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**Report on current state of the art & understanding of the Circular Economy**

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### Summary

The key objective of this deliverable is to gain insights on and assess how CE is being implemented and R&I is being funded at regional level, e.g., via the RIS3 strategy and Structural Funds. As such it sets the scope for the project and provides the background against which programmes and measures can be understood, assessed, developed and recommended in succinct tasks and work packages. The objective of this report is to provide a concise overview of the current R&I priorities, as expressed in running and newly introduced funding and legislative measures with respect to Circular Economy in European countries and regions.

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### Approval

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## EXECUTIVE SUMMARY

The objective of this report is to provide a concise overview of the current R&I priorities in European countries and regions, expressed in running and newly introduced funding and legislative measures with respect to Circular Economy. Chapter 1 introduces the methodology and the survey response; Chapter 2 presents the survey results on the funding for CE in European countries and regions (Questions 1.1 to 1.16); Chapter 3 presents the survey results on legal mechanisms and technology and business field development in European countries and regions (Questions 3 and 4); Chapter 4 derives conclusions and points out the highlights of the survey.

The survey is based on data collected by questionnaires, which were distributed among the 24 CICERONE project partners assigned responsible for the data collection in specific European countries or regions.

In total, data of 26 EU and non-EU countries and of the EU as a political entity were obtained representing altogether **104 CE funding programmes**. These programmes were described in detail along 19 survey questions by the project partners on desktop basis.

Based on the assessment of 104 R&I programmes, the results can be summarised as follows:

At present, the R&I for CE in Europe overwhelmingly consists of **national programmes** (70%) with a **volume of 1-5 million** (39%) **or more than 13 million** (27%) and a **duration of 1-3 years** (78%). The focus is predominantly on the resources **waste or biomass**, and the most frequently addressed product life cycle phase is the **end-of-life phase** while the other phases have been reported at similar frequencies.

The **major type of funding** is predominantly addressed to **technology and process optimisation** (62%) and the most frequently **beneficiary sector** is the **manufacturing and water sector**. With regard to the Technology Readiness Levels (TRL), the programmes are **mostly field pilots or market introduction**.

In the overall view, **long-term up-scaling projects** necessary for bridging the gap between research and implementation are **comparably lower represented** and the objectives and key performance indicators of the programmes disclose **different and partly contradictory strategies of the European countries** which could indicate a need for more integrative approaches with regard to resources, sectors, funded activities and beneficiaries addressed.

**Legislation and the development of technology and business fields** are well underway in practically all European countries and regions but the implementation status is **very diverging** to date. While **education & training and social & behaviour programmes** are **generally underrepresented** in this survey the strong focus on technology and process optimisation may indicate a potential need of a more balanced R&I funding for both production and consumption side.

## KEYWORDS

Circular economy, research & innovation, Europe, funding, legal mechanisms, SRIA.

## 1 OBJECTIVES OF THE EVALUATION AND METHODOLOGICAL APPROACH

The CICERONE project brings together programme owners, research organisations and other stakeholders to create a platform for efficient Circular Economy programming. The priority setting and the organisation of the future platform is driven by Programme Owners (POs), involved either as project partners, or via a stakeholder network.

### 1.1 Objectives

Within the project, WP 1 aims to generate an understanding for CE in terms of its societal challenge, industrial relevance, R&I policy, and trends in technology developments using as far as possible relevant available reports (e.g., from various EU-funded projects Circular Impacts, SCREEN, MIREU, CRESTING, FUTURING, SCRREEN, and others). It compiles and analyses the status quo regarding the emergence of circular economy and affiliated strategies and policy making in a European Union context.

The key objective of this deliverable is to gain insights on and assess how CE is being implemented and R&I is being funded at regional level, e.g., via the RIS3 strategy and Structural Funds. As such it sets the scope for the project and provides the background against which programmes and measures can be understood, assessed, developed and recommended in succinct tasks and work packages.

The objective of this report is to provide a concise overview of the current R&I priorities, as expressed in running and newly introduced funding and legislative measures with respect to Circular Economy inside Europe. The survey was conducted with support and data provision of 24 CICERONE projects partners where the single projects partners were assigned responsible for one or more countries or regions.

This deliverable is structured as follows:

Chapter 1 will introduce the methodology and the survey response.

Chapter 2 will present the survey results on the funding for CE in European countries and regions (Questions 1.1 to 1.16).

Chapter 3 will present the survey results on legal mechanisms and technology and business field development in European countries and regions (Questions 3 and 4)<sup>1</sup>.

Chapter 4 will derive conclusions and point out the highlights of the survey.

### 1.2 Methodology

The survey is based on data collected via a questionnaire, which was forwarded to the 24 CICERONE project partners assigned responsible for the data collection in specific European countries or regions, according to the proposal Work Package 1 (WP1).

As a first step, the task developed a draft questionnaire for the investigation of the actual R&I priorities for the Circular Economy in European countries and regions. The draft questionnaire was intensively discussed with the task partners (led by WI) and also took into account the data requirements of subsequent work packages as well as incorporated comments of the involved

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<sup>1</sup> Question 2 collected stakeholder information for project internal purposes, such as workshops in following work packages and is therefore not evaluated in this report (see further explanation in Chapter 1.2).

projects partners (JÜLICH, VITO, IVL, and RVO). The data collection was kicked-off on 21 January 2019 with a return period of 3 weeks.

The data collection sheet contains four clusters of questions (see ANNEX 5). The complex “Funding for CE” comprises 16 questions and asks for max. five programmes of the most important CE (framework) funding programmes in the various countries to be described in detail along these questions. The cluster is a mixture of open and closed questions. A second focus is put on “R&I stakeholders”, where country managers were asked to provide up to 10-15 contacts. These data are sensitive and are not going to be presented in this report. Rather, they are important for subsequent work packages and workshops and therefore only handled internally. In order to get an impression of current developments in legislation, the question complex “Legislation for CE” asks respondents to provide 2-3 national examples of legislative measures, which are considered triggering R&I for CE from 2015 onwards. The fourth complex finally asks for “R&I priorities” with clear CE implications on a circular economy and provides space for open answers concerning country-specific trends in technology development and business fields.

The data collection and elaboration of the individual country sheets based on the questionnaire was conducted on a desktop basis, and for practical and data reasons, partly focused on macro-regions as follows: JÜLICH (Germany, UK and Ireland), IETU (Central and Eastern Europe), CEA (France, Spain and Portugal), VITO (Belgium & Luxemburg), TNO (the Netherlands), VTT (Finland & Baltic States), IVL (Scandinavia), ENEA (Italy and Eastern Mediterranean), PNO (European-level data collection), WI (Austria & Switzerland).

In total, data of 26 EU and non-EU countries and of the EU as a political entity were obtained. The project partners provided the following survey responses:

- Individual information of 21 EU countries (including the United Kingdom),
- One integrated response for the group of the East Mediterranean EU countries and Greece, and the non-EU countries Croatia and Albania,
- One response for the whole of the European Union (EU),
- Further responses from Norway and Switzerland, as part of the European Environment Information and Observation Network (EIONET).

### 1.3 Survey Response

In total, 104 CE funding programmes were described along the survey questions. An average of 3.9 programmes was provided for each country examined. An overview of all programmes is provided in Table 10 in the Annex. Table 1 displays the countries for which information on programmes was provided and the number of programmes described.

**Table 1: Country responses**

Country responses (number of programmes described)			
Albania (2)*	Austria (5)	Belgium (5)	Croatia (1)*
Czech Republic (10)	Denmark (5)	Estonia (5)	Finland (5)
France (4)	Germany (5)	Greece (1)*	Hungary (4)
Ireland (3)	Italy (5)	Latvia (0)	Lithuania (0)
Luxembourg (3)	The Netherlands (2)	Norway (5)	Poland (5)
Portugal (5)	Slovakia (1)	Spain (4)	Sweden (5)
Switzerland (5)	United Kingdom (5)	European Union (4)	

\* Described in one integrated response for the “East Mediterranean countries”

In the survey, respondents were asked to describe max. 5 programmes they consider most important for CE R&I in the country they examined. In the case respondents described more than five programmes, these additional programmes were also included in the analysis. For the two countries of Latvia and Lithuania, survey responses indicated that funding programmes covering circular economy issues did not exist.

The detailed evaluation and interpretation of the responses along 16 questions (Q1.1-Q1.16) for the CE funding programmes will take place in the following Chapter 2. In addition to the identification of CE funding programmes and their detailed description, two further questions asked for information on recent legislation (Q3) and further CE relevant R&I priorities with respect to technology development and business fields (Q4). In this part, the survey obtained fewer responses but nonetheless insightful information, which will be described in Chapter 3 of this report. Chapter 4 will derive conclusions and point out the highlights of the survey. In addition to the text version, the Annex provides further detailed information.

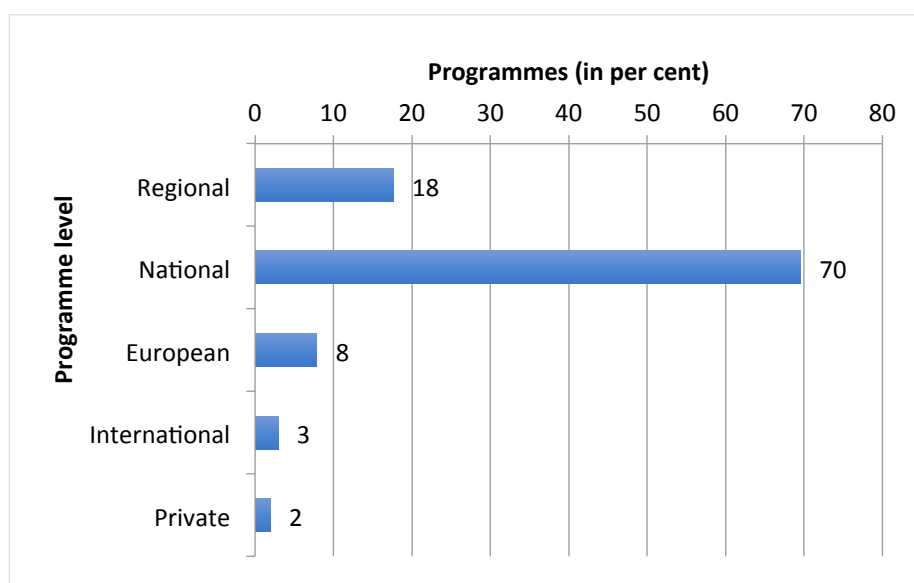


## 2 SURVEY RESULTS ON FUNDING FOR CE IN EUROPEAN COUNTRIES AND REGIONS

The following section presents the survey results along the individual questions of the data collection sheet (see ANNEX).

### 2.1 Programme level (source of funding)

Introducing to the data collection, respondents were asked to identify max. 5 of the most important CE (framework) funding programmes in the respective country or region and specify the programme level (i.e., international, European, national, regional, private) (Q1.1)<sup>2</sup>. Figure 1 depicts where the main sources of funding is located (in per cent).



**Figure 1: Programme level (source of funding)**

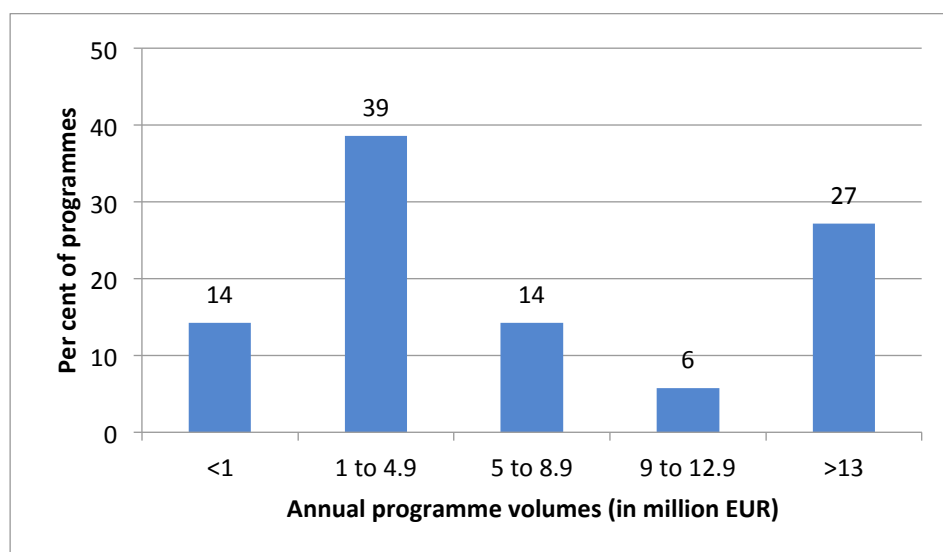
valid cases: 102 programmes; missing cases: 2 programmes

Most of the programmes (70%) are national programmes (see Figure 1). A certain share of the described programmes (18%) is implemented at the regional level. These include, inter alia, several programmes developed by regions of Spain (i.e., Basque and Galicia), United Kingdom (i.e., Scotland and Wales), Italy (i.e., Emilia Romagna, Regione Campania, Regione Lazio and Southern Italy), France (i.e., Hauts de France region), Belgium (i.e., Walloon Region, Brussels Capital Region, Flanders Region), and Austria (Federal State of Salzburg, Federal State of Upper Austria). Also, two municipal programmes (i.e., Cities of Geneva/Switzerland and Lyon/France) were subsumed to the regional level. In comparison, few programmes described are located at the European level (8%) or are international programmes (3%) – nevertheless it should be taken into account that the focus was on national and regional programmes.

<sup>2</sup> Q1.2 asked for programme owner and contact person data, which are not displayed here. Concerning information on the programme website (Q1.3), see ANNEX 1.

## 2.2 Financial volumes

For the programmes identified, the overall budget size (or the part of budget allocated to CE) was inquired (Q1.4). Figure 2 depicts approximated figures on the shares of programmes disposing of different annual financial volumes.



**Figure 2: Annual programme volumes**

valid cases: 70 programmes ; missing cases: 34 programmes

Figure 2 shows that the largest part of the described programmes (39%) have annual financial volumes between 1 and 4.9 million EUR. A considerable share of programmes (27%) is funding more than 13 million EUR per year. A smaller but relevant part of the described programmes is funding less than 1 million EUR per year (14%) and another share of 5 to 8.9 million EUR (also 14%). The smallest number of annual programmes is the category of 9 to 12.9 million EUR volumes per year (6%).

When examining the annual financial programme volumes, several challenges had to be addressed, and should be noted by readers:

- Respondents indicated different kinds of data on the budgetary volumes of the programmes. In order to include as many programmes as possible in the analysis, the authors levelled the obtained data. Thus, data on *annual* financial volumes were applied, if indicated by respondents. Furthermore, *the authors calculated average volumes per year* if respondents had indicated the programme duration and the total financial volume of the programme.
- The programmes differ with regard to the funded issues, and not all of the programmes described by respondents are exclusively funding circular economy projects.

The original figures on programme volumes indicated by respondents as well as the information on the topics funded by the respective programmes are provided separately for each of the included programmes in Table 11 in the Annex.

## 2.3 Funding per project and number of projects funded

Three different kinds of data were provided by respondents concerning the **funding of the projects** (Q1.5):

- a) Data on the total funding for individual projects,
- b) Data on the average funding per project, and

c) Data on the funding per project and year.

With regard to 10 programmes, the *total funding for individual projects* was indicated by data describing the range of financial volumes funded per project. According to survey results, the total project volumes funded vary considerably in a range between 10,300 EUR for the smallest projects (funded by the Norwegian programme “Grants for Bioeconomy”) to a maximum funding of 3,880,000 EUR (Czech Republic’s “Funding programme for applied research, experimental development and innovation EPSILON”). However, the latter programme also grant means for projects not related to circular economy issues (see Table 12 in the Annex for an overview of programmes focusing exclusively on circular economy issues and of programmes also funding other topics).

In addition, the *average funding per project* was indicated for 10 programmes. It ranges from 7,500 EUR for consulting support (in the programme “Vale Economia Circular” in Portugal) to 2,000,000 EUR (in the French programme “Investissements d’Avenir”). The 10 programme-specific figures indicate an average funding per project of 532,300 EUR.

Finally, the *funding per project per year* was indicated for one programme (i.e., the Austrian programme “Abfallvermeidungs-Förderung (AVF) der Sammel- und Verwertungssysteme für Verpackungen” - Promotion of waste prevention of packaging collection and recovery systems). In this programme the funding ranges from 1,000 EUR to 100,000 EUR per project and year, and material costs are funded by up to 30,000 EUR per year. Table 2 summarises the results.

**Table 2: Funding for individual projects**

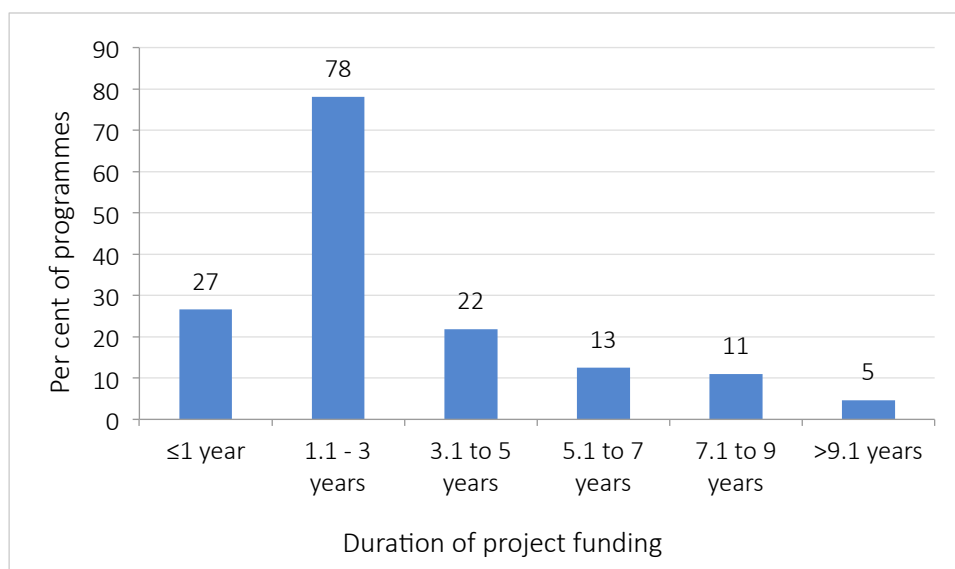
Data categories	Minimum (in EUR)	Maximum (in EUR)	Number of programmes
Total funding for individual projects	10,300	3,880,000	10
Average funding per project within the same programme	7,500	2,000,000	10
Funding per project per year	1,000	100,000	1

valid cases: 21 programmes; missing cases: 83 programmes

With regard to the **number of funded projects**, programmes vary considerably between one project funded (i.e., in the Dutch programme “Samen tegen voedselverspilling” - Together against food waste) and more than 1,000 projects funded (in the Portuguese programme “Fundação por la Ciencia e la Tecnologia (FCT)”), which similarly funds projects not related to circular economy issues. The concrete number of projects funded is provided for all included programmes in Table 12 in the Annex.

## 2.4 Duration of funded projects

The duration of funded projects was asked in Q1.6. The following Figure 3 shows the varying shares of programmes with different programme periods.



**Figure 3: Durations of project funding**

valid cases: 64 programmes; missing cases: 40 programmes

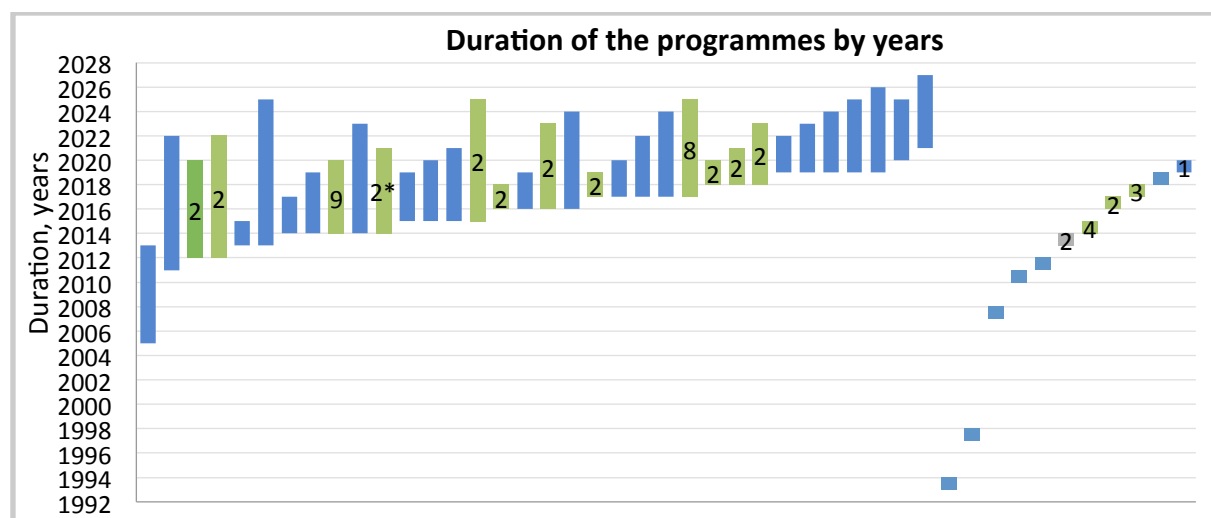
The highest share of programmes (78%) runs projects from 1.1 to 3 years. A considerable share of projects (27%) only lasts up to 1 year. Further relevant project runtimes last from 3.1 to 5 (22%), 5.1 to 7 (13%) and 7.1 to 9 (11%) years. Notably, only 5% of the programmes have a project duration of more than 9.1 years.

Methodologically, the above categories of programme periods were determined by the authors based on the survey results. In those cases where programmes covered more than one category, the programmes were counted several times. Such multiple counting could occur due to particularly long project durations for example when it was mentioned that the projects in a programme last 1-5 years or the project durations are maximum 4 years. As a result, the total is over 100%.

Overall, it can be concluded that long-term projects (with a duration of more than 5 years) account for only a small proportion and are apparently funded more infrequently. Many new developments from the circular economy which are to be implemented on the market and which are intended to last in the long term would however require a longer financing period.

## 2.5 Duration of programmes

Figure 4 depicts the duration of the programmes specified by the respondents in Q1.7 of the questionnaire. Programmes with similar durations are marked in green and their number is noted on the bars. While respondents indicated the programme duration for 54 programmes, for 18 programmes only data on the programme start was provided. In Figure 4, those programmes are depicted by lines, which indicate the start.



**Figure 4: Duration of the programmes**

valid cases: 72 programmes; missing cases : 32

- The two EU programmes, which are included in this bar, last from 2014 - 2021 and subsequently will continue from 2021 to 2027.

	Programme duration of programme
	Programme duration occurring several times; the number of similar programmes is stated
	Programmes for which only starting points were indicated in the survey
	Similar cases of programmes for which only starting points were indicated in the survey; the number of similar cases is stated

Figure 4 shows that particularly from the year 2011 onwards the number of programmes supporting circular economy issues has continuously increased in the Europe. However, the figure also shows that already in 1993 a programme existed that supported developments towards circularity (i.e., the Austrian programme “UFI – Umweltförderung im Inland” - Domestic Environmental Support).

The span of duration of the programmes varies between 2 to 12 years. The average programme duration is 5.6 years. It should be noted that data was only available with regard to the years of start and end, but not on the exact months. In order to integrate the data, the authors employed the assumption that programmes started and ended at the same time in the year when calculating the average annual programme volumes.

## 2.6 Examples of funding schemes, initiatives and funded projects

In order to better illustrate the different schemes, initiatives and funded projects, respondents were asked to provide examples (Q1.8). Based on the results, the following box gives an overview.

**Box 1: Funding schemes and examples of funded projects****Examples of funding schemes and of funded projects**

In the **Austrian** federal state of Salzburg, the programme "Promotion of environmental measures in municipalities" ("Förderung von Umweltschutzmaßnahmen in Gemeinden") has, for example, supported the project "Re-use: measures to implement the preparation for reuse".

In **Czech Republic**, the ETA programme is funding projects, such as a project conducting circular city scans.

In **Denmark**, the "Fund for Green Business Development" finances various projects, such as a project on the eco-friendly recycling of artificial turf.

**Estonia** has set up the "Circular Economy Programme". In particular, the programme supports companies in improving their circular design capacity.

In **Finland**, the programme "A Climate-Neutral and Resource-Scarce Finland" has been introduced. One project funded within this scheme is "Sustainable, Climate-Neutral and Resource-Efficient Forest-Based Bioeconomy (FORBIO)".

**France** has implemented funding schemes, such as the programme "Industrial Renewal / New materials and processes / Circular Economy". The scheme is financing projects, such as "PARME: reversible absorption process of micropollutants in water".

A programme introduced in **Germany** is "Materials for a resource-efficient industry and society" (*MatRessource*). One of the projects funded in this scheme is "Galleff", which aims at improving the material efficiency of gallium in gallium arsenide separation and in the production of LEDs.

In **Luxembourg**, the programme "Fit4Circularity" has been introduced, which supports companies in improving their circularity.

The **Netherlands** have implemented the programme "Samen tegen voedselverspilling". In the programme, a monitoring system is set up together with businesses from all segments of the food supply chain. By measuring food waste, the initiative aims at several objectives, such as at stimulating legislations supportive of circularity.

In **Poland**, the "FALCON Programme" focuses on the implementation of innovative environmental technologies. For example, a project aiming at the removal of wood impregnation and at the recovery of wooden raw materials has been funded.

In the programme DURE, **Portugal** provides funds for plastic waste prevention. One of the supported projects aims at the redesign of plastic containers supportive of their reuse in the hospitality.

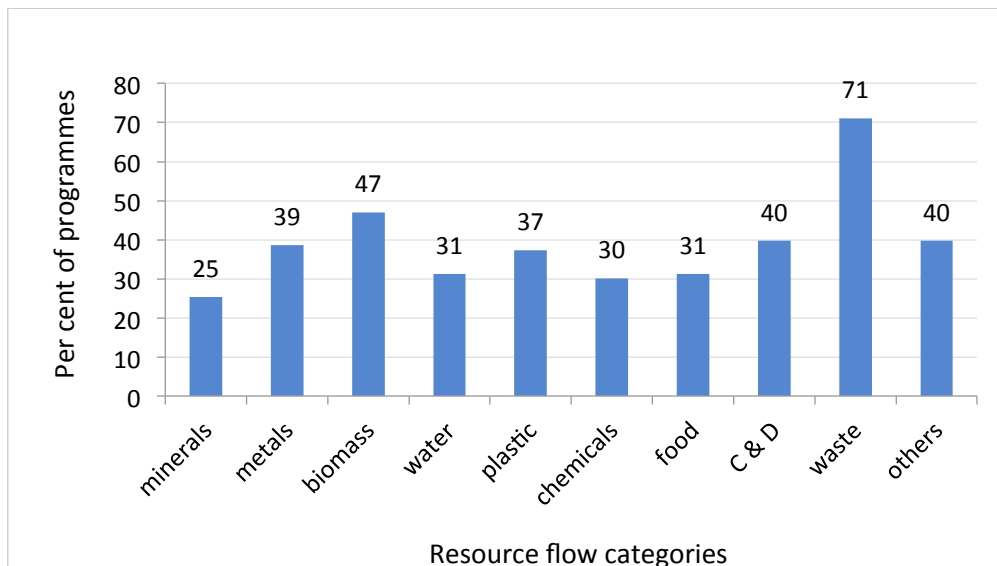
In **Galicia/Spain**, the Initiative BIOPOL develops biopolymers to be used in flavours, fragrances, and absorbents for environment sanitation on the basis of the milk industry's subproducts and based on waste recovery.

In **Switzerland** private actors (i.e., impact hub and sanu durabilities, and MAVA foundation) have introduced the programme Circular Economy Transition. For example, the programme has funded the initiative "gemüsegarten" (vegetable garden), which purchases second option vegetables and fruits from farmers and sells them to clients.

In **Scotland/United Kingdom** the Circular Economy Investment Fund has funded a project demonstrating a new manufacturing technology to produce, bulk high protein food, ethanol and animal feed using a zero waste fermentation process.

## 2.7 Resource flows addressed

A particular aspect considered informative was the question which resource flows are being addressed by the programmes. A multiple-choice question (Q1.9) gave the opportunity to choose between various resource flows. Figure 5 shows the shares of programmes addressing the different categories in the identified programmes.



**Figure 5: Shares of programmes covering different resource flows**

valid cases: 83 programmes; missing cases: 21 programmes

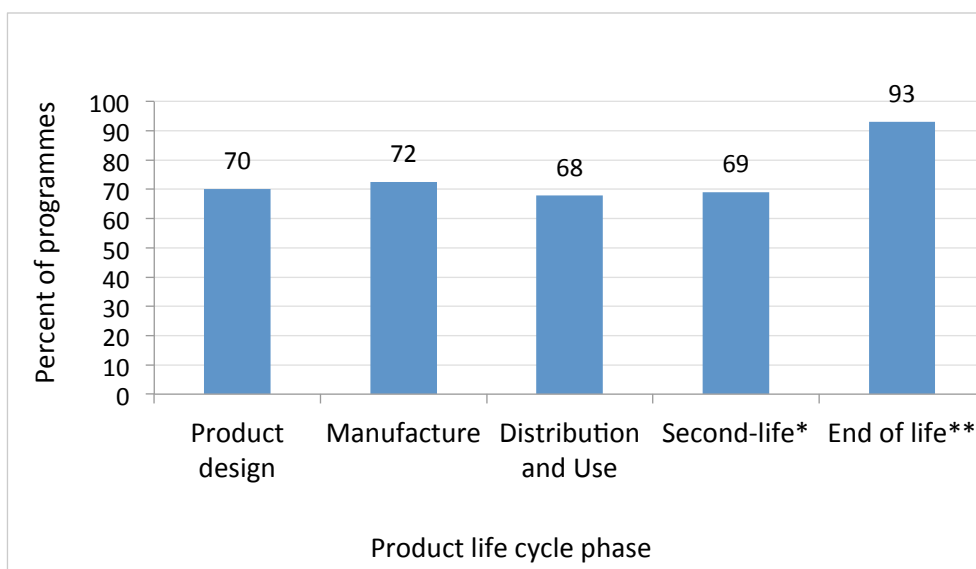
According to survey results, a large majority of programmes (71%) addresses waste issues. With regard to specific resource flows, biomass represents the resource flow which is most frequently addressed by funding programmes (47%). Projects focusing on the other resource flows were all addressed by between 25% and 40% of the programmes.

In methodological terms, the results were obtained based on a closed question, which included 10 response categories: minerals, metals, biomass, water, plastic, chemicals, food, construction and construction and demolition (C&D) waste, and other. Respondents could choose more than one response category, and in fact, many multiple indications occurred with regard to most programmes. Therefore, the total is over 100%. Due to the overlaps between the different categories, a clear conclusion regarding a focus on resource flows is difficult. The picture shows a relatively balanced distribution of programmes' foci with a peak in the waste category.

## 2.8 Product life cycle phases addressed

The different phases of the product life cycle were retrieved in Q1.10. Here also multiple indications were allowed, so that respondents could choose any relevant response categories from Product design, Manufacture, Distribution and Use, Second-life (repair, refurbish, remanufacture), and End-of-life (collection, recycle, recovery).

Figure 6 shows the frequency of the product life cycle phases that were addressed by the programmes covered in the survey.



**Figure 6: Shares of programmes addressing different phases of the product life cycle**

valid cases : 87 programmes, missing cases: 17 programmes

\* the response category covers repair, refurbishing, and remanufacturing

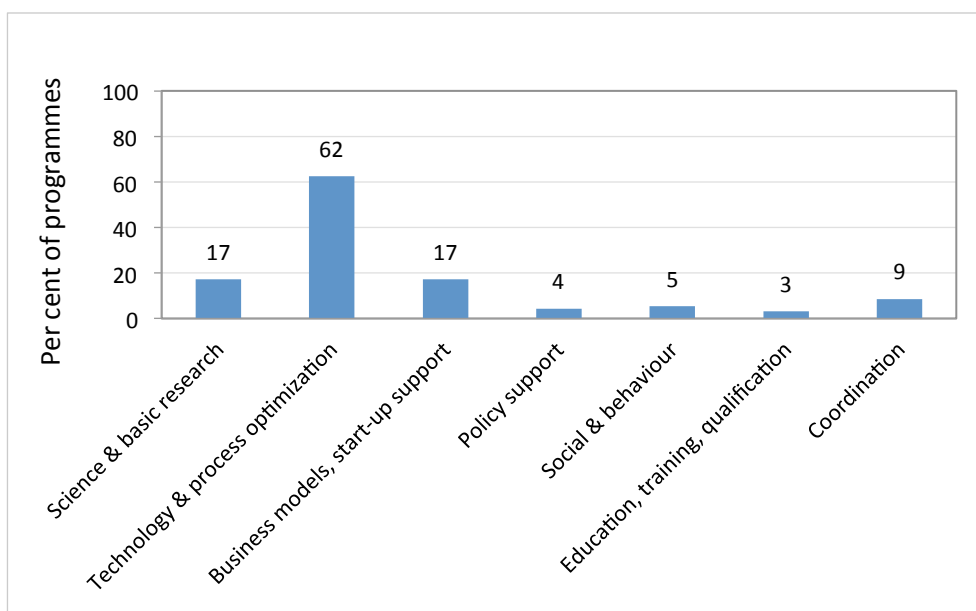
\*\* the response category covers collection, recycling, and recovery

Nearly all programmes (93%) are indicated to have a focus on the “end of life” phase. All the other life cycle phases were addressed by almost equal shares of programmes (i.e., between 68% and 72% of the programmes). As all life cycle phases are thus covered by at least 68% of the programmes, survey results suggest that most programmes have a rather broad focus with regard to product life cycle phases. Table 13 in the Annex also shows the life cycle phase for the individual programmes in the different countries. It is noticeable that only few programs address only one life cycle phase. Out of 104 programmes, only 10 address just one life cycle phase. Often all five life-cycle phases are addressed. It can be therefore concluded that the life cycle phase is not a decisive reason for funding projects.

## 2.9 Major types of funded activity

In Q1.11 the major types of the funded activities were of particular interest. Respondents were asked to indicate the most relevant ones out of a selection of seven categories which were Science & basic research (often R projects), Technology and process optimisation (often D&I projects, transfers), Business models & start up support (including coaching, consultancy), Policy support (such as policy implementation or recommendation), Social & behaviour (e.g. awareness raising, consumer behaviour), Education, training & qualification (e.g. students trainees), and Coordination (e.g. clusters, networks, platforms). The following figure depicts in which shares the programmes support different kinds of activities.





**Figure 7: Focus of funding, by activities (in per cent)**

Figure 7 demonstrates that by far the largest share of programmes (62%) addresses technology and process optimisation. A certain share of programmes of funding projects is related to “science and basic research” and “business model and start-up support” (both 17%). Coordination is funded by 9% of the programmes. All other activities (i.e., social and behaviour, policy support, education, training and qualification) are only funded by 3% to 5% of the programmes.

Another way of visualisation accentuates which countries have a focus on which funding type (see Table 3): For example, technology & process optimisation was reported as the main focus for the Czech Republic, Germany, East Mediterranean, and Poland, or on Business models & start up support for Belgium. A number of countries appear to have a balanced portfolio of programme types included. It has to be stressed however that the selection process which programmes were identified and considered as “worth reporting” was conducted by the survey respondents who represented the country experts in the project consortium.

**Table 3: Major types of funded activity by country\***

Country	Programme 1	Programme 2	Programme 3	Programme 4	Programme 5
Austria	Technology	Technology	Social & behaviour	Coordination	Education & training
Belgium	Business models, start-up support	Business models, start-up support	Business models, start-up support	Business models, start-up support	
Czech Republic	Technology	Technology	Technology	Technology	Technology
Denmark		Technology	Science & basic research	Business models, start-up support	Business models, start-up support
			Technology	Technology	Technology
East Mediterranean	Technology	Technology	Technology	Technology	
Estonia	Education & training	Policy support	Science & basic research	Science & basic research	Technology

Country	Programme 1	Programme 2	Programme 3	Programme 4	Programme 5
Finland	Technology	Coordination	Science & basic research	Science & basic research	Technology
France	Technology	Technology	Technology	Social & behaviour	
Germany	Technology	Technology	Technology	Technology	Technology
	Business models, start-up support	Policy support	Science & basic research		Education & training
Hungary	Technology				
Ireland	Technology	Business models, start-up support	Technology		
Italy	Technology	Policy support	Business models, start-up support	Technology	
Luxembourg			Technology		
The Netherlands	Coordination	Coordination			
Norway	Science & basic research	Technology	Technology	Science & basic research	Science & basic research
	Technology		Science & basic research	Technology	Technology
	Business models, start-up support		Business models, start-up support	Coordination	
	Coordination				
Poland	Technology	Technology	Technology	Technology	Technology
Portugal	Science & basic research	Coordination	Technology	Social & behaviour	Social & behaviour
Spain	Technology	Technology	Coordination	Technology	
Sweden	Science & basic research	Science & basic research	Business models, start-up support	Technology	Technology
Switzerland	Science & basic research	Technology	Business models, start-up support	Technology	Business models, start-up support
UK	Science & basic research	Business models, start-up support	Business models, start-up support		
			Technology		
EU	Technology	Science & basic research	Technology	Technology	

\* No data available for Latvia, Slovakia and Lithuania.

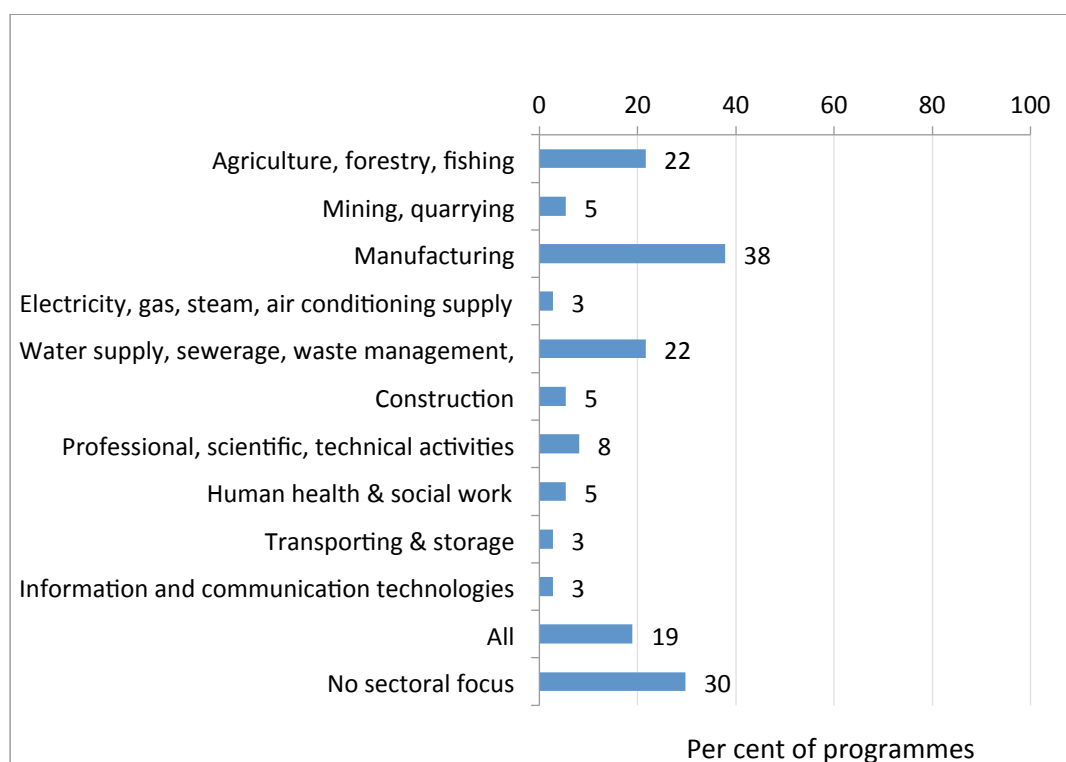
The colouring also underlines that Education & training as well as Social & behaviour are not very high on the agenda for CE funding at present with only 4 and 3 mentions out of a 93 programmes. The main focus of the programmes included in this survey is on technology and process optimisation,

and thus points to potential gaps that could arise from one-sided funding of R&I in the context of CE. While CE is an innovation agenda for economy and industry, its success is nonetheless strongly dependent on fundamental structural social & behavioural changes from the bottom, such as repair, reuse and collaborative consumption, etc.

## 2.10 Industrial sectors addressed

Question 1.12 put a focus on the industrial sectors addressed by the funding programmes. It was recommended to use NACE sectors in case the programmes had a sectorial focus. Therefore, multiple responses were possible.

Figure 8 depicts the shares of programmes addressing different sectors.



**Figure 8: Shares of programmes addressing different sectors**

valid cases : 37 programmes, missing cases: 67 programmes

The results depicted in the figure above show that the sector most frequently addressed by the described programmes (38%) is the manufacturing sector. Further relevant shares of programmes mention “agriculture, forestry and fishing” and “water supply, sewerage and waste management” (both 22%).

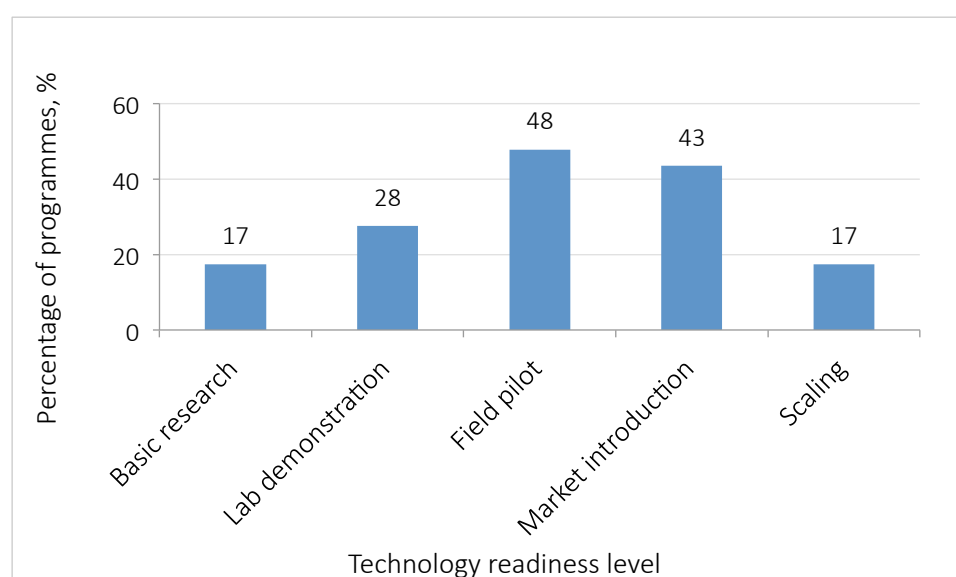
Other sectors (i.e., “mining and quarrying”, “electricity, gas, steam and air conditioning supply”, “construction”, “professional, scientific, technical activities”, “human health and social work”, “transporting and storage”) are addressed by considerably lower shares of 3% to 9% of the programmes. It is striking, for example, that the transport, storage and ICT sectors received very low mentions. However, the high proportions of responses for “all” and “no sectoral focus” and 69 missing cases may indicate that the question was difficult to answer or clearly attribute.

A fully-fledged circular economy is necessarily a cross-sector programme that requires very close cooperation between sectors and the integration of material flows and secondary material flows for

recycling, reuse, remanufacturing for finally closing the loops. Manufacturing as the main benefitting sector of funding may be interpreted as a further indication that the focus is still very much on process optimisation within separate sectors, thus calling for a more integrative and forward-thinking R&I approach.

## 2.11 Level of technological readiness

In Q1.13 respondents were asked to specify the technology readiness level in case the funding programme described had a focus on technology innovation. This term is used in order to assess the maturity of a technology towards full economic operation and is therefore useful for governments or funding bodies to define eligibility criteria. For the purpose of this survey, it had to be distinguished between Basic research (TRL 1-2), Lab Demonstration (TRL 3-4), Field pilot (TRL 5-6), Market introduction (TRL 7-8), and Scaling (TRL 9).



**Figure 9: Technology readiness levels of different programmes**

valid cases: 69 programmes; missing cases: 35 programmes

Figure 9 shows that the technological readiness level of the 69 programmes indicated as technology programmes were most frequently Field pilots (TRL 5-6) (48%) and Market introduction (TRL 7-8) (43%). Comparatively smaller shares of programmes were indicated as Lab demonstration (TRL 3-4) (28%), Basic research (TRL 1-2) (17%), and Scaling projects (TRL 9) (17%).

The colouring in the following Table 4 accentuates the various TRLs of the programmes by country.

**Table 4: Technology readiness level of programmes, by country\***

Country	Programme 1	Programme 2	Programme 3	Programme 4	Programme 5
Austria	Market introduction	Field pilot	Market introduction	Field pilot	Field pilot
Belgium		Field pilot		Market introduction	
Czech Republic	Basic research	Basic research	Market introduction		
	Lab demonstration	Lab demonstration			

Country	Programme 1	Programme 2	Programme 3	Programme 4	Programme 5
	Field pilot	Field pilot			
	Market introduction	Market introduction			
Denmark	Basic research	Market introduction	Lab demonstration	Market introduction	Market introduction
	Lab demonstration	Scaling	Field pilot		Scaling
	Field pilot		Market introduction		
	Market introduction		Scaling		
	Scaling				
East Mediterranean	Field pilot	Field pilot	Field pilot	Field pilot	
Estonia					Scaling
Finland		Basic research	Basic research	Basic research	Basic research
France	Market introduction	Lab demonstration	Market introduction	Market introduction	
Germany	Field pilot	Field pilot	Lab demonstration	Field pilot	Lab demonstration
Ireland	Field pilot	Market introduction	Market introduction		
Italy	Field pilot			Scaling	Field pilot
Luxembourg			Field pilot		
The Netherlands			Market introduction		
Norway	Basic research	Market introduction	Lab demonstration		Market introduction
	Lab demonstration	Scaling	Field pilot		
	Field pilot		Market introduction		
	Market introduction		Scaling		
	Scaling				
Poland	Scaling	Scaling	Field pilot	Field pilot	Market introduction
Portugal	Lab demonstration		Field pilot		
Spain	Lab demonstration	Market introduction		Field pilot	
Sweden	Basic research	Basic research		Lab demonstration	Lab demonstration
Switzerland	Lab demonstration	Field pilot	Market introduction	Market introduction	Field pilot

Country	Programme 1	Programme 2	Programme 3	Programme 4	Programme 5
UK			Lab demonstration		
			Field pilot		
			Market introduction		
			Scaling		
EU	Field pilot				

\* No data available for Latvia, Slovakia, Hungary and Lithuania.

The picture here is fairly balanced, both between the different TRLs and between countries. It has to be noted that some countries interpreted the closed question as multiple choice question and thus indicated that some programmes may cover several TRL types (see Czech Republic, Denmark, Norway, UK).

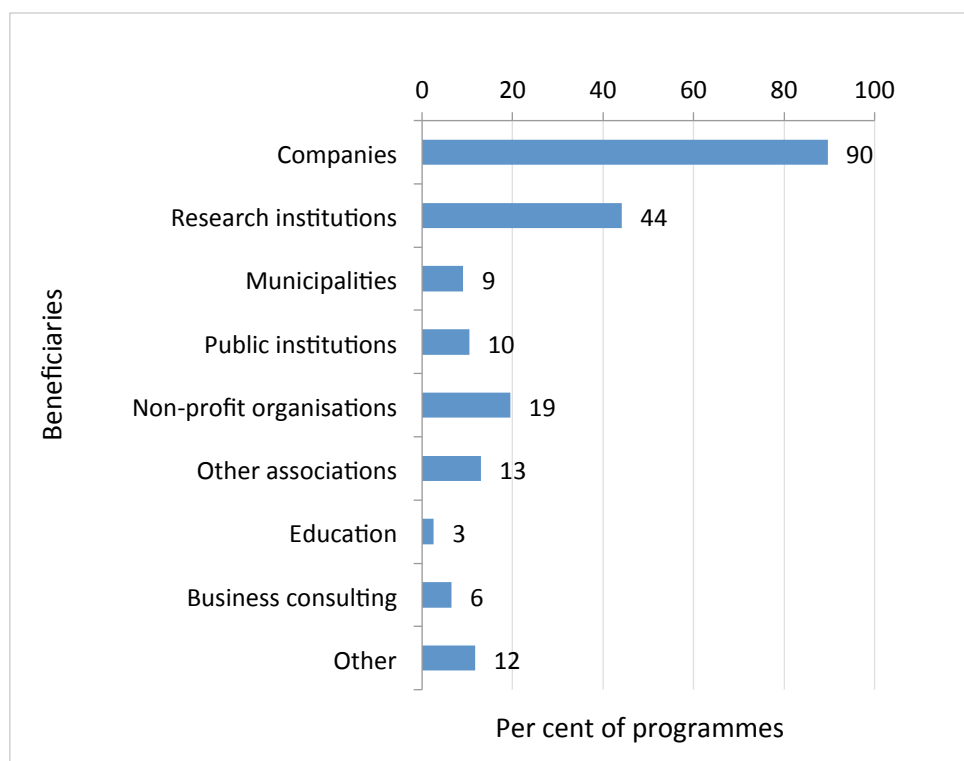
## 2.12 Beneficiary types

The survey also contained an open question concerning the types of programme beneficiaries (Q1.14). The responses were categorised as depicted in Table 5.

**Table 5: Categorisation of survey responses on beneficiaries**

Survey responses on programme beneficiaries	Categorisation
Commercial/state enterprises, SMEs, industry, large industry, business companies and cooperatives, consortia of enterprises, self-employed (self-governing), legal persons, private-public bodies, public corporations	Companies
Public/private universities and technical colleges, public/private research (incl. knowledge dissemination) institutions, research, development and innovation, institution, academia	Research institutions
Municipal associations, regional and local authorities, state organisations, public institutions	Municipalities
Public sector, environmental agencies, central administration, entities of territorial self-government, policy makers	Public institutions
Non-profit organisation, non-governmental organisations, non-economic organisations, contributory organisations, civil society organisations, environmental foundations, social and solidarity economy structures	Non-profit organisations (NPOs)
Associations in general, district waste associations, churches and religious societies and their unions, entrepreneurial associations, associations of physical or legal entities	Other associations
Educational (school, colleges) facilities	Education
Technical centres, business consultants, support centres for technological innovation, as well as training, business consultants and organisations involved in business innovation	Business consulting
Economy, consumers, wider population, partnerships, health facilities, technology transfer institutions	Other

The different shares of beneficiary types of the programmes included in the survey are visualised in the following Figure 10. A choice of more than one category was possible.



**Figure 10: Shares of programmes addressing different beneficiaries**

valid cases : 77; missing cases : 27

A considerable share of beneficiaries are companies (90%) (see Figure 10). Almost half of the programmes' funding (44%) is directed towards research institutions. A smaller but noticeable share of programmes is funding projects conducted by "non-profit organisations" (19%) and "other associations" (13%). All other beneficiary types (i.e., "municipalities", "public institutions", "other associations", "education", "business consulting") are supported at rather low shares in the range of 3% to 10% of the programmes. At this point it has to be stressed again that the survey is not representative, but represents a selection based on expert knowledge and data provision.

### 2.13 Key performance indicators, targets and actual developments

In the context of funding key performance indicators are generally of great importance. For this reason the survey asked in Q1.15 whether and which of the identified CE programmes contained Key Performance Indicators (KPIs), such as reduced primary raw materials input or increased secondary raw material input, or others. In addition, potential targets and the actuals were also queried.

A closer look at the responses to this questions on Key Performance Indicators revealed that the questionnaires were often completed with information on qualitative objectives to be achieved by the different funding programmes. In order to get an overview which objectives are essentially pursued by the programmes, they were grouped into four different categories: ecological, economical, societal and research targets.

- **Ecological targets** covering waste reduction, increasing of reuse, remanufacturing and recycling, reducing emissions, climate relevant gases, energy and resource consumption as well as responsible production and green innovations.
- **Economical targets** addressing innovative technologies, improved products and processes, increased revenues, new patents, and licensing agreements, strengthening the production and productivity and supporting start-ups.

- **Societal targets** including job creation, participation and good governance, poverty relief, education, societal innovation and improving the quality of life.
- **Research and development targets** involving applied results from research organisations, new pilot plants, increasing knowledge and know-how transfer, increasing the volume of the R&D sector and new publications.
- Since many targets could be regarded as ecological and economical targets, there is also the category “**Eco & economical target**”. These are, for example, innovative low carbon technologies, the support of national circular economy policies or the improvement of material efficiency.

As shown in Table 6, ecological targets are the most frequently addressed. 27 programmes from 13 countries are funding the CE to achieve ecological targets. Economical targets are also frequently reported, 17 programmes set economical targets. Besides, 15 programmes set targets that equally have positive impacts on the economy and the environment. In addition to these two “expectable” categories to be achieved by financial support of projects for CE, societal as well as R&D goals were named. 8 programmes addressed societal targets and 6 addressed aims in the R&D sector.

Besides, it should be noted that targets from different categories have been included in a single programme. For example, programme 3 from Belgium “BeCircular” pursues societal, ecological and economical targets. However, if several targets were identified in one category, the category was only included once. For example, for programme 1 from Denmark “Grand Solutions Programme - Green Growth” only one ecological target was included, although both a reduction of resource consumption as well as a reduction of climate and/or environmental impact shall be achieved.

**Table 6: Targets grouped country-by-country**

Country	Programme 1	Programme 2	Programme 3	Programme 4	Programme 5
Austria	Ecological target	Ecological target	Ecological target	Ecological target	Ecological target
Belgium			Ecological target	Ecological target	
			Economical target	Economical target	
			Societal target	Societal target	
Czech Republic		Economical target	Eco & economical target		
		Research target			
Denmark	Ecological target			Ecological target	
	Economical target	Economical target		Eco & economical target	
	Societal target				
East Mediterranean	Ecological target				
	Societal target				
Estonia					Ecological target
					Economical target
Finland					Ecological target
					Economical target
					Research target
France	Ecological target			Ecological target	



Country	Programme 1	Programme 2	Programme 3	Programme 4	Programme 5
				Societal target	
Germany		Ecological target	Eco & economical target		
	Economical target		Economical target		
Ireland		Economical target			
The Netherlands	Ecological target	Ecological target			
Norway	Ecological target	Ecological target		Ecological target	
	Economical target		Eco & economical target		Eco & economical target
				Research target	
				Economical target	Economical target
Poland	Ecological target	Ecological target	Eco & economical target	Eco & economical target	
		Economical target			
	Societal target	Research target		Research target	
Portugal	Eco & economical target	Eco & economical target	Eco & economical target	Eco & economical target	Eco & economical target
Slovakia	Ecological target				
Switzerland		Eco & economical target	Ecological target	Ecological target	Eco & economical target
				Economical target	Economical target
	Research target		Societal target		Societal target
UK			Eco & economical target		
EU			Ecological target	Ecological target	
				Economical target	

\*No data available for Hungary, Italy, Latvia, Lithuania, Luxembourg, Spain and Sweden.

The following Table 7 develops a more specific and quantitative perspective and summarises the survey responses on

- key performance indicators on programme success,
- quantitative targets, and
- the actual developments of the indicators.

It represents explicitly those countries and programmes which provided information and data on all three categories (KPI, targets and actuals).

**Table 7: Key performance indicators, corresponding targets, and actual developments**

Programmes (country)	Key performance indicators	Targets	Actuals
DELTA - Funding programme for applied research, experimental development and innovation Delta (Czech Republic)	<ul style="list-style-type: none"> <li>a) Average aid intensity for the programme</li> <li>b) Minimum number of supported projects</li> <li>c) Minimum rate of successfully completed projects</li> <li>d) Minimum number of outputs</li> <li>e) Minimum number of applied outputs</li> <li>f) Number of international links between project participants</li> </ul>	<ul style="list-style-type: none"> <li>a) Average aid intensity for the program: 74%</li> <li>b) Minimum number of supported projects: 75</li> <li>c) Minimum rate of successfully completed projects: 80%</li> <li>d) Minimum number of outputs: 150</li> <li>e) Minimum number of applied outputs: 100</li> <li>f) Number of international links between project participants: 250</li> </ul>	n/a
EPSILON - Funding programme for applied research, experimental development and innovation EPSILON (Czech Republic)	<ul style="list-style-type: none"> <li>a) The number of ideas proven to be applicable;</li> <li>b) The number of results of research organisations applied;</li> <li>c) The number of new and improved products and services marketed, the number of new and improved manufacturing processes introduced and the associated interannual growth in revenue (turnover) for the users;</li> <li>d) The interannual increase in beneficiaries' turnover;</li> <li>e) The total number of applied R&amp;D results;</li> <li>f) The number of patents resulting from the research and commercialized in the form of product or process innovation or licensing;</li> <li>g) The revenues obtained based on these commercialized patents;</li> <li>h) The number of licenses to the results of projects offered by research organisations;</li> <li>i) The number of license agreements concluded and the amount of royalties;</li> <li>j) The revenues generated by the sale and use of prototypes;</li> <li>k) The number of verified and implemented functional prototypes based on the experimental development conducted;</li> <li>l) The number of new pilot plants;</li> </ul>	<ul style="list-style-type: none"> <li>a) Minimum number of patents: 50*</li> <li>b) Minimum number of utility models and industrial designs: 200*</li> <li>c) Minimum number of pilot plants and proven technologies: 300*</li> <li>d) Minimum number of prototypes and functional samples: 150*</li> <li>e) Minimum number of software: 50*</li> <li>f) Minimum number of certified methodologies, procedures and specialized maps with professional content: 45*</li> <li>g) Minimum number of results reflected in legislation and standards and non-legislative directives and provisions: 5*</li> <li>h) Minimum number of programme results applied: 800*</li> </ul>	n/a

Programmes (country)	Key performance indicators	Targets	Actuals
	m) The number of transfers of know-how and technologies from research organisations to enterprises;		
Ettevõtte ressursitõhusus - <i>Resource efficiency of companies</i> (Estonia)	Increased resource productivity, resource savings	In 200 companies	in 33 companies
ARVI Material Value Chains (Estonia)	a) Number of peer reviewed academic publications b) Number of conference papers c) Number of PhD thesis d) Number of master's thesis e) Number of bachelor's thesis f) Number of technical reports for industry; g) Number of workshops on recycling business models	n/a	a) 40; b) 20; c) 1; d) 22; e) 9; f) 41; g) 9;
Circular economy, zero waste (France)	a) Tonnes of waste prevented b) Jobs created c) Cost savings realized	a) prevent and redirect several thousands of tones of waste; b) create more than 200 jobs; c) create 70% of cost savings for companies and citizens.	n/a
Ressourceneffiziente Kreislaufwirtschaft - Innovative Produktkreisläufe - ReziProK - <i>Resource efficient circular economy - innovative product cycles</i> (Germany)	Enhancing raw materials productivity	30 % until 2030 based on 2010	n/a
Samen tegen voedselverspilling - <i>Together against foodwaste</i> (Netherlands)	Reduction of food spillage	Reduction of 450 - 490 million kg	n/a

Programmes (country)	Key performance indicators	Targets	Actuals
Innowacyjny recykling - <i>Innovative Recycling (Poland)</i>	a) Number of developed products or technologies b) Number of patent applications by beneficiaries c) Number of implemented results of R&D works d) Income from the implemented results of R&D works e) The share of recyclable waste in the total mass of waste processed by the beneficiaries of the Programme f) Share of raw materials obtained from recycling of waste in the total mass of raw materials used for production at the beneficiaries of the Program g) Electricity consumption in production by enterprises implementing developed R&D solutions h) CO <sub>2</sub> emission in production by enterprises implementing the developed R&D solutions	a) 104 b) 100 c) 133 d) 285 e) increase by 10 % f) increase by 15 % g) increase by 30 % h) increase by 30 %	n/a
Generator koncepcji Ekologicznych GEKON - <i>Generator of ecological concepts (Poland)</i>	Number of developed and implemented ecological technologies	58	66
Program SOKÓŁ – wdrożenie innowacyjnych technologii środowiskowych - <i>FALCON Program - implementation of innovative environmental technologies (Poland)</i>	a) Number of developed products or technologies b) Number of patent applications by beneficiaries c) Number of implemented results of R&D works d) Income from the implemented results of R&D works e) The share of recyclable waste in the total mass of waste processed by the beneficiaries of the Programme f) Share of raw materials obtained from recycling of waste in the total mass of raw materials used for production at the beneficiaries of the Program g) Electricity consumption in production by enterprises implementing developed R&D solutions h) CO <sub>2</sub> emission in production by enterprises implementing the developed R&D solutions	a) 104 products or technologies b) 100 patent applications by beneficiaries c) 133 implemented results of R&D works d) Target for income from the implemented results of R&D works exists e) 10% increase in the share of recyclable waste processed by the beneficiaries of the Programme f) 15% increase in the share of raw materials obtained from recycling of waste in the total mass of raw materials used for production at the beneficiaries of the Program g) 30% decrease in electricity consumption in production by enterprises implementing developed R&D solutions	1. 16 R&D; 2. 3 market implementations.

Programmes (country)	Key performance indicators	Targets	Actuals
		h) 30% decrease in CO <sub>2</sub> emission from production by enterprises implementing the developed R&D solutions	
Operačný program Kvalita životného prostredia - Operational Programme Quality of Environment for the period 2014 – 2020 (OP QE) (Slovakia)	Share of recovered waste in the total amount of waste generated	60 % share of recovered waste in the total amount of waste generated (in 2023)	

These results show that only a limited number of programmes described in the survey, i.e. 11 out of 104 programmes, imply concrete key performance indicators, quantitatively measurable programme targets or data on the corresponding development. In fact, in some cases key performance indicators have been adopted but no targets were set out or no actual developments or measured so far.

In summary, the development of specific quantitative indicators to measure the performance or success of programmes is clearly underdeveloped. The vast majority of the programmes currently still refers to qualitative objectives, the measurement of which is rather difficult.

## 2.14 Collaborations between funding programmes and ideas of joint funding

In question Q1.16 respondents were asked to provide ideas on joint funding and / or specify existing collaborations between funding programmes. The examples of six countries are displayed in the following box.

### Box 2: Collaborations between funding programmes and indicated ideas on joint funding

#### Examples of collaborations between funding programmes and indicated ideas on joint funding

**Austria** employs EFRE co-financing of federal state funds in the programme "Environmental assistance in Austria" (UFI - Umweltförderung im Inland).

In **Belgium**, in the programme "Brucircle", cooperations exist mostly with the private sector, such as with the companies Lita.co, Inventures or Triodos.

**Finland** reports a nordic collaboration related to the programme "Bio and Circular Finland". Furthermore, with regard to the programme "ARVI Material Value Chains", Finland points to collaborations with "Business Finland" and with the EU joint undertaking Bio-Based Industry (BBI).

In **Germany**, the programme "Ressourceneffiziente Kreislaufwirtschaft - Innovative Produktkreisläufe – ReziProK" is cofunded by the ERA-NET Cofund on Raw Materials (ERA-MIN 2), which is a public-private partnership funded under Horizon 2020. In the programme "Ressourceneffiziente Stadtquartiere für die Zukunft - RESZ" (Resource efficient urban quarters for the future), collaboration takes place with "The Sustainable Urbanisation Global Initiative (SUGI). Furthermore, the programme "Materialien für eine ressourceneffiziente Industrie und Gesellschaft – MatRessource" collaborates with the funding programme M-era.Net (ERA-NET for materials research and innovation).

With regard to the **Swedish** programme "BioInnovation" respondents stated that the programme would support international cooperation on key technologies for bio-based products.

With regard to **EU** programmes, a "limited amount" of collaboration with the European Investment Bank (EIB) was reported for the "Life" programme. Furthermore, in the programme Horizon 2020, joint programming has been piloted with the EIB.

### 3 SURVEY RESULTS ON LEGAL MECHANISMS AND TECHNOLOGY AND BUSINESS FIELD DEVELOPMENT IN EUROPEAN COUNTRIES

A second part of the survey was interested in obtaining insights of recent legislation for the Circular Economy in the EU countries and further country-specific but CE relevant R&D priorities.

#### 3.1 Recent CE legislation in EU countries

Q3 specifically asked the survey respondents for CE legislation introduced in the countries and requested to provide 2-3 national examples of legislative measures (considered important) which are assumed to be directly triggering research & innovation for CE from 2015 onwards. It was not asked for loosely related strategies or programmes of the years before 2015 but examples of pertinent laws, regulations, guidelines, directives (e.g., plastic ban regulations, CE laws, national roadmaps for CE, etc.). Twenty-two countries delivered information for this question.

#### Box 3: Recent legislation for Circular Economy

##### Examples for recent legislation for Circular Economy (in alphabetical order)

**Austria** has an existing **Resource Efficiency Action Plan (REAP)**.

The **Czech Republic** has released a **State environmental policy** for 2012-2020 which consists of detailed objectives and instruments. The main goals are Reducing the share of waste disposed by landfilling, Increasing the share of material and energy recovery of Waste and Waste prevention.

Furthermore the **Waste Prevention Programme** from 2014 in combination to the National Waste Management Plan (2015-2024) presents an analysis of present activities and measures of Waste Prevention and Waste Streams subjected to further elaboration. The Programme includes 1 Main Objective, 13 Phased Targets and 26 Draft Measures.

Another Programme based in the Czech Republic is the **Secondary Raw Materials Policy** with Action Plan consisting of 5 strategic objectives.

The **Strategy for Circular Economy in Denmark** was published by the Ministry of Environment and Food and the Ministry of Industry, Business and Financial Affairs in 2018. Additional to this they utilize a waste prevention strategy called **Without Waste II**, which is published by the Danish government.

The **East Mediterranean Countries Albania, Croatia and Greece** are introducing initial steps on **Waste Management** and **environmental and nature protection, energy efficiency and renewable energies**.

**Estonia** has released a **Packaging Act** with the aim of preventing plastic pollution as well as a **Waste Act** with the goal of preventing waste generation and hazards arising from it. Furthermore they have released a **Climate Change Adaption Plan** until 2030 and a **decarbonisation strategy** until 2050.

**Finland** is operating a **road map to a circular economy** (2016-2025).

Back in 2015 **France** introduced the **Law on Energy Transitions**, which has various domains related to Circular Economy. It consists of objectives in terms of greenhouse gas emissions, fossil fuels, reduction of energy consumption, less waste in landfill and a reduction of nuclear energy. The **Roadmap on Circular Economy** was finalised in May 2018 whereas the **National Strategy on Ecological Transition towards Sustainable Development** ensures the coherence of public policies in France in the field of sustainable development area.

The **Packaging-Law in Germany** has been launched in December 2018 whereas **waste sorting** has been mandatory since 2012.

The **National Environmental Technology Innovation Strategy** 2011-2020 in **Hungary** highlights the importance of stimulating green and sustainable public procurement with regard on econ-innovations, eco-design, energy

and resource efficiency and non-hazardous technology and products. The main goal of the strategy is to reduce primary material use. Hungary has also a National Framework Strategy on Sustainable Development and a Waste Prevention Program (2014-2020) with a range of objectives and measures to promote reasonable resource use and to reduce material use and waste generation.

**Italy** introduced regulations concerning **production residues, reporting criteria and ecodesign and waste of electrical and electronic equipment** and **measures to apply environmental criteria** in the procedures for goods and services purchase by the public administration.

**Latvian Smart Specialisation Strategy** 2014-2020 is containing eco-innovation development, bio-economy, smart materials and sustainable energy solutions.

The **National Waste Management Plan** 2014-2020 from **Lithuania** highlights the importance for better waste management and effective recycling of waste.

The **Netherlands** have introduced a **plan to increase waste taxes**. Additionally the country is going to set **minimum prices for CO<sub>2</sub>** in 2020 for electricity production.

**Norway** has published a **White Paper on Circular Economy**. The most important segments of the paper are the environmental research for a green social change, the program for climate, the program for energy, the program for value creating within food and bio-based industries and user-controlled innovation arena.

The **Roadmap of transformation towards a circular economy** in **Poland** is an instrument to identify the activities for the increasing of eco-effectiveness of the use of resources and reduction of waste generation. Poland has also released an **environmental policy** with perspective to 2030 and a **raw materials policy**, which consists of rules and actions to reduce the risks in the supply of raw materials aimed at securing the long-term economic and social needs of the country.

In 2017 the **National plan for a transition towards circular economy** was adopted by the **Portuguese** government, which is an instrument for monitoring CE Activities in the country. The **Fundo ambiental** supports action for climate, energy transition, natural resources protection, sustainable exploitation and transition to a circular economy.

The **Republic of Ireland** initiated a **waste management program** and a **national litter pollution monitoring system**.

**Greener Slovakia – The Strategy for the Environmental Policy of the Slovak Republic** defines a vision for the year 2030. It identifies basic problems, sets targets, proposes framework measures to improve the current situation and contains also the basic performance indicators for verification of the results achieved. The country has an existing **waste management plan** for 2016-2020 and a **legal act on waste** from 2016 which is a very important document in the context of improvement of circular economy.

**Spain** has released a **law** that includes **prevention of waste**, leakages and soil contamination. **Espana Circular 2020** is a strategy for a circular economy published in 2018. The region of **Andalusia** has its own regional strategy for circular economy in relation with national plans. Other regions may be included later.

**Sweden** is planning to introduce **producer responsibility for textiles**

**Switzerland** has released a **law for the protection of environment**, which is called „Bundesgesetz über den Umweltschutz“.

The **United Kingdom** published the **Clean Growth Strategy** in 2017 which sets out a pathway to meeting national carbon commitments. Furthermore they have an **Industrial Strategy** which sets out a long term plan to boost the productivity and earning power of people in the UK. **Scotland** has its own **strategy on circular economy** which contains of a range of goals and measures in order to boost the circular economy potential in the region.



Concluding from the data retrieved from the various countries, there is a clear trend towards the development of circular economy strategies and programmes, as well as an increasing integration of circular economy elements within the framework of material resource efficiency and waste management strategies.

Even where a complete adoption of the course has not been fully implemented, concepts, drafts or related programmes are being worked on in most countries.

There were only seven countries that did not report any activities.

At the same time, the examples given here cover a wide range of very different specific instruments, e.g., Sweden's plan for producer responsibility of for textiles or the Swiss Law for the protection of the environment.

Overall, it can be observed that priorities and focus areas increasingly merge; clean growth and environmental strategies progressively take up circular economy aspects an circular economy strategies often choose raw material efficiency as a central starting point. Others start from a waste prevention or waste management perspective. This cannot be further investigated here, but is principally interesting with regard to the question of whether an input or end-of-pipe perspective is chosen.

With regard to the innovation landscape, it can be concluded that the present selective funding may result in fragmentary and non-cross sectorial innovation and would prospectively benefit from more EU instruction.

### 3.2 Country-specific trends in technology development

In order to retrieve some insights regarding the spectrum of technology developments, the country respondents were conclusively asked in Q4.1 to provide information on country-specific trends in CE innovation, for example, waste separation technologies, 3D print, electro mobility, etc.

An overview of CE relevant trends in the technological development of eleven European countries is provided in the following Table 8. The technology trends cover a wide range and vary from future mobility and communication technologies to developing a bio-economy.

**Table 8: Country-specific trends in technology development**

Country	Country-specific trends in technology development
Czech Republic	The National Research, Development and Innovation Policy of the Czech Republic 2016–2020 defines the following areas of research in relation to, among others the Waste Prevention Plan: Development of environmentally friendly technologies and procedures in the extraction, transport and processing of raw materials and substituting primary sources with secondary sources in relation to strategy documents in the area of wastes and circular economy. Research and innovation in circular economy are however on a very generic level.
Denmark	Digitalisation, waste prevention, scaling up of biomass utilization in energy systems
Estonia	Smart specialisation in resource efficiency and ICT technology, 3D print, open data, big data
Finland	Emphasis on Circular bio-economy; Biomass treatment, wood-based biomass treatment, synthetic biology and industrial biotechnology, material development, recycling and separation technologies (e.g. textiles, metal containing waste, WEEE, batteries, nutrient)
France	Critical raw materials, industry of the future (3D printing, digitization, etc.), bi-economy, electro mobility, recycling of end of life products of new technologies for energy (PV, batteries, fuel cells, etc.), CCU.

Germany	Three of six priority tasks (from Hightech-Strategy 2025, 2017): <ul style="list-style-type: none"> <li>• The digital economy and society – innovative solutions addressing the challenges inherent in digital technologies.</li> <li>• The sustainable economy and energy – the way to produce and consume needs to become more resource-efficient, environmentally friendly and socially compatible: Our overall goal is to decouple economic growth from resource consumption and thereby increase raw material productivity. To achieve this goal, we will intensify the transition to a resource-efficient circular economy.</li> <li>• Intelligent mobility – pursuing research in support of integrated transport policies that optimise the different modes of transport in terms of their efficiency, capability and interactions.</li> </ul>
Italy	Waste treatment technology, energy production from biomasses, bio-plastics
Norway	Scaling up utilisation of biomass resources in the economy, including in energy systems and materials in production.
Portugal	Focus on CE practices in plastics value chains
Spain	Most actions taken are initiated and supported by regional stakeholders, especially industrial clusters. No country-specific aspects but different region-specific ones probably.
Sweden	Chemical plastics recycling initiatives, plastic sorting, textile sorting

In summary, it can be stated that there is no clear indication of trends in technology development. The only trends are in the areas of digitisation and the bio-economy. However, since the question about trends in technology development was only answered for 11 countries, the total amount is too small to deduce Europe-wide trends.

### 3.3 Country-specific trends in circular economy business field development

Similar to the question above, Q4.2 asked the respondents to spotlight country-specific trends in CE business fields.

The results of eight countries, which provided information on this aspect, are shown in Table 9. The business fields stressed address a range of sectors such as the built environment, digitalisation and the food sector.

**Table 9: Country-specific trends in circular economy business field development**

Country	Country-specific trends in circular economy business field development
Estonia	ReUse centres, start-ups, upcycling in textile/fashion, hackathon
Finland	Circular business models (e.g. service business, 2nd life (e.g. in batteries), ecosystem approach, digitalisation,
Germany	Repair shops, re-use, upcycling, regional networking and collaborating on CE (e.g. circular berlin)
Italy	Bio-economy
Portugal	Focus exists on improving CE practices in the hostelry and construction/demolition sector, as well as to deploy a network of repair cafes in Portuguese cities
Spain	Actions in major cities (e.g. Barcelona Fab City initiative on disseminating Fab Labs in districts, or organising short circuits for food distribution, etc.)
Sweden	Sharing economy initiatives

United Kingdom	<p>The British Standards Institution established a committee of expert stakeholders to develop what is believed to be the first standard to help improve understanding and implementation of the circular economy at an organisational level. The first output of this programme, BS 8001 Framework for implementing the principles of the circular economy in organisations – Guide will help organisations continually improve their transition from a linear to a more sustainable and circular mode of operation. Specifically, the guide aims to provide organisations with an understanding of:</p> <ul style="list-style-type: none"><li>- What the circular economy is and how it may be relevant both now and in the future; and</li><li>- How to implement the principles of the circular economy in order to create direct and indirect value as a result of process, product/service or business model innovation</li></ul> <p>Manufacturing a Circular Economy- A position statement on circular economy research in the UK sets out a synthesis of views on publicly-funded research being done in the UK relevant to the circular economy. It summarises the opportunity for the UK and identifies the research communities contributing to this area as well as key stakeholders across the research and innovation landscape. Aimed at academics, industrialists, policy makers and funders it identifies a number of research challenges highlighted by stakeholders and recommends some approaches to take these forward. Views were gathered from a broad range of academics and experts in the area across multiple disciplines as well as input from BBSRC, ESRC, NERC, Innovate UK, KTN, Ellen MacArthur Foundation and the Green Alliance.</p>
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## 4 CONCLUSIONS

Based on the assessment of 104 R&I programmes, the results can be summarised as follows:

At present, the R&I for CE in Europe overwhelmingly consists of national programmes with a volume of 1-5 million or more than 13 million and a duration of 1-3 years. The focus is predominantly on the resources waste or biomass, and the most frequently addressed product life cycle phase is the end-of-life phase while other phases show a balanced picture.

The major type of funding is predominantly addressed to technology and process optimisation and the most frequently beneficiary sectors are the manufacturing and water sector. With regard to the Technology Readiness Levels (TRL), the programmes are mostly field pilots or referred to market introduction.

With regard to the overall volume and duration of project funding, there seems to be a deficit with regard to long-term up-scaling projects that would bridge the gap between successful research and actual implementation on an industry level. This challenge seems to be of specific relevance for the CE R&I programmes that face the necessity of often interdisciplinary cooperation of actors from different sectors alongside the value chain anyway; thus often related to rather high uncertainties and economic risks – as well as business opportunities.

Looking at the objectives and key performance indicators, the results do not really provide a consistent strategic idea of an European circular economy approach. The different member states and regions seem to follow different and sometimes even contradictory strategies. And although the member states and regions have of course very different potentials and framework conditions for transformations towards a circular economy, the differences worked out in this report seem to rather highlight the need for a more consistent European R&I strategy on CE than a smart specialisation strategy.

Of course, the overall results are much more differentiated and complex. Nevertheless, this initial spotlight can point to the fact that a consolidation of research and innovation in the context of CE needs to be carefully developed and should be more integrative with regard to resources, sectors, funded activities and beneficiaries addressed.

It can also be seen in the context of legislation and the development of technology and business fields that the situation in Europe is still very fragmented and context-dependent. A large momentum of aligned instruments cannot yet be observed, although most countries are now working very intensively on the development of CE instruments and strategies. The implementation status is very diverging.

At the same time, consumer-oriented programmes like in the fields education & training and social & behaviour are not very high on the agenda of CE funding at present. The main focus of the programmes focus on technology and process optimisation indicating to potential gaps potentially arising from production-side oriented R&I in the context of CE. As CE is an innovation agenda for economy *and* society, technology innovation has to be flanked with fundamental social & behavioural innovation which need to be supported too.

## 5 ANNEX

### 5.1 ANNEX 1: OVERVIEW OF PROGRAMMES DESCRIBED BY SURVEY RESPONDENTS

The following Table 10 provides an overview of the 104 programmes, which were described by respondents in the survey.

**Table 10: Overview of surveyed programmes**

Country (region)	Programme	Programme website
Albania	Climate-friendly integrated solid waste management and circular economy in Albania	<a href="https://www.giz.de/en/worldwide/62845.html">https://www.giz.de/en/worldwide/62845.html</a> - <a href="https://www.giz.de/en/downloads/WASTE_FACTSHEET_PRINT_EN.PDF">https://www.giz.de/en/downloads/WASTE_FACTSHEET_PRINT_EN.PDF</a>
	Economic Reform Programme 2018-2020	<a href="https://financa.gov.al/wp-content/uploads/2018/06/Economic_Reform_Programme_2018-2020-1.pdf">https://financa.gov.al/wp-content/uploads/2018/06/Economic_Reform_Programme_2018-2020-1.pdf</a> - <a href="http://www.azht.gov.al/files/pages_files/17-03-23-02-20-53DRAFT_PINS_Tirane_Durres__20_06_2016.pdf">http://www.azht.gov.al/files/pages_files/17-03-23-02-20-53DRAFT_PINS_Tirane_Durres__20_06_2016.pdf</a>
Austria	UFI – Umweltförderung im Inland (Environmental assistance in Austria)	<a href="https://www.bmnt.gv.at/umwelt/klimaschutz/ufi/ufi.html">https://www.bmnt.gv.at/umwelt/klimaschutz/ufi/ufi.html</a>  <a href="https://www.umweltfoerderung.at/rechtliche-grundlagen-ufi.html">https://www.umweltfoerderung.at/rechtliche-grundlagen-ufi.html</a>
	Produktion der Zukunft (Production of the Future)	<a href="https://www.bmvit.gv.at/innovation/produktion/produktion_der_zukunft.html">https://www.bmvit.gv.at/innovation/produktion/produktion_der_zukunft.html</a>  <a href="http://www.ffg.at/produktionderzukunft">www.ffg.at/produktionderzukunft</a>
	Abfallvermeidungs-Förderung (AVF) der Sammel- und Verwertungssysteme für Verpackungen (Waste prevention promotion of packaging collection and utilisation systems)	<a href="http://www.vks-gmbh.at/abfallvermeidungs-foerderung.html">http://www.vks-gmbh.at/abfallvermeidungs-foerderung.html</a>
Austria (Federal State of Salzburg)	Förderung von Umweltschutzmaßnahmen in Gemeinden (Promotion of environmental protection measures in local authorities)	<a href="https://www.salzburg.gv.at/umweltnaturwasser/_Seiten/abfallwirtschaft-gemeinden.aspx">https://www.salzburg.gv.at/umweltnaturwasser/_Seiten/abfallwirtschaft-gemeinden.aspx</a>
Austria (Federal State of Upper Austria)	Förderungen zum Thema Umwelt und Natur (Funding on the subject of the environment and nature)	<a href="https://www.land-oberoesterreich.gv.at/12846.htm">https://www.land-oberoesterreich.gv.at/12846.htm</a>  <a href="https://www.land-oberoesterreich.gv.at/files/publikationen/us_umweltbericht2018.pdf">https://www.land-oberoesterreich.gv.at/files/publikationen/us_umweltbericht2018.pdf</a>
Belgium (Flanders Region)	Open Call for demonstration projects	<a href="https://www.vlaanderen-circulair.be/nl/aan-de-slag/open-call">https://www.vlaanderen-circulair.be/nl/aan-de-slag/open-call</a>
	Flemish Environmental Holding	<a href="http://www.vmh.be">www.vmh.be</a> & <a href="http://www.vlaanderen-circulair.be/vmh">www.vlaanderen-circulair.be/vmh</a> (under construction)
Belgium (Brussels-)	BeCircular Project Call	<a href="http://www.circulareconomy.brussels/appels-a-projets-be-circular-entreprises/">http://www.circulareconomy.brussels/appels-a-projets-be-circular-entreprises/</a>

Country (region)	Programme	Programme website
Capital Region)	Brucircle	<a href="https://www.finance.brussels/nl/filialen/brucircle">https://www.finance.brussels/nl/filialen/brucircle</a>
Belgium (Walloon Region)	NEXT program	<a href="https://www.sriw.be/en/">https://www.sriw.be/en/</a>
Croatia	Environmental Protection and Energy Efficiency Fund (EPEEF)	<a href="http://www.fzoeu.hr/en/environmental_protection/sustainable_development/circular_economy/">http://www.fzoeu.hr/en/environmental_protection/sustainable_development/circular_economy/</a>
Czech Republic	Funding programme for applied research, experimental development and innovation Delta	<a href="https://www.tacr.cz/index.php/en/programmes/delta-programme.html">https://www.tacr.cz/index.php/en/programmes/delta-programme.html</a>
	Funding programme for applied research, experimental development and innovation EPSILON	<a href="https://www.tacr.cz/index.php/en/programmes/epsilon-programme.html">https://www.tacr.cz/index.php/en/programmes/epsilon-programme.html</a>
	Operational Program Enterprise and Innovation for Competitiveness, Low-carbon technologies - Secondary raw materials - Challenge IV	<a href="https://www.agentura-api.org/programy-podpory/nizkouglikove-technologie/nizkouglikove-technologie-druhotne-suroviny-vyzva-iv/">https://www.agentura-api.org/programy-podpory/nizkouglikove-technologie/nizkouglikove-technologie-druhotne-suroviny-vyzva-iv/</a>
	National Programme Environment	<a href="https://www.sfpz.cz/en/administered-programmes/national-programme-environment/">https://www.sfpz.cz/en/administered-programmes/national-programme-environment/</a>
	Operational Programme Environment	<a href="https://www.opzp.cz/">https://www.opzp.cz/</a>
	ETA programme supporting research, experimental development and innovation of applied social sciences and humanities	<a href="https://www.tacr.cz/index.php/en/programmes/eta-programme.html">https://www.tacr.cz/index.php/en/programmes/eta-programme.html</a>
	Environment Programme Prostředí pro život (Space for living)	
	Delta 2	<a href="https://www.tacr.cz/index.php/cz/programy/program-delta-2.html">https://www.tacr.cz/index.php/cz/programy/program-delta-2.html</a>
	Kappa	<a href="https://www.tacr.cz/index.php/cz/programy/program-kappa.html">https://www.tacr.cz/index.php/cz/programy/program-kappa.html</a>
	Zéta	<a href="https://www.tacr.cz/index.php/cz/programy/program-zeta.html">https://www.tacr.cz/index.php/cz/programy/program-zeta.html</a>
Denmark	Grand Solutions Programme - Green Growth	<a href="https://innovationsfonden.dk/en/programmes/grand-solutions/green-growth">https://innovationsfonden.dk/en/programmes/grand-solutions/green-growth</a>
	Fund for Green Business Development	<a href="https://groenomstilling.erhvervsstyrelsen.dk/fund-green-business-development">https://groenomstilling.erhvervsstyrelsen.dk/fund-green-business-development</a>
	Danish Eco-Innovation Program - Ecoinnovation subsidy scheme	<a href="https://eng.ecoinnovation.dk/the-danish-eco-innovation-program/ecoinnovation-subsidy-scheme/">https://eng.ecoinnovation.dk/the-danish-eco-innovation-program/ecoinnovation-subsidy-scheme/</a>
	Increased Growth through Circular Business Models in SMEs	<a href="http://ldcluster.com/portfolio-item/projekt-coe-smv/#1449488030748-eb993ecc-04793798-84210115-42ea7cd7-772e4dce-667ffed7-0d2d">http://ldcluster.com/portfolio-item/projekt-coe-smv/#1449488030748-eb993ecc-04793798-84210115-42ea7cd7-772e4dce-667ffed7-0d2d</a>
	Denmark Green Investment Fund - Green Loans	<a href="https://gronfond.dk/en/green-loans/">https://gronfond.dk/en/green-loans/</a>
Estonia	Central Baltic Programme 2014-2020	<a href="http://centralbaltic.eu/">http://centralbaltic.eu/</a>
	Circular economy programme	<a href="https://kik.ee/en/supported-activity/circular-economy-programme">https://kik.ee/en/supported-activity/circular-economy-programme</a>
	Personal Research Funding	<a href="https://www.etag.ee/en/funding/research-funding/personal-research-funding/">https://www.etag.ee/en/funding/research-funding/personal-research-funding/</a>

Country (region)	Programme	Programme website
	Base funding	<a href="https://www.hm.ee/en/activities/research-and-development/base-funding-and-centres-excellence">https://www.hm.ee/en/activities/research-and-development/base-funding-and-centres-excellence</a>
	Ettevõtte ressursitõhusus (Resource efficiency of companies)	<a href="https://ressurss.envir.ee/">https://ressurss.envir.ee/</a>
Finland	Bio and Circular Finland	<a href="https://www.businessfinland.fi/en/for-finnish-customers/services/build-your-network/bioeconomy-and-cleantech/bio--circular-finland/">https://www.businessfinland.fi/en/for-finnish-customers/services/build-your-network/bioeconomy-and-cleantech/bio--circular-finland/</a>
	BioNets	<a href="https://www.businessfinland.fi/en/for-finnish-customers/services/build-your-network/bioeconomy-and-cleantech/bionets/">https://www.businessfinland.fi/en/for-finnish-customers/services/build-your-network/bioeconomy-and-cleantech/bionets/</a>
	A Climate-Neutral and Resource-Scarce Finland	<a href="https://www.aka.fi/en/strategic-research-funding/programmes-and-projects/a-climate-neutral-and-resource-scarce-finland/">https://www.aka.fi/en/strategic-research-funding/programmes-and-projects/a-climate-neutral-and-resource-scarce-finland/</a>
	Keys to sustainable growth	<a href="https://www.aka.fi/en/strategic-research-funding/programmes-and-projects/keys-to-sustainable-growth-2018-2023/">https://www.aka.fi/en/strategic-research-funding/programmes-and-projects/keys-to-sustainable-growth-2018-2023/</a>
	ARVI Material Value Chains	<a href="http://arvifinalreport.fi/">http://arvifinalreport.fi/</a>
France	Investissements d'Avenir / Accelerating ecological transition / Circular economy and waste valorisation / Demonstrators and ambitious innovative territories	<a href="https://appelsaprojets.ademe.fr/aap/ECOCIR C2018-20#resultats">https://appelsaprojets.ademe.fr/aap/ECOCIR C2018-20#resultats</a>
	Industrial Renewal / New materials and processes / Circular Economy	<a href="http://www.agence-nationale-recherche.fr/suivi-bilan/editions-2013-et-anterieures/environnement-et-ressources-biologiques/ecotechnologies-ecoservices/eco-ts-thematiques/">http://www.agence-nationale-recherche.fr/suivi-bilan/editions-2013-et-anterieures/environnement-et-ressources-biologiques/ecotechnologies-ecoservices/eco-ts-thematiques/</a>
France (Hauts de France region)	Clusters' collaborative R&D projects (pôles de compétitivité), Fonds Unique Interministériel (FUI), Regions.	<a href="http://www.team2.fr/">http://www.team2.fr /</a> <a href="http://competitivite.gouv.fr/les-financements-des-projets-des-poles/les-appels-a-projets-de-r-d-fui-375.html">http://competitivite.gouv.fr/les-financements-des-projets-des-poles/les-appels-a-projets-de-r-d-fui-375.html</a>
France (City of Lyon)	Circular economy, zero waste.	<a href="http://www.economie.grandlyon.com/actualites/metropole-de-lyon-appel-a-manifestation-dinteret-economie-circulaire-zero-gaspillage-2017-2391.html">http://www.economie.grandlyon.com/actualites/metropole-de-lyon-appel-a-manifestation-dinteret-economie-circulaire-zero-gaspillage-2017-2391.html</a>
Germany	Ressourceneffiziente Kreislaufwirtschaft - Innovative Produktkreisläufe - ReziProK (Resource efficient circular economy - innovative product cycles)	<a href="https://www.bmbf.de/foerderungen/bekanntmachung-1492.html">https://www.bmbf.de/foerderungen/bekanntmachung-1492.html</a>
	Ressourceneffiziente Stadtquartiere für die Zukunft - RESZ (Resource efficient urban quarters for the future)	<a href="https://www.bmbf.de/foerderungen/bekanntmachung-1331.html">https://www.bmbf.de/foerderungen/bekanntmachung-1331.html</a>
	Materialien für eine ressourceneffiziente Industrie und Gesellschaft - MatRessource	<a href="https://matressource.de/de/">https://matressource.de/de/</a>
	Technologie-initiative Bioraffinerie	<a href="https://www.bmbf.de/foerderungen/bekanntmachung-1391.html">https://www.bmbf.de/foerderungen/bekanntmachung-1391.html</a>
	Innovationsinitiative industrielle Biotechnologie	<a href="https://www.bmbf.de/foerderungen/bekanntmachung-634.html">https://www.bmbf.de/foerderungen/bekanntmachung-634.html</a>

Country (region)	Programme	Programme website
Greece	ERDF-funded projects on waste management	<a href="https://ec.europa.eu/regional_policy/en/newsroom/news/2018/10/31-10-2018-going-circular-in-greece-funding-the-reuse-and-recycling-of-waste">https://ec.europa.eu/regional_policy/en/newsroom/news/2018/10/31-10-2018-going-circular-in-greece-funding-the-reuse-and-recycling-of-waste</a> <a href="https://www.naftemporiki.gr/finance/story/1404426/neo-programma-espas-gia-ti-diaxeirisi-apobliton">https://www.naftemporiki.gr/finance/story/1404426/neo-programma-espas-gia-ti-diaxeirisi-apobliton</a>
Hungary	OPKÖRNYEZETI ÉS ENERGIAHATÉKONYSÁGI OPERATÍV PROGRAM (KEHOP) (Environmental and Energy Efficiency Operational Programme)	<a href="https://www.kehop.hu/">https://www.kehop.hu/</a>
	Hungarian scientific research Fund (OTKA)	<a href="https://nkfi.gov.hu/funding/otka">https://nkfi.gov.hu/funding/otka</a>
	National Research, Development and Innovation Fund (NKFI)	<a href="https://nkfi.gov.hu/funding/portfolio-of-calls-to/calls-of-the-national">https://nkfi.gov.hu/funding/portfolio-of-calls-to/calls-of-the-national</a>
	Solution for circular economy –call for proposal by the Ministry of Agriculture	n/a
Italy	Impresa 4.0	<a href="http://www.sviluppoeconomico.gov.it/index.php/it/industria40">http://www.sviluppoeconomico.gov.it/index.php/it/industria40</a>
Italy (Regione Lazio)	POR FESR LAZIO 2014-2020 - Call for interventions to support the circular economy and energy supply chains linked to the Intelligent Specialization Strategy	<a href="http://lazioeuropa.it/bandi/por_fesr_bando_circular_economy_ed_energia-494/">http://lazioeuropa.it/bandi/por_fesr_bando_circular_economy_ed_energia-494/</a>
Italy (Emilia Romagna)	Fund for incentive prevention and reduction of waste in the Emilia-Romagna Region	<a href="http://www.atersir.it/amministrazione-trasparente/fondo-dambitodi-incentivazione-alla-prevenzione-e-riduzione-dei-rifiuti">http://www.atersir.it/amministrazione-trasparente/fondo-dambitodi-incentivazione-alla-prevenzione-e-riduzione-dei-rifiuti</a>
Italy (Regione Campania)	PSR FEASR CAMPANIA 2014-2020 - Supply chain cooperation for sustainable biomass supply for energy production	<a href="http://www.agricoltura.regione.campania.it/PSR_2014_2020/prebandi/1661.pd">http://www.agricoltura.regione.campania.it/PSR_2014_2020/prebandi/1661.pd</a>
Italy (South Italy)	PON Impresa e Competitività	<a href="http://www.ponic.gov.it">http://www.ponic.gov.it</a>
Ireland	Green Enterprise Call 2018	<a href="http://www.epa.ie/researchandeducation/research/epafunding/researchcall2018/greeneenterprisecall2018/">http://www.epa.ie/researchandeducation/research/epafunding/researchcall2018/greeneenterprisecall2018/</a>
	Disruptive Technologies Innovation Fund	<a href="https://dbei.gov.ie/DTIF">https://dbei.gov.ie/DTIF</a>
	ERA-Net on the Blue Bioeconomy (BlueBio) – Unlocking the Potential of Aquatic Bioresources	<a href="https://dbei.gov.ie/DTIF">https://dbei.gov.ie/DTIF</a>
Luxembourg	Fonds pour la protection de l'environnement	n/a
	Fonds Climat &Energie	n/a
	Fit4Circularity	<a href="https://www.luxinnovation.lu/innovate-in-luxembourg/performance-programmes/fit-4-circularity/">https://www.luxinnovation.lu/innovate-in-luxembourg/performance-programmes/fit-4-circularity/</a>
Netherlands	Samen tegen voedselverspilling (Together against foodwaste)	<a href="http://samentegenvoedselverspilling.nl/">http://samentegenvoedselverspilling.nl/</a>
	Plastic Pact NL	n/a
Norway	Grants for Bioeconomy Projects	<a href="https://www.innovasjon Norge.no/no/tjenester/innovasjon-og-utvikling/finansiering-for-innovasjon-og-utvikling/tilskudd-til-bioekonomiprojekter/">https://www.innovasjon Norge.no/no/tjenester/innovasjon-og-utvikling/finansiering-for-innovasjon-og-utvikling/tilskudd-til-bioekonomiprojekter/</a>
	Renewable energy in agriculture	<a href="https://www.innovasjon Norge.no/no/tjenester/landbruk/finansiering-for-landbruket/fornybar-energi-i-utlandet/">https://www.innovasjon Norge.no/no/tjenester/landbruk/finansiering-for-landbruket/fornybar-energi-i-utlandet/</a>



Country (region)	Programme	Programme website
	Programme for User-driven Research-based Innovation (BIA)	<a href="https://www.forskningsradet.no/en/Funding/BIA/1254038119283/p1184150364108?visAktive=true">https://www.forskningsradet.no/en/Funding/BIA/1254038119283/p1184150364108?visAktive=true</a>
	Sustainable Innovation in Food and Bio-based Industries (BIONÆR)	<a href="https://www.forskningsradet.no/en/Funding/BIONER/1253976797119">https://www.forskningsradet.no/en/Funding/BIONER/1253976797119</a>
	Green Industry Innovation Programme	<a href="http://www.eeagrants.lt/en/programmes/description/program-description/program/25">http://www.eeagrants.lt/en/programmes/description/program-description/program/25</a>
Poland	Gospodarka o obiegu zamkniętym w gminie (The Circular Economy in the local community)	<a href="http://nfosigw.gov.pl/oferta-finansowania/srodki-krajowe/programy-priorytetowe/gospodarka-o-obiegu-zamknietym/">http://nfosigw.gov.pl/oferta-finansowania/srodki-krajowe/programy-priorytetowe/gospodarka-o-obiegu-zamknietym/</a>
	Innowacyjny recykling (Innovative Recycling)	<a href="https://www.ncbr.gov.pl/programy/fundusze-europejskie/poir/konkursy/nnowacyjnecykling2017/">https://www.ncbr.gov.pl/programy/fundusze-europejskie/poir/konkursy/nnowacyjnecykling2017/</a>
	Generator koncepcji Ekologicznych GEKON (Generator of ecological concepts)	<a href="http://program-gekon.pl/">http://program-gekon.pl/</a>
	Program SOKÓŁ – wdrożenie innowacyjnych technologii środowiskowych (FALCON Program - implementation of innovative environmental technologies)	<a href="https://www.nfosigw.gov.pl/oferta-finansowania/srodki-krajowe/programy-priorytetowe/sokol-innowacyjne-technologie-srodowiskowe/#kot1">https://www.nfosigw.gov.pl/oferta-finansowania/srodki-krajowe/programy-priorytetowe/sokol-innowacyjne-technologie-srodowiskowe/#kot1</a>
	Wspólne Przedsięwzięcie CuBR (CuBR Joint Undertaking of The National Centre for Research and Development and KGHM Polska Miedź S.A.)	<a href="https://www.ncbr.gov.pl/programy/programy-krajowe/wspolne-przedsiwziecia/cubr/">https://www.ncbr.gov.pl/programy/programy-krajowe/wspolne-przedsiwziecia/cubr/</a>
Portugal	Fundação por la Ciencia e la Tecnologia (FCT)	<a href="https://www.fct.pt/agendastematicas/ecocirc.phtml.pt">https://www.fct.pt/agendastematicas/ecocirc.phtml.pt</a>
	Apoiar a Transição para uma Economia Circular - Fase II Apoiar a Transição para uma Economia Circular	<a href="https://www.fundoambiental.pt/aviso-2018/economia-circular/apoiar-a-transicao-para-uma-economia-circular-fase-ii.aspx">https://www.fundoambiental.pt/aviso-2018/economia-circular/apoiar-a-transicao-para-uma-economia-circular-fase-ii.aspx</a>
	Repensar os Plásticos na Economia: Desenhar, Usar, Regenerar (DURE)	<a href="https://www.fundoambiental.pt/aviso-2018/economia-circular/repensar-os-plasticos-na-economia-desenhar-usar-regenerar-dure.aspx">https://www.fundoambiental.pt/aviso-2018/economia-circular/repensar-os-plasticos-na-economia-desenhar-usar-regenerar-dure.aspx</a>
	Apoiar a Economia Circular no Setor da Construção (CIRCULAR - Construção)	<a href="https://www.fundoambiental.pt/aviso-2018/economia-circular/apoiar-a-economia-circular-no-setor-da-construcao-circular-construcao.aspx">https://www.fundoambiental.pt/aviso-2018/economia-circular/apoiar-a-economia-circular-no-setor-da-construcao-circular-construcao.aspx</a>
	Vale Economia Circular	<a href="https://www.iapmei.pt/PRODUTOS-E-SERVICOS/Incentivos-Financiamento/Sistemas-de-Incentivos/Economia-Circular.aspx">https://www.iapmei.pt/PRODUTOS-E-SERVICOS/Incentivos-Financiamento/Sistemas-de-Incentivos/Economia-Circular.aspx</a>
Slovakia	Operational Programme Quality of Environment for the period 2014 – 2020 (OP QE)- Operačný program Kvalita životného prostredia	<a href="http://www.op-kzp.sk">www.op-kzp.sk</a>
Spain	National Plan for Research, Science, Technology and Innovation (2017-2020) / Bioeconomy (objective 2) and Secure, efficient and low carbon energy (objective 3)	<a href="http://www.ciencia.gob.es/stfls/MICINN/Presna/FICHEROS/2018/PlanEstatatIIDI.pdf">http://www.ciencia.gob.es/stfls/MICINN/Presna/FICHEROS/2018/PlanEstatatIIDI.pdf</a>
	SBIOC (Spanish BioCluster)	<a href="http://sbioc.com/">http://sbioc.com/</a>

Country (region)	Programme	Programme website
Spain (Galicia)	Conecta Peme / Initiative BIOPOL	<a href="https://sede.xunta.gal/detalle-procedemento?codtram=IN852A">https://sede.xunta.gal/detalle-procedemento?codtram=IN852A</a>
Spain (Basque)	Project of demonstration of Circular Economy	<a href="http://www.euskadi.eus/web01-a2aznscp/es/k75aWebPublicacionesWar/k75aObtenerPublicacionDigitalServlet?R01HNoPortal=true&amp;N_LIBR=052066&amp;N_EDIC=0001&amp;C_IDIOM=es&amp;FORMATO=.pdf">http://www.euskadi.eus/web01-a2aznscp/es/k75aWebPublicacionesWar/k75aObtenerPublicacionDigitalServlet?R01HNoPortal=true&amp;N_LIBR=052066&amp;N_EDIC=0001&amp;C_IDIOM=es&amp;FORMATO=.pdf</a>
Sweden	Mistra Closing the loop	<a href="https://mistrarees.se/">https://mistrarees.se/</a>
	Mistra REES	<a href="https://mistrarees.se/">https://mistrarees.se/</a>
	Vinnova: Innovations for a sustainable society	<a href="https://www.vinnova.se/en/">https://www.vinnova.se/en/</a>
	BioInnovation (Strategic Innovation Program)	<a href="https://www.bioinnovation.se/">https://www.bioinnovation.se/</a>
	RE:Source (Strategic Innovation Program)	<a href="https://resource-sip.se/">https://resource-sip.se/</a>
Switzerland	NFP 73 Sustainable Economy	<a href="http://www.nfp73.ch/de">http://www.nfp73.ch/de</a>  <a href="http://www.snf.ch/de/fokusForschung/nationale-forschungsprogramme/nfp-73/Seiten/default.aspx">http://www.snf.ch/de/fokusForschung/nationale-forschungsprogramme/nfp-73/Seiten/default.aspx</a>
	Umwelttechnologieförderung (Environmental technology promotion)	<a href="https://www.bafu.admin.ch/bafu/en/home/topics/education/innovation/umwelttechnologiefoerderung.html">https://www.bafu.admin.ch/bafu/en/home/topics/education/innovation/umwelttechnologiefoerderung.html</a>
	Circular Economy Transition	<a href="https://www.cetransition.ch">https://www.cetransition.ch</a>
	Technologiefonds (Technology Funds)	<a href="http://www.technologiefonds.ch/buergschaften/zielgruppe/">http://www.technologiefonds.ch/buergschaften/zielgruppe/</a>  <a href="https://regiosuisse.ch/finanzhilfen-fuer-die-regionalentwicklung">https://regiosuisse.ch/finanzhilfen-fuer-die-regionalentwicklung</a>
Switzerland (City of Geneva)	Programme d'innovation sociétale G'innove (G'innove societal innovation program)	
United Kingdom	Industrial Strategy Challenge Fund - Innovate UK	<a href="https://www.ukri.org/innovation/industrial-strategy-challenge-fund/">https://www.ukri.org/innovation/industrial-strategy-challenge-fund/</a>
United Kingdom (Scotland)	Circular Economy Investment Fund	<a href="https://www.circulareconomyclub.com/listings/funding/circular-economy-investment-fund-scotland/">https://www.circulareconomyclub.com/listings/funding/circular-economy-investment-fund-scotland/</a>  <a href="https://www.zerowastescotland.org.uk/circular-economy/investment-fund">https://www.zerowastescotland.org.uk/circular-economy/investment-fund</a>
	Scottish Institute for Remanufacture (SIR)	<a href="http://www.scot-reman.ac.uk/">http://www.scot-reman.ac.uk/</a>
	Resource Efficient Circular Economy Accelerator Programme - European Structural Funds in Scotland	<a href="https://www.zerowastescotland.org.uk/content/resource-efficient-circular-economy-accelerator-programme">https://www.zerowastescotland.org.uk/content/resource-efficient-circular-economy-accelerator-programme</a>
United Kingdom (Wales)	Circular Economy Capital Investment Fund	<a href="https://gov.wales/newsroom/environmentalndcountryside/2017/170310-cabinet-secretary-confirms-6m-circular-economy-fund/?lang=en">https://gov.wales/newsroom/environmentalndcountryside/2017/170310-cabinet-secretary-confirms-6m-circular-economy-fund/?lang=en</a>
EU	Life	<a href="http://ec.europa.eu/environment/life/about/">http://ec.europa.eu/environment/life/about/</a>
	Horizon 2020	<a href="http://ec.europa.eu/horizon2020">http://ec.europa.eu/horizon2020</a>
	EIT RawMaterials	<a href="https://eitrawmaterials.eu/">https://eitrawmaterials.eu/</a>
	EIT Climate-KIC	<a href="https://www.climate-kic.org/">https://www.climate-kic.org/</a>

## **5.2 ANNEX 2: INDICATED DATA ON FINANCIAL VOLUMES OF PROGRAMMES**

Table 11 depicts the survey data based on which annual financial programme volumes, as depicted in Figure 2, were calculated. In those cases other currencies than Euro were indicated, the figures were converted into Euro based on exchange rates as of between 18-27 March 2019.

**Table 11: Annual financial volumes of programmes supportive of circular economy projects**

Country (region)	Programme	Original survey data behind annual financial volumes	Issues to which the financial volume is spent
Albania	Climate-friendly integrated solid waste management and circular economy in Albania	3 million EUR total volume; spent during programme duration (2016-2019)	
	Economic Reform Programme 2018-2020	178.4 million EUR total volume for the programme parts on “Water and Waste Water”, Sustainable Agricultural Land Management program, and non-food industry development policy; spent during programme duration (2018-2020).	
Austria	UFI – Umweltförderung im Inland (Environmental assistance in Austria)	For the field of waste and resources, about 187 million EUR were spent between 2006 and 2015.	
	Produktion der Zukunft (Production of the Future)	18 million EUR in 2019	n/a
	Abfallvermeidungs-Förderung (AVF) der Sammel- und Verwertungssysteme für Verpackungen (Waste prevention promotion of packaging collection and utilisation systems)	1.04 million EUR in 2017	
Austria (Federal State of Salzburg)	Förderung von Umweltschutzmaßnahmen in Gemeinden (Promotion of environmental protection measures in local authorities)	n/a	
Austria (Federal State of Upper Austria)	Förderungen zum Thema Umwelt und Natur (Funding on the subject of the environment and nature)	6.8 million EUR for waste measures during the period 2012-2017	
Belgium (Flanders Region)	Open Call for demonstration projects	4,6 million EUR in 2018	
	Flemish Environmental Holding	n/a	n/a
Belgium (Brussels-Capital Region)	BeCircular Project Call	1.5 million EUR per year	
	Brucircle	1.5 million EUR for 3 years	
Belgium (Walloon Region)	NEXT program	n/a	n/a
Croatia	Environmental Protection and Energy Efficiency Fund (EPEEF)	n/a	

Country (region)	Programme	Original survey data behind annual financial volumes	Issues to which the financial volume is spent
Czech Republic	Funding programme for applied research, experimental development and innovation Delta	37.83 million EUR for the period 2014-2019*	
	Funding programme for applied research, experimental development and innovation EPSILON	502.44 million EUR for the environmental component for the years 2015-2025*	
	Operational Program Enterprise and Innovation for Competitiveness, Low-carbon technologies - Secondary raw materials - Challenge IV	19.48 million EUR for the environmental component for the period 2018-2021*	
	National Programme Environment	Part allocated to eco-innovation priority: 7.79 million EUR for the period 2018-2020*	
	Operational Programme Environment	11.66 million EUR for the project parts "waste prevention" and "material and energetic recovery of waste" for the period 2014-2020.*	
	ETA programme supporting research, experimental development and innovation of applied social sciences and humanities	93 million EUR for 4 years*	
	Environment Programme Prostředí pro život (Space for living)	n/a	n/a
	Delta 2	64.32 million EUR for the period 2020-2025*	n/a
	Kappa	30.32 million EUR for the period 2019-2024*	n/a
	Zéta	32.91 million EUR 2017-2021*	n/a
Denmark	Grand Solutions Programme - Green Growth	20.11 million EUR for 2019*	n/a
	Fund for Green Business Development	7.3 million EUR for the period 2013-2015*	n/a
	Danish Eco-Innovation Program - Ecoinnovation subsidy scheme	62.47 million EUR since 2007*	
	Increased Growth through Circular Business Models in SMEs	2.59 million EUR for 3 years*	
	Denmark Green Investment Fund - Green Loans	n/a	n/a
Estonia	Central Baltic Programme 2014-2020	n/a	n/a
	Circular economy programme	2 million EUR in 2018	
	Personal Research Funding	n/a	n/a
	Base funding	n/a	n/a
	Ettevõtte ressursitõhusus (Resource efficiency of companies)	100 million EUR for the period 2014-2023	
Finland	Bio and Circular Finland	300 million EUR for the period 2019-2023	
	BioNets	46 million EUR for the period 2016-2018	n/a

Country (region)	Programme	Original survey data behind annual financial volumes	Issues to which the financial volume is spent
	A Climate-Neutral and Resource-Scarce Finland	28.5 million EUR for the period 2015-2021	n/a
	Keys to sustainable growth	22.7 million EUR for the period 2018-2023	n/a
	ARVI Material Value Chains	10 million EUR for the period 2014-2017	n/a
France	Investissements d'Avenir / Accelerating ecological transition / Circular economy and waste valorisation / Demonstrators and ambitious innovative territories	500 million EUR for the period 2017-2019	n/a
	Industrial Renewal / New materials and processes / Circular Economy	40 million EUR for the period 2005-2013	
France (Hauts de France region)	Clusters' collaborative R&D projects (pôles de compétitivité), Fonds Unique Interministériel (FUI), Regions.	n/a	
France (City of Lyon)	Circular economy, zero waste.	0.08 million EUR for the period 2017-2020	
Germany	Ressourceneffiziente Kreislaufwirtschaft - Innovative Produktkreisläufe - ReziProK (Resource efficient circular economy - innovative product cycles)	30 million EUR for the period 2017-2022	
	Ressourceneffiziente Stadtquartiere für die Zukunft - RESZ (Resource efficient urban quarters for the future)	25 million EUR for the period 2019-2022	
	Materialien für eine ressourceneffiziente Industrie und Gesellschaft - MatRessource	70 million EUR for the period 2012-2020	
	Technologie-initiative Bioraffinerie	47 million EUR for the period 2012-2022	
	Innovationsinitiative industrielle Biotechnologie	45 million EUR for the period 2011-2022	
Greece	ERDF-funded projects on waste management	20 million EUR in total; programme duration: 2021-2027	
Hungary	OPKÖRNYEZETI ÉS ENERGIAHATÉKONYSÁGI OPERATÍV PROGRAM (KEHOP) (Environmental and Energy Efficiency Operational Programme)	n/a	
	Hungarian scientific research Fund (OTKA)	n/a	
	National Research, Development and Innovation Fund (NKFI)	n/a	
	Solution for circular economy –call for proposal by the Ministry of Agriculture	n/a	
Italy	Impresa 4.0	n/a	n/a


Country (region)	Programme	Original survey data behind annual financial volumes	Issues to which the financial volume is spent
Italy (Regione Lazio)	POR FESR LAZIO 2014-2020 - Call for interventions to support the circular economy and energy supply chains linked to the Intelligent Specialization Strategy	10 million EUR for the period 2014-2020	
Italy (Emilia Romagna)	Fund for incentive prevention and reduction of waste in the Emilia-Romagna Region	11.2 million EUR for the period 2014-2020	
Italy (Regione Campania)	PSR FEASR CAMPANIA 2014-2020 - Supply chain cooperation for sustainable biomass supply for energy production	1.5 million EUR for the period 2014-2020	n/a
Italy (South Italy)	PON Impresa e Competitività	n/a	
Ireland	Green Enterprise Call 2018	n/a	n/a
	Disruptive Technologies Innovation Fund	500 million EUR for the period 2017-2024	
	ERA-Net on the Blue Bioeconomy (BlueBio) – Unlocking the Potential of Aquatic Bioresources	n/a	n/a
Luxembourg	Fonds pour la protection de l'environnement	n/a	
	Fonds Climat &Energie	n/a	
	Fit4Circularity	n/a	
Netherlands	Samen tegen voedselverspilling (Together against foodwaste)	7 million EUR for the period 2018-2021	
	Plastic Pact NL	0.6 million EUR for the period 2019-2025	
Norway	Grants for Bioeconomy Projects	n/a	
	Renewable energy in agriculture	n/a	
	Programme for User-driven Research-based Innovation (BIA)	4.62 million EUR in 2019*	
	Sustainable Innovation in Food and Bio-based Industries (BIONÆR)	25.14 million EUR annually*	
	Green Industry Innovation Programme	n/a	n/a
Poland	Gospodarka o obiegu zamkniętym w gminie (The Circular Economy in the local community)	10.5 million EUR for the period 2017-2020*	
	Innowacyjny recykling (Innovative Recycling)	21 million EUR for the period 2014-2020*	
	Generator koncepcji Ekologicznych GEKON (Generator of ecological concepts)	93 million EUR for the period 2013-2025	n/a

Country (region)	Programme	Original survey data behind annual financial volumes	Issues to which the financial volume is spent
	Program SOKÓŁ – wdrożenie innowacyjnych technologii środowiskowych (FALCON Program - implementation of innovative environmental technologies)	581 million EUR for the period 2016-2023	n/a
	Wspólne Przedsięwzięcie CuBR (CuBR Joint Undertaking of The National Centre for Research and Development and KGHM Polska Miedź S.A.)	46 million EUR for the period 2012-2022	n/a
Portugal	Fundação por la Ciencia e la Tecnologia (FCT)	n/a	
	Apoiar a Transição para uma Economia Circular - Fase II	6.4 million EUR in 2018 for the circular economy section	
	Apoiar a Transição para uma Economia Circular		
	Repensar os Plásticos na Economia: Desenhar, Usar, Regenerar (DURE)	1 million EUR in 2018	
	Apoiar a Economia Circular no Setor da Construção (CIRCULAR - Construção)	0.5 million EUR in 2018	
	Vale Economia Circular	0.65 million EUR (1 shot)	
Slovakia	Operational Programme Quality of Environment for the period 2014 – 2020 (OP QE)- Operačný program Kvalita životného prostredia	1801 million EUR for the period 2014-2020	
Spain	National Plan for Research, Science, Technology and Innovation (2017-2020) / Bioeconomy (objective 2) and Secure, efficient and low carbon energy (objective 3)	469 million EUR for the period 2017-2020	
	SBIOC (Spanish BioCluster)	n/a	n/a
Spain (Galicia)	Conecta Peme / Initiative BIOPOL	n/a	n/a
Spain (Basque)	Project of demonstration of Circular Economy	0.4 million EUR for one year	
Sweden	Mistra Closing the loop	8.33 million EUR for the period 2012-2020*	
	Mistra REES	3.97 million EUR for the period 2015-2020*	
	Vinnova: Innovations for a sustainable society	6.62 million EUR for the period 2019-2022*	
	BioInnovation (Strategic Innovation Program)	n/a	
	RE:Source (Strategic Innovation Program)	n/a	
Switzerland	NFP 73 Sustainable Economy	17.61 million EUR for the period 2016-2024*	n/a
	Umwelttechnologieförderung (Environmental technology promotion)	3.52 million EUR annually*	



Country (region)	Programme	Original survey data behind annual financial volumes	Issues to which the financial volume is spent
	Circular Economy Transition	n/a	
	Technologiefonds (Technology Funds)	n/a	
Switzerland (City of Geneva)	Programme d'innovation sociétale G'innove (G'innove societal innovation program)	0.23 million EUR in 2017*	n/a
United Kingdom	Industrial Strategy Challenge Fund - Innovate UK	5505 million EUR for 4 years*	
United Kingdom (Scotland)	Circular Economy Investment Fund	21.08 million EUR for the period 2016-2018*	
	Scottish Institute for Remanufacture (SIR)	n/a	
	Resource Efficient Circular Economy Accelerator Programme - European Structural Funds in Scotland	85.15 million EUR for the period 2014-2020*	
United Kingdom (Wales)	Circular Economy Capital Investment Fund	n/a	
EU	Life	650 million EUR for the period 2014-2020	
	Horizon 2020	934 million EUR for the period 2014-2020	
	EIT RawMaterials	270 million EUR for the period 2014-2020	n/a
	EIT Climate-KIC	40 million EUR in 2019	

\* Currencies were converted into EUR by the authors by employing exchange rates occurring between 18<sup>th</sup> to 25<sup>th</sup> March 2019.

 Indicated financial volume exclusively spent to circularity increasing projects    n/a    data not available

 Indicated financial volume also spent to other than circularity issues

### 5.3 ANNEX 3: INDICATED DATA ON THE NUMBER OF PROJECTS FUNDED AND ON THE FUNDING PER PROJECT

Table 12 depicts the survey data on the number of projects funded and on the funding per project. Concerning the funding per project different kind of data were indicated by respondents (i.e., the total amount of funding per project, the average funding per project, and the funding per project per year). The different data categories are also marked in Table 12.

**Table 12: Number of projects funded and average funding per project**

Country (region)	Programme	Number of projects funded	Funding per project
Albania	Climate-friendly integrated solid waste management and circular economy in Albania	3 projects in the period 2016-2019	n/a
	Economic Reform Programme 2018-2020	n/a	n/a
Austria	UFI – Umweltförderung im Inland (Environmental assistance in Austria)	waste and resources sector: 106 projects between 2006 and 2015	n/a
	Produktion der Zukunft (Production of the Future)	2011–2016: 226 funded projects	n/a
	Abfallvermeidungs-Förderung (AVF) der Sammel- und Verwertungssysteme für Verpackungen (Waste prevention promotion of packaging collection and utilisation systems)	2017: 25	funding per project and year Small projects: 1,000 EUR - ≤ 10,000 EUR Major projects >10,000 EUR - 100,000 EUR Material cost projects 2,000 EUR - 30,000 EUR
Austria (Federal State of Salzburg)	Förderung von Umweltschutzmaßnahmen in Gemeinden (Promotion of environmental protection measures in local authorities)	n/a	n/a
Austria (Federal State of Upper Austria)	Förderungen zum Thema Umwelt und Natur (Funding on the subject of the environment and nature)	2012-2017: 5848 funding projects	n/a
Belgium (Flanders Region)	Open Call for demonstration projects	53 projects were funded in 2018	n/a
	Flemish Environmental Holding		200,000 – 3000,000 EUR per project
Belgium (Brussels-Capital Region)	BeCircular Project Call	96 after 3 years	50.000 EUR average funding per project
	Brucircle	n/a	50,000- 200,000 EUR /project
Belgium (Walloon Region)	NEXT program	n/a	n/a
Croatia	Environmental Protection and Energy Efficiency Fund (EPEEF)	n/a	n/a
Czech Republic	Funding programme for applied research, experimental development and innovation Delta	n/a	Max. 0.97 million EUR*
	Funding programme for applied research, experimental development and innovation EPSILON	n/a	minimum subsidy 39,000 EUR per project, max 3.88 million EUR*

Country (region)	Programme	Number of projects funded	Funding per project
	Operational Program Enterprise and Innovation for Competitiveness, Low-carbon technologies - Secondary raw materials - Challenge IV	n/a	n/a
	National Programme Environment	n/a	n/a
	Operational Programme Environment	n/a	total eligible project costs up to EUR 1.94 million including VAT. The minimum amount of eligible direct implementation costs is EUR 19,000 (excluding VAT)*
	ETA programme supporting research, experimental development and innovation of applied social sciences and humanities	n/a	n/a
	Environment Programme Prostředí pro život (Space for living)	n/a	n/a
	Delta 2	n/a	n/a
	Kappa	n/a	n/a
	Zéta	n/a	n/a
Denmark	Grand Solutions Programme - Green Growth	n/a	n/a
	Fund for Green Business Development	33 projects between 2013-2015	n/a
	Danish Eco-Innovation Program - Ecoinnovation subsidy scheme	401 projects since 2007	n/a
	Increased Growth through Circular Business Models in SMEs	n/a	n/a
	Denmark Green Investment Fund - Green Loans	n/a	n/a
Estonia	Central Baltic Programme 2014-2020	2 projects partly connected to CE topic (period unclear)	n/a
	Circular economy programme	53 projects on CE topic (period n/a)	n/a
	Personal Research Funding	1 project partly connected to CE topic (period n/a)	n/a
	Base funding	1 project on CE in the period 2017-2018	n/a
	Ettevõtete ressursitõhusus (Resource efficiency of companies)	33 projects	n/a
Finland	Bio and Circular Finland	n/a	n/a
	BioNets	128 projects in the period 2016-2018	n/a
	A Climate-Neutral and Resource-Scarce Finland	5 projects (period n/a)	n/a
	Keys to sustainable growth	6 projects (period n/a)	n/a
	ARVI Material Value Chains	n/a	n/a




Country (region)	Programme	Number of projects funded	Funding per project
France	Investissements d'Avenir / Accelerating ecological transition / Circular economy and waste valorisation / Demonstrators and ambitious innovative territories	n/a	2 million EUR average funding per project
	Industrial Renewal / New materials and processes / Circular Economy	From 2005 to 2013: 132 projects (an average of 20 projects per year).	n/a
France (Hauts de France region)	Clusters' collaborative R&D projects (pôles de compétitivité), Fonds Unique Interministériel (FUI), Regions.	n/a	n/a
France (City of Lyon)	Circular economy, zero waste.	n/a	n/a
Germany	Ressourceneffiziente Kreislaufwirtschaft - Innovative Produktkreisläufe - ReziProK (Resource efficient circular economy - innovative product cycles)	27 projects (period n/a)	1,1 million EUR average funding per project
	Ressourceneffiziente Stadtquartiere für die Zukunft - RESZ (Resource efficient urban quarters for the future)	13 projects (period n/a)	n/a
	Materialien für eine ressourceneffiziente Industrie und Gesellschaft - MatRessource	44 projects (period n/a)	n/a
	Technologie-initiative Bioraffinerie	65 (period n/a)	0,7 million EUR average funding per project
	Innovationsinitiative industrielle Biotechnologie	99	0.5 million EUR average funding per project
Greece	ERDF-funded projects on waste management	n/a	n/a
Hungary	OPKÖRNYEZETI ÉS ENERGIAHATÉKONYSÁGI OPERATÍV PROGRAM (KEHOP) (Environmental and Energy Efficiency Operational Programme)	n/a	n/a
	Hungarian scientific research Fund (OTKA)	n/a	n/a
	National Research, Development and Innovation Fund (NKFIA)	n/a	n/a
	Solution for circular economy –call for proposal by the Ministry of Agriculture	n/a	n/a
Italy	Impresa 4.0	n/a	n/a
Italy (Regione Lazio)	POR FESR LAZIO 2014-2020 - Call for interventions to support the circular economy and energy supply chains linked to the Intelligent Specialization Strategy	n/a	n/a

Country (region)	Programme	Number of projects funded	Funding per project
Italy (Emilia Romagna)	Fund for incentive prevention and reduction of waste in the Emilia-Romagna Region	n/a	n/a
Italy (Regione Campania)	PSR FEASR CAMPANIA 2014-2020 - Supply chain cooperation for sustainable biomass supply for energy production	n/a	n/a
Italy (South Italy)	PON Impresa e Competitività	n/a	n/a
Ireland	Green Enterprise Call 2018	n/a	n/a
	Disruptive Technologies Innovation Fund	27 projects are approved for funding	n/a
	ERA-Net on the Blue Bioeconomy (BlueBio) – Unlocking the Potential of Aquatic Bioresources	n/a	n/a
Luxembourg	Fonds pour la protection de l'environnement	n/a	n/a
	Fonds Climat &Energie	n/a	n/a
	Fit4Circularity	n/a	n/a
Netherlands	Samen tegen voedselverspilling (Together against foodwaste)	1 (period n/a)	n/a
	Plastic Pact NL	1 (period n/a)	n/a
Norway	Grants for Bioeconomy Projects	n/a	EUR 10,300 to EUR 206,000 per project*
	Renewable energy in agriculture	n/a	n/a
	Programme for User-driven Research-based Innovation (BIA)	3-5 projects (period n/a)	n/a
	Sustainable Innovation in Food and Bio-based Industries (BIONÆR)	n/a	n/a
	Green Industry Innovation Programme	n/a	EUR 170,000-1.5 million; Small Grants Scheme: EUR 50,000-200,000 per project
Poland	Gospodarka o obiegu zamkniętym w gminie (The Circular Economy in the local community)	n/a	n/a
	Innowacyjny recykling (Innovative Recycling)	12 projects (period n/a)	n/a
	Generator koncepcji Ekologicznych GEKON (Generator of ecological concepts)	66 projects (period n/a)	n/a
	Program SOKÓŁ – wdrożenie innowacyjnych technologii środowiskowych (FALCON Program - implementation of innovative environmental technologies)	66 projects (period n/a)	n/a

Country (region)	Programme	Number of projects funded	Funding per project
	Wspólne Przedsięwzięcie CuBR (CuBR Joint Undertaking of The National Centre for Research and Development and KGHM Polska Miedź S.A.)	21 projects (period n/a)	n/a
Portugal	Fundação por la Ciencia e la Tecnologia (FCT)	1618 projects	232,000 EUR average funding per project
	Apoiar a Transição para uma Economia Circular - Fase II	20 projects funded in 2017	50,000 EUR average funding per project
	Apoiar a Transição para uma Economia Circular	4 projects funded in 2018	142,000 to 199,000 EUR per project
	Repensar os Plásticos na Economia: Desenhar, Usar, Regenerar (DURe)	3 projects funded in 2018	48,000 to 50,000 EUR per project
	Apoiar a Economia Circular no Setor da Construção (CIRCULAR - Construção)	85 SMEs accredited in one shot	Respectively 7,500 EUR in consulting support
Slovakia	Operational Programme Quality of Environment for the period 2014 – 2020 (OP QE)- Operačný program Kvalita životného prostredia	n/a	n/a
Spain	National Plan for Research, Science, Technology and Innovation (2017-2020) / Bioeconomy (objective 2) and Secure, efficient and low carbon energy (objective 3)	n/a	n/a
	SBIOC (Spanish BioCluster)	n/a	n/a
Spain (Galicia)	Conecta Peme / Initiative BIOPOL	n/a	n/a
Spain (Basque)	Project of demonstration of Circular Economy	36 projects financed (period n/a)	Maximum funding per project: 30,000 EUR
Sweden	Mistra Closing the loop	6 projects (period n/a)	n/a
	Mistra REES	7 projects (period n/a)	n/a
	Vinnova: Innovations for a sustainable society	n/a	n/a
	BioInnovation (Strategic Innovation Program)	n/a	n/a
	RE:Source (Strategic Innovation Program)	n/a	n/a
Switzerland	NFP 73 Sustainable Economy	25 projects (period n/a)	Average funding of a project on circular economy: 670,000 EUR*
	Umwelttechnologieförderung (Environmental technology promotion)	2007-2011: 193 projects	n/a

Country (region)	Programme	Number of projects funded	Funding per project
	Circular Economy Transition	more than 25 swiss startups are supported (period n/a)	n/a
	Technologiefonds (Technology Funds)	n/a	n/a
Switzerland (City of Geneva)	Programme d'innovation sociétale G'innove (G'innove societal innovation program)	2017: 9 funded projects 2016-2017: 16 funded projects	The value of the support provided for free to every selected team is estimated at EUR 13.400*
United Kingdom	Industrial Strategy Challenge Fund - Innovate UK	15 "challenges" on website	n/a
United Kingdom (Scotland)	Circular Economy Investment Fund	n/a	n/a
	Scottish Institute for Remanufacture (SIR)	12 on website	n/a
	Resource Efficient Circular Economy Accelerator Programme - European Structural Funds in Scotland	n/a	n/a
United Kingdom (Wales)	Circular Economy Capital Investment Fund	n/a	n/a
EU	Life	~172 CE projects (1999-2019)	n/a
	Horizon 2020	~60 CE projects (2014-2017)	n/a
	EIT RawMaterials	n/a	n/a
	EIT Climate-KIC	n/a	n/a

\* Currencies indicated by survey respondents were converted into EUR by the authors by employing exchange rates as of 28<sup>th</sup> March 2019.

-  funding per project per year
-  average funding per project
-  funding for individual projects



## 5.4 ANNEX 4: ADDRESSED PRODUCT LIFE CYCLE PHASES OF PROGRAMMES

**Table 13: Product Life Cycle Phases of programmes, by country\***

Country	Programme 1	Programme 2	Programme 3	Programme 4	Programme 5
Austria	Product design	Product design			Product design
	Manufacture	Manufacture		Manufacture	Manufacture
			Distribution & Use	Distribution & Use	Distribution & Use
			Second-life	Second-life	Second-life
	End of life	End of life	End of life	End of life	
Belgium	Product design	Product design	Product design		
	Manufacture	Manufacture	Manufacture		
	Distribution & Use	Distribution & Use	Distribution & Use	Distribution & Use	
	Second-life	Second-life	Second-life	Second-life	
	End of life	End of life	End of life	End of life	
Czech Republic	Product design			Product design	Product design
	Manufacture	Manufacture	Manufacture	Manufacture	Manufacture
				Distribution & Use	Distribution & Use
			Second-life	Second-life	Second-life
	End of life	End of life	End of life	End of life	End of life
Denmark	Product design	Product design	Product design	Product design	Product design
	Manufacture	Manufacture	Manufacture	Manufacture	Manufacture
	Distribution & Use	Distribution & Use	Distribution & Use	Distribution & Use	Distribution & Use
	Second-life		Second-life	Second-life	Second-life
	End of life	End of life	End of life	End of life	End of life
East Mediterranean	Distribution & Use	Distribution & Use		Distribution & Use	
	Second-life	Second-life		Second-life)	
	End of life	End of life	End of life	End of life	
Estonia		Product design			Product design
		Manufacture			Manufacture
		Distribution & Use			
		Second-life			
		End of life			
Finland	Product design	Product design	Product design	Product design	
	Manufacture	Manufacture	Manufacture	Manufacture	
	Distribution & Use		Distribution & Use	Distribution & Use	
	Second-life			Second-life	Second-life
	End of life	End of life	End of life	End of life	End of life
France	Product design	Product design			-
		Manufacture			
		Distribution & Use		Distribution & Use	
	Second-life	Second-life	Second-life	Second-life	
	End of life	End of life	End of life	End of life	
Germany	Product design	Product design	Product design	Product design	Product design
	Manufacture		Manufacture	Manufacture	Manufacture
	Distribution & Use	Distribution & Use	Distribution & Use	Distribution & Use	Distribution & Use

Country	Programme 1	Programme 2	Programme 3	Programme 4	Programme 5
	Second-life	Second-life	Second-life	Second-life	Second-life
	End of life	End of life	End of life	End of life	End of life
Hungary	End of life				
Ireland	Product design	Product design	Product design		
	Manufacture	Manufacture	Manufacture		
	Distribution & Use	Distribution & Use	Distribution & Use		
		Second-life			
	End of life	End of life	End of life		
Italy	Product design			Product design	Product design
	Manufacture			Manufacture	Manufacture
	Distribution & Use		Distribution & Use		Distribution & Use
	Second-life	Second-life			Second-life
	End of life	End of life	End of life	End of life	End of life
The Netherlands		Product design			
	Manufacture	Manufacture			
	Distribution & Use	Distribution & Use			
		Second-life			
	End of life	End of life			
Norway	Product design		Product design	Product design	Product design
	Manufacture	Manufacture	Manufacture	Manufacture	Manufacture
		Distribution & Use	Distribution & Use		Distribution & Use
			Second-life		Second-life
	End of life		End of life	End of life	End of life
Poland	End of life	End of life	Product design	Product design	Product design
			Manufacture	Manufacture	Manufacture
			Distribution & Use	Distribution & Use	Distribution & Use
			Second-life	Second-life	Second-life
			End of life	End of life	
Portugal		Product design	Product design		Product design
		Manufacture	Manufacture		Manufacture
		Distribution & Use	Distribution & Use		Distribution & Use
		Second-life	Second-life	Second-life	Second-life
		End of life	End of life	End of life	End of life
Slovakia	End of life				
Spain	Product design	Product design	Product design		
	Manufacture	Manufacture	Manufacture		
		Distribution & Use			
		Second-life			
	End of life	End of life	End of life	End of life	
Sweden	Product design	Product design	Product design	Product design	Product design
		Manufacture	Manufacture	Manufacture	Manufacture
		Distribution & Use	Distribution & Use	Distribution & Use	Distribution & Use
	Second-life	Second-life	Second-life		Second-life

Country	Programme 1	Programme 2	Programme 3	Programme 4	Programme 5
	End of life	End of life	End of life		End of life
Switzerland		Product design		Product design	Product design
		Manufacture		Manufacture	
	Distribution & Use	Distribution & Use			Distribution & Use
	Second-life	Second-life	Second-life		Second-life
	End of life	End of life	End of life	End of life	End of life
UK	Manufacture	Product design	Product design		
		Manufacture	Manufacture		
		Distribution & Use			
		Second-life	Second-life		
		End of life	End of life		
EU	Product design	Product design	Product design		
	Manufacture	Manufacture	Manufacture		
	Distribution & Use	Distribution & Use	Distribution & Use	Distribution & Use	
	Second-life	Second-life	Second-life	Second-life	
	End of life	End of life	End of life	End of life	

\* No data available for Latvia, Luxembourg and Lithuania.

## 5.5 ANNEX 5: QUESTIONNAIRE

<b>General Information</b>	<b>Country</b>					
	<b>Name of Participant</b>					
	<b>Organisation</b>					
<b>Q1: Funding for CE</b> Please identify max. 5 of the most important CE (framework) funding programmes in your country and analyse them along the following categories.						
<b>Programme</b>	<i>Enter the name of the programme</i>	<i>Enter the name of the programme</i>	<i>Enter the name of the programme</i>	<i>Enter the name of the programme</i>	<i>Enter the name of the programme</i>	<i>Enter the name of the programme</i>
<b>1.1 Programme level</b> (specify country and region, if applicable)	please select	please select	please select	please select	please select	please select
Specify country and region						
<b>1.2 Programme owner and contact person data</b>						
<b>1.3 Programme website</b>						
<b>1.4 Overall budget size (or part of budget allocated to CE)</b>						
<b>1.5 Number of projects funded (or average funding per project)</b>						
<b>1.6 Duration of funded projects</b>						
<b>1.7 Duration of the programme itself</b>						

1.8 Example projects							
1.9 Resource flows (e.g. raw materials, water, plastic, waste, chemicals, food, biomass)	please select	please select	please select	please select	please select		
1.10 Product life cycle phase	tick all that apply						
Product design							
Manufacture							
Distribution and Use							
Second-life (repair/ refurbish/ remanufacture)							
End of life (collection/ recycle/ recovery)							
1.11 Major type of funded activity (select the most relevant one for the programme) Science & basic research (often R projects), Technology and process optimisation (often D&I projects, transfers), Business models & start up support (including coaching, consultancy), Policy support (such as policy implementation or recommendation), Social & behaviour (e.g. awareness raising, consumer behaviour), Education, training & qualification (e.g. students trainees), Coordination (e.g. clusters, networks, platforms)	please select	please select	please select	please select	please select		
1.12 Industrial Sectors addressed (use NACE sectors, only relevant if the programme has a sectoral focus) <a href="http://ec.europa.eu/competition/mergers/cases/index/nace_all.html">http://ec.europa.eu/competition/mergers/cases/index/nace_all.html</a>							
1.13 If the programme focuses on funding technology innovation select the most relevant innovation stage - Technology readiness level (select one)	please select	please select	please select	please select	please select		
1.14 Beneficiary types (e.g. academia, industry/SME, civil society)							
If you don't think the above classifications (questions 1.9 – 1.14) have described well the programme, please add a <b>brief explanation</b> of the scope and objective of the programme.							

<b>1.15 What are the Key Performance Indicators (KPIs) of the programme?</b> (for example, reduced primary raw materials input, or increased secondary raw material input)							
What are the targets?							
What are the actuals?							
<b>CICERONE plans to select a few funding programs for further case studies to identify success factors. If your program is selected as a case study candidate, would you be interested in participating and in sharing data on the impact of the program?</b>	please select	please select	please select	please select	please select		
<b>1.16 Please provide joint funding ideas or existing collaborations between funding programmes</b> (if any)							

<b>Q3: Recent legislation for CE</b>	Provide 2-3 important national examples of legislative measures in your country ( <i>if available</i> ) directly triggering research & innovation for CE from 2015 onwards. It is not asked for loosely related strategies or programmes of the years before 2015 but examples of pertinent laws, regulations, guidelines, directives (e.g., plastic ban regulations, CE laws, national roadmaps for CE, etc.) Please specify relevant passages or articles in order to indicate relevance.
<b>Example-No.</b>	<b>Description</b>
1	
2	
3	

<b>Q4: Further R&amp;I priorities for CE</b>	Please identify further R&I priorities of your country with clear CE implications (if available). For example:
<b>4.1 Country-specific trends in technology development</b> (e.g., waste separation technologies, 3D print, electro mobility, etc.)	
<b>4.2 Country-specific trends in circular economy business field development</b> (e.g., ReUse in Flanders, repair shops, etc.)	

The following question was asked for internal purposes only and was included as information for AP4.1.

**Q2: Further R&I stakeholders for CE**

Please provide (ca. 10-15) further important CE-related public and private stakeholders in your country, incl. one or two keywords to describe his/her role within the R&I context for CE

**2.1 Priority theme** (e.g., raw materials, water, plastic, waste, chemicals, food, biomass and biotechnology)

**2.2 Name**

**2.3 Contact person**

**2.4 Link/ Website**

**2.5 Private or public stakeholder**

**2.6 Specific role in the context** (e.g., innovative SMEs, investors and finance institutions, industrial associations, networks, etc.)