants can follow along and ask questions as you navigate through the demonstration.
8. **Collaborative Activities:** Incorporate collaborative activities like brainstorming sessions, role-playing, or problem-solving exercises. Participants can share ideas and work together to find solutions.
9. **Guest Speakers:** Invite experts or practitioners to join the workshop as guest speakers. Their insights and perspectives can provide additional depth and diverse viewpoints.

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10. **Quizzes and Gamification:** Incorporate short quizzes or interactive elements that challenge participants' understanding of the material. You can also gamify the learning experience by adding points, badges, or rewards.

11. **Use of Multimedia:** Incorporate videos, animations, and multimedia elements to break up the presentation and engage different learning styles.

12. **Reflection and Journaling:** Introduce moments for reflection, where participants can jot down their thoughts, insights, or questions in a digital journal. Encourage them to share these reflections during discussions.

13. **Live Demonstrations:** Perform live experiments, demonstrations, or simulations relevant to the topic, allowing participants to witness concepts in action.

14. **Storytelling:** Use stories and anecdotes to convey important messages and concepts. Stories can make the content relatable and memorable.

15. **Feedback and Interaction:** Encourage participants to provide feedback on the content, delivery, and overall workshop experience by evaluating the session. Use this feedback to adapt and improve future workshops.

Remember to vary these methodologies to maintain engagement and cater to different learning preferences. Keep the pace of the workshop dynamic, allowing participants to interact, ask questions, and contribute actively throughout the session.

The Annex 4 is a template used for planning a lesson or activity. We encourage trainers to use it when planning their interactions.

2.5 Evaluation Moments

Incorporated within these training activities are two pivotal evaluation stages. At the commencement of each activity, we propose a diagnostic assessment phase aimed at comprehending participants' existing knowledge levels precisely. This initial evaluation serves as a foundational step, enabling us to tailor the trainer's approach to align with predetermined learning outcomes.

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Upon the conclusion of the training activity, we advocate for the dissemination of an evaluation questionnaire to all participants. This post-activity assessment serves as a crucial feedback mechanism, enabling us to gauge the extent of the activities' impact and the attainment of learning objectives. Additionally, this questionnaire affords participants the opportunity to provide constructive feedback encompassing all facets of the activities, fostering continuous improvement.

These evaluation questionnaires should be executed and provided by ISQ, for later data analysis (D 8.8 in M36).

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Annex 1- Internal workshops

Workshop n^{er}	Title	Date	Leading partner	Target groups	Learning Outcomes
1 (internal)	Health and Safety (H&S) issues	M19	NSB	Project's partners and internal stakeholders	*To be executed by the trainer of the workshop*
2 (internal)	Bio rubber material- *(specific title to be decided after needs assessment results)*	M24 *(Proposed date)*	(NCC) *Leading partner to be confirmed after the choice of theme made through the needs assessment exercise*	Project's partners and internal stakeholders	*To be executed by the trainer of the workshop*
3 (internal)	Bio rubber material- *(specific title to be decided after needs assessment results)*	M25 *(Proposed date)*	(NCC) *Leading partner to be confirmed after the choice of theme made through the needs assessment exercise*	Project's partners and internal stakeholders	*To be executed by the trainer of the workshop*
4 (internal)	Bio plastic material- *(specific title to*	M27 *(Proposed date)*	(LABRENTA) *Leading partner to be confirmed*	Project's partners and	*To be executed by the trainer*

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	be decided after needs assessment results)		*after the choice of theme made through the needs assessment exercise*	internal stakeholders	*of the workshop*
5 (internal)	Bio plastic material- *(specific title to be decided after needs assessment results)*	M28 *(Proposed date)*	(LABRENTA) *Leading partner to be confirmed after the choice of theme made through the needs assessment exercise*	Project's partners and internal stakeholders	*To be executed by the trainer of the workshop*
6 (internal)	Wood composite material *(specific title to be decided after needs assessment results)*	M30 *(Proposed date)*	*(*Fraunhofer) *Leading partner to be confirmed after the choice of theme made through the needs assessment exercise*	Project's partners and internal stakeholders	*To be executed by the trainer of the workshop*
7 (internal)	Wood composite material *(specific title to be decided after needs*	M31 *(Proposed date)*	*(*Fraunhofer) *Leading partner to be confirmed after the choice of theme made through the*	Project's partners and internal stakeholders	To be executed by the trainer of the workshop

	assessment results)		*needs assessment exercise*		

Annex 2- External workshops

Workshop n^{er}	Title	Date	Leading partner	Target groups	Learning Outcomes
1 (external)	Dissemination of the bio-rubber value chain	*Depending on the advancements of the project*	NCC	Stakeholders, industry leaders, and local communities	To be executed by the trainer of the workshop
2 (external)	Dissemination of the bio-plastic value chain	*Depending on the advancements of the project*	TDZ	Stakeholders, industry leaders, and local communities	To be executed by the trainer of the workshop
3 (external)	Dissemination of the wood composite value chain	*Depending on the advancements of the project*	LABRENTA	Stakeholders, industry leaders, and local communities	To be executed by the trainer of the workshop

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Annex 3- Template for setting Learning Outcomes

TITLE OF THE COMPETENCE UNIT	**Workload:**

OBJECTIVES [max. 500 characters including spaces]

The objectives of this unit are…

In this Unit, learners will…

LEARNING OUTCOMES		
	Upon completion of this unit, the learner will be able to…	
KNOWLEDGE	**SKILLS**	**ATTITUDES**
Theoretical/Factual knowledge in: *or* *Specialized knowledge in:* *Etc…* *….* *Etc. Etc.* • *Please complete here* • *Please complete here*	• *Please complete here* • *Please complete here* • ***Example:*** "Explain the concept of hazard"	• *Please complete here* • *Please complete her* • ***Example:*** "Differentiate hazards and risks"

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• ***Example:*** “Manage stress in the work enviroment.”		

EXTERNAL RESOURCES

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Annex 4- Template for the lesson plan

TEACHING PLAN	**CONTACT HOURS**	**TOOLS**
Day---	*Total of hours of this teaching plan*	*Discriminate every tool used for the specific activity*
Please describe activities, dynamics, methodologies (…) that you plan on implementing	*Time used for specific activity*	*Discriminate every tool used for the specific activity*
Please describe activities, dynamics, methodologies (…) that you plan on implementing	*Time used for specific activity*	*Discriminate every tool used for the specific activity*

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References and Resources

Cedefop (2022). *Defining, writing and applying learning outcomes: a European handbook - second edition*. Publications Office of the European Union. http://data.europa.eu/doi/10.2801/703079

Council of European Union (2017). Council recommendation of 22 May 2017 on the European Qualifications Framework for lifelong learning and repealing the recommendation of the European Parliament and of the Council of 23 April 2008 on the establishment of the European Qualifications Framework for lifelong learning [legislation]. *Official Journal*, C 189, 15-28. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32017H0615(01)

Krathwohl, D. R. (2002). A Revision of Bloom's Taxonomy: An Overview. *Theory into Practice, 41*(4), 212-218. https://doi.org/10.1207/s15430421tip4104_2

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