

H2020 Work Programme

D3.1 - Planning of governance, financial and sustainability assessment

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This document is outcome of the BIObec project (contract no. 101023381) corresponding to D3.1 (M16) led by UNIBO. This document contains the summary of the activities conducted and the information collected throughout Task 3.1.

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1. Acronyms and abbreviations

BBEC	Bio-Based Education Centre
BET	Bioeconomy Education and Training
BMC	Business Model Canvas
DOA	Description of Action
ET	Education and Training
IRWG	Implementation and Replication Working Group
MS	Member State of EU
T	Task
WP	Work Package

1.1. Partners and abbreviations

<i>NAME</i>	<i>SHORT NAME</i>
ALMA MATER STUDIORUM – UNIVERSITA DI BOLOGNA	UNIBO
UNIVERSITAET HOHENHEIM	UHOH
ITA-SUOMEN YLIOPISTO	UEF
IRISH BIOECONOMY FOUNDATION	IBF
MUNSTER TECHNOLOGICAL UNIVERSITY	MTU
FUNDACION CORPORACION TECNOLOGICA DE ANDALUCIA	CTA
CONSIGLIO NAZIONALE DELLE RICERCHE	CNR
FBCD AS	FBCD
INSITUT NATIONAL DES SCIENCES ET INDUSTRIES DU VIVANT ET DE L'ENVIRONNEMENT - AGROPARISTECH	APT
UNIVERSITAT AUTÒNOMA DE BARCELONA	UAB
FUNDACJA EDUKACJI I DIALOGU SPOLECZNEGO PRO CIVIS	PRO-CIVIS
SUSTAINABLE INNOVATIONS EUROPE SL	SIE
STICHTING IHE DELFT INSTITUTE FOR WATER EDUCATION	IHE
WAGENINGEN UNIVERSITY	WU
FVA SAS DI LOUIS FERRINI & C.	FVA
UNIVERSITAET FUER BODENKULTUR WIEN	BOKU
INSTYTUT BADAN EDUKACYJNYCH	IBE
TRAKIYSKI UNIVERSITET	TRU
ZEMEDELSKY VYZKUM, SPOL SRO	ART



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2. Executive summary

This deliverable presents the outputs of the BIObec Task 3.1 (*T3.1 - Cross-task set up and planning of reality-check of potential implementation solutions*).

The main objective of T3.1 was to guarantee consistency among the different WP3 Tasks' activities and the consistency between Tasks' activities and BBECs design.

In this direction, the strategy of the project was to promote a co-construction process among task leaders, BBEC leaders, and the whole consortium, in two main coordinated directions:

- On the one hand, in the operationalization of the BBEC concepts designed in WP1 and 2;
- On the other hand, in the specification of the scope, methods, and planning of the WP3 assessment.

To support this process, two forms were designed, namely: The “*Task implementation solutions description*” form (“Task form”), and the “*BBECs potential implementation solutions description*” form (“BBEC form”).

The former aimed to understand all the fundamental dimensions to develop the different Tasks, like which methodological approach the Tasks will exploit, who will be involved, the target results, the qualitative results expected, and the timeline.

Instead, the latter tried to analyse the contextualization of the BBECs in the scenario in which they will be likely implemented, considering both the *external* and *internal* conditions of the BBECs. For the external dimension, the *Porter's Diamond tool* was adopted, while, for the internal conditions, a *Key Activities Description Table* was made.

The two forms were directed to the Task leaders and the BBEC leaders to be filled out. Anyhow, their fulfilment required the interaction with the other BIObec partners to be completed.

Moreover, the two forms have been designed to provide results that can be interconnected with each other, so that the consistency of assessment activities and BBECs design is guaranteed.

Regarding the Tasks, the main result obtained is an overview of the planning of the assessment activities. In particular, for each Task the methodology and activities planned have been made explicit, together with the timing and people involved. Furthermore, a list of results and indicators was provided by each Task leader.

Beyond these outputs, T3.1 made clear to all the Consortium the importance of proceeding in parallel for T3.2, T3.3, and T3.4, guaranteeing strong connections and flows of information among Tasks. Indeed, only in this way the consistency between the various dimensions and, in the end, the sustainability of each BBEC, can be ensured.

The outputs of BBECs forms were in line with the regional needs and expectations outlined for each BBEC in the previous activities of the project (i.e. WP1 and WP2) and enriched the practical elements of the description of BBECs. Nevertheless, also for the



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BBECs, it became evident that the involvement of regional partners and stakeholders is not enough. Indeed, the exchange of information among the 6 BBECs is a fundamental step for providing an exhaustive description of the establishment of the Centres themselves.



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3. Introduction and objectives

The results coming from Work Package 1 (WP1) of the BIObec project gave the elements to understand the different bioeconomic scenarios as well as the needs, opportunities, and expectations of the different European regions where the Bio-Based Education Centres (BBECs) will be established (D1.1 and D1.3). Moreover, the desk research, conducted within this WP, found some best practice cases for Bio-based Education Centres, following some defined criteria such as target audience, key governing elements, innovation components, relationships among actors, and the main focus of the hub (D1.2).

These general concepts were further explored during WP2 activities, in which the focus moved from general frameworks toward the specificities of each BBEC (D2.1 and D2.2).

First, through the submission of a Centre Readiness Level Framework Survey, the Consortium identified the main actors and, coherently, the main focus of each Regional BBEC in terms of bioeconomy sectors and educational levels to be addressed.

After that, each Regional BBEC conducted a co-creation workshop together with the regional Implementation and Replication Working Group (IRWG) members, developing a Business Model Canvas (BMC) for each BBEC. The scope of that activity was to identify the preliminary ten dimensions of each BBEC, namely:

- *value proposition;*
- *key activities;*
- *key partners;*
- *key resources;*
- *customer relationships;*
- *customer segments;*
- *channels;*
- *cost structure;*
- *revenue streams;*
- *governance.*

A final number of 6 BMCs, one per each BBEC, have been collected.

All the outcomes of WP1 and WP2, and, in particular, the 6 BMC were the starting point for the WP3 activities.

The present document aims to synthesize the information gathered in the scope of Task 3.1. According to the Description of Action (DoA), Task 3.1 has two purposes. Firstly, to coordinate and fine-tune the governance framework, assessment, and funding options through the different BBECs. Secondly, to ensure consistency among the different tasks of the WP, notably among governance plans, economic analysis, funding strategies, and overall assessment.



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In order to implement this approach, the strategy of the project was to promote a co-construction process among task leaders, BBEC leaders and the whole consortium, in two main coordinated directions:

- On the one hand, in the operationalization of the BBEC concepts designed in WP1 and 2;
- On the other hand, in the specification of the scope, methods and planning of the WP3 assessment.

The achievement of these purposes was conducted involving all the Consortium. However, the main units responsible for the activities were the WP3 Task leaders (i.e. FBCD, UNIBO, and UAB) and the BBEC leaders (i.e. UNIBO, UEF, FBCD, MTU, PROCIVIS, UHOH). Indeed, the former was asked to fill out the "*Task implementation solutions description*" form ("Task form"), while the latter was asked to complete the "*BBECs potential implementation solutions description*" form ("BBEC form").

On one hand, the Task form provided guidelines to set up the WP3 Tasks (i.e. Task 3.2, Task 3.3, Task 3.4, and Task 3.5), in order to coordinate the efforts toward the different dimensions that will characterize the BBECs.

Instead, on the other hand, the BBEC form helped to analyse the contextualization of the BBECs in the scenario in which they will be inserted, considering both the external and internal conditions of the BBECs.

The two documents were designed in a way that, once completed, the results can be integrated and can be read in a bilateral way, namely from Tasks perspective and from BBECs perspective.



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4. Methodology

4.1. Overview

To plan the reality-check of potential implementation solutions in Task 3.1, the UNIBO team drafted two twin documents (forms), namely:

- *Task implementation solutions description form* ("Task form");
- *BBECs potential implementation solutions description form* ("BBEC form").

The forms have been designed to provide results that can be connected to each other so that the consistency of tasks' activities and BBECs settlement is guaranteed.

The main recipients of the two T3.1 documents were the WP3 Task leaders (i.e. FBCD, UNIBO, and UAB) and the BBEC leaders (i.e. UNIBO, UEF, FBCD, MTU, PROCIVIS, UHOH). Anyhow, according to *the co-creation approach* that characterizes the BIObec project, an informal involvement of the BIObec partners and the IRWG was performed to better analyse the context, plan the activities and understand the feasibility of the different aspects described.

However, it was requested to all partners fulfil the forms using both the results coming from previous WPs (i.e. WP1 and WP2) and new inputs. In particular, about the former, the main contribution came from the 6 Business Model Canvas (BMC), in which many valuable aspects were already discussed with IRWGs and partners.

Furthermore, the two forms were provided with comments to serve as guidelines for their compilation, so that, in the end, all contributions were comparable. More in detail, the activity was conducted by exploiting four tools (two per each form). Any of these tools aimed to achieve a different objective. A detailed explanation of the two forms - and associated tools - to clarify objectives and rationale is provided below.

4.2. Task implementation solutions description form

The aim of the *Task implementation solutions description form* was to provide an exhaustive description of the Tasks that will be performed during the WP3, from M14 (October 2022) to M24 (August 2023).

To do so, two tools were adopted:

- **Planning of assessment activity per task;** the form tried to get a preliminary description of the Tasks' Workplan, providing some descriptors, namely:
 - o Methodology & Activities;
 - o Planning (time and – eventually – people involved);
 - o Results & Indicators;



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- **Task Indicators per BBEC Table;** the Table provided the main indicators that each Task will try to measure/estimate from each BBEC in order to provide a quantitative assessment of its feasibility.

The form was sent to all WP3 Task leaders and it was also discussed during the WP3 monthly meeting, to coordinate the responses and to avoid any doubts.

4.3. BBECs potential implementation solutions description form

The *BBECs potential implementation solutions description form* aimed to describe with a certain degree of detail the *external* and *internal* dimensions of the BBECs.

The two tools chosen to describe these dimensions were:

- **Porter's Diamond scheme;** the Diamond is an economic model created by Michael Porter (Porter, 1990) and designed to understand the competitive advantage that nations or firms or, more in general, groups possess. The four dimensions that compose the Diamond are:
 - Factor (input) conditions;
 - Demand conditions;
 - Related & supporting industries;
 - Firm strategy, structure & rivalry;
- **Key Activities Description Table;** the Table explored all the major dimensions to settle the activities of the BBEC. Indeed, for each activity, it was proposed a list of descriptors suitable to help to understand the feasibility of the activity itself. The descriptors were:
 - What (specification);
 - When (in 5 years);
 - Audiences;
 - Purpose;
 - KPI;
 - People involved & PMs.

Furthermore, to guarantee the homogeneity of development of the 6 BBECs two common elements were defined and agreed upon with the BBEC leaders, namely: Time horizon (5 years) and connection with a Common European Coordination of BBECs. Although this European Coordinator is still not defined in its main dimensions (governance, role, structure, etc.), it is clear to all the partners that a central institution that coordinates and ensures a common European vision is necessary.

The form was sent to all the BBEC leaders, who discussed within their own BBEC the main dimensions.

4.4. Implementation

The process has been steered by regular monthly meetings open to all the consortium.



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Although the two forms were originally thought to be prepared in parallel, they have been subjected to a different drafting process. Indeed, the Task form originated more by a comparison process held among WP3 Task leaders through meetings – always open to all the Consortium – and sharing the draft versions of the filled form. In other words, the process was more horizontal/in series.

Instead, the BBECs form was filled by each BBEC leader, following the indications of their partners and the peculiarities of their own context. In this sense, the process can be seen more as a vertical/ parallel process. Nevertheless, thanks to the sharing of the filled forms in SharePoint, there was the opportunity to have a comparison among BBEC leaders and, more in general, to provide insights to all the Consortium.

In the following section, we provide an overview of the outputs collected through the two forms.

However, it is important to emphasize that what was provided in this Task is not mandatory for the next steps of the project, both for the Tasks and BBECs. Indeed, the results of T3.1 represent a first reflection of the Consortium and of each individual BBEC, on the main dimensions that will be explored during WP3 and will be subject to revision through a continued co-construction process.



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5. Planning of Tasks and BBECs

5.1. Task implementation solutions description form outputs

5.1.1. Planning of assessment and indicators for Task 3.2

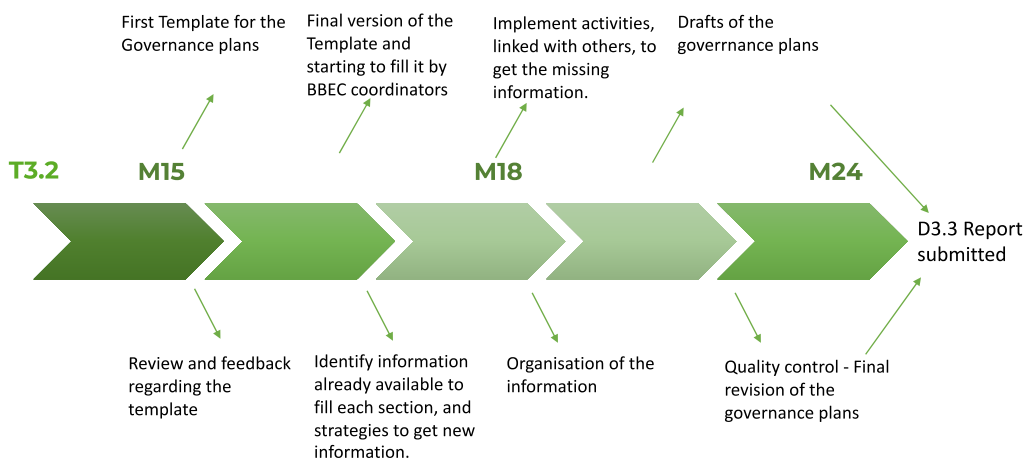
Methodology & Activities:

In this task, a sustainable governance plan will be designed for each BBEC, based on the business model developed in WP2, in order to manage the internal operations, personnel expertise and data sharing of the organization, and guarantee future scalability and engagement in the region.

Each BBEC should work to design its governance plan and to do so, the following structures is provided. In some cases, the information will be already available in the reports performed in the previous WP. In other cases, the information will be gathered and systematized in parallel through other tasks related to WP2. Finally, some of the data, if it's not available, should be gathered during the following months, together with other activities planned within the project.

The first template of the structure for the governance plan is available in annex 1.

Planning (time and – eventually – people involved):



To go ahead with this task:

- the first step is the agreement on the Governance Plan structure.
- each BBEC coordinator should design which is the best way to get the needed information to fill the governance plan for the BBEC.
- some information might not be available, so that, each BBEC coordinator should design the process to get this data. This process should be linked to other activities
- fill the template with information from previous WP, from other activities of WP3, and also with information obtained *ad hoc* for this activity.

Qualitative Results & Indicators:

- Each BBEC centre should provide its governance plan.
- Description of the processes followed to get the data to fill the governance plan.
- Description of the stakeholders involved in the process followed to fill the governance plan.

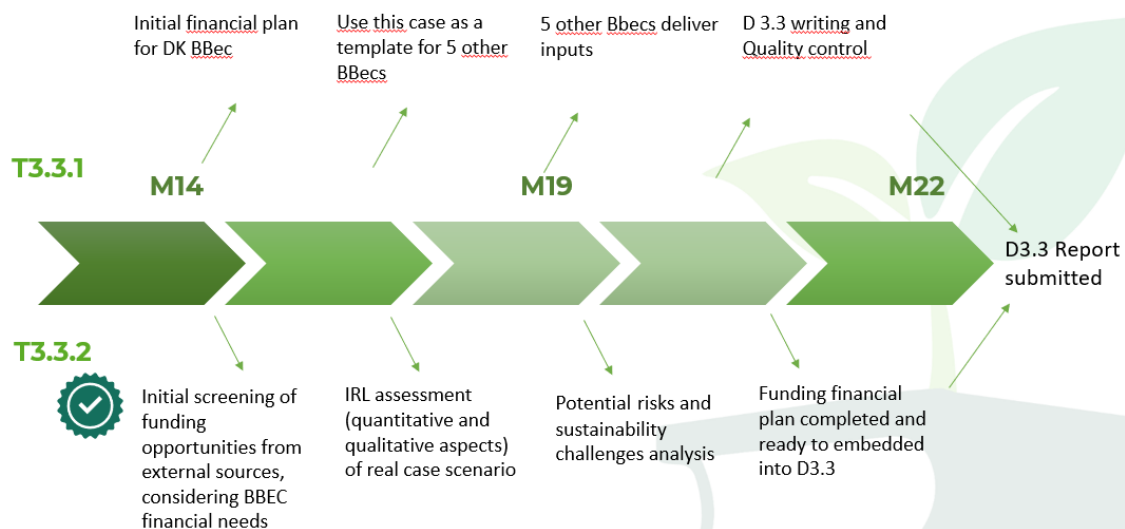
5.1.2. Planning of assessment and indicators for Task 3.3

Methodology & Activities:

Each BBEC will develop its own budget and financial plan as they will probably differ quite substantially.

A preliminary example of a Central Denmark Regional BBEC budget and financial considerations have been forwarded as a template to the remaining 5 BBECs and all BBECs have been asked to prepare own budget and financial plan inspired from this.

Planning (time and – eventually – people involved)



- Central Denmark Regional BBEC budget and financial considerations are shared by end December 2022 (FBCD and SIE)
- We urge each BBEC to consult with key local stakeholders (contributors, competitors, funding sources (public/private) etc.) to develop a preliminary budget and financial plan, including external funding sources to be delivered to FBCD/SIE in M 19 (end of March 2023).
- This will be followed by virtual dialogue/meeting with each BBEC and FBCD/SIE to understand/unfold the proposed budgets
- The essence of the budget/financial plans and external funding sources will be compiled for D 3.3. for quality review ultimo May 2023 and submitted ultimo June 2023.

Qualitative Results & Indicators:



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Few/none of the BBECs are expected to become financially sustainable the first years without some external funding sources – or funding from some of the key stakeholders. Each BBEC will develop a preliminary excel format budget with main expected figures, including

- Investment budget
- Operational expenses budget (depending on the # and type of courses)
- Income budget (depending on # and type of courses, and prize/market)
- Cash flow/liquidity budget -> required external funding input
- External funding sources
 - Public
 - Private

5.1.3. Planning of assessment and indicators for Task 3.4

Methodology & Activities:

The task aims to identify plans and programs for vocational, academic, and lifelong learning. The main objectives are **what** and **how** the activities will be conducted in the BBEC.

N.B.: By activities we mean not only teaching in the strict sense but all the training activities (e.g. mentoring, internships, etc.). To do so, a focal point **will be the engagement of local IRWGs** and, in particular, **industry**.

This task will be performed in two phases.

Each BBEC will have to:

1. Select the training plans. It means to identify the typology of **activities** that will be performed in the BBEC – based on **pre-selected criteria** identified through the co-creation process (i.e. a process that involves BIObec partners before and then local IRWGs);
2. Fill out a specific form on the contents of each of the activities previously identified (see annex 2).

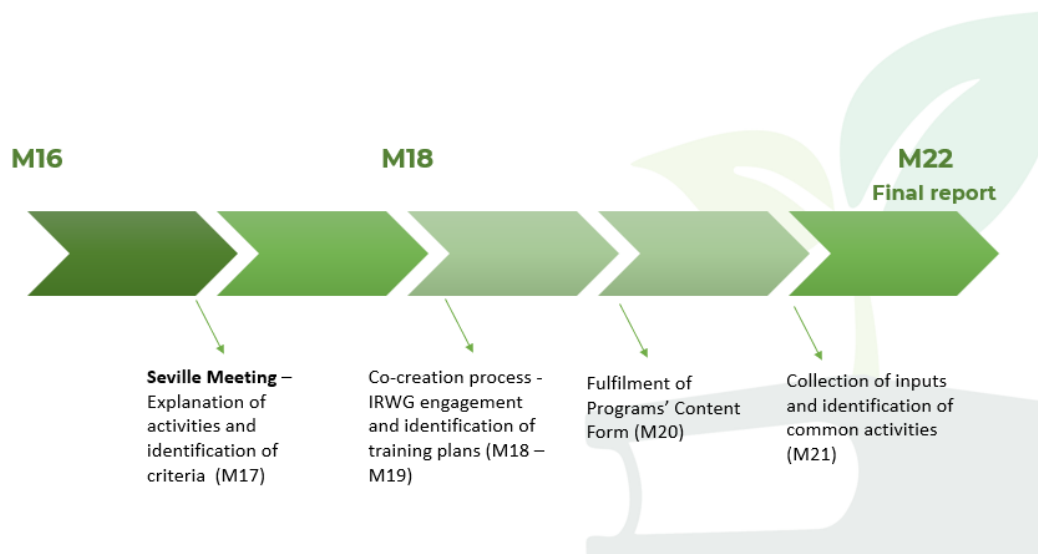
Furthermore, UNIBO, after collecting all the inputs from the 6 BBECs, will try to identify the **common topics** spread throughout the BBECs in order to find possible **common activities** that can be performed centrally by the European coordination of the BBEC.

Planning (time and – eventually – people involved):

The planning activities are reported in the timeline below.



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The Seville Project Meeting will be crucial to define the criteria and to coordinate the activities of this Task both among BBECs and among the other WP3 Tasks.

The involved people will be BIObec Partners and local IRWGs.

Qualitative Results & Indicators:

The qualitative results of this Task will be the Plans and the Programs for each BBEC. The main indicators will be identified in the Seville Project Meeting, in order to guarantee a co-creation process and a common understanding of what is meant by plans, programs, activities, IRWGs engagement, educational and not educational activities, etc.

In the scope of the programs' content several dimensions will be defined, e.g. learning objectives, skills, timing, people involved (internal and external) and their efforts.

5.1.4. Planning of assessment and indicators for Task 3.5

Methodology & Activities:

This task will collect data/examples and cases during M15-M22 when D3.1-D3.4 will be produced

The workshop in Sevilla (January 2023) will be important for this task.

Planning (time and – eventually – people involved):

In months 20-22 the indicators and activities of the above tasks will be followed

In M22-24, the results of tasks 3.1-3.5 will be presented at a stakeholder workshop by all BBEC leaders and the resulting deliverable will be ready by M 24.

Qualitative Results & Indicators:

Indicators and results depend on the indicators identified in the above tasks.

Task Indicators per BBEC Table

Task	Assessment indicators	BBEC1	BBEC2	BBEC3	BBEC4	BBEC5	BBEC6
T3.2	Draft with the identification of information already available and the information to be gathered						
	Plan to get the missing information needed to fill the governance plan						
	Each BBEC centre should provide its governance plan						
	Description of the processes followed to get the data to fill the governance plan						
	Description of the stakeholders involved in the process followed to fill the governance plan						
T3.3	Investment budget						
	Operational budget						
	Cash Flow/ Liquidity budget						
	Resulting needs for external funding						
	External public 'funding' – credit based						
	External private 'financing' – equity based						
T3.4	Indicator 1 (tbd in Seville)						
	Indicator 2 (tbd in Seville)						
	Indicator 3 (tbd in Seville)						



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	Indicator 5 (tbd in Seville)						
	Indicator 6 (tbd in Seville)						
T3.5	Depends on the above Assessment indicators, when ready						
	Indicator 1						
	Indicator 2						
	Indicator 3						
	Indicator 4						



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5.2. BBECs potential implementation solutions description form outputs

5.2.1. Refined description of the Mediterranean BBEC

MEDITERRANEAN BBEC	
Factor (input) conditions	<p>Basic factor conditions:</p> <ul style="list-style-type: none"> • High labour force potential from the consolidated sectors of the Bioeconomy in terms of both <u>not qualified and qualified workers</u>; • <u>Infrastructure</u>: no broad band equally spread in the Mediterranean area; same speech for roads, trains and flights – ranging from poorly connected areas to well-equipped areas. <p>Advanced factor conditions:</p> <ul style="list-style-type: none"> • <u>Qualified workers</u>: not many experts in bioeconomy and in its holistic vision. It means no many skilled teachers and trainers. • <u>Credit</u>: many EU project on the topic involving Mediterranean countries; good interest and engagement of bio-based industries; however <u>few structural funds</u> for Education and Training in Bioeconomy (BET). • For both qualified workers and credit, many resources are available in specific fields (e.g. agriculture and food)
Demand conditions	<ul style="list-style-type: none"> • Strategic importance of biomass and water management push toward skilled workforces in bioeconomy; • High need of trained human resources form industry to manage new processes/value chains or highly technological processes; • Low participation from individual workers moved by personal interest; • Low <i>willingness to pay</i> (WTP), both from industry and individuals; • Increasing importance of optimizing the processes (mainly in terms of energy, and reuse and valorisation of by-products) in the traditional value chains, e.g. Agrifood in Mediterranean Area.
Related & supporting industries	<ul style="list-style-type: none"> • Each sector composing Bioeconomy, in particular, in Mediterranean Area, two main streams: <ul style="list-style-type: none"> ◦ <i>Primary producers (agriculture, forestry, fishery, etc.)</i>; ◦ <i>Biotech industries</i>; • Bio-based Industries Consortium and various Clusters at national and European level;
Firm strategy, structure & rivalry	<ul style="list-style-type: none"> • Bioeconomy Education & Training can be seen as a new market, with all pros and cons of the case; • Few initiatives in BET and mostly disaggregated in the Mediterranean area. However, networking and dissemination activities are increasing; • EU coordination, but Member States regulate Education and Training (ET) ; • <u>Rivalry</u>: no rivalry in Bioeconomy ET (BET) but consolidated ET systems in steady and traditional sectors can be an obstacle.

MEDITERRANEAN BBEC						
	Descriptors					
Key activities:	What (specification)	When (in 5 years)	Audiences	Purpose	KPI	People involved & PMs
Matching demand and supply of Education and Training service by brokerage and matchmaking activities;	<ul style="list-style-type: none"> - Online service (platform): <ul style="list-style-type: none"> o Education and Training offer or request for registered users; o Newsletter (periodically) for events and opportunities; o Reminders for inactive users; - Periodical events (e.g. annually): <ul style="list-style-type: none"> o Info days; o Job days. 	In 1 year (2024)	<ul style="list-style-type: none"> - Industry - Public administrations 	Filling that gap in Bioeconomy Education and Training	Nr of visualizations of the platform: 1000/month ; Nr of newsletter subscribers: >500 ; Nr of participants in periodical events: >100	<u>Internal:</u> Education experts (per country) to validate material and proposals – 3 PM Newsletter managers – 0.5 PM Staff to organize periodical events – 2 PM <u>External:</u> Platform maintenance – 0.5 PM
Valorisation of existing teaching material first and then creating common teaching materials;	<ul style="list-style-type: none"> - Online service (platform): <ul style="list-style-type: none"> o Collection & selection of teaching material (<u>copyright check</u>); o Updating old material and creation of new one; - Tutoring for subscribed students (<u>fee for service</u>). 	In 1 year (2024)	<ul style="list-style-type: none"> - Students from various educational levels; - Teachers of different educational levels 	Valorising existing material; Providing a common European understanding about Bioeconomy	Nr of visualizations of the platform: 1000/month ; Nr of hours of lesson requested: >60 h/month ; Nr of downloads: >700/year ;	<u>Internal:</u> Education experts (per country) to select and update material and proposals – 3 PM Tutors – 0.5 PM Administrative labour - 0.2 PM
Training the trainers – at different Educational levels;	<ul style="list-style-type: none"> - Training pathways for teachers and trainers (online & in person): <ul style="list-style-type: none"> o For various educational levels (school, academia, VET, lifelong learning); o At various levels following students' background (e.g. basic, intermediate, advanced) - (Possible) tutorial/webinars made by education & training experts and/or communication experts. 	In 3 or 4 years (2026 - 2027)	<ul style="list-style-type: none"> - Industry trainers; - School teachers; - Vocational Education and Training teachers; - University professors of other disciplines 	Providing teachers with the elements to gradually introduce bioeconomy to their students.	Nr of teachers subscribed: 40 teachers/year ;	<u>Internal:</u> Teachers and trainers – 3 PM Communication and dissemination experts – 1 PM <u>External:</u> IT experts – 0.1 PM



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<p>Identification of priorities, skill profiles, education and training needs;</p>	<ul style="list-style-type: none"> - Identification of <i>personas</i> and coherent pathways (together with industry); - Continuous update of needs, priorities and, consequently, of <i>personas</i>; - Periodical events (e.g. annually or half yearly): <ul style="list-style-type: none"> o Workshops or conferences with all the relevant actors; o Periodical surveys to involved firms. 	<p>Identification phase during next 2 years (2023-2024). Continuous update in following years (>2024)</p>	<ul style="list-style-type: none"> - Industry; - Public administration - Students (various educational levels); - NEETs; - Principals of Schools, High schools, VET schools and Universities 	<p>Bringing industry (and, in general, production sectors) and education & training closer together.</p>	<p>Nr of <i>personas</i>: >10; Nr of descriptors per <i>persona</i>: tbd;</p>	<p><u>Internal</u>: Human Resources expert – 1 PM Staff to update – 0.2 PM Administrative Labour – 0.1 PM <u>External</u>: Industry Human Resources experts – 0.3 PM Industry representatives – 0.1 PM</p>
<p>Re-allocate or improve (ex. internships) students' curricula in compliance with industry requirements;</p>	<ul style="list-style-type: none"> - Mentoring by industry; - Internships. 	<p>In 2 or 3 years (2025 – 2026)</p>	<ul style="list-style-type: none"> - Workers; - Students (various educational levels); - NEETs; - Teachers (various educational levels) 	<p>Making the bioeconomy a sector with a high social impact.</p>	<p>Nr of firms involved: >150; Nr of mentoring hours: 10 h/month; Nr of internships: >20 (availability); Nr of students per category (workers, NEETs, etc.): 15/year;</p>	<p><u>Internal</u>: Administrative labour to coordinate internships and mentoring (bureaucratical issues) – 0.8 PM <u>External</u>: Industry representatives for mentoring – 1 PM Tutors from industry for internships – 0.5 PM</p>



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5.2.2. Refined description of the Finnish BBEC

FINNISH BBEC "GREENHUB"	
Factor (input) conditions	<ul style="list-style-type: none"> • Researchers from various different fields in bioeconomy • Students from all levels in bioeconomy-related studies (vocational, bachelor, masters, doctoral) • Research and study infrastructures from the educational and research institutes • National and international networks (EBU, BIOBEC, Bioregions Facility, FOEBE) • Wide knowledge in bioeconomy and project management • All quadruple levels represented
Demand conditions	<ul style="list-style-type: none"> • Students from the three educational organisations • Teachers from the three educational organisations • SMEs and large bioeconomy companies within the region • Research institutes: Luke, Syke, EFI, UEF, and their researchers • Regional actors (city of Joensuu, Business Joensuu, Finnish Forest Centre)
Related & supporting industries	<ul style="list-style-type: none"> • Food, pharma, cosmetics, chemical, engineering, metal & steel, construction, IT • Other BBECs and BIOBEC network • EBU network • Bioregions Facility network • FOEBE project network
Firm strategy, structure & rivalry	<ul style="list-style-type: none"> • First forest bioeconomy related hub in the region • First forest bioeconomy related hub in Finland that connects all quadruple levels • Co-operation with other forest industry related hubs and regional hubs that include forests (e.g., North Savo Superecosystem) • Co-operation with other regional hubs • Ecosystems and hubs are today very popular and appearing in almost all industries and they are gaining funding and governmental support too • Responding to the Finnish Bioeconomy strategy (2022) and regional climate and energy programme (2020)

FINNISH BBEC "GREENHUB"						
	Descriptors					
Key activities:	What (specification)	When (in 5 years)	Audiences	Purpose	KPI	People involved & PMs
Open cooperation platform coordination	<ul style="list-style-type: none"> - Updating the online platform to match the demands of the key actors - Creating content for the platform - Responding to inquiries and connecting actors to each other 	<ul style="list-style-type: none"> - A mock version of the platform already exists - The platform should in its right form by the end of 2023 with all functionalities 	<ul style="list-style-type: none"> - Students and teachers from all three education organisations related to bioeconomy (300-400 people) - Regional companies within bioeconomy (100 companies) - Researchers from four organisations (300) 	<ul style="list-style-type: none"> - Students can do their traineeships and gain work opportunities from local companies - Students can gain thesis topics and implement them with the support from companies - Platform connects education actors to other actors within the region, provides relevant information and functions as the cornerstone of the hub 	<ul style="list-style-type: none"> - Nr of thesis work executed - Nr of national and international students employed in local companies for traineeships or other - Nr of new business created (through the BBEC) - Nr of new research projects started - Nr of new contacts gained from the platform 	<p><u>Internal:</u></p> <ul style="list-style-type: none"> - UEF/Business Joensuu coordinator of the platform 4 PM - A representative from each key partner organisation (9) 3 PM <p><u>External:</u></p> <ul style="list-style-type: none"> - Local companies 0,25 PM - Students 0,25 PM - Researchers 0,25 PM
Knowledge creation and transfer	<ul style="list-style-type: none"> - Creating interesting blog texts about forest-based bioeconomy - Providing information about local and international students and their capabilities - Providing information about partner organisations' events and new materials (publications etc.) 	<ul style="list-style-type: none"> - Basic content should be available within the 2023 and updated regularly 	<ul style="list-style-type: none"> - Students (300-400) - Companies (100) - Researchers (300) - Regional actors (city of Joensuu) - Business Joensuu - Political actors 	<ul style="list-style-type: none"> - Students know more about the local job opportunities - Companies hear from the education activities and students' capabilities - All relevant actors stay interested in and connected to the hub 	<ul style="list-style-type: none"> Nr of blog texts created per year Nr of shared blog texts in social media Nr of mentions in social media Nr of subscribers of the website, blog or newsletter 	<p><u>Internal:</u></p> <ul style="list-style-type: none"> - UEF/Business Joensuu or other, coordinator of the platform 3 PM - A representative from each key partner organisation (9) 1 PM <p><u>External:</u></p> <ul style="list-style-type: none"> - Local companies 0,1 PM - Students 0,1 PM - Researchers 0,2 PM
Event organisation	<ul style="list-style-type: none"> - Organising job fairs for students - Organising meetings for teachers from the three educat. organisations - Organising joint lectures - Organising forest bioeconomy related 	<ul style="list-style-type: none"> - These activities should start latest in 2024, platform has to be active and accepted first 	<ul style="list-style-type: none"> - Students and teachers from all three education organisations related to bioeconomy (500-600) - Local companies (100) - Researchers (300) 	<ul style="list-style-type: none"> - To make students and teachers from all levels meet and interact - To share information between organisations - To get people (researchers, companies, 	<ul style="list-style-type: none"> -Nr of joint lectures organised -Nr of meetings organised for teachers -Nr of job fairs organized -Nr of workshops organised 	<p><u>Internal:</u></p> <ul style="list-style-type: none"> - UEF/Business Joensuu or other, coordinator of the platform 2 PM - Karelia, Riveria and UEF and teachers within them 0,5 PM -Business Joensuu (for fairs) 0,25 PM



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	workshops for businesses and researchers to meet			students, and teachers) meet more regularly		<u>External:</u> - Local companies 0,1 PM - Students 0,1 PM - Researchers 0,1 PM
Linking actors together (links to the activity 1)	<ul style="list-style-type: none"> - Finding right people from right organisations for joint activities (projects, lectures etc.) - Bringing students and local companies together - Teachers from different education organisations meet regularly 	<ul style="list-style-type: none"> - These activities are already running but the platform should be developed further during the next 2 years 	<ul style="list-style-type: none"> - Key actors (9 organisations) - Local companies (100) - Students (300-400) - Researchers (300) 	<ul style="list-style-type: none"> - To increase students' work life skills and employment - To make local and international students interact together more - To share bioeconomy knowledge from different educational levels - To create new projects involving several actors - To create new businesses in the area - To initiate new research 	<ul style="list-style-type: none"> - Nr of thesis work executed with companies - Nr of national and international students employed in local companies for traineeships or other - Nr of new business created - Nr of new research projects started - Nr of project funding applied 	<u>Internal:</u> -Coordinator of the platform 3 PM <u>External:</u> - Students and teachers from the three educational organisations 0,2 PM - Researchers 0,2 PM - Local businesses 0,2 PM



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5.2.3. Refined description of the Danish BBEC

DANISH BBEC	
Factor (input) conditions	<p>We have</p> <ul style="list-style-type: none"> • A strong network of bioresource actors in DK and especially in Central Denmark Region • Resources – Potential financial inputs from key actors • Teachers and educations at various educational levels • Biorefining facilities, R&D level, Full scale level • Incubation facilities for biobased start-ups
Demand conditions	<ul style="list-style-type: none"> • Lack of 'cross silo knowledge'. • Need for a modular master-level education (120 ECTS) where ECTS points can be gathered over perhaps 4-5 years in short or longer modules • Access to innovation and knowledge: when FBCD organizes occasional events, there is a large interest from industry and students • Start-up -training, talent recruiting
Related & supporting industries	<ul style="list-style-type: none"> • Educational institutions <ul style="list-style-type: none"> ○ <i>Academia: AU CBIO, AU Animal Sciences, AU Engineers, AU Agroecology,</i> ○ <i>Vocational educations: Asmildkloster, Dania, JU-Beder</i> ○ <i>ABP Incubation, Municipalities, SEGES innovation, Food & Biocluster</i> • Companies in the fields of <ul style="list-style-type: none"> ○ <i>Livestock, Dairy, manure handling, Biogas and green biorefining, Pyrolysis; Agriculture/biomass/ plant and pig production etc</i> • Planning authorities, policy makers
Firm strategy, structure & rivalry	<ul style="list-style-type: none"> • We build a platform for biobased master-level courses <ul style="list-style-type: none"> ○ <i>We cooperate closely with existing educational institutions and add more/new aspects such as business visits, innovation and incubation to their curricula</i> ○ <i>We find young talents for Biobased industry in the educational system</i>

Danish BBEC						
	Descriptors					
Key activities - examples:	What (specification)	When (in 5 years)	Audiences	Purpose	KPI	People involved & PMs
Full master education, using EU competencies frame The below courses can become part of this	Master: Danish/EU bioeconomy/biorefining 10-20 courses with ECTS points, total of 120 ECTS	Start in 2025, but modules can be taken over the course of 5 years	Business Employees, researchers/ students/ teachers Policymakers	To add Bioeconomy to existing education in DK	30 students completed by 2030 120 have taken some courses	See below, this is the sum of the courses needed
Semester courses (20 ECTS each which are the 'fundamentals' of the master education)	<ul style="list-style-type: none"> The role of milk production in bioeconomy The role of straw in bioeconomy Biorefinery and cascading Biogas plant management 	Could start in 2024, a new course every semester	University students: Vet, agronomy, Engineers, Vocational students, farmers Biorefinery industry employees EU/international students	To give 'circular value-chain' insight, knowledge, and examples Understand cascading and biorefinery	>15 students/ semester	Example for 'Milk production in bioeconomy': AU Agroecology, Animal /Vet. science, DKC: Total of 3 PM Vocational education: 1 PM Businesses: Thiese, Arla, Biogas, biorefining, Re-milk, total 1 PM, including excursions Regulation: Viborg Municipality, 0,2 PM
Study Exchange/ visits to facilities in DK and at other BioBECs 5 ECTS	<ul style="list-style-type: none"> Pyrolysis network trip to Sweden/Germany/NL Green biorefining in NL Algae cultivation in Norway 	Every 2 years (2-3 days)	Business employees, academia researcher/students/ teachers Policy makers,	Cross-silo networking, innovation, business development, policymakers	>15 participants > 3 helix participants 5 ects point	Planning, Execution, and evaluation 2 PM
International summer schools, 10 ECTS Value-chain focus Short courses	<ul style="list-style-type: none"> Green biorefining Algae in bioeconomy Regenerative agriculture Hemp refining 	Every summer	Business employees, academia students/ teachers, potential start-ups Policymakers	To 'go deep' in a narrow value chain	10 students every course	3 PM for each course, one main teacher, business visits
People-Plant-Profit BMC courses	Start-up bioeconomy	Every semester	Advanced students/start-ups	To prepare for business start-up	5 /semester – 3 successfully established	2 PM from Agro Business Park/Business schools
Hackathons	Give a specific challenge for 'youngsters' from a biobased business 'what-if'-innovation training	Occasionally, when a challenge has been defined	Students: Vocational, university	To learn from a specific software challenge from a company		1 PM from ABP, 1 from Business



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5.2.4. Refined description of the Irish BBEC

IRISH BBEC	
Factor (input) conditions	<p>WE HAVE</p> <ul style="list-style-type: none"> • A very strong bioeconomy network in Ireland including a number of research centres and clusters focussed on bioeconomy. • Developed a number of undergrad, postgraduate and CPD specific to bioeconomy and circular economy which are scalable and replicable. • Access to R&D expertise and start-up incubation programmes, facilities and funding streams.
Demand conditions	<p>NEEDED</p> <ul style="list-style-type: none"> • There is a lack of cross sectoral knowledge transfer which requires a strategic quintuple helix approach for unified implementation. • Demand for modular and stackable micro-courses, training and skills development that is industry targeted and with clear recognition of prior learning. • Significant investment in citizen awareness and engagement initiatives required. • Access to Information- Stakeholders would like further/easy access to information regarding EU projects including results from past projects, information on available grants and grant writing, consortium building.
Related & supporting industries	<ul style="list-style-type: none"> • The Higher and Further education sectors are connected and placed to design and deliver state of art learning pathways for bioeconomy and circular economy. • Funding- Ireland has a number of funding bodies with a portfolio of collaborative funding mechanisms that can be activated for the bioeconomy sector. • Policy- Irelands government is committed to the development of the bioeconomy, in particular the Department of Agriculture, Food & Marine (DAFM) and Department of Environment, Climate & Communications (DECC). • Co-operatives- Coops are an important aspect of the agriculture sector in Ireland. They are aware of the benefits of implementing bioeconomy aspects for a more sustainable value chain.
Firm strategy, structure & rivalry	<ul style="list-style-type: none"> • To build a national platform for bioeconomy and circular economy education, training and skills. MTU/IBF lead on the strategy with inputs from other bioeconomy stakeholders in Ireland including government departments, clusters, research centres and third-level institutions. • To further develop existing networks and cluster relationships on a European and International level to ensure best opportunities for collaboration, research and funding success.

IRISH BBEC						
	Descriptors					
<i>Key activities:</i>	What (specification)	When (in 5 years)	Audiences	Purpose	KPI	People involved & PMs
International Matchmaking	Study visits to European countries to learn about bioeconomy developments in the region. Similarly, organising trips to Ireland for the same.	Every year, starting immediately 2022	Industry bioeconomy stakeholders including researchers, post-grad students and policy leaders.	Events virtual and in person will be used for networking, business development and potential consortium building. Each event and/or visit will be used as an introduction where subsequent online networking will be done.	4X virtual event 1 study visit 1 study visit host	MTU/IBF staff members to organise visits. Similar staff in destinations to partake/facilitate visits. and host events online and in person
Post-graduate career days and mentoring	Career days focussed on all aspects of bioeconomy to include stands from primary production industries, government departments, research centres and PhD opportunities	Every year (September), starting immediately 2023	Recent graduates of all disciplines but focussed on science and engineering.	Showcase the various careers that are available in the bioeconomy sector in Ireland	1 career day per year	MTU and partner Higher Education Institutes
Research Centre activities and events	Networking events throughout Ireland to highlight Ireland's developing bioeconomy with stakeholders working in the industry.	2-3 Networking events throughout the year. Starting 2023.	Research Centres and third-level institutions, cluster, SMEs, corporations	Networking events will be used for highlighting the work done in Ireland's bioeconomy and how organisations not already involved in the bioeconomy can adopt bio-based solutions in their business and foster collaboration.	2-3 Networking events leading to collaboration.	MTU/IBF staff
Student Exchanges	Erasmus type Bioeconomy-focussed student exchanges with other Universities for undergrad and masters students	Every year. Starting 2023	Undergrad and masters students that are studying topics	Knowledge exchange between students and staff of the colleges partaking	1 exchange per year.	MTU/Other third-level staff members to organise visits. Similar staff in destinations to partake/facilitate visits.



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	in Europe. MTU offers masters in bioeconomy & business as well as science/engineering at undergrad.		related to bioeconomy.			
Information Platform/Website	'One Stop Shop' Platform to provide information up to date information on the bioeconomy in Ireland and Europe	Constant. Starting 2024	Irish bioeconomy stakeholders	Provide information on education, jobs, news, grant applications, short education videos, pilot-scale facilities, access to finance for SMEs etc	300 website clicks per month	MTU/IBF and inputs from all bioeconomy stakeholders in Ireland. Also, graphic designers and IT staff for website maintenance.
Civic society engagement	Educational material aimed at general public about the bioeconomy including short videos, infographics and advertisements	Constant. Starting 2023	General public	Give the public a better understanding of the benefits of bioeconomy. Information such as 'what is bioeconomy', 'how can I work in bioeconomy', 'career paths' etc.	Produce a number of advertisements and short videos.	MTU/IBF, government departments, other clusters and research centres. Build on the success of Bioeconomy Ireland Week (http://irishbioeconomy.com/)
Bioeconomy programme design and delivery	Design, delivery of bio economy environment and sustainability education.	In progress	Undergrad Postgrad Further Ed CPD Second Level Primary Level Civic Society	Purpose: to escalate bioeconomy education across all learner levels and create transformation that reaches all sectors of society	KPI	People involved: MTU & IBF HEI partners Ireland and EU



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5.2.5. Refined description of the CE Europe BBEC

BBEC CENTRAL-EASTERN EUROPE-EAST	
Factor (input) conditions	<ul style="list-style-type: none"> • Knowledge about bioeconomy in the region (valuable partners map, resources, technology, tools, didactical materials etc.) • Network of already existing educational institutions, universities, science institutes • Platforms and cooperation schemes for the stakeholders established during other projects • Experienced staff willing to take part in training courses as lecturers • R&D Infrastructure • Funding resources and priorities areas • Unlike the network of Bioeconomy University established in the Western, Southern and Northern part of Europe, there has been no such network in the BIOEAST macro region. • The Thematic Study of the BIOEAST Thematic Working Group Bioeconomy Education developed by the BIOEASTsUP project states that however the BIOEAST macro region is rich in biomass resources availability to ensure a knowledge-based transformation towards a biobased economy, new transdisciplinary curricula should be developed, and existing ones should be adjusted to existing needs of the agricultural practice, industry, and policy makers, as well as the foreseen needs for the upcoming decades.
Demand conditions	<ul style="list-style-type: none"> • Implementation of EU Bioeconomy Strategy • Regional strategic documents/ mechanisms for implementation • Low awareness of the meaning of bioeconomy • Developing circular economy – organisation and types of businesses involved in circular economy • Protection of the environment and natural resources • Growing demand for skilled workforce in Bioeconomy • Level of competencies, education and expertise in bioeconomy • Growing demand for flexible education • The findings of the BIOEAST Foresight Report highlighted the structural problems in the bioeconomy related education and skills development in the Central and Eastern European macro-region. The lack of human resources in higher education and research means that it could become one of the main bottlenecks to accomplishing the goals of the European Green Deal. • The BIOEAST HUB CZ initiated the establishment of the BIOEAST Bioeconomy University Network.
Related & supporting industries	<ul style="list-style-type: none"> • Initiatives on Vocational Training • External funding opportunities • Significant bioeconomy and bio materials demanding sectors (Agriculture and Food Processing, Forestry, Wood Processing and Furniture Industry, Construction industry, Renewable Bio-Energy etc.)

	<ul style="list-style-type: none"> • Thematic Working Group established on the BIOEAST macro-regional level Bioeconomy Education • National bioeconomy HUBs as a working tool of the BIOEAST Initiative – the first and so far the only one the BIOEAST HUB CZ
Firm strategy, structure & rivalry	<ul style="list-style-type: none"> • Development of the national Bioeconomy Strategy in process (PL+BIOEAST) • Low cooperation between the stakeholders and initiatives in the field of bioeconomy education (PL+BIOEAST) • Low participation in international projects regarding bioeconomy education (PL+BIOEAST) • Existing education/ VET in the field of bioeconomy (BG) • Limited strategies/ initiatives to provide alternative business/ transition to the coal mining industry (BG) • Social and economic risk in the coal mining regions (BG)



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BBEC CENTRAL-EASTERN EUROPE-EAST						
	Descriptors					
Key activities:	What (specification)	When (in 5 years)	Audiences	Purpose	KPI	People involved & PMs
<p>Supports the exchange of knowledge between science /academia, industry, other actors</p>	<ul style="list-style-type: none"> - Development of an on-line platform for stakeholders that supports the exchange of knowledge - Developing a network of stakeholders (IRWG members, other stakeholders, other BBEC's) - Facilitation of contacts within the network, promotion of interactions, knowledge sharing and mutual learning within the network (regular meetings and workshops, joint events on - Facilitation of internships programs with the participation of representatives from academia and from industry - joint projects? - joint publications? 	5 years	<ul style="list-style-type: none"> - Bioeconomy companies (SME, large) - Research institutes - Education and academia - Business development organisations - Public administration - Global national, regional and local political actors - Clusters, Networks and Associations - NGO's - Private Investors - Start-ups 	The main goal is to enable mutual learning and effective communication between BBEC CEEE, other BBEC's, IRWG and others actors in order to develop capacity of the bioeconomy education and cooperation in the region. The additional result being the joint innovative initiatives in the sphere of bioeconomy education and development.	<ul style="list-style-type: none"> On-line platform - 1 Number of events for members (6 per year) Number of events for potential members (4 per year) Number of study visits Number of matchmaking events for start – up's - Number of trainings/ educational exchanges/ short-term secondments Number of internships programs Number of joint projects Number of joint publications 	<p>Internal:</p> <ul style="list-style-type: none"> - Costs of management and coordination. - Costs of organization of events and workshops <p>External:</p> <ul style="list-style-type: none"> - Platform maintenance and development. - Costs of communications activities (staff creating content, advertising) <p>Costs of internship programs</p> <p>Costs of joint publications ...</p>



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<p>Provides information about education and training providers with valuable offer in the field of Bioeconomy</p>	<ul style="list-style-type: none"> - Creating a database of education and training providers in bioeconomy - Creating an assessment methodology of the education and training offers and providers - Promoting the valuable education and training offers (especially BBEC members) 	<p>5 years</p>	<ul style="list-style-type: none"> - Bioeconomy companies (SME, large) - Research institutes - Education and academia - Public administration - Start – up’s and individual inventors - Science communicators - Home educators - Student organizations - NGO’s - Employers organizations - Technology transfer centers, - Business incubators - Labor market institutions, - Associations of students and doctoral students 	<p>The main goal is to map valuable bioeconomy education and training providers that will respond to the needs of the industry and other actors in the field of developing skills and learning. The goal is also to improve the quality of education and training providers in the field of bioeconomy. This activity will also help the industry and other actors to identify educational needs in the right way and address them to education and training providers. It is of high importance to educate also the general public / the society at large about the advantages and opportunities offered by the bioeconomy.</p>	<p>Assessment methodology of education and training providers – 1</p> <p>Workshops to education and training providers (2 per year)</p> <p>Guide to education and training providers – 1</p> <p>Workshops to stakeholders with training needs (2 per year)</p> <p>Guide to stakeholders how to diagnose training needs – 1</p> <p>Data base of education and training providers – 1</p> <p>Number of promotional activities and social campaigns</p>	<p>Internal:</p> <ul style="list-style-type: none"> - Costs of management and coordination. - Costs of organization of workshops - Costs of mapping education and training providers <p>External:</p> <ul style="list-style-type: none"> - Cost of expertise (methodology) - Costs of guiding materials - Costs of promotional activities and social campaigns
<p>Provides information about VET and education providers that certificates skills in bioeconomy</p>	<ul style="list-style-type: none"> - Creating a database of VET and education providers that certificates skills in bioeconomy - Providing information about the certification systems for education providers and how to be allowed to give certificates 	<p>5 years</p>	<ul style="list-style-type: none"> - Bioeconomy companies (SME, large) - Research institutes - Education and academia - Local, regional and national administration 	<p>The main goal is to map VET and education providers that will respond to the needs of the industry and other actors in the field of developing skills and learning.</p>	<p>Data base of education and training providers – 1</p> <p>Guide to education providers about external skills</p>	<p>Internal:</p> <ul style="list-style-type: none"> - Costs of management and coordination. - Costs of mapping education and training providers - Costs of promoting the valuable education offers



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	<ul style="list-style-type: none"> - Promoting the valuable education offers (especially BBEC members) - Conducting the benchmark activities as for the offers of other European and international bioeconomy educational centres 				<p>certificate systems – 1</p> <p>Workshops to stakeholders with training needs (2 per year)</p> <p>Open events/ forums on dedicated topics</p>	<p>External:</p> <ul style="list-style-type: none"> - Cost of expertise (methodology) - Costs of guiding materials
<p>Provides tools, didactical materials, contents, expertise, etc.</p>	<ul style="list-style-type: none"> - Developing tools and materials to raise awareness and basic knowledge about the bioeconomy - Lectures and presentations to support the EU, national and regional bioeconomy strategies - Providing expertise in bioeconomy specializations which are connected to the BBEC5 countries and regions - Providing supportive materials on the innovative potential of bioeconomy - Sectoral Qualification Frameworks for the sectors connected to bioeconomy - Developing educational programmes for non-bio workers (lawyers, IT, engineers etc.) 	5 years	<ul style="list-style-type: none"> - Primary education, secondary education - Bioeconomy companies (SME, large) - Research institutes - Education and academia - Public administration - Global, national, regional and local political actors - Consulting companies - NGO's - Technology transfer centres - Science centres, - Business incubators, -Specialized press and media 	<p>The main goal is building awareness about the importance of bioeconomy in the modern world at all levels of education, support to decision-makers in developing and implementing policy in the field of bioeconomy (i.e. Strategies, Road Maps etc.)</p> <p>Supporting companies willing to capitalize on the business potential of the bioeconomy.</p>	<p>Publications -</p> <p>Manuals for teachers -</p> <p>Given lectures - ...</p> <p>Conference promoting bioeconomy in the region -</p> <p>Number of positions papers regarding bioeconomy ...</p> <p>Number of innovative tools and methods identified and/or developed in order to be offered to the business ...</p> <p>- Number of short films, podcasts, interactive games, dedicated apps -</p>	<p>Internal:</p> <ul style="list-style-type: none"> - Costs of management and coordination. - Costs of organization of events and workshops - Costs of developing tools and methods supporting innovativeness in the bioeconomy sector <p>External:</p> <ul style="list-style-type: none"> - Costs of creating materials for rising awareness actions. - Costs of expertise and consulting.



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<p>Supports international mobility of students and science staff in the field of bioeconomy</p>	<ul style="list-style-type: none"> - Creating data base about exchange programs, internships and practices for students and science staff - Workshops and events for students and science staff about international mobility - Promoting international mobility of academia representatives and of students - Cooperation of more than one educational Institutions with a rotation of studies and courses - Adaptation of the educational curricula according to specific needs and requirements - Involvement of the private sector (Industry) to the studies employing students during their diploma thesis - Development of projects based on synergies between public and private sectors 	<p>5 years</p>	<ul style="list-style-type: none"> - Research institutes - Education and academia - Educators / science communicators - Student associations, career offices, volunteer centres 	<p>The main goal is to enable the development of future staff working in sectors related to bioeconomy. Exchanges between different countries with a higher level of awareness and development of bioeconomy will contribute to expanding the knowledge of students and academic staff which will help to disseminate and develop knowledge in the regions.</p>	<p>Data base about international mobility – 1</p> <p>Guide to students and science staff – 1</p> <p>Number of promotional initiatives ...</p>	<p>Internal:</p> <ul style="list-style-type: none"> - Costs of management and coordination. - Costs of promotional initiatives. <p>External:</p> <ul style="list-style-type: none"> - Costs of guiding materials
<p>Consulting: creating project consortiums, applications for funds</p>	<ul style="list-style-type: none"> - Providing information about upcoming calls (EU and national funds) - Coming up with identified interesting topics to be further presented in the form of project applications - Matching partners in order to create projects consortium 	<p>5 year</p>	<ul style="list-style-type: none"> - Consulting companies - Bioeconomy companies (SME, large) - Research institutes - Education and academia - Start-ups - Clusters, Networks and Associations - Public administration - NGO's 	<p>The main goal is to support the development of the potential of enterprises, universities, research institutes and other actors operating in the bioeconomy sector through participation in international projects</p>	<p>Matchmaking events -</p> <p>Seminars about latest calls and application possibilities and how to apply for funds -</p> <p>Meetings for the joint development of</p>	<p>Internal:</p> <ul style="list-style-type: none"> - Costs of management and coordination. - Costs of organization of events and workshops <p>External:</p> <ul style="list-style-type: none"> - Costs of expertise and consulting.



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	- Supporting and facilitating the process of development of project application		- Municipal offices, - Business incubators, - Student organizations - Employers' organizations	co-financed by EC and other sources.	potential projects' topics.	
Events, Workshops	- Participation in events and workshops related to bioeconomy on regional, national and European level - Organization of events and workshops (not included in points 1-6)	5 year	- BBEC CEEE - IRWG	The main goal is to participate in externally organized events and workshops related to different areas of bioeconomy to promote and communicate its development, achievements in the region, and to encourage participation in supporting initiatives.	Number of events in which BBEC participated – (1/Q)	Internal: - Costs of management and coordination. External: Costs of participation in conferences and events



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5.2.6. Refined description of the German BBEC

GERMAN BBEC	
Factor (input) conditions	<p>Strategic:</p> <p>Germany has a bioeconomy strategy with guidelines and objectives for its policy and measures for its implementation. The state of Baden-Württemberg, as other states, also have a bioeconomy strategy and both highlight the importance of formal and informal education for the bioeconomy i.e. training and further education programmes and courses at vocational and technical schools, colleges and universities. There is a focus on covering technologies, digital technologies in breeding, agriculture and forestry for bioeconomy education.</p> <p>The Federal Ministry of Education and Research (BMBF) and the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) established the Bioeconomy Council, whose central task is to search for ways and means for sustainable solutions, and to present their insights in a global context.</p> <p>Employment:</p> <p>It is estimated that Germany has a total of 3.1-3.6 million people employed in all the sectors of the bioeconomy. These sectors (biomass producing and converting sectors) add value estimated in 125 billion euros, being the food, beverage and tobacco, the sector contributing the most with 1.01 million people (Bringezu et al., 2021 and JRC)</p> <p>Between 2008 and 2019, there has been an increment of around 100% employment in the sectors of liquid biofuels and bio-based electricity (JRC)</p> <p>Research and education:</p> <p>Regarding the bioeconomy research landscape, Germany counts with 60 universities, 37 universities of applied sciences and 61 research facilities. The general federal government has funded around 1160 joint or individual projects involving more than 900 actors. The majority of the projects focus on the creation and diffusion of techno-economic knowledge (Federal Ministry of Education and Research, 2015).</p> <p>According to the report Promoting education, training and skills across the bioeconomy (2022), Germany has a total of 168 educational programmes in higher education institutions linked to bioeconomy. While regarding VET, there are offers for topics on: Agriculture; manufacture of bio-based chemicals; pharmaceuticals, plastics and rubber; manufacture of bio-based textiles; food, beverages and tobacco; and energy, water and waste management.</p> <p>By analysing the bioeconomy-education networks, there are four dedicated-biobased education hubs in Germany, two of which are campuses (Bioeconomy Campus Straubing and Science Campus plant-</p>

	<p>based Bioeconomy Halle), one is a cluster (BioEconomy Cluster) and one is a centre (BioSC Bioeconomy Science Centre) (BIObec, 2022)</p>
<p>Demand conditions</p>	<p>Those who are working on the bioeconomy industry are mainly academics from disciplines such as biology, biotechnology, chemistry, chemistry engineering, bio process technology, among others.</p> <p>For the industry, there is a need for a transformation but the bioeconomy is still too complex to completely grasp or understand.</p> <p>Few professors come from the industry but have developed the skills in the academia. Professors are required to have the right skills, for example related to interdisciplinarity.</p> <p>Expectations:</p> <p>From value chains to value webs: there is a need for professionals that deal and move along the value chains and understand their complexity, who have sustainable and interdisciplinary skills</p> <p>Stronger connection to technology comprehension and production know-how and understanding of the value networks</p> <p>Understanding of material flow in companies in order to build valuable partnerships between companies</p> <p>It is missing bidirectional transfer of results from research to the economy.</p> <p>What it is missing is the add on to the profile with communication skills or business skills. In management positions is essential to have for example training in business</p> <p>There is a need for innovation spaces where industry meets science.</p> <p>There will be a need of professionals that can create a sustainable transition, people who can manage this transformation practically and not just theoretically.</p> <p>Employees in public institutions such as the environmental ministry should take a training package that could be eventually co-created or co-led with the BBEC</p> <p>Need of “personalized” education programs for bio-based industries: agriculture, forestry, biobased materials, biotechnology, etc. (Actors platform)</p> <p>Startups in the field of Bioeconomy- bring and need competences</p>



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<p>Related & supporting industries</p>	<p>In Baden-Württemberg, there is a strong commitment from the governmental institutions to promote the bioeconomy.</p> <p>There are current established networks and clusters: BIOPRO, wood-based, fibre-based, food, biomimicry, circular bioeconomy in Rhein-Necker region, innovation-hub for recycling of CO2, plant-based value chains fibres for food and fabric, new proteins, Urban bioeconomylab, Biorefineries, among others</p> <p>Furthermore, German research organizations active in bioeconomy are for example : the Fraunhofer Gesellschaft, the Helmholtz Gemeinschaft, the Max Planck Gesellschaft, and the Leibniz Gemeinschaft.</p> <p>The new platform for bioeconomy-related actors has been built making it easier to find stakeholders for different projects or potential clients or collaborators for the BBEC.</p> <p>Also, the educational institutions in BW and Germany (see in Factor)</p>
<p>Firm strategy, structure & rivalry</p>	<p>Funding options from national and regional calls related to bioeconomy. For example for new technologies, innovations, and networks: https://biooekonomie.baden-wuerttemberg.de</p>



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German BBEC						
Key activities:	Descriptors What (specification)	When (in 5 years)	Audiences	Purpose	KPI	People involved & PMs
Identification and mapping of knowledge (experts)/ Managing actively the network	Work together with the regional ministry for the actors platform and contact the regional experts	2023	Educational and research institutions	Identify the experts and categorize them to manage the network	20 experts identified in different topics of bioeconomy	3 PM
Create framework for bioeconomy-related curricula adaptation and creation	Define the background for the content related to bioeconomy education	2023-2027 continuous	Industry actors (complete value chain)	Communicate about current, missing, to-be-improved training offerings	Framework defined	3 PM
Create framework for consultancy work	Determine the work path for dealing with new clients	2024	Industry actors (complete value chain)	To offer a professional consultancy service	Framework defined	3 PM
Identification and mapping of existing courses/ Creation of educational material/ formats	Identify the educational offerings in the region and create new formats and materials depending on the framework defined	2024	Professionals (employees/ future employees)	Identify gaps and map the educational offerings	Courses /programmes identified And material designed	30 PM
Create and maintain a homepage	Design and create a homepage and post meaningful information for policy actors	2024	policy actors	Inform	Visits	10 PM
Initiate collaborations, distribution and exhibition of bioeconomy-related material	Build on the network of actors relevant for the BBEC	2024	Societal actors	Inform and apply for new projects	collaborations	20 PM



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Find funding alternatives	Apply to calls	2024-continuous	Educational and research institutions Industry actors (complete value chain) Professionals (employees/future employees) policy actors Societal actors	Get funded	Projects funded	10 PM
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6. Lessons learned, cross-cutting issues and next steps

The activities carried out in task 3.1 confirmed the need for a coordination activity before starting the various specific WP3 Tasks. This was indeed motivated by the wide interconnections among the principal dimensions composing the BBECs (i.e. governance; plans and programs; economic and financial requirements).

Additional lessons learned from the initial steps of WP3 concerned the following:

- The WP3 assessment requires an operational specification of the BBEC; entering into more practical details emphasised the differences across BBECs and their design, hence assessment methodologies will need to deal with this diversity;
- At the same time, the diversity of BBECs provides a high potential for evaluating a range of solutions, that can actually provide a valuable contribution to the process;
- The different tasks must have common elements in terms of BBECs design and activities in order to be consistent; however, the specification is a work-in-progress that will benefit from reciprocal learning among different centres and tasks;
- In this vein, it might be expected that the contents of the BBECs will evolve further during the project or afterwards, taking into account changing opportunities or realising resource limitations;
- As a consequence, it will be important that the assessment considers elements of uncertainty such as potential alternative implementation options, different sets of activities, and sensitivity analyses to key context parameters or break-even points for economic feasibility.

Hence, T3.1 revealed to be very useful to align the different WP3 Tasks, making clear to all the partners the importance of proceeding in parallel for T3.2, T3.3, and T3.4, guaranteeing strong connections and flows of information among the Tasks themselves.

During the activities performed in the scope of T3.1, both for Tasks and BBECs descriptions, some cross-cutting issues have been taken into account.

In particular, for Task leaders, the main issue was to relate their own Tasks with the other tasks of WP3, as well as to account for BBECs and regional differences.

From the perspective of both the task planning and BBECs design, a key issue to consider was the time horizon. This was initially set at 5 years as a common reference, but actually, more pragmatically, it was interpreted as the need for an explicit timeframe or dynamic development of centre activities.

These cross-cutting issues are not only relevant for the activities of T3.1 but, in general, will remain as common elements in all the following WP3 activities.

The documents presented in this Deliverable (i.e. Task form tools and BBEC form tools) are not static documents but rather working documents in progress. They allowed obtaining some preliminary reflection points for the start of subsequent activities.



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These preliminary points will undergo further improvements during the next steps of the BLObec project, which are expected to be largely incorporated in the output of tasks 3.2, 3.3, and 3.4. In addition, T3.5, which aims to collate the feedback coming from WP3 activities, will represent the final coordination and summarising effort, hence completing the effort started in Task 3.1 (fig. 1).

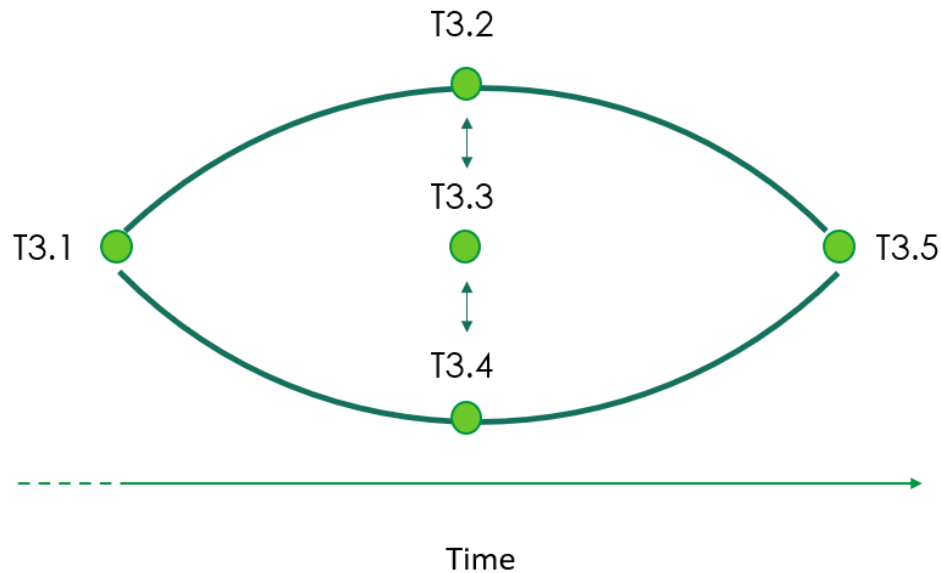


Figure 1. The flow of information among WP3 Tasks in relation to time.

The initial use of D3.1 would be to work as a checklist and guideline to collect initial information about specific plans and assessment info (e.g. governance options, costs) from each BBEC during January 2023.

A focal point for the overall project is the co-creation process. To ensure its implementation, an important moment will be the next Consortium meeting in Seville in January 2023 (M17).

Indeed, during the meeting, it will be possible to discuss in detail the future activities with particular attention to:

- The Tasks' timeline;
- Stakeholder engagement;
- The *sustainability* of the BBECs' design;
- Connections between WP3 and WP4.

Regarding the timeline, it will be defined how to overlap the different activities in the scope of different tasks of WP3. In particular, it will be discussed how the outputs of each Task could be integrated into other Tasks' results. Indeed, given the close connection among different dimensions (e.g., programs and cost structure), it will be fundamental to guarantee clear connections and the flow of information among Tasks.

Instead, regarding stakeholder engagement, the discussion will address how to involve IRWG members and, in general, all the stakeholders in the process. Every Task leader will present the formal and informal stakeholders' engagements that will be required during their Task, in order to help partners in planning activities.

The sustainability of the BBECs' design will be addressed during all the WP3 Tasks but in particular in Task 3.5 (*T3.5 – Overall sustainability assessment*), which represents the last activity in the scope of that WP. In order to guarantee a coherent flow of outputs and keep in mind the final sustainability assessment, it will be important to discuss the sustainability dimension *before* the beginning of various Tasks.

Finally, a connection of the activities of WP3 with the ones of WP4 (*European EU bio-based education Centres coordination plan for roll-out and replication*) will be performed in order to set the stage for replication plans of BBECs.

The proposed planning, to be further specified and validated at the meeting in Seville, is the following:

- January 2023: circulating D3.1 and request information based on sketched assessment activities;
- 25-26 January 2023: discussion at the Consortium Meeting in Seville;
- February 2023: refinement and integration of information collected (based on input from stakeholders and, in particular, IRWG members);
- End of February 2023: first drafts of plans for governance, economic requirements and learning program (milestones 7, 8 and 9);
- March-April 2023 further collection of feedback and integration
- End of April 2023: second draft of plans for governance (D3.2), economic requirements (D3.3) and learning program (D3.4) and a first draft of D3.5;
- May-June 2023: Circulation of draft and further fine-tuning;
- End of June 2023: finalisation D3.2, D3.3, D3.4 and second draft of D3.5;
- July 2023 Task 3.5 workshop;
- August 2023: finalisation of D3.5.

It is advised to continue monthly coordination meetings in order to ensure a smooth flow of information among tasks and WPs.



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Annexes

Annex 1

T3.2 - Structure of the Governance plan

A.- The context of action:

All institutions are situated in a context; sociocultural and economic, to which they must respond and which justifies their meaning and existence.

A.1. The socioeconomic context:

- Socioeconomic reality and future prospects.
- Present and future needs of the training/assessment/counseling/research to which it is intended to respond.
- Existing training bodies and institutions in the field of action where you want to influence or collaborate.

A.2. The regulatory context

- Ownership of the institution: public, private, consortium, linked to another body, etc..
- Justification of the institution ownership: economic benefits, incomes, grants, etc..
- Institution size

B.- Institutional purposes:

They refer to the purposes and goals pursued by the institution

- Mission and vision of the BBEC.
- Strategic planning that guides your intervention.
- Training project: values that BBEC want to promote, general professional skills to develop and intervention methodology.
- Plans that it develops and some characteristics of these.
- Singular and innovative projects in which BBEC will work: internships in companies, ICT implementation, entrepreneurship workshops,....

C.- The operating structures:

They refer to the way in which existing resources are organized to achieve the established institutional purposes.

C.1. The structure of human resources:

- Governance and participation bodies (organization chart): management bodies and their functions, participation bodies (stakeholders they represent and their functions).
- Organization of the staff participating in the institution: selection, assignment to job positions, training and improvement, and working conditions.
- Organization of users: rights and duties



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- Organization of other participants in the institution: sponsoring companies, Public Administrations, professional groups,...

C.2 The structure of material resources:

- Infrastructure of the BBEC: spaces, security conditions, health and sustainability of the facilities,
- General and laboratory/workshop furniture and materials, with reference to its functionality and level of updating.

C.3. Functional Resources:

- Calendar and hours of operation.
- Budget: origin of financial funds, items and control and monitoring systems.
- Most prominent aspects of internal regulations.

D.- Management and operation:

Review the format and actions of the institution's management bodies

- Management: training, selection, functions and working conditions
- Management teams: composition and functions.
- Intermediate management (coordinators, area managers,...) and their functions.

E.- The relational system:

Analyze the most important aspects that affect people's behavior

- The communication processes in the center.
- The motivation of the staff.
- The coordination of people.
- Decision making.
- Institutional culture.

F.- Institutional dynamics:

It refers to the most relevant aspects of the institutional day-to-day.

- The annual planning of the center, who, how and when it is carried out.
- Monitoring of plans and programs. Evaluation and accountability.
- Quality indicators and internal quality assurance systems.
- The link with the environment and its institutions and companies.
- The elaboration and development of improvement and innovation plans.
- Institutional marketing.
- Networking with other institutions.



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Annex 2

T3.4 - Plans and programmes for vocational, academic and life-long-learning Background & Aim of the Document

The present document aims to provide plans and programs for vocational, academic education as well as for lifelong learning activities in the scope of the 6 Bio-Based Education Centres. In particular, it will specify **activities, learning objectives, entering requirements, skills, contents** (topics), **teaching methods, learning instruments**. The plans will provide a concrete reality check of **the activities planned** in the centres and could provide models for other centres and replicators. The plans will take into account the interplay of the different levels/types of education, with respect to the local and international needs of the industry and other players. It will also provide connection with other information/education needs (e.g. consumers, policy makers, etc.).

[NAME] BBEC

BBEC General information

Targeted Educational level(s)

Vocational

Academic

Lifelong learning

Entrepreneurship training

Other

If "Other" specify: [Click or tap here to enter text.](#)

Main Contents (topics)

Primary production systems – agriculture, forestry, aquaculture, including waste and side streams

Food, feed, fibres and bio-based industries

Fuels and bio-energy

Sea, oceans and waters

Other

If "Other" specify: [Click or tap here to enter text.](#)

Principal Entering requirements (e.g. open access, open access with assessment of personal competencies, restrict access, etc.)

[Click or tap here to enter text.](#)

Language

[Click or tap here to enter text.](#)

Period of activities



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All the year (without Summer schools)

All the year (with Summer schools)

Only winter period

Only summer period (Summer schools)

Activity information

Activity 1¹

Learning and/or general objectives

Click or tap here to enter text.

Entering requirements

Click or tap here to enter text.

Skills provided

Click or tap here to enter text.

Contents (topics)

Click or tap here to enter text.

Teaching methods & Required Staff/Expertise

Click or tap here to enter text.

Learning instruments

Textbook

Teacher presentation

Handouts

Databases

Video

e-platform

Gaming

Computer lab

Learning journey

Use of laboratories

Other

If "Other" specify: Click or tap here to enter text.

Timing (e.g. monthly, half yearly, yearly, etc.)

Click or tap here to enter text.

Assessment methods

Click or tap here to enter text.

¹ This part of the module will be replicated for each educational activity of the BBEC (Activity 2, Activity 3, etc.)