



# Investment Package Manual for European Cities and Regions

## VOLUME III

National and Regional investment package on  
circular bioeconomy for European Regions and  
Cities

[www.hoopproject.eu](http://www.hoopproject.eu)



The HOOP project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°101000836.

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## List of Acronyms

Acronym	Description
CAPEX	CAPital EXpenditures
CF	Cohesion Fund
DNSH	Do No Significant Harm
EC	European Commission
EIB	European Investment Bank
ERDF	European Regional Development Fund
ESF	European Social Fund
EU	European Union
GHG	GreenHouse Gas
ICT	Information and Communication Technologies
JASPERS	Joint Assistance to Support Projects in European RegionS
N	Nitrogen
NACE	<i>Nomenclature statistique des Activités économiques dans la Communauté européenne</i> - statistical classification of economic activities in the European Community
NGO	Non-Governmental Organisation
OFMSW	Organic Fraction of Municipal Solid Waste
OP	Operational Programme
OPEX	OPerational EXpenditures
P	Phosphorous
PAYT	Pay-As-You-Throw

<b>Acronym</b>	<b>Description</b>
<b>PDA</b>	Project Development Assistance
<b>R&amp;D</b>	Research & Development
<b>RRF</b>	Recovery and Resilience Facility
<b>RRP</b>	Recovery and Resilience Plan
<b>SDG</b>	Sustainable Development Goals
<b>SME</b>	Small and Medium-sized Enterprises
<b>TRL</b>	Technology Readiness Level
<b>UWWS</b>	Urban WasteWater Sludge
<b>VAT</b>	Value Added Tax
<b>WBCSD</b>	World Business Council for Sustainable Development

# 1. Executive Summary

Circular Bioeconomy needs to be deployed thanks to investments aligned with the green financing and funding to comply with requirements and goals from public policies and strategies toward a circular and carbon-neutral economy by 2050. Thanks to green finance, European cities, regions, their entrepreneurs and businesses will be able to accelerate their transition to a low-carbon, resilient and resource-efficient economy,

The Investment Package Manual was designed at first time as confidential for the HOOP project's pilot cities and regions, called Lighthouse, supporting them with knowledge and tools in their circularity journey. The HOOP project [October 2020 - September 2024] aims to unlock bio-based investments and deploy local bio economies in Europe through a systemic and cross-cutting approach. It will offer project development assistance to a group of 8 Lighthouse Cities and Regions to build the technical, economic, financial and legal expertise needed to develop concrete investments to valorise biowaste and wastewater, with the aim of obtaining safe and sustainable bio-based products.

The manual demonstrated a practical utility over time, being extensible and valuable resource for other EU Member States and their cities and regions. For this reason, the authors propose a public version that was developed to be disseminated among Cities and Regions of the HOOP Network and others across Europe and offers an overview on funding and financing schemes and opportunities at European, National and Regional levels.

The Investment Package Manual was developed on three-step approach and the public version distributed through 3 respective volumes. This Volume III presents a selection and inventory of funding and financing schemes, programmes, instruments and tools for investment projects on circular bioeconomy and bioenergy at National and Regional levels, under 8 European countries and regions case studies: Finland, Greece, Germany, Italy, Norway, Portugal, Spain and The Netherlands.

Volume I presents the description of the EU Taxonomy concepts, methodology, objectives, technical screening criteria and DNSH (“do no significant harm”) applied to economic activities linked to the circular bioeconomy technologies, processes, activities and bioproducts from biowaste and wastewater sludge feedstocks, and respective regulation package. These economic activities selected are related to the bio-based technologies and processes being invested in the HOOP project by the European Cities and Regions.

The second step (Volume II) guides the reader through the selection and inventory of funding and financing schemes, programmes, instruments and tools for investment projects on circular bioeconomy and bioenergy at European level.

The Recovery and Resilience plans and Horizon Europe already included the DNSH principle from EU Taxonomy, i.e., no measure in the projects and investments should lead to significant harm to any of the 6 environmental objectives: climate change mitigation, climate change adaptation, circular economy, sustainable use and protection of water resources, pollution prevention and control, protection and restoration of biodiversity and ecosystems.



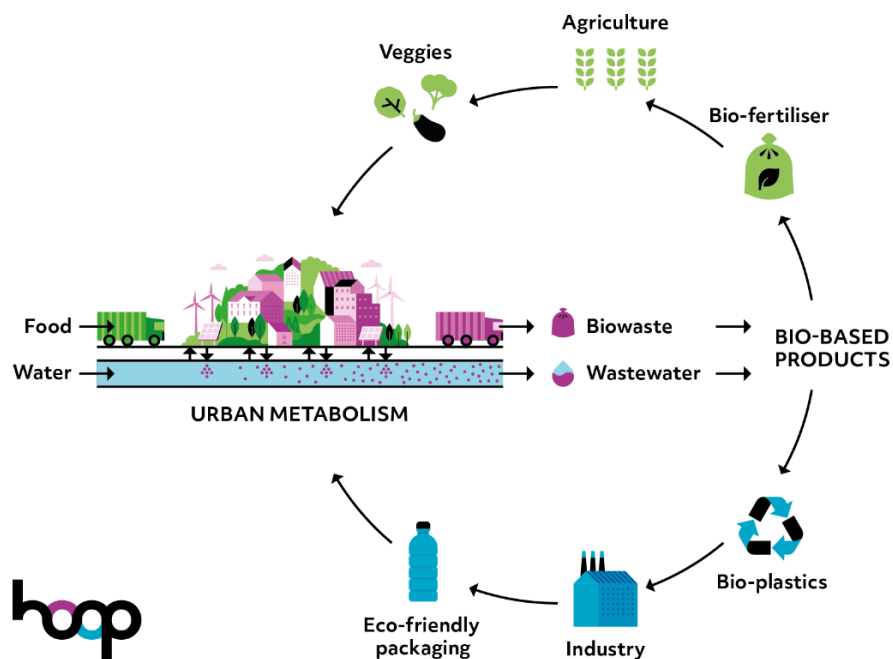
## 2. Introduction

The circular economy concept is gaining attention as the consumption and use of resources increases to serve a fast-growing population with rising standards of living. Circularity refers to the circular flow and efficient use and reuse of resources, materials and products. This new economic model represents sustainable green growth, moving from a consumption and disposal-based linear model to a system that extends the life of products and materials and minimises waste. The circular model has many environmental, climate, social and economic benefits [1].

The circular economy is backed strongly by the European Commission (EC) and other European Union (EU) institutions, as well as by a growing number of cities and countries across the EU, like HOOP demonstration territories, the so-called Lighthouse Cities and Regions. It is also attracting attention from the business community and public and private investors. The circular economy goes beyond resource efficiency and recycling. It provides the framework to develop new business models aimed at increasing the value, use and lifespan of materials, products and assets and designing out waste from production and consumption [1]. Inspired by these principles, the HOOP project is ongoing, and **this manual was developed for the European Cities and Regions, in order to provide them a green investment package of knowledge and opportunities to boost urban circular bioeconomy.**

### 2.1. The HOOP project [2]

The HOOP project, “**H**ub of circular cities **b**OOsting **P**latform to foster investments for the valorisation of urban biowaste and wastewater”, emerges to help unlock bio-based investments and deploy local bioeconomies in Europe through a systemic and cross-cutting approach. **The project offers Project Development Assistance (PDA), budgeted with EUR 5.78 million, to a group of 8 Lighthouse Cities and Regions** [2] with a variety of sizes, geographical distribution throughout Europe and different socio-economic context. In order to build the technical, economic, financial and legal expertise needed to develop concrete investments to valorise Organic Fraction of Municipal Solid Waste (OFMSW) and Urban Wastewater Sludge (UWWS), with the aim of obtaining safe and sustainable bio-based products. The urban bioeconomy concept of the HOOP project and its biowaste and wastewater cycle of material valorisation is illustrated through the **Figure 1**.



**Figure 1 – Urban circular bioeconomy concept of the HOOP: biowaste and wastewater converted into innovative high-value bioproducts.**

The report “State-of-the-art of technologies for the production of bioproducts from biowaste and wastewater” was presented in July 2021 and will be transformed in both a scientific review article and a series of *technology factsheets*. It provides a technical description and a multidisciplinary analysis of 17 technologies preselected by HOOP technological partners and on technology readiness levels (TRL) from 5 to 9. This document aimed to be an early tool for the identification of potential paths towards circular bioeconomy strategies for cities and regions.

Furthermore, HOOP will develop, from the bioprocesses and technologies selected by the Lighthouse Cities and Regions as BATs (best available techniques/technologies): **circular business models, technological and environmental assessments, innovative financial engineering & procurement, stakeholder engagement & mobilisation, and a replication strategy.**

The PDA will focus on a variety of projects within the cities and regions, with different investment volumes planned that are expected to be complemented by public and private investments. The HOOP project partners will create an understanding among investors on specific aspects of those processes (i.e., technical specifications, input and output materials/products, business cases, among others) as this is a prerequisite to be able to support the development of tools and the decision-making on financing solutions.

Besides Lighthouse Cities and Regions, the project impacts will be extended through the project’s large **Network of Cities & Regions – a network that aims to include 100+ cities and regions to facilitate the exchange of knowledge and mutual learning** among European cities and regions that are willing to recover valuable resources from OFMSW and UWWS to make bio-based products – will ensure that the provided PDA mechanisms will reach beyond the HOOP demonstration territories and spread across all Europe. This Network



is led by HOOP partner ACR+, acronym of “association of cities and regions for sustainable resource management”.

By joining this Network, cities and regions gain information to innovative urban bioeconomy solutions and engage in activities relevant to their context and specific interests. Participants have direct exchanges with the 8 HOOP lighthouse cities and regions, sharing experiences and expertise.

**The following resources and tools will be available for the HOOP Network of Cities & Regions by September 2022:**

- ◆ The Urban Circular Bioeconomy Hub;
- ◆ Circularity Label;
- ◆ Knowledge exchange activities;
- ◆ Virtual Academy.

More information about HOOP project, resources, tools and the HOOP’s Network of Cities and Regions are available on its website [here](#) [2].

## 2.2. The Investment Package Manual

The investment package manual was designed at first time as confidential for the HOOP’s Lighthouse Cities and Regions, supporting them with knowledge and tools in their circularity journey. This manual demonstrated a practical utility over time, being extensible and valuable resource for other EU Member States and their cities and regions. For this reason, this current public version was developed to be disseminated into the HOOP’s Network of Cities and Regions, and other interested on it. Therefore, this manual aimed at the identification of funding and financing schemes and opportunities at European, National and Regional levels, available for the European Cities and Regions. Such investment package will be considered in the financial schemes and development of business models in further advanced tasks of HOOP project.

**The Investment Package Manual was delivered in the end of January 2022 as confidential (extended) version, only available for the HOOP’s Lighthouse Cities and Regions and project partners. However, the present shorter version of the Manual was designed and divided in three volumes for public dissemination and training of Cities & Regions of the HOOP Network and others across Europe.**

## 2.3. Objectives

The manual was developed to be a thorough still easy-to-consult resource. The methodology behind its development consists of a three-step approach illustrated below in **Figure 2** and reflected in this three-volume public version of the manual. The first step (**Volume I**) is the description of the EU Taxonomy concepts, methodology, objectives, technical screening criteria and DNSH assessment applied to economic activities linked to the circular bioeconomy technologies, processes, activities and bioproducts from biowaste and

wastewater feedstocks, and regulation package in this field. In the Volume I was also identified the economic activities and sectors related to the bio-based technologies and processes being invested in the HOOP project by the European Cities and Regions.

The second step (**Volume II**) was the selection and inventory of funding and financing schemes, programmes, instruments and tools for investment projects on circular bioeconomy and bioenergy at European level. The third step (**Volume III**) was the selection and inventory of funding and financing schemes, programmes, instruments and tools for investment projects on circular bioeconomy and bioenergy at National and Regional levels, under 8 European countries and regions case studies: Finland, Greece, Germany, Italy, Norway, Portugal, Spain and The Netherlands.

Several programmes establish both bioeconomy and bioenergy lines combined, e.g., some schemes only grant projects where circular bioeconomy activity also includes bioenergy production in order to decarbonise the organisations and economic activities. For this reason, all investment opportunities identified in this manual for the European Cities and Regions are focused on both activities.

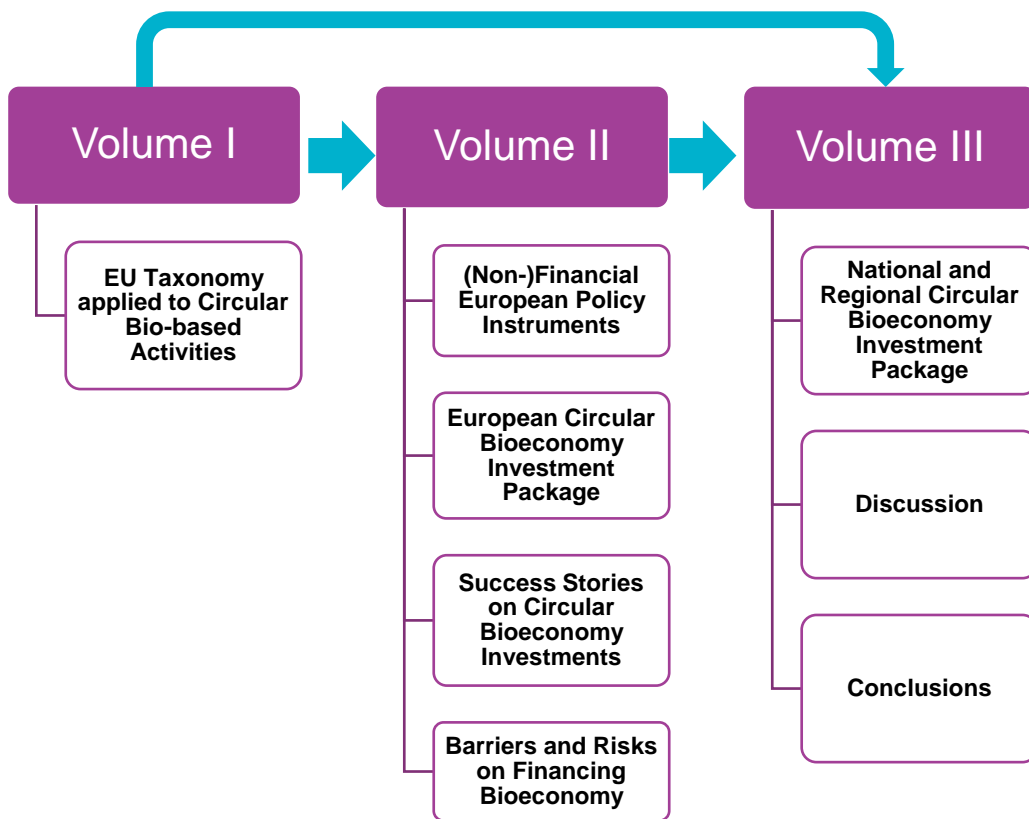


Figure 2 – Investment Package Manual’s contents distributed by each Volume.

More in detail, the content of the 3 volumes constituting the public version of Investment Package Manual for the European Cities and Regions is distributed as follows:

**Volume I - EU Taxonomy applied to circular bio-based activities**

- ◆ Provide a description of the concepts and methodology of the EU Taxonomy, as well as the regulation package and other issues related to its application;
- ◆ Identify the economic activities classified, namely macro-sector, NACE (statistical classification of economic activities in the European Community) levels and codes, in the EU Taxonomy linked to the circular bioeconomy technologies, processes, activities and bioproducts from biowaste and wastewater feedstocks.

**Volume II - European investment package on circular bioeconomy for European Member States, Regions and Cities**

- ◆ Select and characterise the financial and non-financial European policy instruments for policymakers, and European funding and financing instruments, schemes, sources, investors and tools on circular bioeconomy available for European Cities and Regions;
- ◆ Present some investment success stories on circular bioeconomy from urban biowaste and sewage sludge to inspire the European Cities and Regions.

**Volume III - National and Regional investment package on circular bioeconomy for European Regions and Cities**

- ◆ Identify some business models applied to circular bioeconomy projects and activities for cities and regions, as well as the circular bio-based characteristics applied to urban solid biowaste and wastewater sectors;
- ◆ Create an investment intake form on circular bioeconomy to be inserted on HOOP's website and used by the HOOP's Network of Cities & Regions in order to characterise the investment projects and provide PDA;
- ◆ Identify the national and regional funding schemes and initiatives on circular bioeconomy under 8 European countries and regions case studies;
- ◆ Provide complementary resources and tools supporting circular bioeconomy initiatives, financing services and funding available for European Cities and Regions.

# 3. National and Regional investment package on circular bioeconomy for European Regions and Cities

In this Volume III is explored 1) **circularity tips and features toward a circular bio-based city**, 2) **some business models and their principles applied to circular (bio)economy**, and 3) **a portfolio of funding opportunities applied to circular bioeconomy in 8 country and regions case studies**.

**Cities are targeted by circular investment opportunities mainly for these reasons** [3, 4, 1]:

- ◆ **Cities can be seen as circular cradles and ecosystems** in which circular solutions to pressing problems and challenges are initiated and nurtured. Furthermore, innovations and changes in consumer behaviour are adapted at a fast pace in cities due to intense social and other media influences. Then, a city is an ideal ecosystem for the development and implementation of new circular bio-based business models that can drive the circular transition and sustainable development.
- ◆ **Cities can also be seen as circular catalysts** since city authorities can lead and accelerate the transition. They can create a circular vision and strategy, optimise infrastructure and logistics networks, connect stakeholders, provide incentives for and facilitate circular initiatives, and they benefit from information of different kinds.

The confluence of businesses, citizens, government actors, and universities in cities creates living innovation labs in which new circular bio-based practices can be tested and developed. The concept of Living Labs applied to cities is defined by the EC (European Commission) as [3, 4]:

***“[an] open innovation ecosystems based on a systematic user co-creation approach that integrates public and private research and innovation activities in communities, placing citizens at the centre of innovation.”***

Municipalities can actively stimulate the creation of **Circular Living Labs**. In this way, these Labs are an ideal instrument and platform to support innovative circular start-ups, foster promising collaborations, and involve citizen groups in identifying and implementing different circular bio-based concepts and projects [3, 4].

### 3.1. What will a circular bio-based city look like?

A local urban bioeconomy ensures that all biowaste and by-products are recovered and used as feedstock for nutrient or chemical recovery, with residues both used for energy generation and later returned to the soil. Companies are located in industrial clusters and matched to facilitate and enable industrial symbiosis where residues, by-products or waste heat/water generated by one company can be used by another, thereby saving feedstock costs for one company and waste management costs for the other. Moreover, digital tools facilitate material tracking, and material/service exchanges, industrial symbiosis and monitoring of circular progress [4].

#### ► How is a circular bioeconomy defined?

**Bioeconomy** covers all economic and industrial sectors and systems, their functions and principles, that use biological resources and processes to produce food, feed, bio-based products, energy and services. The **EU Bioeconomy Strategy** sees cities becoming major circular bioeconomy hubs, where biowaste is a feedstock for safe and sustainable bio-based products [2].

When the concept is applied to OFMSW and UWWS, it means that the organic waste streams must be recycled to the soil as compost or sludge, reducing the soil erosion and improving the soil nutrition and fertility, or valorised into new bioproducts through novel bioprocesses.

#### ► What will a circular bio-based city look like?

Amsterdam (one of the early adopters of the circular economy concept at city level) developed 7 principles to guide its transition [3]:

- 1 Closed loops:** all materials are reused and recycled infinitely, including the organic wastes into the soil.
- 2 Reduced emissions:** all energy is generated from renewable sources, e.g., biogas, biofuels, solar, wind, etc.
- 3 Value generation:** resources are used to generate shared financial and societal value.
- 4 Modular design:** all products are designed in a flexible way and production chains enable the adaptability of systems.
- 5 Innovative business models:** new implemented business models enable the shift from possessing goods to using goods through services, e.g., for introduction into markets of bioproducts from OFMSW and UWWS.
- 6 Region-oriented reverse logistics:** logistic systems are shifted to a more region-oriented service with reverse-logistics capabilities.
- 7 Nature systems up-gradation:** all human activities positively contribute to ecosystem services and the reconstruction of natural capital, e.g., practices of urban composting, urban farming, etc.

The **transition to a circular bioeconomy entails transformative changes in all economic sectors**. Learn more about urban circularity from publications listed on Ellen MacArthur Foundation's website [5].

### 3.1.1. A circular bioeconomy approach on waste management and material recycling sector

#### ► What are the benefits of improving a city's waste management system for the circular bioeconomy?

About 500 kg of municipal waste per capita are generated every year in the EU (European Union), which the biowaste fraction represents about 30%. Waste management is currently a costly activity, however the organic fraction can be turned into new bioproducts and bioenergy production. Reuse of secondary products will 1) avert the environmental impacts related to the production of new raw products, 2) offset waste management cost and, 3) substitute traditional raw material with cheaper alternative.

Currently, however, less than half of the municipal waste generated in the EU is recycled and only 12% of the inputs to industry comes from recycling [3, 6]. Hence, **the reintegration of the OFMSW into the soil as compost or for production of other bio-based products will bring benefits both to economic activities, like biotechnology industries, agriculture, forestry and environment.**

#### ► How can a city transform a waste management system into circular bioeconomy?

According to the Ellen MacArthur Foundation [5], a waste management system needs to comply with several criteria to be truly circular:

- ◆ Waste should be reduced to the largest extent possible.
- ◆ Environmental awareness for households, SME, services, etc. is essential in order to prevent the generation of new (bio)wastes;
- ◆ Waste should be viewed as a resource. All products and waste streams have intrinsic value;
- ◆ Adequate separate collection systems and material recovery facilities should be made available and easily accessible, which permitted to produce compost and other new bio-based products with higher quality suitable to be introduced into markets;
- ◆ Reusing and high-value recycling should be prioritised, for instance the reintroduction of the compost and sludge/digestate into the soil in order to improve the soil fertility and its physicochemical properties;
- ◆ Best practices in biowaste and wastewater management should be shared, while innovative projects should be scaled up.

#### ► How can circular bioeconomy strategies be applied to the waste management sector?

Some examples of circular strategies/models applied for biowaste streams are listed below [3]:

**Value recovery models:** a key component of circular waste management is viewing biowaste and sludge as a resource. After consumption, it should be ensured that biowaste are discarded to enable the collection of clean and good quality materials. Different behavioural incentives can be used: an example of this is “WastedLab” [7], a Dutch project that incentivises consumers to recycle by offering them coins in exchange for separated waste. Moreover, after a careful evaluation of its applicability, a city can implement a PAYT system to directly incentivise waste reduction and separate collection. Another option is to introduce a citizen’s waste fee, calculated based on the average amount of waste produced by citizens. A good introduction to PAYT systems in European cities is available [8]. Currently, a large share of mixed and poor quality biowaste cannot be recycled or end up in lower/higher-value applications that may be difficult to recycle. **Improved design and separate collection will improve the potential for recycling and material valorisation.**

**Circular support models:** ICT can contribute to circular waste management in many ways. Big Data and artificial intelligence can be used to monitor material and waste flows, waste generation in production, and treatment performance. Collecting this data can help decision makers identifying areas for improvement. ENEVO [9], in Rotterdam, uses the Internet of Things through the installation of smart meters on waste collection containers. This enables them to track waste management through monitoring, data analysis, and route planning. Optical sorting technology can be used to sort out different materials, while image recognition can target and enable extraction of specific packaging items.

### 3.1.2. A circular bioeconomy approach on wastewater sector

#### ► What are the benefits of improving a city’s wastewater management system for the circular bioeconomy?

As for OFMSW, the benefits will be economic, environmental and also geopolitical. The demand for water is expected to grow further due to climate change and growing urban populations. A more circular water and wastewater system would entail closing loops to minimise the extraction and pollution of local waterways. In addition, **UWWS can be a new source of N and P nutrients** (fertiliser) for soil amendment or valorised into other chemical bioproducts, while e.g., **biogas/biomethane** can be produced at same time by anaerobic digestion (biomethane has been used for mobility). Therefore, **there are 3 basic principles for the resource-efficient implementation based on circular wastewater management** (5 Rs), namely [3, 10]:

- ◆ A reduced impact of society on water resources. In this topic is important the **environmental awareness** and education for **reducing** and **reusing** of water resources;
- ◆ Delivering the true value of water for society, the economy, and the environment through **recycling** (recycle resources and wastewater), **restoring** (return water to source at the same or better quality) and **recovering** (recover resources from wastewater and put them to use). In this aspect is crucial to ensure the **recovery of UWWS for fertilisation or recycling into soil**, and valorisation into new bioproducts or/and production of biogas;
- ◆ Securing society’s long-term resilience, stability, sustainability, and security regarding water.

However, the application of these principles are inhibited by **common barriers** to circular wastewater management approach in urban environment, namely [10]: 1) regulation and sludge quality; 2) resources (CAPEX, OPEX, turnover and human resources); 3) the **negative public perception to recycling and recovering sewage sludge for agriculture and biotechnology industry**, arising from lack of awareness; 4) lack of dialogue among stakeholders, policymakers and potential beneficiaries from biotechnology, agriculture and forestry sectors, which increase the difficulty to introduce new bioproducts from UWWS into the markets. More detailed information about practical guidelines and tools for overcoming these barriers is available in the World Business Council for Sustainable Development (WBCSD) report [10]. The same report identified the following main drivers for recycling and valorisation of the wastewater into bio-based products distributed in four categories:

- ◆ **Emerging regulatory frameworks:** regulatory compliance (city level); internal compliance (corporate level, city level).
- ◆ **Risks to water supplies and treatment:** securing license to operate (corporate, city); opportunity for growth (city); reducing operating risks (corporate, city).
- ◆ **Costs and resources:** significant savings and revenues (corporate, city), mainly in bioenergy and chemicals replacing.
- ◆ **Corporate policy:** reputation enhancement (corporate, city).

► **How can a city transform a wastewater management system into circular bioeconomy?**

There are some examples of circular strategies/models applied for sewage sludge streams:

**Circular design models:** when designing a wastewater treatment plant, it should be ensured that it can recycle water, or at least is provided with connections for future advanced treatment modules. Ideally, the wastewater treatment plant should also be integrated into a nature-based ecosystem [10].

**Value recovery models:** through the recovery of N and P from UWWS, high-quality fertilisers and ammonia compounds can be produced. Biogas can be produced from the anaerobic digestion of UWWS, which enables the cogeneration of renewable electricity and heat. Through this recovery, wastewater treatment plants can become 100% energy-autonomous [3].

**Circular support models:** ICT is an important tool to supply data on water use and reuse, water treatment and quality, sludge recovery and bioenergy production. This can then be shared on platforms that connect solutions and initiatives, sharing best practices on UWWS valorisation for application into agriculture and forestry activities and/or into other new bio-based products. These collaborative platforms can also be created to have an environmental awareness approach in order to increase the social perception and acceptance of the bioproducts resulted from sludge valorisation. The availability of this data can lead to predictive analysis for soil amendment and nutrition, minimising negative impacts on soil fertility and organic content [3, 10].



## 3.2. Business models applied to circular bioeconomy projects and activities for cities and regions

For the circular transition, a city needs to establish circular city functions, services, infrastructure, and tools that facilitate circular business models. The shift to a circular bioeconomy requires organisations and individuals to rethink not only their use of materials, products, and assets but also to redesign and adopt new business models. Such **models should be based on dematerialisation, longevity, refurbishment, remanufacturing, capacity sharing, and increased reuse and recycling**. Offering products as a service rather than sale is a central circular business model [3, 1, 11].

Although there are many other categories, we have selected as example four categories of **circular bio-based strategies and business models**, namely [1, 11]:

- ◆ **Circular design models:** focus on the application of reduce/recycle strategies in the design and production phases, i.e., focus on the development of existing or new bio-based products, technologies and processes that seek to optimise circularity.
- ◆ **Use & Life extension models:** focus on the application of reuse/repair/repurpose/refurbish /remanufacture strategies in use phase in order to extend the value, use and life of a bioproduct. Such product-to-service models have financial implications coming from, for instance, the changing nature of cash flows, with increasing working capital to pre-finance clients, balance sheet extension, and re-evaluation of residual value. Related challenges lie in product tracking and legal issues surrounding ownership of collateral and its value. Such risks may be difficult to assess or value and could lead to difficulties in financing this type of project.
- ◆ **Value recovery models:** focus on the application of recycle/recover strategies, in after-use phase, into new bioproducts or useful resources. This aspect, named upcycling, involves transforming agricultural, forestry and industrial by-products, OFMSW and UWWS into new innovative biomaterials or bioproducts of higher quality or better environmental value. In this model is included the following circular categories:
  1. **separate collection and reverse logistics of OFMSW and UWWS;**
  2. **recovery of materials from separately collected OFMSW and UWWS;**
  3. **recovery and valorisation of separately collected OFMSW and UWWS as food, wood, nutrients, fertilisers and other bio-based materials and chemical feedstocks;**
  4. **reuse/recycling of UWWS, e.g., into the soil for agriculture and forestry activities.**
- ◆ **Circular support models:** focus on the support and facilitation (tools, ICT and services) of all circular strategies in all lifecycle phases, i.e., on the management and coordination of circular value networks and resource streams, and optimising incentives and other supporting activities in a circular network.

These different business models can be illustrated in what is known as Value Hill Business Model Tool [3, 1, 11], shown in **Figure 3**.

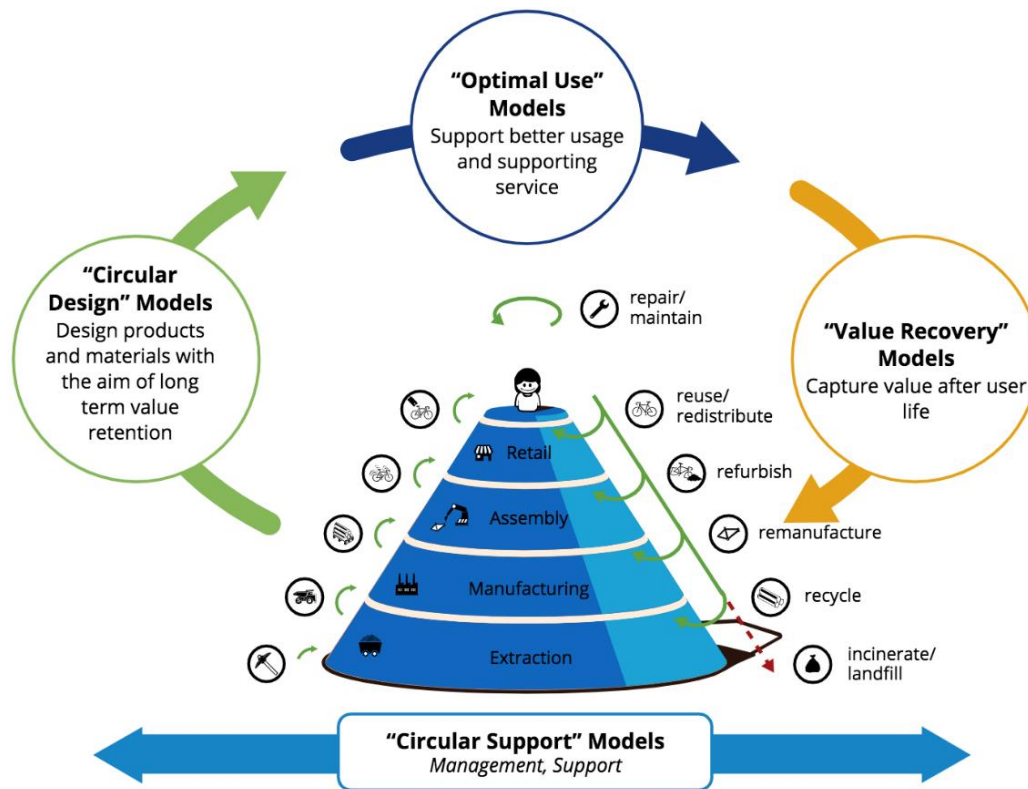


Figure 3 – Business model categories mapped on the Value Hill for circular bioeconomy investment projects [3].

### 3.3. Circularity strategic roadmap step-by-step for cities

The EIB developed a guide for cities [4], a **roadmap guided in 15 steps** (described in detailed in **Table 16** of Annex 7) towards strategy of circularity that involves planning, acting on different levels and mobilising stakeholders. With the circular potential of a city translated into a vision and strategy for circular development, the city government and relevant stakeholders can start the implementation of this roadmap.

To develop a vision and strategy for a complex transition, we need to first define the goal or targeted situation: what would the ideal circular city look like? However, previously, it is important to understand the city's current situation and identify the potential for circular bio-based developments and projects. **The following steps can be pursued in developing a circular vision and strategy** [3]:

- 1** Map the current situation: characterise and analyse the local context and resource and waste flows, covering all relevant sectors.
- 2** Sketch and define how the future circular city may look.
- 3** Identify the required changes and actions at different levels and prioritise sectors with easily accessible circular potential.

**4** Outline different pathways towards your circular city.

**5** Choose the most promising pathway as your circular strategy and complement it with ambitious but realistic circular goals and targets.

**The 15 key actions**, as illustrated in **Table 16** of Annex 7 [4], **are distributed among 3 main phases which can be applied for fostering circular bioeconomy into Cities and Regions:**

- ◆ **Plan:** The city administration together with all relevant stakeholders should look at the current linear issues and future circular potential, and then map out a circular way forward.
- ◆ **Act:** With the circular potential of a city translated into a vision and strategy for circular development, the city administration and relevant stakeholders can start the implementation through key actions.
- ◆ **Mobilise and monitor:** Monitoring and reporting on circular progress enable tracking of achievements towards the objectives and targets of the circular strategy. This phase includes circular awareness, circular monitoring, stakeholder mobilisation, case studies of success to inspire, and communication.

### 3.4. Investment intake form on circular bioeconomy of OFMSW and UWWS for cities and regions

**The investment intake form is a document that collects information and translates an investment project idea into financial language, in order to mobilise green financing and funding for its realisation. It is also an important instrument to initiate the PDA (project development assistance).**

**The purpose of the investment intake form is addressed to:**

- ◆ provide investors, funders and financial institutions with the basic information necessary to assess an investment project in a simple and fast manner;
- ◆ transform circular bioeconomy plans into sound investment packages and thus, facilitate the access to funding and green financing for municipalities/local authorities and local public entities aggregating municipalities/local authorities.

**This form is online available on the website of HOOP and its virtual academy** [2] in order to collect relevant data of future investment projects, which will be assessed for PDA innovative financial engineering for leveraging public & private investments and public procurements procedures, and development of circular bio-based business models.

Based on best practice of the financial industry and the baseline study developed in HOOP's "Report on the baseline studies for the Lighthouse Cities", **the investment intake form was developed and structured in seven sections**, namely:

1. Applicant description: organisation information.
2. Applicant description: contact person.
3. Project description: city and project description.
4. Project description: type of waste and investment activity.
5. Project description: technology readiness and maturity levels.
6. Project description: impacts.
7. Investment sought.

Furthermore, this investment intake template concept and structure is based on consultation made by RdA Climate Solutions to investors. Also, similar intake is used under the Smart Cities Marketplace of the European Commission [12].

## 3.5. Funding initiatives on circular bioeconomy in 8 Countries and Regions

**Funding and financing opportunities are identified at national and regional levels for 8 case studies: Finland, Greece, Germany, Italy, Norway, Portugal, Spain and The Netherlands. Some considerations should be taken into account, such as:**

- ◆ The funding initiatives can be referenced to schemes, programmes, networks of stakeholders, projects, advisory services and technical assistance, and relevant events under the field of circular (bio)economy and bioenergy. For this reason, we used the term “initiative” to englobe all typologies;
- ◆ The references were included through websites linked to each funding initiative, but not included in chapter 6 “references”, given that these references are available in local language;
- ◆ The funding beneficiaries are not exclusively addressed to municipalities. SMEs, companies, NGO and other public organisations were also included;
- ◆ Some initiatives closed their calls in 2021. However, new funding programmes will open briefly under national Recovery and Resilience plans (RRPs);
- ◆ Some funding programmes and financing schemes are finished in 2020-2021. Although the website references and managing authorities will not change, and these digital platforms will also provide the future calls under the new programmes. Those references will be replaced with new ones. For this reason, we kept the references and their initiatives in this subchapter;
- ◆ Other relevant considerations and some missing information about European funding schemes and programmes, linked to the initiatives listed below for each country and region, can be consulted in the **Volume II**.

The following Tables for each European country and region offer a funding panorama of important initiatives and resources available in the field of the circular bioeconomy, particularly on the valorisation of OFMSW and UWWS into innovative bioproducts.

### 3.5.1. Italy and region of Lazio

Following a crisis due to the pandemic, [Italy's Recovery and Resilience Plan](#) responds to the urgent need of fostering a strong recovery and making Italy future ready. The reforms and investments in the Plan will help Italy become more sustainable, resilient and better prepared for the challenges and opportunities of the green and digital transitions. It will be supported by **EUR 68.9 billion in grants and EUR 122.6 billion in loans**, and **31.05% of the plan will support climate objectives**.

[Italy's Recovery and Resilience Plan](#) supports the green transition with key investments in, among others, **development of renewable energies and the circular economy and improvement in waste and water management with EUR 15.05 billion of funding (protection of the territory and water resources)**.

Regarding the circular economy policies, it is worth mentioning the Legislative Decree 116/2020 - the so-called "[Waste Decree](#)" - which transposes in Italy in a single decree two of the four European directives (2018/851 and 2018/852) contained in the "Circular Economy Package" concerning waste, packaging and packaging waste.

The redefinition of the [Industry 4.0 Plan](#) aimed at encouraging green investments by enterprises in circular economy; the expansion of the Revolving Fund for the support of enterprises and investments in R&D and investment programmes and operations in the field of decarbonisation of the economy, circular economy, adaptation and mitigation climate change measures, among others.

Furthermore, in May 2019 the update of the [National Circular Bioeconomy Strategy](#) was presented, aligned with the new "European Bioeconomy Strategy", which strongly emphasises the need to reorient all economic sectors into bioeconomy circularity and environmental sustainability.

The Lazio Region, as part of the new 2021-2027 programming, has started the revision of its strategy for smart specialisation "[Smart Specialization Strategy - RIS3](#)", which aims at promoting growth and employment in the most competitive areas and sectors of activity in the territory.

Table 1. Funding initiatives on circular bioeconomy in Italy.

Initiative	Description
Italia Domani	<p><a href="#">Italia Domani</a>, the Italy's RRP is integrated with a Complementary Fund, endowed with additional resources equal to EUR 30.6 billion.</p> <p>The “<a href="#">green revolution and ecological transition</a>” mission aims to achieve Italy's green and ecological transition by promoting the circular economy, the development of renewable energy sources and more sustainable agriculture. The total allocated to the mission is 31,05% of the total value of the National RRP. <b>The areas of investment under this mission, related to circular bioeconomy and bioenergy, are:</b></p> <ul style="list-style-type: none"> <li>◆ <b>Circular economy and waste management:</b> it aims to strengthen the separate waste collection network and material treatment and recycling plants to improve the circular economy and waste management throughout the country.</li> <li>◆ <b>Renewable energy sources:</b> it aims to increase Italy's share of renewable energies, including the launch of hydrogen-based solutions. Italy's current target for 2030 is 30% of final consumption.</li> </ul> <p>The calls can be consulted through the <a href="#">digital platform Italia Domani</a>.</p>
Invitalia	<p><a href="#">Invitalia</a> is the National Development Agency, owned by the Ministry of Economy. It gives impetus to the country's economic growth, focuses on strategic sectors for development and employment, is committed to relaunching crisis areas and operates above all in the South.</p> <p><b>It manages all national incentives that favour the birth of new businesses and innovative start-ups. It finances large and small projects</b>, targeting entrepreneurs with concrete development plans, especially in innovative sectors with high added value, <b>which include circular bioeconomy sector</b>.</p> <p>It offers services to the Public Administration to accelerate the expenditure of EU and national funds and for the enhancement of cultural heritage. It is the Central Commission and the Contracting Authority for the implementation of strategic interventions in the area.</p>
SPRING - Cluster Italiano della Bioeconomia Circolare	<p><a href="#">SPRING – Cluster Italiano della Bioeconomia Circolare</a> is an Italian cluster for circular bioeconomy, which goal is to foster the development of bioindustries in Italy through a holistic approach to innovation, meant to revive the Italian chemical sector under the name of environmental, social and economic sustainability. <b>The cluster stimulates research and investments in new technologies in the bioeconomy sector</b>, while constantly engaging in a fruitful dialogue with the stakeholders in the local areas. Under its website platform is possible to get updated information about calls, enterprises and other organisations, R&amp;D projects, and other kind of ongoing initiatives in Italy in circular bioeconomy.</p>

Table 2. Funding initiatives on circular bioeconomy in Lazio region.

Initiative	Description
POR FERS - Regione Lazio	<p><a href="#">POR FERS Regione Lazio</a> is an operational programme for the region of Lazio in the scope of Horizon 2020. Several calls have been opening during 2021.</p> <p><b>The line of investment on circular bioeconomy and bioenergy is distributed in the axis 1 (R&amp;D projects) with €180,000,000, 3 (Competitiveness) with €276,400,000 and 4 (energy sustainability and mobility) with €176,000,000.</b> The calls can be consulted on the <a href="#">POR FERS platform</a> and this programme will be actualised under Horizon 2030.</p> <p>At the regional level, since 2015 the Lazio Region has approved the "APEA Guidelines", in order to establish the "Ecological Equipped Production Areas" programme. This scheme provides allocation of financial resources, administrative facilities for strategic production and sustainability, promoting eco-innovation in infrastructures, products, processes, as well as services as a competitive factor of the regional economic system. This initiative aims at the on-site reuse of waste within neighbouring companies (not only organic waste). The calls under this programme provide funding at maximum of 50% of the eligible expenses per project.</p>
PSR FEASR - Regione Lazio	<p><a href="#">PSR FEASR Regione Lazio</a> is another operational programme for the region of Lazio, under the scope of Horizon 2020, <b>for the areas of agriculture, forestry and rural development sectors.</b> Several calls have been opening during 2021.</p> <p><b>The line of investment on circular bioeconomy and bioenergy is included in this programme.</b> The calls can be consulted on the <a href="#">PSR FEASR platform</a> and this programme will be updated under Horizon 2030.</p>
PO FEAMP - Regione Lazio	<p><a href="#">PO FEAMP Regione Lazio</a> is another operational programme for the region of Lazio, under the scope of Horizon 2020, <b>for the areas of fishery and aquaculture sectors.</b> Several calls have been opening during 2021.</p> <p><b>The line of investment on circular bioeconomy and bioenergy is included in this programme.</b> The calls can be consulted on the <a href="#">POR FEAMP platform</a> and this programme will be updated under Horizon 2030.</p>
Lazio INNOVA	<p><a href="#">Lazio INNOVA</a> supports enterprises and local public administration in the region of Lazio, for innovation and production of new services and goods. The supporting of the programme <b>provides funding and financial schemes and instruments in several sectors of activity and knowledge, including circular bioeconomy and bioenergy.</b> Several calls have been opening during 2021, which can be consulted through its digital <a href="#">INNOVA platform of calls</a>. This platform also provides case studies, ongoing projects, events, and network for stakeholders in the field of circular economy.</p>
Lazio Europa	<p>The Region of Lazio Authority has a digital platform named <a href="#">Lazio Europa</a>, where is possible to consult open, closed and future calls for several economic sectors in the field of <b>circular bioeconomy and bioenergy.</b> This platform is addressed to enterprises of all sizes, R&amp;D organisations, public bodies, municipalities and NGO. <b>In this online platform, there are all regional and European funding and financing schemes and programmes for the region of Lazio.</b></p>

Regione Lazio calls

The [Region of Lazio Authority](#) has a [digital platform for calls](#), where is possible to consult open, closed and **future calls for several economic sectors in the field of circular economy and bioenergy**. This platform is addressed to enterprises of all sizes, R&D organisations, public bodies, municipalities and NGO. In this online platform, there are all regional and local funding and financing schemes and programmes applied for the region of Lazio.

### 3.5.2. The Netherlands and region of Flevoland

In terms of Recovery and Resilience Facility, **the Netherlands has not submitted a Recovery and Resilience Plan so far** [13]. Due to money released through the REACT-EU European Fund, the four operational programmes for the European Regional Development Fund (ERDF) have been adjusted in the Netherlands. The European Commission has now approved these changes. These adjustments will increase the resources available for **ERDF investments by almost EUR 262 million**. In the Netherlands, this allows the regions North, East, South and West to count on additional financing opportunities, making it easier to invest in regional economies and the green and digital transition [14, 15].

European Structural and Investment Fund focusses on innovation, sustainability and (regional) economic development. This means that the funds emphasise the importance of promoting the growth of the economy while stimulating eco-friendly innovation and sustainable growth. This includes circular initiatives and solutions, especially the **Cohesion Fund** [14] , the **ERDF** [14, 15], the **European Social Fund Plus** [14, 15], **and the new REACT-EU package can play an important role in funding the circular transition** [14, 15].

In the Just Transition Fund [16], four regions from the Netherlands applied for funding: Groningen, South-Holland, East Netherlands and South Netherlands. In total EUR 626 million of investment.

**Table 3. Funding initiatives on circular bioeconomy in The Netherlands.**

Initiative	Description
Uitvoeringsprogramma Circulaire Economie	<p><a href="#">Uitvoeringsprogramma Circulaire Economie</a> is a <b>Dutch action agenda “Circular economy financing”</b> that is ongoing; first results are expected in February 2022. The Circular Economy Implementation Programme has an annual update. <b>In the 2021 edition, the focus was on three topics of circular (bio)economy:</b></p> <ol style="list-style-type: none"> <li>1. Higher on the R-ladder and more on the front of the chain and product.</li> <li>2. System change from linear to circular.</li> <li>3. Impact through focus on raw material flows.</li> </ol>



<p>Het Versnellingshuis</p>	<p><a href="#">Het Versnellingshuis</a> offers different programmes for entrepreneurs. This Acceleration House <b>supports entrepreneurs with their circular ambitions and associated questions on a national level. They connect and offer expertise to entrepreneurs where they desire it.</b> This includes matchmaking.</p> <p>It has created a large network of entrepreneurs and experts. Through its online community, entrepreneurs can get in touch with other entrepreneurs. In this community entrepreneurs place their challenges and solutions in order to help each other. There are already more than 5,000 entrepreneurs involved on it. It also refers to entrepreneurs outside their online community: if an entrepreneur submits a custom question to Het Versnellingshuis, they can refer them to partners who offer circular services, experts and other entrepreneurs. Then Het Versnellingshuis tries to look for a match.</p> <p>The second programme is customisation for bigger problems. Het Versnellingshuis will guide entrepreneurs to answer their questions based on their expertise and experience. For example, it can link entrepreneurs to knowledge institutions, producers, suppliers or other entrepreneurs.</p> <p>In order to realise the path to a circular economy, some chains require a sector-wide approach. So, a transition that is not only supported by a few companies, but by the whole sector - in which several parties are involved. For this reason, Het Versnellingshuis selects 5 complex chains every year. It works together with entrepreneurs to realise collaboratively a circular chain transition. Het Versnellingshuis calls these kinds of breakthrough projects Moonshots, offering funding for these projects. Het Versnellingshuis also supports entrepreneurs finding subsidies and financing. Currently there are no concrete funding opportunities, but collaboration with other parties is possible.</p>
<p>Servicepunt Circulair</p>	<p>The <a href="#">Servicepunt Circulair</a> offers customised help for entrepreneurs. <b>It works with companies and start-ups, which offers personal and dedicated support.</b> The Servicepunt Circulair thinks that we should learn from each other and from other pioneers, and believes this is <b>especially important in the transition to a circular economy.</b> Therefore, they bundle the various individual examples and experiences with the Service Point. In this way, every company or entrepreneur does not have to reinvent the wheel and at the same time help each other and other entrepreneurs who want to take a step.</p> <p><b>The Servicepunt Circulair main focus areas are:</b></p> <ol style="list-style-type: none"> <li>1. Regulatory alignment;</li> <li>2. Financing;</li> <li>3. New business models;</li> <li>4. Cooperation partners;</li> <li>5. Suitable locations;</li> <li>6. Marketing.</li> </ol> <p>Currently there are no concrete funding opportunities, but collaboration with other parties is possible.</p>

Table 4. Funding initiatives on circular bioeconomy in Flevoland region.

Initiative	Description
Platform Circulair Flevoland	<p>The <a href="#">Platform Circulair Flevoland</a> is the Circular Flevoland Platform consists of the province, together with municipalities, knowledge institutions and entrepreneurs. <b>On this platform it is possible to form new value chains and exchange knowledge.</b> It is an opportunity for entrepreneurs to make new contacts. The authorities can identify where bottlenecks and obstacles are, so that they can get to work on them.</p> <p>Currently there are no concrete funding opportunities, but collaboration with other parties is possible.</p>
Praktijk Innovatiecentrum Circulaire Economie (PRICE)	<p><a href="#">PRICE</a> is a Flevoland-based <b>platform for innovation and circular economy.</b></p> <p>PRICE is a place where education institutions, local businesses and the government work together through innovations and experiments. The goal is to create a circular economy in the Netherlands and the region. The aim is to do this through <b>new education practices connected to applied research by connecting this to local (innovation) knowledge and talent.</b> As a result, talent is activated, insights and innovations are brought to the market from an experiment in which knowledge deepening, valorisation and upscaling are key.</p> <p>Currently there are no concrete funding opportunities, but collaboration with other parties is possible.</p>
WaterLab Circulair Water	<p>In the province of Flevoland, governments, knowledge institutions and companies have joined forces to initiate a <b>water transition.</b> In <a href="#">WaterLab Circulair Water</a>, the WaterLab Circular Water, <b>suppliers are challenged to test innovations together with end-users in 7 practical domains</b> “food processing industry”, “living, working and learning”, “business areas”, and “recreation”.</p> <p><b>The Flevoland region is being used as a testing ground for making the whole water chain circular.</b> The goal is to engineer and realise an innovative and sustainable water chain that is a closed loop. The results will be used to show the potentials of circular water. Currently there are no concrete funding opportunities within this Lab, but collaboration with other parties is possible.</p>
HORIZON Flevoland	<p><a href="#">Horizon Flevoland</a> is a regional development agency. They support entrepreneurs from Flevoland that want to grow. They <b>provide advice to entrepreneurs, financing, and expertise concerning internationalisation. Circular economy is one of their focus points.</b></p> <p>One of their financial services is “voucherregeling Ondernemerschap Flevoland” which <b>provides vouchers for entrepreneurs.</b> A voucher stands for a subsidy that can be used to further develop a company, expand activities in order to grow and take the next step.</p>
Technofonds Flevoland	<p><a href="#">Technofonds Flevoland</a> provides <b>venture capital to innovative companies and start-ups that are established in Flevoland</b> or wish to establish themselves there. Initially up to a maximum amount of EUR 300,000. An amount that can be increased to EUR 500,000 at a later stage. Financing provided from the Technofonds generally consists of a <b>combination of share capital and loan.</b></p>
MKB Fonds Flevoland	<p><a href="#">MKB Fonds Flevoland</a> is the SME Fund Flevoland <b>provides venture capital to ambitious Flevoland entrepreneurs who want to grow</b> (further). Initially up to a maximum amount of EUR 300,000. An amount that can be increased to EUR 500,000 at a later stage. Financing provided from MKB Fonds Flevoland usually consists of a <b>combination of share capital and loan.</b></p>

### 3.5.3. Norway and region of Vestland Country

Norway has decided a partial participation in InvestEU [17, 18] and Horizon Europe [19] 2021-2027 programmes. **The EEA agreement provides to Norway an opportunity to participate in several financial instruments in InvestEU on equal terms with the Member States.** It has not yet been decided which financial products in this programme Norway will have access to. However, loan, guarantee and equity instruments are predicted. The programme will, among other things, support the initiatives in the other framework programmes and is a central part of the EU's Green Deal. More information about the Norway's participation in EU programmes is available [here](#).

In Norway, most of the national funds related to the COVID-19 pandemic is granted, and it is not expected more fund as for now. Most of the calls for 2021 is past deadline and the calls for 2022 is not defined or published yet. Hence, some of the calls listed below is for 2021, but similar calls are also expected for 2022.

**Table 5. Funding initiatives on circular bioeconomy in Norway.**

Initiative	Description
<p>Research Council of Norway - Innovation Project for the Industrial Sector 2022</p>	<p><a href="#">Research Council of Norway - Innovation Project for the Industrial Sector 2022</a></p> <p><b>The purpose of this grant is to stimulate businesses to invest in R&amp;D that can contribute to sustainable innovations and value creation. Relevant topics for this call includes “sustainable value creation in Norwegian business and industry” and “sustainable value creation in the bio-based industries (land-based food, environment and bioresources)”.</b></p> <p>The expected results can be a new product, a new service, a new production process or a new way of delivering products and services. Significant improvements, or new features of existing products, services or processes at the companies, can also be a result.</p> <p>Applicants can be private or public companies. There is a requirement for collaboration with at least one partner or one R&amp;D supplier. The companies that collaborate need new knowledge or technology to succeed with the innovation. The R&amp;D activities must be industrial research or experimental development.</p> <p>The project has a scope and a risk profile that indicates that the companies will not be able to carry out the project without funding from the Research Council. This means that the grant must be triggering in order to implement the R&amp;D activities. The grant can also be crucial in triggering further private investments in the companies for further development and utilisation of the results.</p> <p>In the line “industrial research”, the grant rate is 50% for small companies, SME and large companies. In the line “experimental development”, the grant rate is 45% for small companies, 35% for SME and 25% for large companies.</p>

<p><b>Research Council of Norway - Demonstration Project for the Industrial Sector 2022</b></p>	<p><a href="#">Research Council of Norway - Demonstration Project for the Industrial Sector 2022</a></p> <p>The purpose of a Demonstration Project is to <b>strengthen companies' own efforts to demonstrate new technology for applications with major socio-economic benefits. Projects are to ensure expertise, job creation, value creation and a competitive industrial sector in Norway.</b> The innovation can be a new product, a new service, a new production process, or a new way of delivering products and services. <b>Circular bioeconomy projects from industrial sector are also included.</b></p> <p>The call is aimed at Norwegian companies that, in collaboration with other partners in the value chain, need to pilot and demonstrate new technology for use nationally and for sale in international markets.</p> <p>The starting point for a demonstration project in the Industrial sector is an R&amp;D project, for example an innovation project in the Industrial sector or a separate company-led project. Industrial projects that need extensive research activity should apply for the call Innovation Project in Industrial sector 2022.</p>
<p><b>Innovation Norway - Grants for bioeconomy projects</b></p>	<p><a href="#">Innovation Norway - Grants for bioeconomy projects</a></p> <p>The grant purpose is related to the <b>development of solutions that will increase value creations based on resources from the sea, land and forests, i.e., higher processing of bioresources and use side streams for new products.</b></p> <p>Applicants: companies that develop and implement solutions for the production, processing and distribution of bioresources can receive financing. The grant range is: 100,000 – 3 mill. NOK.</p> <p><b>The prioritisation criteria are:</b></p> <ul style="list-style-type: none"> <li>◆ Projects that contribute to increased value creation and employment in Norway.</li> <li>◆ Projects that contribute to increased profitability for the company.</li> <li>◆ Projects that develop solutions in production, processing and/or full utilisation in the use of biological resources. For example, product development, process or organisational development.</li> <li>◆ Projects that contribute to the development of market-oriented strategy, new markets and/or brand building.</li> <li>◆ Projects that can prove a positive climate contribution.</li> <li>◆ Projects that contribute to increased and sustainable food production.</li> </ul>

<p>Innovation Norway - Demonstration of solutions for bioeconomy</p>	<p><a href="#">Innovation Norway - Demonstration of solutions for bioeconomy</a></p> <p>The grant purpose is related to <b>pilot demonstration of projects in bioeconomy. Grants for companies that have concrete plans to develop, build and test innovative technology, processes and systems.</b> Innovative and environmentally friendly project for better utilisation of biological resources and reduced GHG emissions. The solutions must have a market potential beyond the company's application. The grant will provide risk relief and contribute to the solution being tested before commercialisation.</p> <p><b>Topics that can be addressed in the project:</b></p> <ul style="list-style-type: none"> <li>◆ <b>New products and production methods based on bio-raw materials that can provide environmental improvement in a global perspective.</b></li> <li>◆ <b>New products and production methods that can provide new and more valuable use of biowaste.</b></li> <li>◆ <b>New products and production methods for processing biomaterial based on circular economy.</b></li> <li>◆ New products and production processes for more sustainable and efficient taxation of biological resources and protection of ecosystems.</li> <li>◆ New solutions that monitor, measure and warn against emissions and pollution, so that these can be limited.</li> </ul>
<p>Innovation Norway - Circular economy</p>	<p><a href="#">Innovation Norway - Circular economy</a></p> <p>The grant purpose is related to <b>supporting the transition to a circular business model, includes the company's product range, producer responsibility, digital solutions, production processes, logistics systems, transport, inventory, payment models and much more.</b> Relevant projects are those that increase the service life end of products, business models that facilitate maintenance and repairs, processes that contribute to the full utilisation of raw materials and systems that lead to return and reuse. This also includes innovative product design and the transition to materials that enable the products to be recycled, i.e., innovative projects for more environmental friendly production processes and optimal use of resources.</p> <p><b>Topics that can be addressed in the project:</b></p> <ul style="list-style-type: none"> <li>◆ New business models that ensure increased service life and reuse of products, components and materials.</li> <li>◆ Use of artificial intelligence and digital solutions to promote circularity and efficient utilisation of resources.</li> <li>◆ Use of new principles for design and production that lead to less waste, environmentally friendly resource utilisation and ensure a longer life for the raw materials and easier recycling.</li> <li>◆ Solutions to reduce material consumption and increase recycling of plastics, textiles, electronic components and building materials.</li> <li>◆ Solution for "industrial symbiosis" between companies in collaboration - for example that side streams or waste at one producer becomes an input factor at another.</li> <li>◆ Solutions for material recycling for new raw materials and new products.</li> <li>◆ Other solutions that contribute to increased resource utilisation and less waste.</li> </ul>

EEA and Norway Grants	<p><a href="#">EEA and Norway Grants 2014-2021</a></p> <p>Allocated to sectors that are crucial for development in the beneficiary country, and where there is potential for and interest in cooperation with Norway. <b>Examples of priority sectors related to circular bioeconomy:</b></p> <ul style="list-style-type: none"> <li>💧 Innovation, Research, Education and Competitiveness.</li> <li>💧 Environment, Energy, Climate Change and Low Carbon Economy.</li> </ul>
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**Table 6. Funding initiatives on circular bioeconomy in Vestland Country region.**

Initiative	Description
Regional research Fund Vestland	<p><a href="#">Regional research fund Vestland</a></p> <p>No relevant calls published at the moment.</p>
Vestland County - Contributions to innovation and business development	<p><a href="#">Vestland County - Contributions to innovation and business development</a></p> <p>Municipalities, organisations and research and development institutions can apply for partial funding for development projects. This call is particularly aimed at a <b>strengthened circular economy and that business achieve an even greater green restructuring</b>. The call is not aimed at business support, start-up support, product development, companies or private individuals.</p> <p><b>The focus areas are:</b> energy; <b>circular business models</b>; <b>green competitiveness</b>; value chains related to plastics and sustainability.</p> <p><b>In the line of circular economy, the projects can be addressed to:</b></p> <ul style="list-style-type: none"> <li>💧 New business models that ensure increased service life and reuse of products, components and materials.</li> <li>💧 Use of artificial intelligence and digital solutions to promote circularity and efficient utilisation of resources.</li> <li>💧 Production that leads to less waste, environmentally friendly resource utilisation and ensures longer life for raw materials and easier recycling.</li> <li>💧 Industrial cooperation between companies where e.g., waste at one producer becomes an input at another.</li> </ul>

### 3.5.4. Finland

The Finland's [National Waste Plan](#) is a strategic plan adopted by the Government laying down the objectives and measures for waste management and prevention in Finland to 2023. The four key areas in the National Waste Plan are: construction and demolition waste, biodegradable waste, municipal waste, and electrical and electronic waste. **Increasing research funding for recycled fertiliser products and the recovery of nutrients from waste, developing and introducing instruments in agriculture to encourage the use of recycled nutrients for field crops and intensifying the provision of advisory services in biowaste sorting to residents and developing the biowaste collection systems** are examples of actions that are contemplated in the National Waste Plan of Finland.

Some programmes and projects exposed below can vary between more holistic European projects, that include Finland, and more specific ones. In these circular bioeconomy initiatives, Finnish cities can also benefit of technical assistance and support advisory.

**Table 7. Funding initiatives on circular bioeconomy in Finland.**

Initiative	Description
EUROSTARS	<p><a href="#">Eurostars</a> is <b>European programme to make European SMEs internationally competitive leaders of their industry</b>. Eurostars, a joint program with 36 participating countries, is part of the international Eureka cooperation and is managed by the Eureka Secretariat in Brussels - Business Finland is the funding body for Finnish applicants.</p> <p>The funding is aid which is primarily aimed at SMEs and mid-cap companies (turnover less than EUR 300 million). The participants must be growth companies seeking international growth; they must be financially in good shape and have financial capacity to run the development project.</p> <p><b>Applicants:</b> Consortiums may submit applications to the Eurostars programme from any subject area, <b>including circular bioeconomy</b>. There are two cut-off dates annually, and all the applications submitted before each deadline are processed in one batch.</p> <p><b>Funding conditions:</b></p> <ul style="list-style-type: none"> <li>◆ Innovative growth companies accepted by Business Finland are granted 50% aid in the case of SMEs.</li> <li>◆ 40% aid in the case of mid-cap companies with a turnover of less than EUR 300 million.</li> <li>◆ For other R&amp;D-performing organisations like large companies, the level of support is 40%, and the company-specific maximum aid is EUR 60,000.</li> <li>◆ Universities and research organisations can also receive funding from Business Finland. The level of support is 70%, and the maximum aid is EUR 70,000 per organisation. If at least two R&amp;D-performing Finnish SMEs or mid-cap companies accepted by Business Finland are participating, the maximum aid is EUR 140,000.</li> </ul> <p><b>Project Duration:</b> The maximum duration of the projects is three years, and the results are expected to enter the market within two years of the project completion.</p>

<p><b>Finnvera</b></p>	<p>Finnvera is a specialised financing company owned by the State of Finland and it is the official Export Credit Agency of Finland.</p> <p>Finnvera <b>provides financing for the start, growth and internationalisation of enterprises and guarantees against risks arising from exports.</b> Finnvera strengthens the operating potential and competitiveness of Finnish enterprises by offering loans, domestic guarantees, export credit guarantees, and other services associated with the financing of exports. The risks included in financing are shared between Finnvera and other providers of financing.</p> <p>Finnvera gives also guarantees against political or commercial risks associated with the financing of exports. Political risks are risks that arise from the economic or political situation in a country where a Finnish export company has customers. Commercial risks pertain either to the buyer or to the buyer's bank.</p> <p>The <a href="#">Finnvera Loan</a> (Investment and Working Capital Loan) is <b>intended for SMEs.</b> It can be used to finance domestic construction, machinery and equipment investments, energy and environment projects, working capital needs, and various ownership arrangements. This loan can have multiple uses, namely to support energy and environment projects, working capital needs.</p> <p><b>Applicants:</b> the enterprise has fewer than 250 employees and its annual turnover does not exceed € 50 million, or its annual balance-sheet total is less than EUR 43 million.</p> <p><b>Loan Amount:</b> EUR 50,000 (minimum), and it is usually used as part of the overall financing package granted by the bank.</p> <p><b>Duration of the loan:</b> 3 - 15 years</p> <p><b>Note:</b> Companies should primarily contact their bank for the planning of overall financing. Financing needs can often be resolved using Finnvera's guarantee products as well (Start Guarantee, SME Guarantee and Finnvera Guarantee).</p>
<p><b>CIRCWASTE</b></p>	<p><a href="#">CIRCWASTE</a> is a <b>seven-year LIFE IP project that promotes efficient use of material flows, waste prevention and new waste and resource management concepts.</b> The project is implemented during the years 2016-2023. All actions contribute to implementing the national waste management plan and directing Finland towards a circular economy. CIRCWASTE is a creation of 20 partners and 10 funding organisations. The project is coordinated by the Finnish Environment Institute.</p> <p>Start Date: 01/10/2016</p> <p>End Date: 31/12/2023</p> <p>Total Budget: € 18,799,605</p>
<p><b>Bioeconomy Ventures</b></p>	<p><a href="#">Bioeconomy Ventures</a> is a project supported by the Interreg North-West Europe programme. It aims at <b>building and leveraging the ideal innovation cluster for bioeconomy entrepreneurship, create a support programme for this market niche and capitalise relationships with investors, regional representatives, and main actors to strengthen the European positioning of disruptive bioeconomy start-up.</b> The final goal is to create a unique ecosystem allowing the connection and collaboration to access funding.</p> <p>Start Date: 05/2021</p> <p>End Date: 11/2023</p> <p>Funding: € 1,499,312,50</p>



<b>BIOREGIO</b>	<p><a href="#">BIOREGIO</a> aims to develop regional circular economy models and best available technologies for biological streams, <b>boosts the bio-based circular economy through the transfer of expertise on the best available technologies and co-operation models</b>. BIOREGIO <b>also aims to improve regional polices by increasing the focus on the bio-based circular economy</b>. The participating countries for this edition were Finland, Slovakia, Romania, France, Spain and Greece. BIOREGIO is funded by Interreg Europe.</p> <p>Starting date: 01/01/2017</p> <p>Ending date: 31/12/2022</p> <p>Budget: € 1.5 million</p>
<b>ELY</b>	<p>The <a href="#">Centres for Economic Development, Transport and the Environment (ELY Centres)</a> are <b>responsible for the regional implementation and development tasks of the central government</b>. <b>ELY Centres have three areas of responsibility: 1) business and industry, labour force, competence and cultural activities, 2) environment and natural resources, 3) transport and infrastructure</b>.</p> <p>ELY Centres play a significant role as authorities granting EU funding and as drivers of regional development. The aim is also to ensure that both regions and their residents can enjoy equal opportunities and to prevent social exclusion. ELY Centres provided funding is from ESF+ or ERDF.</p>
<b>Business Finland</b>	<p><a href="#">Business Finland</a> is the <b>Finnish government organisation for innovation funding and trade, travel and investment promotion</b>. Business Finland's 600 experts work in 40 offices globally and in 16 regional offices around Finland. Business Finland is part of the Team Finland network.</p> <p>Companies and research groups receive funding from for R&amp;D, development and innovation activities.</p>
<b>Pohjois-Savon liitto</b>	<p>The <a href="#">Regional Council of Pohjois-Savo</a> is a statutory joint authority, which is tasked with representing inhabitants, municipalities and business interests nationally and internationally. All the region's municipalities are members of the Council. <b>Regional council channels part of the of the ERDF and ESF+ funds to projects that have high regional priority. The fund are mainly for educational institutions</b>, however SMEs can participate in joint projects with the educational institutions.</p>
<b>TESI</b>	<p><a href="#">TESI</a> is a <b>state-owned investment company investing in venture capital and private equity funds and directly in growth companies</b>. It wants to raise Finland to the forefront of renewed economic growth. It invests profitably and responsibly to create the world's next success stories, sharing its expertise and insights with companies, funds and decision-makers.</p> <p>In addition to good financial performance, TESI wants to ensure Finnish companies thrive. It develops the venture capital and private equity market and create societal impact with EUR 100-150 million new investments annually.</p>
<b>North Savo Startup Fund</b>	<p>The <a href="#">North Savo Startup Fund</a> was established to <b>support and develop business operations in Eastern Finland, especially in the Northern Savonia region</b>. The aim of the fund's activities is not only to generate returns through the increase in the value of the portfolio companies, but also to increase the vitality of the economic area, enable the creation of new companies and support the growth of companies and positive job development in Eastern Finland. The fund's investment capital is EUR 10 million and it will be invested in fifteen companies over the next 5-7 years.</p>

<b>Cross-border Cooperation</b>	Implemented at the border regions between Finland and Russia under the <b>European Neighbourhood Instrument</b> . Eligible programme area consists of the core regions South Karelia, South Savo and Kymenlaakso in Finland, and St. Petersburg and Leningrad regions in Russia. Adjoining areas are Uusimaa, Päijät-Häme, North Savo, North Karelia and Republic of Karelia. In addition to these, partners located in the cities of Turku and Moscow may participate to the projects with some limitations in the use of financial frame and roles of partnership. Programme total funding frame is EUR 77.5 million of which the EU co-financing is 50% and the other half equally covered by the state co-financing from Finland and Russia.
<b>Climate Fund</b>	The <a href="#">Climate Fund (Imastorahasto Oy)</a> is a <b>fully state-owned special-assignment company</b> . Its operations <b>focus on combating climate change, boosting low-carbon industry</b> and promoting digitalisation. The Climate Fund's investment policy defines and sums up the company's approach to investment, operative investment principles and objectives, funding criteria and categories, instrumentation and investment process, and the principles and objectives of the company's liquid asset management. The Climate Fund's Board of Directors confirms the company's investment policy on an annual basis. Depending on the funding category and target, the funding by the Climate Fund can vary between EUR 1-20 million. The annual financing volume is approximately EUR 80 million.
<b>Sentica Partners</b>	<a href="#">Sentica</a> is an <b>independent private equity company</b> focusing on investing in and developing SMEs with Finnish origin.
<b>Finnish Business Angles Network</b>	<a href="#">Finnish Business Angels Network (FiBAN)</a> is a <b>non-profit association of private investors on a mission to inspire private investments</b> . The network is one of the largest and most active business angel networks in the world with over 650+ approved members. FiBAN's three main activities consist of matchmaking of startups and investors, sharing best practices, and representing the interest of private investors.

### 3.5.5. Germany and region of North Rhine-Westphalia

Bioeconomy is considered as one of the most important future fields for sustainable economic activity in Germany. The Federal Government has set down the guidelines and its policy objectives in this area in the National Bioeconomy Strategy. To achieve this, the Federal Ministry of Food and Agriculture and the Federal Ministry for Education and Research [will support innovations and hands-on research projects with their tools and facilities](#). **From 2020 to 2024, these ministries will provide EUR 3.6 million for bioeconomy-relevant projects and measures.**

The [Germany National Bioeconomy Strategy of 2020](#) defines six modular building blocks that cover the various aspects of the bioeconomy. **The building blocks are: biological knowledge as the key to the bioeconomy, converging technologies and cross-disciplinary cooperation, boundaries and potentials, transfer to application, bioeconomy and society, and global research cooperation.**

The funding bodies, the State of North Rhine-Westphalia, the Federal Government, and the EU strive for different economic and social objectives with their funding programmes. [Funding programmes](#) share several similar funding conditions among them. They can be divided into the following basic types of financial and funding instruments: grants, loans, equity or risk capital, technical assistance and support advisory.

Some of the calls listed below are posterior of 2019-20, but similar calls are also expected for 2022. Programmes and other initiatives exposed bellow can vary between more holistic European projects, that include Germany, and more specific ones.

**Table 8. Funding initiatives on circular bioeconomy in Germany.**

Initiative	Description
<p>Validation of the Technological and Societal Innovation Potential of Scientific Research - VIP+</p>	<p>The funding programme <a href="#">Validation of the Technological and Societal Innovation Potential of Scientific Research - VIP+</a>, from the Federal Ministry of Education and research, <b>supports researchers in systematically validating their research results and in opening possible areas of application in the validation process that can be expected to have a high economic or social benefit.</b> At the same time, they contribute to strengthening the transfer culture in their institutions as well as in the scientific and research landscape.</p> <p><b>Beneficiaries:</b> Universities, non-university research institutions jointly funded by the Federal Government and the Länder and federal institutions with R&amp;D.</p> <p><b>Topics addressed to the projects:</b></p> <ul style="list-style-type: none"> <li>◆ Studies to prove feasibility.</li> <li>◆ Development of demonstrators or functional models, execution of test series or pilot applications to prove suitability and acceptance, application-oriented basic research for the further development of research results in the direction of application or for adaptation to new areas of application.</li> <li>◆ Evaluative analyses to demonstrate the economic or social innovation potential.</li> <li>◆ Analysis and safeguarding of intellectual property rights.</li> </ul> <p><b>Grant conditions:</b> the grant should not exceed EUR 500,000 per project or joint project per year. The grants can be granted as non-repayable grants by way of project funding for a period of up to three years. The basis of assessment for universities, research and scientific institutions and comparable institutions is the eligible project-related expenditure, which can be funded individually up to 100%. In the case of R&amp;D projects at universities, a project lump sum of 20% is granted on top of the federal grant. Both individual projects and joint projects can be funded.</p> <p>This Funding Directive shall be extended not beyond 31 March 2029.</p>

<p>GO-Bio initial</p>	<p>The aim of <a href="#">GO-Bio initial</a>, an initiative from the Federal Ministry of Education and Research, is the identification and development of life science research approaches with innovation potential.</p> <p>GO-Bio initial is a <b>building block for the implementation of the Federal Government's High-Tech Strategy 2025, which provides for a significant strengthening of the transfer of ideas, knowledge, and technology</b>. The High-Tech Strategy 2025 aims to "pave the way for cutting-edge research to quickly become innovative products and business ideas" and "to support an open culture of innovation and risk that specifically promotes creative ideas and mobilises untapped innovative potential in Germany".</p> <p><b>Beneficiaries:</b> Private individuals are generally excluded as recipients of grants. However, it is possible for private individuals to submit a sketch and, in the event of a positive evaluation of the sketch, to transfer it to an institution entitled to apply. Universities and non-university research institutions are eligible to apply.</p> <p><b>Grant conditions:</b></p> <ol style="list-style-type: none"> <li><b>1. Exploratory phase:</b> The basis of assessment for universities, R&amp;D institutions and comparable institutions are the eligible project-related expenses, which can be funded individually up to 100%.</li> <li><b>2. Feasibility phase:</b> In the case of research projects at universities, a project lump sum of 20% is granted in addition to the eligible expenses. As a rule, up to EUR 100,000 can be granted for the exploratory phase. For the feasibility phase, up to EUR 500,000 or up to EUR 1 million (for universities plus project lump sum) for joint projects or for the involvement of research partners in subcontracts can usually be granted for individual projects. The basis of assessment for universities, R&amp;D institutions and comparable institutions is the eligible project-related expenditure, which can be individually funded up to 100%.</li> </ol> <p>The grants are granted by way of project funding as non-repayable grants. This funding programme is ongoing until 31 December 2030.</p>
<p>EIC Accelerator</p>	<p><a href="#">EIC Accelerator</a> is a <b>funding and investment project for individual start-ups and small companies to develop and scale up game changing innovations</b>, being a project embraced by the Horizon Europe.</p> <p><b>The EIC Accelerator provides substantial financial support with:</b></p> <ul style="list-style-type: none"> <li>◆ grant funding (non-dilutive) of up to EUR 2.5 million for innovation development costs;</li> <li>◆ investments (direct equity investments) of up to EUR 15 million managed by the EIC Fund for scale up and other relevant costs.</li> </ul> <p><b>Cut-off dates:</b> Due to a delay in the adoption of the EIC work programme 2022, there will be no EIC Accelerator cut-off date in January as originally foreseen. As soon as information on the next EIC Accelerator cut-off date is available, it will be published on the respective website.</p>
<p>KMU-innovativ</p>	<p>The <a href="#">KMU-innovativ</a> funding initiative in Germany is specifically aimed at SMEs. It intends to <b>shorten procedures for innovative research projects and make it easier to access funding to support cutting-edge research in SME sector</b>. Funding is provided for a broad range of research and development fields and <b>circular bioeconomy is one of those fields</b>.</p> <p>The funding amount approved so far amounts to more than EUR 1,737 million for more than 2,380 individual and joint projects, in which around 3,880 SMEs are involved. This means that the <a href="#">KMU-innovativ funding initiative</a> accounts for about a quarter of the BMBF's SME funding.</p>

Table 9. Funding initiatives on circular bioeconomy in North Rhine-Westphalia.

Initiative	Description
BIO.NRW Business Angel Network	<p><a href="#">BIO.NRW: The Home of Biotechnology</a></p> <p>BIO.NRW is the <b>catalyst for the sustainable development of the strengths of North Rhine-Westphalian biotechnology and bioeconomy</b>. BIO.NRW thematic fields are bioeconomy, industrial biotechnology and red biotechnology.</p> <p>BIO.NRW Business Angel Network <b>supports innovative life science start-ups directly at university, promising young companies</b>, as well as international biotech/life science companies that intend to settle in NRW. Besides financing founders, BIO.NRW Network also provides support in the subsequent financing of established companies that are looking to take the next step in their development.</p>
BIO.NRW Business Angel Circle	<p><a href="#">BIO.NRW: The Home of Biotechnology</a></p> <p>BIO.NRW is the catalyst for the sustainable development of the strengths of North Rhine-Westphalian biotechnology and bioeconomy. BIO.NRW thematic fields are Bioeconomy, Industrial Biotechnology and Red Biotechnology.</p> <p>As part of the BIO.NRW Business Angel Network, <b>both founders and young companies have access to strictly confidential investor circles (BIO.NRW Business Angel Circle) three of four times a year. This platform offers the chance to pitch ideas to a hand-picked selection of investors (private, development banks, corporate venture) and to find funding</b>. More than 100 start-ups, founders, as well as SMEs used the opportunity to present their business models in a professional and confidential setting and subsequently discuss them.</p> <p>Besides the Business Angel Circle Meetings, BIO.NRW organises the international Business Angel Congress each year in March. This congress focusses on investors and companies and offers a platform for sharing ideas and discussing current developments in the world of European life science finance. Young biotech companies are coached, together with experienced business developers, and alternative financing models are discussed.</p>
European Bioregions Accelerator	<p>The <a href="#">European Bioregions Accelerator</a> <b>involves a team of experienced bioeconomy industry experts and coaches scouting for promising European start-ups, especially in the forest-based circular bioeconomy sector</b>.</p> <p>Founding member regions, Basque Country (Spain), North Karelia (Finland) and North Rhine-Westphalia (Germany), are working together to identify and support the most promising ventures to market.</p> <p>The European Bioregions Accelerator will provide unparalleled <b>access to capital and market expertise that can help early-stage start-ups navigate the scaling process</b>. Business planning, coaching, raising capital and member events are some of the intentions for this accelerator project.</p>
ICLEI Circulars	<p>ICLEI – Local Governments for Sustainability is a global network of more than 2,500 local and regional governments committed to sustainable urban development.</p> <p><a href="#">ICLEI Circulars</a> is a <b>side-project, a variant focused on the circular economy</b> managed by the Circular Development Team at the World Secretariat (Bonn, Germany) in close collaboration with the ICLEI Regional Offices around the world, dealing with <b>projects that focuses on electronics and ICT, plastics, textiles, construction and buildings, water and nutrients, and food</b>.</p>

<p><b>NRW.Bank: North Rhine- Westphalia Bank</b></p>	<p><a href="#">North Rhine-Westphalia Bank (NRW.Bank)</a> is the development bank for North Rhine-Westphalia, supporting its region in completion of its structural and economic tasks. NRW.BANK <b>offers a wide range of promotional tools, from low-interest promotional loans to equity financing and advisory services.</b></p> <p>North Rhine-Westphalia boasts a first-class scientific research base, numerous internationally successful SMEs and a globally active chemical and pharmaceutical industry. In NRW.BANK the focus is on diagnostics and analytics, pharmaceutical and industrial biotechnology, nanotechnology, enabling technologies, and services. The innovations originating in the <b>biotech sector</b> find their way into wide-ranging applications, e.g., in healthcare/medicine, the chemical industry, food production and environmental protection.</p>
<p><b>Environmenta l Innovation Programme</b></p>	<p><a href="#">Environmental Innovation Programme</a> is funded by the Federal Ministry for the Environment, Nature Conservation, Building, Nuclear Safety and Consumer Protection. <b>Large scale industrial projects and plants are funded</b>, if they are contributing positively to the environment and have a demonstration purpose to show the environmental benefits of the technologies. <b>Waste management plants are also eligible</b> for the funding which can include grants to cover loans from the KfW or investment grants.</p>
<p><b>Competition of ideas on new products for Bioeconomy</b></p>	<p><a href="#">Innovative Products for the bioeconomy</a> are being funded through an <b>easily accessible idea competition</b>, were SMEs, as well as research institutes, are eligible to hand in brief overviews of their ideas. <b>Circular bioeconomy products can also be part of the funding.</b></p>

### 3.5.6. Spain and region of Murcia

The [Spanish Bioeconomy Strategy](#) and the [Circular Economy Strategy](#) **have established the financing schemes in bioeconomy for the near past and coming years. Within their planned actions and budget there are defined several calls for funding which will be managed by different national agencies.**

There are other agencies with capacity to manage funding calls, as the Biodiversity Foundation, dependent of the Ministry of Ecologic Transition and Demographic Challenge, whose mission is to work in the conservation, study and sustainable use of biodiversity and natural heritage in its environmental, social, economic and cultural aspects; or IDAE (Institute for diversification and energy saving) in charge of the energy funding schemes. In addition, several administrative bodies will publish funding calls during the following years as a result of the RRP application.

The different public bodies dependent on the General State Administration, the Autonomous Communities and Town Councils will publish calls for tenders and subsidies, the award of which is regulated by the Public Sector Contract Law and by the General Subsidy Law. Likewise, they will implement different instruments of public-private collaboration contemplated in the Law on the legal regime of the public sector and other regulatory provisions.

It is worth to bear in mind that the RRP has a special orientation to support SMEs and the self-employed. To ensure the success and impact of the participation of SMEs in the different planned investments of the RRP, [different mechanisms and support initiatives have been considered](#).

- [RED.ES-Acelerapyme](#) (Facilitating Agents + Ambassadors/Promoters): Digitisation initiatives.
- [IDAE](#): Climate initiatives (electric mobility, energy rehabilitation, renewable deployment, etc.).
- [Entrepreneurial Service Points \(PAE\) - CIRCE System](#): entrepreneurship initiatives.
- [SME Platform](#): initiatives for entrepreneurship, growth and aimed at SMEs in general.
- [ENISA](#): entrepreneurship financing initiatives.
- [CDTI](#): Financing of technological entrepreneurship, micro-entrepreneurship, and research initiatives and industrial innovation.
- [Spanish Chamber of Commerce](#): trade-oriented initiatives.
- [SEGITTUR](#): initiatives from the tourism sector.
- [EOI](#): training and capacity building initiatives.

In the Region of Murcia, the [Development Institute \(INFO\)](#) is the main body dependent of the regional government to manage and support companies to reach financial support.

**Table 10. Funding initiatives on circular bioeconomy in Spain.**

Initiative	Description
CDTI calls	<p><a href="#">CDTI (Centre for the Development of Industrial Technology) calls</a> have been opened for the following funding categories and initiatives:</p> <p><b>Partially refundable aids:</b> R&amp;D projects (CIEN, Cervera Transfer Projects); Innovation projects (innovation line, expansion line, oceans and fisheries projects).</p> <p><b>Grants:</b> SMEs seal of excellence; COVID-19 grants; Science and Innovation Missions; FEDER Interconnecta; Innoglobal; Cervera for Technology Centres (First quarter 2022); CDTI- Eurostars; CDTI-Eranet); Innovation projects (COVID-19 grants); start-ups (Neotec).</p> <p><b>Venture capital:</b> start-ups (Invest); SMEs (Invest).</p>

<p><b>AEI calls</b></p>	<p><a href="#">AEI (State Research Agency) calls</a> have been opened for the following funding categories and initiatives:</p> <p><b>1. Grants:</b></p> <p><b>1.1. For R&amp;D entities:</b> Europe inquiry (April 2022); Europe excellence (May 2022); European Project management (April 2022); International collaboration projects (several annual calls); Green and digital transition projects (November 2022); Research networks (April 2022); Proof of concept (April 2022); R+D+I technical staff (January 2022).</p> <p><b>1.2. For companies:</b> Technological and innovation platforms (May 2022)</p> <p><b>2. Loans and grants:</b> For companies: Strategic projects (April 2022); Public-private collaboration projects (January 2022; November 2022); Industrial doctorates (January 2022).</p>
<p><b>Biodiversity Foundation calls</b></p>	<p><a href="#">Biodiversity Foundation's calls</a> has been opened for the following funding categories and initiatives:</p> <p><b>Grants under the following programmes/calls for R&amp;D entities:</b></p> <ol style="list-style-type: none"> <li><b>Bioeconomy call.</b> Pending new open call in 2022.</li> <li>Green employment programme.</li> <li>River ecosystem restoration projects and flood risk reduction in urban environments.</li> </ol>
<p><b>IDAE calls</b></p>	<p><a href="#">IDAE (Institute for the Diversification and Saving of Energy) calls</a> have been opened for the following funding categories and initiatives:</p> <p><b>1. Grants under the following programmes/calls for companies and municipalities:</b></p> <ul style="list-style-type: none"> <li>◆ DUS 5000 Programme: aid for investments to singular local clean energy projects in municipalities with demographic challenge.</li> <li>◆ PREE 5000: energy rehabilitation of buildings in municipalities of demographic challenge.</li> <li>◆ Incentive programs for the implementation of facilities linked to self-consumption and storage, with renewable energy sources, as well as the implementation of renewable thermal systems in the residential sector.</li> </ul> <p><b>2. Loans and grants under the following programmes/calls for companies and municipalities:</b></p> <ul style="list-style-type: none"> <li>◆ Support plan for the implementation of waste regulations, circular economy program and PIMA waste (pending approval).</li> <li>◆ PERTE of the smart and sustainable agri-food chain (under study).</li> </ul>
<p><b>INNOVA INVEST</b></p>	<p>The <a href="#">INNOVA INVEST programme</a>, which is part of the RRP, <b>supports foreign investment in R&amp;D through a range of subsidies aimed at companies with foreign capital that conduct R&amp;D in Spain</b>, so as to encourage their integration into the productive and research fabric of our country.</p> <p>This programme has a financial allocation of EUR 10 million, divided into two rounds of EUR 5 million each, which will go to investment projects of more than EUR 500,000, with a maximum support per beneficiary of EUR 800,000. These projects will be selected on a competitive basis according to the criteria set out in the call for applications (employment, the green transition, etc.). The aid intensity will depend on the type of project and the size of the company, ranging from 25 to 70% of the project amount.</p>



CDTI R&D projects

[CDTI \(Centre for the Development of Industrial Technology\) calls](#) have been opened every year for **R&D projects developed by companies, which aim the creation and significant improvement of production processes, products or services.**

**Scope:** Industrial research and experimental development activities. There is no restriction regarding the sector or technology to be developed.

**Beneficiaries:** private enterprises.

**Funding actions:**

- ◆ **Individual R&D projects:** submitted by a single company.
- ◆ **National Cooperation R&D projects:** presented by a consortium of a minimum of two and a maximum of six autonomous companies. They must sign a private collaboration agreement that governs the consortium.
- ◆ **CIEN projects:** large national industrial research projects aimed at carrying out a planned investigation in strategic areas with potential international projection.
- ◆ **International Technological Cooperation R&D projects:** presented by Spanish companies participating in cooperation programs international technology managed by the CDTI (e.g., EUREKA, IBEROEKA, PRIMA).
- ◆ **R&D projects of European Technological Cooperation:** related to the enhancement of the technological capacity of Spanish companies.
- ◆ **Technological Training R&D projects:** for participation on international or national tenders.
- ◆ **Oriented R&D projects:** individual R&D projects, presented nationally by a single company.

**Minimum eligible budget and financing instrument:** EUR 175,000 for all projects. Partially refundable loan: fixed interest rate: 1-year Euribor; Help of up to 85% of the approved budget; Refund: 10 or 15 years including a grace period of between 2 and 3 years; Non-refundable between 20-33% of the aid.

**Duration of projects:** 12-36 months.

CDTI Missions

[CDTI \(Centre for the Development of Industrial Technology\) calls](#) have been opened every year for missions, which consist of a **support for cooperative precompetitive R&D projects led by companies.**

**Scope:** Industrial research and experimental development activities. Each project must fit into one of the 9 missions of the Programme and must set objectives aimed at solving one or more of the specific areas for improvement proposed by the CDTI in each mission. In addition, companies can propose additional complementary objectives in their project.

**The missions related to circular bioeconomy are:**

1. Boost the Spanish agriculture of the XXI century: sustainable, intelligent, efficient in the consumption of water resources and agricultural inputs and adapted to climate change.
2. Promote safe, efficient and clean energy for the XXI century.
3. Boost Spanish industry in the industrial revolution of the XXI century.
4. Impulse the circular economy through new technologies for recycling and recovery of polymeric waste in Spain.

**Beneficiaries:**

"Large Companies" Missions: group of 3 to 8 companies, at least 2 of them are autonomous. The group must be led by a large company and include a SME.

"SMEs" missions: group of between 3 to 6 companies, at least two of them are autonomous. All must be SMEs, led by a medium company.

**Funding actions:**

**1. "Large Companies" Missions:**

- ◆ Project budget: EUR 5-10 million;
- ◆ Minimum eligible budget per company of EUR 175,000;
- ◆ Project duration: 3-4 years;
- ◆ Minimum industrial research of 60% of the eligible budget.
- ◆ Subcontracting with Knowledge Generating Centres of at least 20% of the eligible budget.

**2. "SMEs" Missions:**

- ◆ Project budget of EUR 1.5-3 million;
- ◆ Minimum eligible budget per company of EUR 175,000;
- ◆ Project duration: 2-3 years;
- ◆ Minimum industrial research of 35% of the eligible budget;
- ◆ Subcontracting with Knowledge Generating Centres of at least 15% of the eligible budget.

**Grant conditions:** grant up to 65% for large companies, 75% for medium companies and 80% for small companies.

**R&D Cervera  
Transfer  
Projects**

[CDTI \(Centre for the Development of Industrial Technology\) calls](#) have been opened every year for R&D Cervera Transfer Projects, which consist of grants for individual R&D projects developed by companies that collaborate with state-level Technology Centres in Cervera priority technologies.

**Scope:** Research and business development projects for the creation or significant improvement of a production process, product or service. Projects must demonstrate a differential technological aspect over existing technologies on the market. The essential characteristic of this typology of projects is that they necessarily have to be developed in a limited group of technological areas (Cervera priority technologies) and contract certain project activities to Technology Centres.

**Beneficiaries:** SMEs and mid-caps.

**Funding conditions:** The CDTI may require the constitution of guarantees for the return of the aid when the economic and financial analysis of the company indicates it. Where appropriate, the CDTI may apply a reduction or exemption of the requested guarantees. Advance payment of 35% of the aid with a limit of EUR 250,000, without requiring additional guarantees. The company must finance at least 15% of the project budget with its own resources.

**Project characteristics:**

- ◆ Minimum eligible budget: EUR 175,000.
- ◆ Relevant participation of Technology Centres of at least 10% of the total project budget.

	<p>◆ Duration: 12-36 months for individual projects.</p> <p><b>Loan conditions:</b> Partially refundable aid. Fixed interest rate: 1-year Euribor. Help of up to 85% of the approved budget. Refund: 10 or 15 years including a grace period between 2-3 years. Non-refundable tranche of 33% of the aid.</p>
<p>NEOTEC</p>	<p><a href="#">CDTI (Centre for the Development of Industrial Technology) calls</a> have been opened every year for NEOTEC programme, which consist of <b>financing start-ups with new business projects that require the use of technologies or developed knowledge</b> from research activity and in which the business strategy is based on the development of technology.</p> <p><b>Scope:</b> The aid may be used for business projects in any technological and / or sectorial field. However, business models that are based mainly on services to third parties, without the development of their own technology, are not suitable for the call. Initiatives that do not clearly reflect continuity in the development of technology in their business plan, nor those that, directly or indirectly, cause significant damage to the environment or those aimed at increasing the efficiency of fossil fuels will not be eligible either.</p> <p><b>Beneficiaries:</b> small innovative companies.</p> <p><b>Funding conditions:</b> New business projects that require the use of technologies or knowledge developed from research activity and in which the business strategy is based on the development of technology. The incorporation of people with a doctorate degree to the company is prioritised to reinforce its absorption and knowledge generation capacities. The costs derived from the start-up of a new business project of innovative companies will be financed, provided that they are included in the business plan and are necessary for its development.</p> <p><b>Project characteristics:</b></p> <ul style="list-style-type: none"> <li>◆ Minimum funding budget: EUR 175,000.</li> <li>◆ Project duration: 12-24 months.</li> </ul> <p><b>Grant conditions:</b> Grants up to 70% of the budget for the action, with a maximum grant amount of EUR 250,000 per beneficiary. Actions that include the employment of at least one doctor may be financed up to 85% of the eligible budget for the action, with a maximum grant amount of EUR 325,000 per beneficiary.</p>
<p>Public-Private collaboration projects</p>	<p><a href="#">AEI (State Research Agency)</a>'s calls have been opened every year for <b>public-private collaboration projects in order to advance in the incorporation of scientific-technical knowledge and results that allow the validation and precompetitive development of new technologies, products and services</b>, creating the appropriate context that stimulates the generation of a critical mass in R&amp;D&amp;I, transfer, search for solutions and generation of results both in the technological and innovation trajectories of companies and in the market.</p> <p><b>Scope:</b> Experimental development.</p> <p><b>Beneficiaries:</b> Public research organizations; Public universities; Accredited health research institutes; Other public R&amp;D centres; State-level Technology Centres and technological innovation support centres; Private universities; Other private R&amp;D centres (non-profit); Companies; Sectoral business associations (non-profit).</p> <p><b>Funding actions:</b> There are 6 areas of project actions, which <b>“5. Climate, energy and mobility” and “6. Food, bioeconomy, natural resources and environment” are related to circular bioeconomy and bioenergy.</b></p>

	<p><b>Funding conditions:</b> Business partners must add at least 51% of the budget, without any entity running alone with more than 70% of said budget. The minimum participation per entity will be 10% of the total project budget.</p> <p><b>Project characteristics:</b></p> <ul style="list-style-type: none"> <li>◆ Minimum budget per project: EUR 400,000</li> <li>◆ At least one company and one research body (public or private). The leader of the group must be a company. However, another of the participating entities may be appointed as the technical coordinator of the project, reflecting the tasks entrusted to it in the declarations of agreement of participation.</li> <li>◆ Project duration: 3 years.</li> <li>◆ It grants 40% of the aid before starting, 40% after justifying the 1<sup>st</sup> year and 10% the 2<sup>nd</sup> year.</li> </ul> <p><b>Grant and loan conditions:</b></p> <ul style="list-style-type: none"> <li>◆ <b>Private investigation organisations:</b> Grant up to 100% of the eligible cost. Public bodies go to marginal costs. Rest of the costs up to 100% of the eligible costs.</li> <li>◆ <b>Sectoral companies and business associations:</b> Loan of up to 95% of the eligible cost (loans will have a maximum of 3 years of grace, 7 of repayment and 10 of amortisation and will be at one-year Euribor interest rate). Personnel expenses (40-60%) will be granted if full-time indefinite doctor is hired.</li> <li>◆ <b>Public companies:</b> Grant with intensity maximum of 40%. When the total loan granted to a beneficiary per project is greater than EUR 200,000, the beneficiary will be obliged to submit guarantees for 25% of the principal of the loan granted.</li> </ul>
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Table 11. Funding initiatives on circular bioeconomy in Murcia region.

Initiative	Description
INFO calls	<p>The <a href="#">Development Institute of the Region of Murcia (INFO)</a> supports <b>R&amp;D&amp;I entities with grants</b>, through the supporting programme for Technology Centres that carry out non-economic R&amp;D activities.</p> <p>INFO also <b>supports companies with grants</b>, through the following programmes: Innovation Check; Europe Check; Business Sustainability Check; Operational Groups; Strategic Projects RIS3MUR.</p> <p>INFO also <b>supports companies with loans and grants</b>, through the Emprendia Line and Invest Line programmes.</p>
Innovation Check	<p><a href="#">Development Institute of the Region of Murcia (INFO)</a> supports Innovation Check Programme, which <b>helps to hire advanced advisory and technical assistance services</b> according to <a href="#">INFO Catalogue</a>.</p> <p><b>Beneficiaries:</b> SMEs with activity object of the project located in the region of Murcia.</p> <p><b>Funding conditions:</b></p> <ul style="list-style-type: none"> <li>◆ 60% of the expenses (75% if it is a RIS3MUR sector) up to a maximum of EUR 9,000.</li> <li>◆ Not having received subsidies for more than EUR 200,000 in the two previous years.</li> <li>◆ Cost of advice, consultancy and technical assistance up to a maximum of EUR 12,000.</li> </ul>

<p><b>Operational Groups</b></p>	<p>The <a href="#">Agrarian Innovation Agency of the Region of Murcia</a> (“<a href="#">Oficina de Innovación Agraria de la Región de Murcia</a>”) supports <b>Operational Groups initiative</b>.</p> <p><b>Beneficiaries:</b> Operational group registered in the Register of Associations of the Region of Murcia that develops the execution of projects in the Region of Murcia.</p> <p><b>Funding conditions:</b></p> <ul style="list-style-type: none"> <li>◆ 100% of the eligible expenses per project.</li> <li>◆ EUR 200,000 subsidy per operating group (dissemination max. 10%; subcontracting max. 90%; innovation agent max. 15%, auditor max. 1.5%).</li> <li>◆ Project duration of maximum 2 years.</li> <li>◆ Project activity must be made in the geographical area of the Region of Murcia.</li> </ul>
<p><b>RIS3MUR Strategic Projects</b></p>	<p>The <a href="#">General Directorate of Commerce and Business Innovation</a> supports <b>strategic projects RIS3MUR</b> for experimental development.</p> <p><b>Beneficiaries:</b> Companies and other Entities - group of companies, researchers from universities and R&amp;D organisations, and other organisation from the Regional System of Science, Technology and Business.</p> <p><b>Funding conditions:</b></p> <ul style="list-style-type: none"> <li>◆ The projects will have a minimum eligible budget of EUR 600,000 and a maximum of EUR 1 million.</li> <li>◆ Project duration: 18-48 months.</li> </ul>

### 3.5.7. Portugal and region of Greater Porto

Following an unprecedented crisis due to the COVID-19 pandemic, [Portugal’s Recovery and Resilience Plan](#) responds to the urgent need of fostering a strong recovery and making Portugal future ready. The Plan is supported by EUR 13.9 billion in grants and EUR 2.7 billion in loans distributed through 3 pillars/axis: climate transition, digital transition, economic and social resilience. Regarding the “climate transition” line, **38% of the plan will support climate and circular objectives**.

The “Climate Transition” axis of investment is a result of Portugal’s commitment and contribution to the climate targets that will enable it to reach carbon neutrality by 2050. The decarbonisation of the economy and society is distributed through six Climate Transition components that were considered for intervention in strategic areas, among others, decarbonisation of industry and bioeconomy.

[Portugal’s plan](#) supports the green transition through a large-scale investment programme, which includes **projects for the greening of industry will also be supported with more than EUR 800 million**. Portugal’s plan also supports the economic and social resilience through, for example, key measures aimed at reinforcing economic resilience include, inter alia, investments aimed at boosting research and innovation (such as the **Research Agendas worth more than EUR 900 million**).

The Portuguese RRP has been opening calls from 2021 for projects of execution in the industry, SMEs, municipalities and public organisations, and other economic and environmental sectors.

In December 2017, Portugal approved the [National Action Plan on Circular Economy](#), where **measures related to circular bioeconomy from management and valorisation of OFMSW and UWWS are planned at national, sectorial and regional levels.**

Recently, the Government of Portugal approved the [Action Plan for Sustainable Bioeconomy 2025](#), which aims to accelerate the transition of the Portuguese economy to a sustainable and circular bioeconomy model. Portugal has a high potential for this transition, given that it has a strong primary sector in forestry, agriculture, fishery and aquaculture sectors, with a sovereignty and jurisdiction over an extensive maritime territory.

Under the [Portugal 2030 Strategy](#), Portugal established four thematic agendas of investment till 2030, among others, **the “Agenda 3: Climate Transition and Resource Sustainability” where is included the circular bioeconomy and bioenergy calls for projects.**

**Table 12. Funding initiatives on circular bioeconomy in Portugal.**

Initiative	Description
<p>National Recovery and Resilience – Sustainable Bioeconomy</p>	<p><a href="#">Portugal’s Recovery and Resilience Plan</a> has been open calls from 2021 for projects of execution in the industry, SMEs, municipalities and public organisations, and other economic and environmental sectors.</p> <p>Under the “Climate Transition” pillar/axis, there is an investment line related to circular bioeconomy, namely <b>“C12. Sustainable Bioeconomy: Accelerate high value-added production from biological resources, promote climate transition and the sustainable and efficient use of resources”</b>.</p> <p><b>Scope:</b> This component seeks to develop the initiatives necessary for a paradigm shift that will accelerate the production of high value-added products from biological resources (as an alternative to fossil-based materials). The main objective of this investment, the execution of which will be the responsibility of the <a href="#">Environmental Fund</a>, will be the <b>incorporation of bio-based materials</b> (as an alternative to fossil-based materials) <b>in three sectors of national economic activity</b>, ensuring greater competitiveness and contributing to the transition to carbon neutrality in a fair and cohesive manner: <b>textile and clothing sector; promotion and exploitation of Natural Resin; footwear sector.</b></p> <p><b>Reforms code:</b> TC-r25: Sustainable Bioeconomy</p> <p><b>Investment code:</b> TC-C12-i01: Bioeconomy</p> <p><b>Budget:</b> EUR 145 million</p> <p>In the <b>textile and clothing sector</b>, the investment is supported across several strategic intervention pillars that aim to achieve the targets proposed for the sustainable use of biological resources, among others:</p> <ul style="list-style-type: none"> <li>◆ <b>From nature:</b> the development of new production processes for functional and innovative textiles made from bio-based raw materials, incorporating forest biomass (cellulose and lignin) and alternative natural fibres from the agro-food sector (fibres from pineapple and banana leaves, hemp, rice husk, among others).</li> <li>◆ <b>Circularity:</b> improving the circularity of the sector by promoting innovative business models that are based on the reprocessing of biological, recycled and reused raw materials. The activities to be developed seek to produce better waste management in Portugal and contribute towards meeting targets in this area.</li> <li>◆ <b>In a sustainable manner:</b> dedicated to investing in knowledge of production processes and systems that allow each article to be reused and recycled several times.</li> </ul>

In the **footwear sector** the investment is based on, among others:

- ◆ **Biomaterials and sustainable components:** to promote the use and recycling of agro-food or industrial by-products and bio-waste, enhancing the carbon-neutral circular bio-economy and industrial and regional symbioses.
- ◆ **Footwear of the future:** promoting the development of new concepts of differentiated bio and eco products with higher added value.
- ◆ **Waste management and the circular economy:** developing models for the management of by-products, production waste and end-of-life footwear, the declassification of waste and the development and production of new materials and products that allow the recovery of by-products and waste and the transition of the footwear and fashion cluster to the circular economy.

[Portugal's Recovery and Resilience Plan](#) has been opening calls from 2021 for projects of execution in the industry, SMEs, municipalities and public organisations, and other economic and environmental sectors.

Under the "Climate Transition" pillar/axis, there is an investment line related to bioenergy and circular bioeconomy, namely "**C11. Decarbonisation of Industry: Decarbonisation of the industrial sector and a paradigm shift in resource use to accelerate the transition to carbon neutrality**".

**Scope:** This component aims to decarbonise the industrial and business sector and promote a paradigm shift in the use of resources, implementing measures in the National Energy and Climate Plan 2030, and constitutes a central strategic RRP objective given that it contributes towards **accelerating the transition to a carbon-neutral economy** and, at the same time, promotes the **competitiveness of industry and enterprises** through decarbonisation, reduced energy consumption and promotion of endogenous energy sources.

**Reforms code:** TC-r24: Decarbonisation of industry

**Investment code:** TC-C11-i01: Decarbonisation of industry

**Budget:** EUR 715 million

This investment, led by [IAPMEI, IP](#), is intended to promote and support financially the national industry initiative for multi-dimensional action at the environmental level, and is structured for the development of projects in four areas, among others:

**Area 1. Low-carbon processes and technologies in industry:** through the introduction of new product processes and business models and the modification of processes to lead to their decarbonisation, including new low-carbon technologies; the incorporation of new raw materials, **fuels derived from waste and biomass**; the **use of industrial symbioses and circular economy measures**, incorporating innovation; and the replacement and/or adaptation of equipment and processes for new sustainable technologies and **renewable energy sources**.

**Area 3. Incorporation of energy from renewable sources and energy storage:** it is also important to promote the incorporation of hydrogen and **renewable gases in industry**, particularly where the technological options for decarbonisation through electrification are more limited.

National  
Recovery and  
Resilience –  
Decarbonisation  
of industry

## Portugal 2030

The [Portugal 2030 https://agrinnova.es/](https://agrinnova.es/) materialises the Partnership Agreement established between Portugal and the European Commission, setting the main strategic objectives for the application, between 2021 and 2027, of the global amount of EUR 24,182 million. Its programming revolves around five strategic objectives of the European Union: smarter (operational programme - OP1), greener (OP2), more connected (OP3), more social (OP4) and closer (OP5). The OP2 will invest EUR 1,568 million for the line “Climate action and sustainability”, EUR 815 million for the line “Innovation and digital transition”, and EUR 341 million for the line “Sea”.

The calls are not open yet, but the areas of investment are already known. **The circular bioeconomy and bioenergy are included in the following areas of investment and action:**

**Innovation and digital transition:** Financed by the FEDER and ESF+. It is aimed at the less developed regions of the Continent and complies mainly with OP 1, supporting digitisation, innovation and R&D, and the internationalisation of enterprises and interface institutions and the scientific system. It also supports companies in OP2 and OP4, in decarbonisation and asset formation projects respectively.

**Climate action and sustainability:** Funded by the CF (Cohesion Fund) with EUR 3,105 million. At a national level, it aims at climate transition, actions that promote adaptation to climate change, the circular economy and urban mobility, objectives framed in OP2.

**Technical assistance:** Funded by ERDF and ESF+. With a national scope, this OP aims to implement capacity building actions for the entities involved in the coordination and management of funds, including monitoring, evaluation, communication, information and control systems. It will place special emphasis on supporting the Roadmap for Enabling the Ecosystem of European Funds. Each OP will have an axis dedicated to technical assistance.

IAPMEI  
Incentives

The [IAPMEI](#) provides a set of Incentive Systems that aim to increase the competitiveness of companies through **the modernisation and innovation of their processes and products, services and business models, making them more efficient in the context of the Circular Economy.**

**The calls are distributed through the following typologies of projects/applications:**

1. **“Vale Economia Circular”** is addressed to SMEs for diagnostic analysis of opportunities in circular economy, and creation of a Circular Economy Business Plan. Project duration: 12 months. Grant up to EUR 7,500 per project (EUR 2,500 for diagnostic services and EUR 5,000 for technical assistance).
2. **“SI Qualificação – Projecto Individual”** is addressed to SMEs in order to support training and capacity-building in the area of competitiveness, among others, development and engineering of products, services and processes, transference of knowledge, eco-innovation. In these individual projects, the eligible expenses to training must range 50-70%, and the maximum of grant is EUR 500,000.
3. **“SI Qualificação – Projecto Conjunto”** is addressed to associations of SMEs in order to support training and capacity-building projects. In these projects from associations of SMEs, the eligible expenses related to training must range between 50 to 70%, and the maximum of grant is EUR 180,000 x number of SME participating in the consortium.
4. **“SI I&D Empresas”** is addressed to enterprises of all sizes in order to support R&D projects. In these individual projects from enterprises in cooperation with R&D organisations, the eligible expenses related to training must range between 60% for industrial R&D projects to 80% for experimental development projects, and the maximum of grant is EUR 1 million per enterprise.



	<p>5. “<a href="#">SI Inovação Produtiva</a>” is addressed to SMEs in order to support innovative production projects, namely investments on production of tradable (internationalisation) goods and services with high level of national incorporation. The refundable incentive is 35-75% for SMEs through grants and loans.</p>
<p>EEA Grants</p>	<p>Through the <a href="#">EEA Grants</a>, Iceland, Liechtenstein and Norway established the objective of reducing social and economic disparities in Europe by strengthening bilateral relations with the Beneficiary States. Portugal will benefit from an amount of EUR 102,7 million.</p> <p><b>The circular bioeconomy projects may be applied through the Programme of grants “Environment, Climate Change and Low Carbon Economy”,</b> in the areas of intervention, among others, “circular economy” and “decarbonisation of society”. This Programme is funded by a total amount of EUR 28,235,294. The calls have been opening several times every year.</p>

**Table 13. Funding initiatives on circular bioeconomy in Greater Porto region.**

Initiative	Description
<p>Norte 2030</p>	<p>Under <a href="#">Portugal 2030</a> Strategy, the North region of Portugal, which includes Greater Porto region, will have an investment of EUR 3,395 million till 2030 through the Operational Programme “<a href="#">Norte 2030</a>”. Its programming revolves around five strategic objectives of the European Union: smarter (OP1), greener (OP2), more connected (OP3), more social (OP4) and closer (OP5). The <a href="#">CCDR</a> is the regional public organisation leading the “Norte 2030” Programme (2021-2030).</p> <p>The calls are not open yet, but the areas of investment are already known. <b>The circular bioeconomy and bioenergy are included in the following areas of investment and action: Innovation and digital transition; Climate action and sustainability.</b></p> <p>Funded by ERDF and ESF+. Regional programs mobilize most OPs, with particular emphasis on OP1, OP2 and OP5. These OPs are particularly focused on the territorial dimension of public policies/territorialisation of public policies, also including the Territorial Plans for a Just Transition financed by the Just Transition Fund.</p> <p><b>The North region of Portugal will have EUR 1,000 million for OP1 and EUR 911 million for OP2.</b> These investments will be applied till 2030.</p>

### 3.5.8. Greece and region of Western Macedonia

The [Greek National Waste Management Plan](#) is “the reversal of government policy which has been pursued for the last ten years. The aim of the new plan is to direct us to **a zero-waste economy and society, which converts waste into resources.**” The key priority targets of the Plan centre around the re-allocation of waste management to a municipal level, placing the responsibility for separation at source and recycling on the municipalities through small-scale units, the encouragement of community participation, the targeting of advanced waste management techniques and, as an overarching principle, maintaining the public nature of waste management. The consequences are, according to the plan, reduced costs, local communities reaping the profits from waste management through appropriate financial incentives and up to 16,000 new jobs.

In the past, most of Greece’s waste was deposited in landfill. The opportunity to reuse large amounts of material was thus missed, with negative environmental consequences. To maximise resource efficiency, [West Macedonia saw the need for an integrated waste management approach](#) covering collection, transfer, storage, sorting, treatment, recovery, and disposal. **The region now views waste as a business opportunity, prioritising extraction of valuable resources and safe and clean processing and disposal, while also taking account of other public health, conservation, economic, aesthetic and engineering considerations.**

The funding programmes and other kind of initiatives exposed bellow can vary between more holistic European projects, that include Greece, and more specific ones.

**Table 14. Funding initiatives on circular bioeconomy in Greece.**

Initiative	Description
<p><b>JASPERS Greece</b></p>	<p><a href="#">JASPERS: Joint Assistance to Support Projects in Europe Regions</a></p> <p>JASPERS can <b>help to establish and extend integrated waste management systems to improve recycling and dispose of residual waste properly and build waste-to-energy facilities to recover energy from waste and reduce landfilling of waste.</b></p> <p>JASPERS <b>helps cities and regions absorb European funds through top-quality projects</b>, where projects from Greece are welcomed as a Member of the UE, and its assistance is free of charge for local authorities and promoters.</p> <p>Allowing the absorption of EUR 350 billion of ESIF Funds intended to achieve greater cohesion in Europe, through projects which are planned, prepared, procured, and run to the highest technical, social, and environmental standards possible.</p>
<p><b>European Bank for Reconstructi on and Development</b></p>	<p>The <a href="#">European Bank for Reconstruction and Development (EBRD)</a> <b>offers a wide range of financial instruments and takes a flexible approach in structuring its financial products.</b> The principal forms of direct financing that the EBRD may offer are <b>loans, equity and guarantees.</b></p> <p>Municipal infrastructure is one area where the EBRD faces some of the most daunting challenges in its countries of operations, including Greece. This institution <b>supports local governments and private operators in the delivery of essential urban services, namely in wastewater, and solid waste management, aspects of interest for the HOOP project.</b></p> <p><b>Loan features:</b> Usually range between EUR 3 up to 250 million, although this can be smaller in some cases; Fixed or floating rate; Senior, subordinated, mezzanine or convertible debt; Short to long-term maturities up to 15 years; Project-specific grace periods may be incorporated.</p> <p><b>Equity and quasi-equity instruments:</b> Ordinary shares.; Preference shares; Subordinated loans; Redeemable preference shares; Listed and unlisted; Underwriting of share issues by public or privately-owned enterprises; Other forms can be discussed with EBRD banking staff.</p> <p>Equity ranging from EUR 2 to 100 million in private sector projects. The EBRD expects a market rate return from its equity investments. EBRD would only invest in minority equity positions.</p>

<p><b>Hellenic Development Bank</b></p>	<p>The <a href="#">Hellenic Development Bank (HDB)</a> is a <b>valuable element in the integration of micro and SMEs financing cycle</b>, through the collateralisation of the fraction of business risk not accepted by the banking system, thus amplifying the scope of viable entrepreneurial initiatives undertaken by SMEs.</p> <p>Through a very focused business agenda, continuously adjusted to counterbalance the negative effect of the difficult macro-economic environment on SMEs sustainability. HDB aspires to become a reference institution in the provision of supplementary funding for the Greek SME market, and as such a growth model for the local economy.</p> <p><b>HDB has broadened the scope of its services, to include, apart from the extension of guarantees and co-guarantees, the origination and management of innovative special purpose funds, co-financing loans and/or guarantees at attractive terms.</b></p>
<p><b>Entrepreneurship Fund II</b></p>	<p><a href="#">Entrepreneurship Fund II</a> is a subprogramme of the <b>investment loans</b> of the Action «Business Financing». This Fund <b>promotes the facilitation of access of micro, small and medium-sized enterprises to financing mechanisms</b>, which enhance the country's investment activity.</p> <p><b>Beneficiaries:</b> micro and SMEs of any legal form and stage of operation, employing up to 250 employees and with a turnover of up to EUR 50 million or assets up to EUR 43 million.</p> <p><b>Budget:</b> EUR 375,000,000</p> <p><b>Loan Amount:</b> EUR 25,000 - 1,500,000</p> <p>A company can submit more than one request for each one of its projects, given the fact that the sum of the fund requests not exceed the maximum of EUR 1,500,000.</p> <p><b>Loan Duration:</b> 60-120 months</p>
<p><b>COVID-19 Guarantee Fund – micro-enterprises</b></p>	<p>The <a href="#">COVID-19 Guarantee Fund – micro-enterprises</a> aims to <b>provide funding to micro-enterprises to overcome economic and financial difficulties that emerged with the pandemic crisis.</b></p> <p><b>Beneficiaries:</b> The affected micro-enterprises, which have a turnover of up to EUR 1 million (from EUR 200 000).</p> <p><b>Loan amount (maximum):</b> EUR 250 000 (from EUR 50 000), maintaining the limit of 25% on the total turnover of each business in the year 2019.</p> <p><b>Conditions:</b> (i) Micro Enterprises which on 31.12.2019 had a turnover of up to EUR 1 million or have been established up to the time of submitting the funding application to the bank. (ii) They have not been included in the first and second cycles of the Guarantee Fund.</p> <p><b>Budget:</b> EUR 458 million</p> <p><b>Loan Duration:</b> 60 months</p> <p>All these loans affected by this Fund were disbursed until 31.12.2021. Funds like this one may continue to exist in the face of today's evolution of the pandemic crises, so companies in Greece should keep verifying the existence of Funds like this provided from HDB.</p>

<p><b>Provision of Working Capital Interest-Free for 2 Years</b></p>	<p>The aim of <a href="#">Provision Working Capital Interest-free for 2 years</a> is to <b>provide long-term and substantial support for the financial liquidity of companies that are suffering the adverse effects due to the Covid-19 pandemic</b>, so that they can face more with greater resilience the consequences of the suspension or restriction of their operation.</p> <p><b>EBA (European Bank Authority)- Banks co-investment relationship:</b> The shareholding ratio between the Contracting Parties is set at a rate of 40% is covered by the "Entrepreneurship II" Fund and 60% by the Bank (EUR 516 million - 784 million, i.e., a total of EUR 1.3 billion).</p> <p><b>Loan amount:</b> 50 - 80% (it can vary depending on the specific conditions of the company and the fund itself).</p> <p><b>Loan duration:</b> 24-60 months</p>
<p><b>Greece 2.0</b></p>	<p><a href="#">National Recovery and Resilience Plan (RRP) "Greece 2.0" for Urban Wastewater and Sludge Management Infrastructures from Wastewater Treatment Plants</a></p> <p>Within the Greek RRP and the component pillar Green Transition, the component 1.4. "Sustainable use of resources, climate resilience and environmental protection" stands out for the importance of the investments in <b>improving the public health infrastructures and the efficiency of wastewater treatment</b>.</p> <p><b>Actions to take place:</b></p> <ul style="list-style-type: none"> <li>◆ Implementation of sewerage network infrastructures and wastewater treatment plants.</li> <li>◆ Upgrading, extension and modernisation of wastewater treatment plants and reuse of treated wastewater.</li> <li>◆ Implementation of sludge management infrastructures from wastewater treatment plants.</li> </ul> <p><b>Target Group:</b> The proposed interventions involve at least 40 Municipal Sewerage Water Companies throughout the country, 12 Municipalities with Water Service throughout the country, as well as the Community of Mount Athos.</p> <p><b>Timeline:</b> The implementation of the investment will commence in 2022 and is expected run until 2025.</p> <p><b>Budget (for the actions mentioned above):</b> The total budget for the investment is EUR 285,2 million, including VAT, all of which will be funded by RRF.</p>

Table 15. Funding initiatives on circular bioeconomy in Western Macedonia region.

Initiative	Description
Western Macedonia Development Fund "TADYM" – Covid19 Small And Very Small Enterprises	<p><a href="#">Western Macedonia Development Fund "TADYM" – Covid-19 Small and Very Small Enterprises</a></p> <p>The co-financed loans will be granted through selected Credit Institutions, in order to provide new working capital loans on favourable terms to businesses in the region of Western Macedonia.</p> <p><b>Initial Amount:</b> EUR 9 000 000</p> <p><b>Budget:</b> EUR 22 500 00</p> <p><b>Conditions of the loan:</b></p> <p>For businesses incorporated before 2020, the maximum loan amount may not exceed the lesser of the following amounts: EUR 50,000 or 25% of total turnover in the year 2019.</p> <p>For businesses incorporated in 2020 or 2021, the maximum loan amount may not exceed the lesser of the following amounts: EUR 50,000 or the amount of liquidity needs for the next 18 months from the date of granting the loan.</p> <p><b>Loan Duration:</b> 24-60 months</p>
LESS-WASTE-II	<p><a href="#">LESS-WASTE-II</a> is a project involved, an acronym of the INTERREG IPA CBC Programme "Greece - Republic of North Macedonia 2014-2020".</p> <p>The overall aim of the LESS-WASTE-II project is to <b>promote waste prevention through a more sustainable and efficient management of biodegradable wastes in Greece</b>, from the Republic of North Macedonia cross-border area and by targeting organic waste from rural and urban households, food waste from individual households and restaurants, and green waste. The project's actions combine both regional (centralised) and local (decentralised, separation-at-source) actions in accordance with the strategy laid out of Local and Regional Waste Management plans in the area and aim at reducing the volume of waste going to land filling.</p> <p>It's important to notice that the Western Region of Macedonia is the lead partner of this project even if it involves other Greek regions.</p> <p><b>Budget:</b> EUR 709,162</p> <p>New calls of the LESS-WASTE-II project might appear within the next years.</p>

<p><b>LIFE-IP CEI- Greece</b></p>	<p><a href="#">LIFE-IP CEI-Greece</a></p> <p>This LIFE project includes both <b>preparatory inventories/reviews/evaluations and actions for the full implementation of national waste policy</b>. It aims gradually to <b>improve waste management and promote waste prevention</b>, information and knowledge of local, regional, and national authorities dealing with waste, formulation of circular economy indicators, as well as technical specifications for waste management, which will strengthen their hierarchy.</p> <p><b>Budget:</b> EUR 15 933 910</p> <p><b>Start date:</b> 01/11/2019</p> <p><b>End date:</b> 31/10/2027</p> <p>This project is ongoing and involves several authorities and entities related to the area of waste management, including the Waste Management of Western Macedonia S.A.</p>
<p><b>NOMAD</b></p>	<p><a href="#">Novel organic recovery using mobile advanced technology (NOMAD)</a></p> <p>The aim of NOMAD's H2020 project is to <b>support a circular economy bio-model that can be widely replicated in rural, peri-urban and ultimately urban areas</b>. It will <b>expand cyclical business opportunities by diversifying the range of organic products</b> that can come from the material remaining after anaerobic digestion, as well as exploring how this material can be combined with other by-products of biowaste to increase the value of all inputs. The Cluster of Bioenergy and Environment of Western Macedonia is involved, as well the Waste Management of Western Macedonia S.A.</p> <p><b>Budget:</b> EUR 5 499 857</p> <p><b>Start date:</b> 11/09/2019</p> <p><b>End date:</b> 11/09/2022</p>

## 4. Discussion

The EU Taxonomy Regulation is the first uniform and credible standard that allows economic parties to align with the transition to low carbon, resilient and sustainable pathways. This actual time of climate emergency is right for a full transition to the EU Taxonomy in public and private investments to align with the EU Green Deal. Therefore, implementing the EU Taxonomy is an exercise that involves multiple components with a high degree of complexity. In this context, European Cities and Regions are encouraged to be proactive with respect to alignment and compliance, but also to use the EU Taxonomy Regulation to assist them in guiding the transformation driven by more sustainable business and public practices.

The EU Taxonomy Regulation is referenced directly in several EU funds, programmes, environmental regulation, financial instruments, public policies, recovery and resilience plans (RRPs), etc. In fact, it is the regulation of the future and sustainability. For this reason, Taxonomy will play an important role for the financing and green transition to circular bioeconomy from waste sector.

Regarding the funding and financing opportunities identified at European level for European Countries and Regions, several structural schemes are not available yet, mainly because the Commission and Member States are focused on the RRP at the moment. In addition, Member States are working on their funding programmes for 2021-2027 period, and for this reason, the specific lines of investment and programmes are not defined yet.

The programmes and schemes listed under this Manual are focused on innovation, bioenergy, new sustainable products, goods and services, circular economy and decarbonisation of the economic activities. Therefore, this green transition will not include traditional approach in the collection and treatment of waste and wastewater activities. The new funding opportunities clearly will reward solutions with innovative approach in this sector.

The selection of the funding and financing schemes and programmes was based on the lines of investment in circular bioeconomy and bioenergy as well. Several programmes establish both lines combined, e.g., some schemes only grant projects where circular economy activity also includes bioenergy production in order to decarbonise the organisations and economic activities. Even though bioenergy is out of scope for HOOP project, the inclusion of this economic activity was fundamental to make the circular bioeconomy activities more Taxonomy-aligned rather than HOOP-aligned, as well as to expose the full potential of a material valorisation coupled to energy production (HOOP technologies coupled to anaerobic digestion).

Regarding the funding and financing opportunities identified at national and regional levels for 8 Countries and Regions case studies, the funding initiatives were referenced to schemes, programmes, networks of stakeholders, projects, financial instruments, advisory services and technical assistance under the field of circular (bio)economy and bioenergy. The funding beneficiaries are not exclusively addressed to municipalities, but also SMEs, companies, NGO and other public organisations.

Some funding programmes and financing schemes are finished in 2020-2021. Although the website references and managing authorities will not change, and these digital platforms will also provide the future calls under the new programmes. Thus, new funding programmes will open briefly under national RRP and Horizon Europe.

# 5. Conclusions

Nowadays, the cities are authentic “Innovative Living Labs” with the enriched confluence of citizens, businesses, policymakers, researchers, and other social actors. Consequently, the first big challenge is to add “circular” in those “labs” through human capital, involving at the same time start-ups and other circular stakeholders. Therefore, new circular bio-based practices can be tested and developed, placing citizens at the centre of circular bioeconomy. This is the first step that cities have to face nowadays. In other words, to persuade their citizens to a better acceptance of new bio-based products made from urban biowaste and wastewater sludge. In that sense, cities should be seen as circular cradles, ecosystems, and catalysts on circular bioeconomy.

The second big challenge for the municipalities is positioning the cities under the circular transition, complying at the same time with the Paris Climate objectives, the European Green Deal, the SDGs, the National Circular Action plans, the National Circular Bioeconomy Strategies and other public policies emerged under European, national, regional and local scopes. Hence, cities must face with this great amalgamation of public policies from different sides. However, circular bioeconomy will play an important role to reduce exposure to linear risks in cities, reducing costs and positioning them into new markets and business opportunities with new bio-based solutions, processes, technologies, and products from the valorisation of endogenous resources as biowaste and wastewater. Thus, circular bioeconomy will support the cities on facing that rain of public policies.

The third big challenge for the cities and their entrepreneurs and policymakers is related to the capacity on adapting and reorienting the economic activities as qualified as environmentally sustainable and the future investments as green, i.e., taking environmental, social and governance aspects. As such, sustainable finance and its tools and recent regulations as EU Taxonomy, will determine whether an economic activity or project of investment qualifies as environmentally sustainable. Furthermore, investors, companies, issuers, project promoters and public bodies will have to face several technical screening criteria if they want to be funded or financed by the European schemes or leading investors.

The Recovery and Resilience plans and Horizon Europe already included the “do no significant harm” principle from EU Taxonomy, i.e., no measure in the projects and investments should lead to significant harm to any of the six environmental objectives: climate change mitigation, climate change adaptation, circular economy, sustainable use and protection of water and marine resources, pollution prevention and control, protection and restoration of biodiversity and ecosystems. In this context, and considering the available information, it is important to highlight that bio-based projects from material valorisation of biowaste and wastewater are aligned with the Taxonomy requirements.

In conclusion, cities and local entrepreneurs and businesses have to deal with this new reality if they want to keep having support. Circular bioeconomy investments are aligned with the green financing and funding, thereby, European cities and regions can accelerate the transition to a low-carbon, resilient and resource-efficient economy, therefore complying with public policies and green financing and funding.

If the municipalities and entrepreneurs overcome these three big challenges, **cities can actively turn into “Circular Living Labs”**.



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# 7. Annex: EIB's 15 steps towards circularity of cities

Table 16. EIB's 15 steps towards circularity of cities.

Phase	Circularity strategic roadmap step-by-step for cities
PLAN	<p><b>1. Characterise and analyse local context and resource flows and identify idle assets.</b></p> <p>Analyse the urban metabolism (material and energy streams, bio-sources and sinks) as a basis for developing a strategic plan for the circular bioeconomy transition. The focus of a circular transition must be on the economic and industrial profile of a city, targeting the sectors with highest wastage and potential for increased product and asset use/utilisation, waste minimisation and closing of material loops. An urban metabolism study can help to map all resource flows. Some cities have employed resource brokers to help companies identify wastage and possibilities to increase circularity in local value loops, including idle or underutilised buildings and other assets.</p>
	<p><b>2. Conceptualise options and prioritise among sectors with circular potential.</b></p> <p>Trying to pursue circularity on all fronts at the same time may be challenging, and successful circular cities usually identify a few target sectors that are important in their socio-economic context and have a high potential for creating and closing local value loops and increasing use of idle assets. Commonly targeted sectors are construction, food and beverages, trade, electric and electronic equipment, food waste, green and park waste, wood waste, sludge and textiles.</p>
	<p><b>3. Craft a circular vision and strategy with clear circular goals and targets.</b></p> <p>A circular vision for the transition will serve as a guiding light for further strategic planning and implementation. The circular vision provides the basis for preparing a circular strategy with goals and targets, covering all city functions, services, target sectors and business activities with circular potential. The preparation of the strategy should involve all relevant stakeholders (for example citizens, businesses, research and teaching institutions, media and civil society) to build awareness and foster a culture of collaboration.</p>
ACT	<p><b>4. Close loops by connecting waste/residue/water/heat generators with off-takers and users of such secondary resources.</b></p> <p>This is one of the central themes in a circular city and should be at the core of the journey towards circularity. The urban metabolism study prepared as a basis for the strategy will identify local value loops. Material brokers may interact with companies to help them identify residue streams wasted heat or water that could be used as feedstock or inputs for other companies. Efforts should also be made to increase the collection and recycling of organic waste streams and by-products for use in biorefineries, urban farms or for energy production (heat and/or electricity, biomethane, biofuels, biochar, etc.), with residues recycled to soils like compost from biowastes or sludge from wastewater treatment plants.</p>

### 5. Consider options for extending use and life of idle assets and products.

This can be achieved by establishing reuse and repair centres, helping companies to go from linear sale of products to new sharing, leasing and product-as-service business models, and by repurposing or promoting the sharing of idle and abandoned buildings and other assets. Such measures will not only save costs, but also extend the life and utility of assets and products and facilitate value recovery at end-of-life. Supporting the set-up of **reverse logistic networks** is key to facilitate the return and take-back of products for repair and remanufacturing.

### 6. Construct and procure circular buildings, energy and mobility systems.

Many cities have a steady influx of new citizens due to urbanisation and migration, and the building stock is also aging, which creates demand for new buildings, energy and mobility systems. The demand for new buildings should be met by planning, procuring and constructing circular buildings. Such buildings are flexible and modular, designed for repurposing to extend their life, and as material banks for disassembly instead of demolition to facilitate reuse and recycling. Energy systems should be planned on the basis of renewable energy sources and local generation to the extent possible, e.g., bioenergy (biofuels, biogas, biomethane, etc.). Mobility systems should be planned with a view to increasing efficiency, reducing congestion and reducing emissions. They should be shared and where possible automated and on-demand.

### 7. Conduct circular experimentation – address urban problems with circular solutions.

There is not one formula for circularity in cities, and developments can and should not follow a static circular blueprint. City administrations should instead encourage testing and experimentation with new circular concepts, approaches and business models. Circular labs and a flexible regulatory framework facilitate the development and testing of new business models. By establishing circular support hubs or similar, cities can encourage and help entrepreneurs to develop their circular ideas into viable businesses.

### 8. Catalyse circular development through regulation, incentives and financing.

Regulatory sticks and incentive carrots should be used as tools and levers for circular change. Charging the full cost, including externalities, for waste management and other environmental services is a good start. Ideally, this should include a differentiated fee structure that incentivises reduction, reuse and recycling over disposal (see **Volume II** to identify the kind of policy incentives that the municipal policymakers can take in local political decisions). Create forums with like-minded cities at the national (and possibly also at EU) level to lobby for necessary changes in EU and national legislation that currently block the transition to a circular bioeconomy.

Providing or subsidising land for circular clusters is an effective way of promoting industrial symbiosis, as is introducing circular requirements in licensing and permitting. City administrations may see a need and reason to support circular start-ups in securing access to financing. This may include providing or facilitating access to grants, subsidies or guarantees. Identify external sources of funding/financing for CE initiatives and projects available at EU and/or national level. This is to complement the cities' own budgetary sources and to get acquainted with funding rules and procedures.

Use circular public procurement to create demand for circular innovations. Facilitate appropriate spaces and funding for experimentation, (private) innovation, knowledge transfers, and matchmaking in the field of circular bioeconomy for businesses, research institutions, and interested citizens.

**9. Create markets and demand for circular products and services – be a launching customer.**

Public procurement amounts to about 15% of gross domestic product in the European Union. By applying circular principles and criteria in procurement of construction, products and services, city administrations can contribute to demand and help establish best practice. Cities can also encourage the inclusion of secondary raw materials in packaging and products by setting such requirements in their procurement criteria or through voluntary pledge programmes.

**10. Capitalise on new ICT tools supporting circular business models.**

Digital tools include material and asset exchanges where supply and demand can be matched. These tools help clients share underutilised materials, products or assets. Many product-as-service business models also require asset tracking to facilitate return and take-back. The internet-of-things and other forms of smart development enable and facilitate many aspects of circular developments. Circular and smart city developments should therefore progress in parallel. City administrations are key to identify needs and demand for such tools and services and to help establish the required infrastructure and tools.

**11. Coach and educate citizens, businesses, civil society and media.**

Educate consumers (and other stakeholders) in civil society and more in particular cities based on an inclusive and participatory approach. Co-creation with citizens is crucial from the start. Progress towards a circular economy does not happen solely in city administration offices, but also in homes, offices and companies. To mobilise these creative ideas and entrepreneurial efforts, city administrations can help disseminate the circular vision and strategy, and then build awareness and understanding among their citizens and businesses so that they take part in and further the circular transition. Mobilising education and research institutions, media and civil society will facilitate and increase the efficiency of such efforts.

**12. Confront and challenge linear inertia, stressing linear risks and highlighting circular opportunities.**

Many individuals and companies are firmly rooted in their old linear patterns and business models, and benefit from not having to pay the full costs of linear externalities. This disincentivises companies to explore circular models. However, with increasing awareness about the implications of resource scarcity, rising prices and volatility, competition from innovative circular companies, increased customer concerns and awareness, and potential regulatory changes, companies will have to pay more attention to future linear risks and value current linear benefits differently. This will focus attention on, and support the transition to, more circular alternatives such as product-as-service business models. City administrations can have a role in building awareness about linear risks and circular opportunities and thus encourage innovation and transition from linear to circular business models.

**13. Connect and facilitate cooperation among circular stakeholders.**

Introduce cross-thematic coordination and promote a culture of cooperation, knowledge exchange, and creation within the own municipal organisation. Identify, address, and include also non-municipal stakeholders early on in the transition process (e.g., businesses, knowledge institutions, citizens). Circular developments and business models rely on cooperation among entities along value chains. City administrations are well-positioned to connect, mobilise and involve stakeholders in the circular planning and to establish circular hubs and support centres that facilitate exchanges and collaboration. Waste, material or reuse exchanges, discussed in step 10, facilitate value chain cooperation, as does the active matching and co-localisation of companies with potential for circular synergies to establish circular clusters built on industrial symbiosis.

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**14. Contact and learn from circular pioneers and champions.**

Cities that have reached higher levels of circularity can act as a model and help starting cities taking their first circular steps and navigate around obstacles. It is also important to identify circular champions in the local community that can drive and inspire circular change with insight, energy and passion. Identify cases of success (case studies) on waste valorisation into bioproducts, within and outside the city, will also valuable.

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**15. Communicate on circular progress based on monitoring.**

Continuously monitor and evaluate the implementation of circular bioeconomy projects and initiatives. This aims at developing a solid knowledge base and providing feedback to guide/adjust the transition process. This will help circular stakeholders follow the progress and focus their efforts. It will also mobilise new circular stakeholders and encourage further circular developments. Monitoring and communication on circular progress enables tracking of achievements towards the objectives and targets set in the circular vision and strategy, and may point at the need to change or intensify efforts on particular fronts. Develop and communicate a long-term, holistic vision about the circular ambitions of the city.

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