The EIB Circular Economy Guide

Supporting the circular transition

European Investment Bank
The EU bank

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For further information on the EIB's activities, please consult our website, www.eib.org. You can also contact our InfoDesk, info@eib.org.

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For more information, visit our website on www.eib.org/circular-economy
or contact us at CircularEconomy@eib.org.

Abbreviations

3D	three-dimensional
CDP	Cassa Depositi e Prestiti
CO_2eq	carbon dioxide equivalent
DSCR	debt-service coverage ratio
EBIT	earnings before interest and taxes
EC	European Commission
EFSI	European Fund for Strategic Investments
ECBF	European Circular Bioeconomy Fund
EIB	European Investment Bank
EU	European Union
EUR	euro
GDP	gross domestic product
Gt	giga-tonne
ICT	information and communication technology
Mt	mega-tonne
RDI	research, development and innovation
SME	small and medium-sized enterprises
UNEP	United Nations Environment Programme

1. Introduction

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

The circular economy is backed strongly by the European Commission and other EU institutions, as well as by a growing number of cities and countries across the European Union. It is also attracting increasing attention from the business community and public and private investors. The circular economy goes beyond resource efficiency and recycling. It provides the framework to develop new business models aimed at increasing the value, use and life of materials, products and assets and designing out waste from production and consumption.

In light of the European Commission's new Circular Economy Action Plan[1], the EIB, as the EU bank, is supporting the transition to a circular economy, particularly in the European Union, but also in other parts of the world. The EIB has a long track record of lending to projects focusing on recycling and the recovery of waste and by-products in various sectors. We aim to increase lending to innovative circular economy projects aimed at systematically designing out waste, extending the life of assets and closing material loops. The EIB also offers circular economy advisory services, and is active in networking, sharing of best practices, connecting stakeholders and facilitating access to finance for circular economy projects. In light of this, this guide aims to:

a. promote a common understanding of the circular economy as well as the challenges and opportunities among our financial and project partners;
b. raise awareness about circular solutions among project promoters and other stakeholders;
c. facilitate and harmonise due diligence and reporting related to circular economy projects with our financial and project partners;
d. outline the EIB's vision to support the circular economy.

The EIB Circular Economy Guide will be updated as our understanding of the needs, opportunities and risks evolves. Any suggestions for future editions can be sent to CircularEconomy@eib.org.

2. The circular economy

The background and needs

Our current linear take-make-use-dispose economy originates in the second industrial revolution, which generated considerable growth in prosperity in the years after World War II. However, it also increased resource use and led to the development of a consumption and throw-away society.

The turn of the millennium saw the reversal of a 100-year trend, with natural resource prices decreasing steadily in parallel with economic growth. Since then, real commodity prices have risen in tandem with economic growth[2] and have increased the focus on resource efficiency and security of supply. While recessions in recent years have temporarily reversed these trends, price volatility and uncertainty remain.

With expected global population growth of about 500-750 million per decade, accompanied by rapid growth in living standards and purchasing capacity in less developed areas, the United Nations Environment Programme's International Resource Panel predicts that material resource use may double from 2015 to 2050[3]. This raises concerns that the earth's finite resources may not be sufficient to sustain the expected increases in consumption and wasteful resource use. The increasing raw materials

1 https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf
2 Accenture, "Circular Advantage" (2014), p. 7, analysis based on World Bank data – Pink sheets
3 UNEP/International Resource Panel, "Assessing Global Resource Use" (2017), p. 8

consumption also increases the costs and related externalities of extraction and transport of resources from more remote and less accessible deposits.

Furthermore, it has been estimated that 20% of global material extraction ends up as waste.[4] Considering that the import dependency for some raw material categories used in the European Union, such as metal ores, is over 90%, and that the European Union has listed 27 raw materials[5] as critical in terms of supply, this presents resource supply constraints and related price volatility risks that may hurt the competitiveness of EU companies.

The concept

In a fully circular economy, waste is minimised by designing products and industrial processes so that resources are kept in use in a perpetual flow, and by ensuring that unavoidable waste or residues are recycled or recovered. The Ellen MacArthur Foundation has described the circular economy in a diagram shown in Figure 1, which comprises two cycles: a biological cycle, in which residues are returned to nature after use, and a technical cycle, where products, components or materials are designed and marketed to minimise wastage. Such a circular system aims at maximising the use of pure, non-toxic materials and products designed to be easily maintained, reused, repaired or refurbished to extend their useful life, and later to be easily disassembled and recycled into new products, with minimisation of wastage at all stages of the extraction-production-consumption cycle.

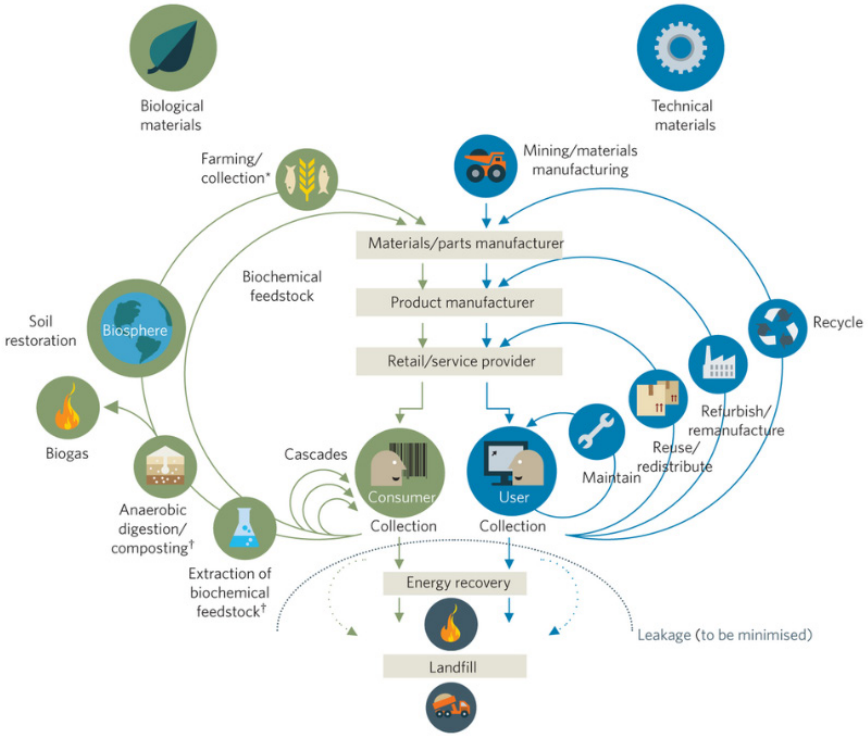

Figure 1: The Ellen MacArthur circular economy diagram[6]

This circular way of producing and consuming disconnects economic growth from the extraction and consumption of materials. As such, a circular economy offers a way to hedge future resource and material supply chain risks for companies and increase their resilience to decreasing supplies and increasing price uncertainty and volatility. This will reduce resource dependency, spur innovation and increase competitiveness. The circular economy is also an opportunity for economic and industrial renewal with a related increase in investments.

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4 OECD "Material Resources, Productivity and the Environment - Key Findings" (2015), p. 10
5 COM(2017) 490 - Communication on the list of critical raw materials 2017
6 Ellen MacArthur Foundation, "Towards the Circular Economy" (2013), p. 24

In summary, the circular economy can be defined as follows: new products and assets are designed and produced in a way that reduces virgin material consumption and waste generation; new business models and strategies are applied that optimise capacity utilisation and extend the useful life of products and assets; and resource and material loops are closed through recycling of end-of-life products and materials.

Links to further information on the circular economy and case studies are provided in Annex 1. The 9Rs[7] of the circular economy are defined in Annex 2.

The drivers and business opportunities

There are three fundamental drivers of the circular economy[8]:

- **Resource constraints**: With global resource demand growing quickly, there is increasing concern about looming shortages of critical raw materials and water. The same holds true for arable land, as demand for cotton, crops, etc. is growing. It is thus becoming imperative to rethink our resource use.
- **Technological development**: The introduction of new technologies, notably the internet of things and big data tools, is enabling the development and introduction of new circular economy business models, often based on sharing and leasing but also reuse and remanufacturing. New technical systems and tools enable the tracking of products or materials during their life to enable extended use/life and maintain the highest possible value. Meanwhile, design and manufacturing capabilities are evolving with advances in production, material science and manufacturing, e.g. 3D printing and artificial intelligence.
- **Socio-economic development**: Currently, about half the world's population lives in cities, and this will rise to six in ten by 2030, according to World Health Organization estimates. Increasing urbanisation supports the development of circular models since urban areas can easily host cost-effective collection and return systems for goods, materials and other resources and thus promote the closing of circular loops, as well as asset-sharing schemes and systems for product reuse.

The circular economy offers the following **opportunities** for companies in the European Union to reduce their exposure to so-called "linear risks"[9], reduce costs and exploit new market and business opportunities:

- **De-risk/hedge future commodity supply uncertainty and price volatility**: The circular economy offers the means to increase resilience and hedge risks related to uncertain future commodity supply and price volatility. As an example, the shift from selling products to services enables manufacturers to control and reuse or recycle components and raw materials used to produce goods as corporate assets.
- **Reducing manufacturing costs**: Design for reuse, disassembly and recycling with a view to facilitating remanufacturing and reintroducing the products is often less expensive than producing new parts from virgin materials. As an example, the remanufacturing of car parts is 30-50% less expensive than producing new parts and generates 70% less waste.
- **Avoided costs and new revenue streams**: Companies realise the rationale of evaluating their production chains to identify by-product and waste streams that could be avoided, reused or recycled. As a consequence, companies turn to resource management or reverse logistics partners rather than waste management companies to identify potential uses for their by-products and waste, an approach that cuts costs and increases efficiency while reducing resource consumption and environmental impact. Companies not able to reuse/recycle their own goods, by-products or waste can offer these to other companies and thus create symbiotic circular relationships. Such approaches create resilient circular business models, generate new revenue streams and avoid waste management costs.
- **New business opportunities and new markets**: The ability to increase the life and revenues from a given asset through repair and refurbishment schemes enables new service-based business models and strengthens the customer relationship. In such models companies design

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7 9Rs: Refuse, Rethink, Reduce, Reuse, Repair, Refurbish, Remanufacture, Repurpose, Recycle

8 Accenture, "Waste-to-Wealth" (2015)

9 Circle Economy, PGGM, KPMG, EBRD, WBCSD, "Linear Risks" (2018)

products to make the repair and component reuse easier, and may also provide consumers with information, tools and replacement parts to repair their products.

The business models

The shift to a circular economy requires companies to rethink not only their use of resources but also to redesign and adopt new business models based on dematerialisation, longevity, refurbishment, remanufacturing, capacity sharing, and increased reuse and recycling.

Reference is often made to three circular business model categories, each of which focuses on a different phase of the value chain: (a) the design and manufacturing phase; (b) the use phase; and (c) the value recovery phase. These different business models can be illustrated in what is called a Value Hill, shown in Figure 2.

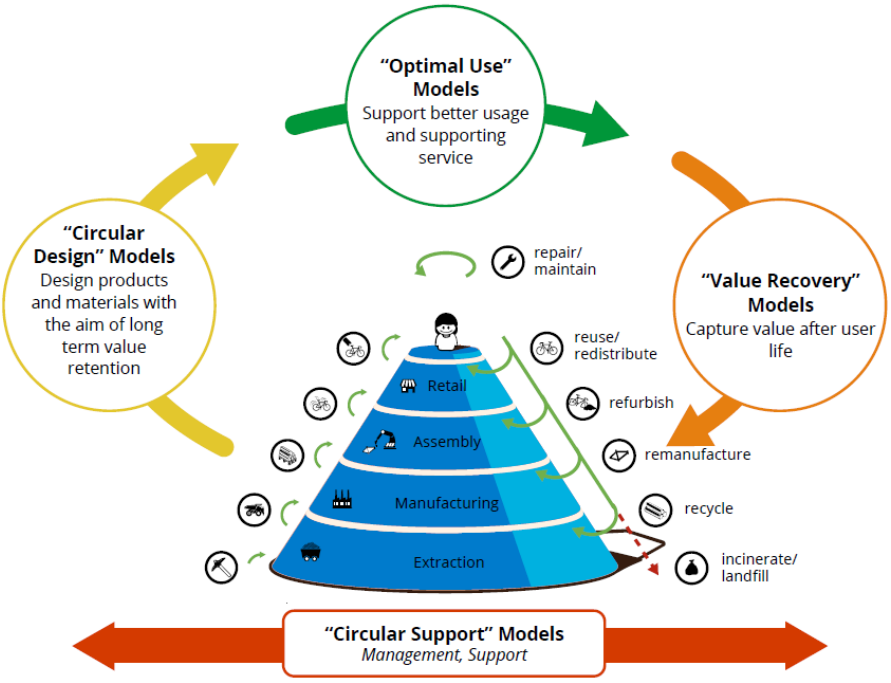

Figure 2: Circular economy business models in the Value Hill[10]

Circular design models focus on the development of existing or new products and processes that seek to optimise circularity. Products are designed to last longer and/or be easy to maintain, repair, upgrade, refurbish, remanufacture or recycle. Additionally, new materials are developed and/or sourced, e.g. bio-based, less resource-intensive, or fully recyclable. The risks related to financing such innovations do not differ much from financing other innovation or Research, Development and Innovation (RDI) projects.

Optimal use models aim to increase the value and use of a product during an extended life. These business models often build on retained ownership of a product, e.g. by providing a service rather than selling a product, and/or take responsibility for the product throughout its useful life, e.g. through maintenance services, or add-ons to extend the life of a product. Such product-to-service models have financial implications coming from, for instance, the changing nature of cash flows, with increasing working capital to pre-finance clients, balance sheet extension, and re-evaluation of residual value. Related challenges lie in product tracking and legal issues surrounding ownership of collateral and its value. Such risks may be difficult to assess or value, and could lead to difficulties in financing this type of project.

[10] Elisa Achterberg, Jeroen Hinfelaar, Nancy Bocken, "The Value Hill Business Model Tool: identifying gaps and opportunities in a circular network" (2016)

Value recovery models focus on maximising recovery and recycling of products and materials after use into new products or useful resources in order to reduce wastage and conserve resources. The development of reverse logistics, i.e. the return from point of consumption to point of production, is essential for this model. It should be considered that for some materials, recycling involves a loss of quality and for products also loss of design, and technical and energy inputs. Acknowledging this, a difference can be made between downcycling, which results in lesser quality and reduced functionality, and upcycling, which involves transforming by-products and waste into new materials or products of higher quality or better environmental value.

Circular support models focus on the management and coordination of circular value networks and resource flows, and optimising incentives and other supporting activities in a circular network. Circular support models also include the development or deployment of key enabling technologies supporting, enabling and facilitating the other business models.

The circular economy in cities

Cities have a lot of potential to be cradles and catalysts for circular developments with their concentration of people, companies, investment capital and knowledge. City administrations can define and communicate a circular vision and strategy together with relevant stakeholders, fostering a culture of circular collaboration. Cities can also lead by example, offering and/or procuring circular solutions and services, and they can facilitate and incentivise circular solutions.

As outlined in the EIB guide "The 15 circular steps for cities,"[11] a circular transition can address many of the linear problems cities suffer from today, and make cities more regenerative, resilient, clean and liveable. More information about circular cities and ways to finance the circular transition can be found on the Circular City Funding Guide website[12], prepared with the European Investment Advisory Hub.[13]

The challenges

Making the shift to a circular economy can be challenging, especially for companies whose structures, strategies, operations and supply chains are deeply rooted in the linear approach. Even if the transition to a circular economy often makes economic sense, production processes first need to transform from linear to circular, which may require initial investments, modification of processes, feedstock, equipment and output, re-training of staff, and coordination within the wider value chain.

The EIB study on access-to-finance for projects supporting the circular economy[14] made the case that the private sector as a whole is by nature focused on short-term gains and generally afraid of taking risks. As commodity prices increase, so will the demand for innovations that increase resource efficiency. Therefore, many businesses are likely to wait until high commodity prices create the business case for the transition to a circular economy.

This has not prevented many established companies and start-ups from successfully pursuing innovative circular business models in new markets. There is an economic advantage to being an innovator in the market, but there also is the consideration of lower environmental costs and the benefits to society that make the case for this transition even more compelling. These companies remain the exception rather than the rule, which is mostly explained by the fact that it is hard for circular businesses to compete with linear businesses. Over time, more customers will become aware of the need for a more circular economy, and companies will become more understanding of the need to hedge material supply risks and price volatility.

The EIB study mentioned earlier concluded that market forces alone could create a circular economy, but the transition could be slow and there could be high opportunity costs. Public sector support is essential to pre-empt potential supply crises, reduce the European Union's dependence on strategic imported resources (as discussed above), and realise the societal and environmental benefits from a

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11 https://www.eib.org/attachments/thematic/circular_economy_15_steps_for_cities_en.pdf
12 https://www.circularcityfundingguide.eu/
13 EIAH - European Investment Advisory Hub
14 EIB, "Access-to-finance conditions for Projects supporting the Circular Economy" (2015), p. 49

transition to a circular economy. The transition to a circular economy will need a systemic approach involving various stakeholders. Businesses must develop circular business models and enabling technologies; policymakers and legislators at the EU and national levels must put in place effective regulations and incentives (see Annex 3); the financial sector must improve the availability of financing and revisit its approach to appraising linear and circular risks (see Chapter 6); and public authorities and civil society as a whole must increase public awareness and help educated consumers.

The relationship to climate change and environmental sustainability

The current linear resource-wasting model is depleting the earth's natural capital. The associated pressure on the earth's ecosystems and their absorption capacity, essential for human survival, will bring irreversible and dangerous changes to our environment and climate.

The exploitation of natural resources is often linked with biodiversity loss, as well as water and soil pollution. Ozone depletion and chemical pollution affect ecosystems' ability to support life in its different forms. Environmental protection is an EIB global policy priority that will benefit from the shift to a circular economy. Reduced extraction of materials, sustainable land use and rehabilitation, ecosystem protection, resource efficiency and renewable energy sources – all linked to the circular economy – will help preserve natural capital.

Climate change is only one of the many serious environmental challenges caused by the current path of human development. Curbing greenhouse gas emissions to fight climate change is one of the European Union's public policy objectives. The Union has committed to achieving transformation to low-carbon pathways to contain global warming well below 2°C, which is critical for the future of the planet.

The potential to reduce greenhouse gas emissions by shifting to a circular economy is substantial, achieved mainly through improving resource efficiency, extending the useful life of buildings and assets, increased recycling and reuse, and an absolute reduction in the use of primary raw materials. Circular economy activities can be an effective way to mitigate climate change[15].

The EIB recently approved a new plan for climate action and environmental sustainability that has three key aims[16]:

- mobilise €1 trillion in investment for climate action and environmental sustainability from 2021 to 2030;
- increase the share of financing for climate action and environmental sustainability to 50% by 2025;
- align all financing with the Paris Agreement by the end of 2020.

The EIB's support to the circular economy is expected to contribute significantly to the Bank's climate and environmental sustainability strategy.

[15] The positive impact of a circular economy on reduction of greenhouse gas emissions is demonstrated by many recent studies and publications, some of which are listed in Annex 4

[16] EIB strategy for climate action and environmental sustainability

3. EU policy framework

In 2019, the new European Commission announced in the European Green Deal its ambition for Europe to be the first climate neutral continent in the world by 2050. A central part of this sustainable growth strategy is the circular economy. After successfully meeting its first Circular Economy Action Plan of 2015, which included 54 actions, the Commission adopted a new Circular Economy Action Plan in March 2020. The new plan aims to turn the circular economy into a mainstream concept and disconnect economic growth from the use of resources, while ensuring that the European Union's economy remains competitive over the long term.

The new plan includes initiatives that cover the whole life cycle of products, targeting product design, promoting circular economy processes, fostering sustainable consumption, and ensuring that the resources we are using are kept in the EU economy as long as possible. The plan comprises 35 measures, including some legislation, targeting areas where EU action can make a big difference.

This plan aims to:

- make sustainable products the norm in the European Union;
- empower consumers and public buyers;
- focus on the sectors that use the most resources, where the potential for circular action is high, such as electronics and ICT, batteries and vehicles, packaging, plastics, textiles, construction and buildings, food, water and nutrients;
- ensure less waste;
- make circularity work for people, regions and cities;
- lead global efforts on the circular economy.

Further information about the EU circular economy and bioeconomy is in Annex 3 and on the European Commission website[17].

4. EIB lending to the circular economy

The EIB has financed circular economy investments in a large number of projects in many sectors, as outlined in the following table for 2015 to 2019[18].

Table 1: EIB circular economy signed operations, 2015-2019

Sector	Lending (€ millions)	Share
Industry and services	747	30%
Waste management	594	24%
Agriculture and bioeconomy	438	18%
Water management	426	17%
Mobility	95	4%
Urban development	80	3%
Energy	71	3%
Total	**2,452**	**100%**

EIB-financed circular economy operations range from more traditional recycling projects to innovative sharing and leasing business models. Some recent projects are presented in Table 2 below. Other examples are presented in the EIB circular economy brochure[19].

[17] https://ec.europa.eu/environment/circular-economy/

[18] The circular economy lending figures have been determined according to the special categorisation valid for the reporting period 2015-2019, which featured in a previous version of this guide. Starting in 2020, circular economy lending figures will be calculated based on the categorisation presented in section 6.

[19] EIB Circular Economy Brochure

Table 2: Approved EIB projects contributing to the circular economy

EIB circular economy projects
Ecotitanium: The first EU industrial plant to recycle and re-melt aviation-grade scrap titanium metal and titanium alloys, which today have to be exported outside Europe. The project will thereby enable the recycling of valuable metal scraps from European manufacturing sources and reduce dependence on imported titanium. Link
Novamont renewable chemistry: Development of innovative bioplastics and biochemicals based on renewable resources, which are biodegradable and compostable. Novamont's holistic approach and vision for the bioeconomy, where the business model includes local agriculture as well as the reuse of by-products, is producing positive results for material innovation, and is opening up opportunities in the market and larger economy. Link
Recycled paper circular economy, Spain: Enabling a containerboard production plant to use more recycled fibre as raw material, improving the management of natural resources, following the principle of the circular economy. Link
CDP climate change investment platform: Risk-sharing investment platform together with Cassa Depositi e Prestiti (CDP), the Italian national promotional bank. This platform focuses on circular economy projects sourced by intermediary commercial banks. The investment platform is supported by a guarantee under the European Fund for Strategic Investments. Link
Omnicane carbon burn-out: Construction of two sugar refineries with related sugar handling and storage facilities, and the expansion of a sugar mill. The project will enable the reuse and recycling of all by-products in the process. Link
Rabobank Impact Loans I - III: Series of intermediated loans to finance small and medium-sized investments with a high impact on society and sustainability, including CE investments, primarily in the Netherlands. The investments involve small businesses and mid-caps that are frontrunners in sustainability and social impact. Link
Belfius Smart Cities, Climate and Circular Economy: Bank-intermediated framework loan that targets areas including projects for the public sector in Belgium. The defined eligibility criteria assist the intermediary bank in sourcing and screening project eligibility. Link
Green Metropole Fund: Loan to a regional investment platform sponsored by the Port of Amsterdam and managed by e3 Partners, a Dutch private fund manager. The EIB loan will leverage the other investors' investment capacity for small businesses and small projects, mainly in the circular economy, renewable energy and energy efficiency, and to a lesser extent in advanced materials and smart technology. Link
Romania Recycling and Circular Economy: Investments to increase the collection of recyclable materials, the production of Polyester Staple Fibre from PET flakes and the recycling of waste electric and electronic equipment to support the transition to a circular economy and meet national recycling targets. Link
Ultimaker: The company develops 3D printers and associated materials in the consumer desktop segment. It also makes open-source software to operate the printers. 3D Printing is transforming the way we make things. A large percentage of our goods could be 3D-printed in the future, making production more circular. Link
De Lage Landen (DLL) Circularity L4SMEs-Midcaps: This intermediated loan co-financed the expansion of DLL's circular economy finance solution, i.e. second and third life equipment financing. The facility provides customers access to equipment finance along multiple stages in the life cycle of the asset and facilitates the remanufacturing or refurbishment of used assets through DLL's Life Cycle Asset Management (LCAM) programme. By offering these financing solutions, DLL encourages SMEs and mid-caps to use (lease) rather than own (purchase) their assets and helps its partners to transition from selling an asset to selling a service, leading to more sustainable circular-focused business models. Link
Orbital shower system: Orbital Systems has developed a water-saving shower solution for use in homes, vehicles and hotels, which can save up to 90% of water and 80% of the energy, compared to a conventional shower. Water that would normally go down the drain is cleaned and reused in the same shower cycle. The EIB financing will help Orbital Systems move to commercialise its product and keep researching other possibilities for its patented technology – see more here. Link

ISP Loan for Circular Economy: A framework loan in Italy that supports the circular transition by preserving the value of products and materials as long as possible, and minimising resource use and waste generation. These projects will be carried out in sectors such as food, energy, mobility, fashion, the environment, consumer goods and industrial manufacturing. They will represent several circular business models, ranging from resource recovery to product-to-service and leasing or sharing. Link
IREN Climate Action and Circular Economy Loan: The operation comprises among others the client's 2018-2022 climate action and circular investments in the solid waste sector. These investments comprise two anaerobic digestion plants for bio-waste including co-composting of digestate and upgrade of biogas to biomethane for injection into the grid, and a waste wood recycling plant that will produce pressed pallets and pallet blocks. Link

5. EIB circular economy financing and advisory

Financing products and instruments

The EIB has a range of financing products and instruments to support the circular economy. Financing can be tailored to the specific needs of the borrower, depending on a project's size, maturity, type of client, position in the value chain, etc.

For more traditional and larger-scale projects, we offer medium and long-term direct loans with fixed or variable interest rates. For smaller operations, we offer financing indirectly through local banks and other intermediaries, particularly targeting small companies and mid-caps. More information about our standard lending products can be found on the EIB website.[20]

More novel project types with medium to high levels of risk may be assisted by the European Fund for Strategic Investments[21], InnovFin[22] and other special financial instruments designed to handle greater risk.

Considering the characteristics and the risks of many projects, the Bank is adapting its standard products and launching circular economy thematic operations. We will keep adapting and developing new lending products to meet the needs and opportunities of the market.

One recent example is the creation of the **European Circular Bioeconomy Fund (ECBF)**[23,24], initiated and coordinated by the EIB's Innovation Finance Advisory. The fund, with a targeted size of €250 million, will support innovative bioeconomy projects, with a priority on circular projects. The fund will focus on five areas: circular economy, enabling technology, biomass production, bio-based materials, and performance biologicals.

For innovative projects that are not fully financially viable, the EIB may recommend sources of grants.

Advisory services

To assist circular project promoters, the EIB provides advisory services on structuring a project and improving its financial viability. Such services cover technical and financial aspects in an integrated manner and are primarily provided by the European Investment Advisory Hub[25] and InnovFin Advisory.[26] URBIS[27] helps local authorities develop investment projects and programmes related to the circular economy. Information on these advisory services can be found on the EIB's webpage on the circular economy.[28]

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20 EIB lending activities and products
21 EFSI - European Fund for Strategic Investments
22 InnovFin – EU Finance for Innovators
23 Financing the Circular Bioeconomy: Structuring an Investment Platform to Improve Access to Finance in Europe
24 https://www.ecbf.vc/
25 EIAH - European Investment Advisory Hub
26 InnovFin Advisory
27 URBIS
28 EIB circular economy webpage: The EIB in the Circular Economy

6. Project eligibility and screening

Eligibility

The circular economy is in line with the EIB's goal to promote environmental protection and the efficient use of resources, and it generally supports climate action. Some projects may include innovative features and thus be considered eligible under the EIB's innovation goals. Depending on the size of the client, circular economy projects may also be eligible under the Bank's financing goals for small businesses and mid-cap companies.

Nevertheless, the new financing models discussed above may involve risk that is below investment grade. This could involve small and poorly capitalised clients whose projects are unproven, with uncertain market potential. New sharing and leasing business models in which customers no longer purchase goods directly would require new risk assessment and financing approaches. It is therefore often necessary to carefully screen and assess circular economy projects.

Screening and assessment

A project is considered to be substantially contributing to the circular economy if it falls under the circular economy categories below. These categories, which refine a similar set of circular economy categories that the EIB used until 2019, were developed by an independent expert group advising the European Commission on circular economy financing.[29] These criteria and other guidance[30] developed by the expert group will guide the EIB in the origination and appraisal of circular economy projects. Further guidance and examples of investments and projects are presented in Annex 5.

Circular economy categories

Group 1 - Circular design and production models

- 1.a Design and production of products and assets that enable circular economy strategies, through e.g. (i) increased resource efficiency, durability, functionality, modularity, upgradability, easy disassembly and repair; (ii) use of materials that are recyclable or compostable
- 1.b Development and deployment of process technologies that enable circular economy strategies
- 1.c Development and sustainable production of new materials (including bio-based materials) that are reusable, recyclable or compostable
- 1.d Substitution or substantial reduction of substances of concern in materials, products and assets to enable circular economy strategies
- 1.e Substitution of virgin materials with secondary raw materials and by-products

Group 2 - Circular use models

- 2.a Reuse, repair, refurbishing and remanufacturing of end-of-life or redundant products, movable assets and their components that would otherwise be discarded
- 2.b Refurbishment and repurposing of end of design life or redundant immovable assets (buildings/infrastructure/facilities)
- 2.c Product-as-a-service, reuse and sharing models based on, inter alia, leasing, pay-per-use, subscription or deposit return schemes, that enable circular economy strategies
- 2.d Rehabilitation of degraded land to return to useful state and remediation of abandoned or underutilised brownfield sites in preparation for redevelopment

Group 3 - Circular value recovery models

- 3.a Separate collection and reverse logistics of wastes as well as redundant products, parts and materials enabling circular value retention and recovery strategies
- 3.b Recovery of materials from separately collected waste in preparation for circular value retention and recovery strategies (excluding feedstock covered under 3.c)
- 3.c Recovery and valorisation of separately collected biomass waste and residues as food, feed, nutrients, fertilisers, bio-based materials or chemical feedstock
- 3.d Reuse/recycling of wastewater

[29] Information on the European Commission Expert Group on Circular Economy Financing is available here.
[30] Categorisation System for the Circular Economy

Group 4 - Circular support

4.a Development/deployment of tools, applications and services enabling circular economy strategies

All 14 circular categories listed above contribute to increasing resource efficiency, and they decrease environmental impacts throughout value chains. It is important to note, however, that not all resource efficiency gains contribute to the circular economy. The Commission Expert Group on Circular Economy Financing and the EIB recognise resource efficiency in activities that substantially contribute to the circular economy as a result of actions that (i) reduce consumption of resources and (ii) enable value retention and/or value recovery strategies throughout value chains[31].

Activities aimed at energy recovery from waste and residues are excluded from the circular economy categorisation system. This is because the resource efficiency gains from waste-to-energy and waste-to-fuel activities are limited compared to activities in the above circular economy categories, particularly when considering the loss of value of potentially recyclable materials.

Activities for the production and use of renewable energy as well as activities supporting an efficient use of energy are also excluded from the circular economy categorisation system. Nevertheless, the Commission Expert Group on Circular Economy Financing and the EIB consider that the production of renewable energy (including biomass, solar, wind and hydro) and the efficient use of energy are sustainable activities with a key role to play in supporting the transition to a more circular economy.

In addition to falling under one of these categories, circular economy projects or project components should have a clearly communicated intention, goal or design brief to contribute to circular economy goals and objectives, and be positive for society and the environment, similar to impact investing. The due diligence must consider the long-term thinking and broader conception of value common in many circular economy projects, where upfront investments generate returns (or reduce risks further in the future than conventional projects) and have multiple values (ecological, social and financial).

Risk assessments

Supply chain risks: An important aspect of the due diligence will be to assess companies' supply chains and related risk management and mitigation. Credit pricing is currently based on the creditworthiness of the individual company rather than the supply chain. For circular economy projects, the creditworthiness of partners within the value chain or customers within a lease or pay-per-use programme will become more important, and analysing the creditworthiness of the client's portfolio or partners will be essential to define the overall risk.

Market and commercial risks: Market and commercial risks for circular economy projects can be related to the following aspects of a business plan:

- Material or feedstock input security related to, for example:
  - no or limited guarantees or contracts for the supply of feedstock;
  - uncertainty on gate fees that can be charged or prices that have to be paid for material or feedstock input.
- Prices or revenues for outputs produced at the facility, in particular when competing with virgin materials that may display price volatility.
- Changes to the cash flow that increase the payback period of the investment.
- For contracts in case of product-as-a-service or leasing: good circular business model contracts incorporate incentives for all parties involved to continue business activities and dissuade contract termination.

[31] Value retention and value recovery strategies are those numbered R4 – R9 in Annex 2. Reduce (R3) strategies that increase resource efficiency and value retention along food value chains by preventing the generation of food waste in agricultural production, processing, manufacturing, distribution and consumption can also substantially contribute to the circular economy.

In light of the above, due diligence needs to assess the following aspects and issues:

- Availability or certainty of materials or feedstock input and the competition for such materials in a reasonably delineated catchment area.
- Credibility of assumptions regarding gate fees to be charged or prices to be paid for input materials or feedstock.
- Robustness of the business plan with regard to variations in feedstock costs and output offtake revenues or costs, as well as maturity of the reuse or second-hand market.
- Soundness and credibility of the commercial strategy of the client and how its market position and management capacities rate in comparison to competitors.
- Soundness of the contracts and cash flow optimisation, i.e. inclusion of 'customer-binding' incentives, deposits or other risk premium to mitigate risks related to early contract termination/loss of customers and secure future cash flow.

In addition to carrying out thorough due diligence of the key aspects outlined above, market risks can be mitigated by requesting that:

- facility input is backed by supply agreements;
- the loan is backed by a corporate or external guarantee;
- the sponsor and feedstock suppliers have a reasonable equity share in the overall financing;
- the business case reaches minimum credit metric levels, e.g. regarding DSCR, interest coverage by EBIT, and cash flow from operations to debt.

Annex 1 Circular economy reference websites and documents

Source/Author	Title/Description	Year
General documents, studies and other information on the circular economy		
ABN Amro, ING, Rabobank	Circular Economy Finance Guidelines	2018
Arup	The Circular Economy in the Built Environment	2016
Circle Economy, PGGM, KPMG, EBRD, WBCSD	Linear Risks	2018
CEPS	The Circular Economy: Barriers and Opportunities for SMEs	2015
Ellen MacArthur Foundation	Various publications on the circular economy	
FinanCE Working Group	Money makes the world go round (and will it help to make the economy circular as well?)	2016
Various NGOs	WALKING THE CIRCLE – the 4 guiding pillars for a Circular Economy	2015
OECD	RE-CIRCLE: resource efficiency and circular economy	
World Economic Forum	Platform for Accelerating the Circular Economy	
European Institutions: reference websites and documents		
European Commission	Circular Economy Action Plan	
European Commission	A European strategy for plastic in a circular economy	2018
European Commission	Report on Critical Raw Materials and the Circular Economy – Commission staff working document	2018
European Commission	Public Procurement for a Circular Economy – Good practice and guidance	2017
European Commission – Expert Group on CE Financing	Accelerating the transition to a circular economy	2019
National, regional, local circular economy initiatives		
City of Amsterdam	Circular Amsterdam	
City of Glasgow	Circular Glasgow	
City of London	Circular London	
City of Paris	Circular economy roadmap for Greater Paris	
City of Rotterdam	Circular Rotterdam	
Catalunya Region	Catalunya Circular	
Flanders Region	Circular Flanders	
Finland – SITRA	Finland's roadmap to the circular economy 2.0	
Slovenia	Roadmap towards the Circular Economy in Slovenia	
The Netherlands	Circular Netherlands	
European Circular Economy Stakeholder Platform	Various other national, regional and local initiatives	

Source/Author	Title/Description	Year
Switch – Asia Network Facility	Advancing Sustainable Consumption and Production (SCP) and the circular economy in Asia	
Circular economy case studies		
Circle Economy	Various case studies	
Ellen MacArthur Foundation	Various case studies	
Encore	Encore regions and circular economy. Best case studies	2016
Circular Flanders	Various case studies	
European Circular Economy Stakeholder Platform	Selection of good practices	
Circular economy and climate change mitigation		
CE Delft	The circular economy as a key instrument for reducing climate change	2016
CEPS	Time to connect the dots: What is the link between climate change policy and the circular economy?	2016
Circle Economy, Ecofys	Implementing Circular Economy globally makes Paris targets achievable	2016
Deloitte	Circular economy potential for climate change mitigation	2016
Ellen MacArthur Foundation, Material economics	Completing the Picture: How the Circular Economy Tackles Climate Change	2019
Material economics	The circular economy – a powerful force for climate mitigation	2018
Circular economy taxonomy, measurement and monitoring frameworks		
CEPS	The Circular Economy: A review of definitions, processes and impacts	2017
Deloitte (commissioned by the Dutch Government)	Quick Scan – Taxonomy Circular Economy – Analysis based on inputs from Dutch financial institutions	2019
European Environment Agency (EEA)	Circular economy in Europe – Developing the knowledge base	2016
European Commission – Expert Group on CE Financing	Categorisation system for the circular economy: A sector-agnostic approach for activities contributing to the circular economy	2020
EUROSTAT	Overview of available indicators on the circular economy	
Ellen MacArthur Foundation	Circulytics – Measuring Circularity	2020
SUMMA (commissioned by Circular Flanders)	Indicators for a Circular Economy	2018
WBCSD	Circular Transition Indicators	2019

Annex 2 Circular economy strategies

R	Strategy	Description
R1	Refuse	Make product redundant by abandoning its function or by offering the same function by a radically different (e.g. digital) product or service
R2	Rethink	Make product use more intensive (e.g. through product-as-a-service, reuse and sharing models or by putting multi-functional products on the market)
R3	Reduce	Increase efficiency in product manufacture or use by consuming fewer natural resources and materials. It includes the prevention of food waste along food value chains including in agricultural production, processing, manufacturing, distribution and consumption
R4	Reuse	Reuse of a product which is still in good condition and fulfils its original function (and is not waste) for the same purpose for which it was conceived
R5	Repair	Repair and maintenance of defective product so it can be used with its original function
R6	Refurbish	Restore an old product and bring it up to date (to specified quality level)
R7	Remanufacture	Use parts of a discarded product in a new product with the same function (and as-new-condition)
R8	Repurpose	Use a redundant product or its parts in a new product with different function
R9	Recycle	Recover materials from waste to be reprocessed into new products, materials or substances whether for the original or other purposes. This includes the reprocessing of organic material but does not include energy recovery and reprocessing into materials that are to be used as fuels or for backfilling operations

A further R strategy often mentioned in combination with the above 9Rs, sometimes even as part of a circular economy definition, is the recovery of (embodied) energy from waste and residues. The EIB acknowledges that from a waste management angle, energy recovery is an environmentally preferable option to landfill disposal in accordance with the waste hierarchy principle. However, the resource efficiency gains from waste-to-energy and waste-to-fuel strategies are limited compared to other 9Rs, particularly when considering the loss of value of potentially recyclable materials through combustion. Hence, the EIB does not consider activities primarily aimed at energy recovery from wastes and residues as substantially contributing to the circular economy.

Annex 3 EU policies on the circular economy and bioeconomy

Circular economy legislation and policies have evolved in recent years. Circular economy goals are high on the political agenda, and the European Union's approach has gained support from EU countries, the European Parliament as well as businesses, cities and citizens. The circular economy has strong synergies with many EU objectives on climate change, energy, industrial and agriculture policy.

In 2015, the European Commission adopted the **Circular Economy Package**[32] comprising an **action plan** with 54 concrete actions, a timetable and a monitoring section. These actions covered the whole cycle of materials and products – from production and consumption to waste management and the market for secondary raw materials. The package gave a clear signal to economic operators that the European Union is using all the tools available to transform the economy, paving the way to new business opportunities and boosting competitiveness. All 54 actions have been delivered and are under implementation.

As to **EU funding in 2016-2020**, the Commission has stepped up efforts totalling **more than €10 billion** in support of the circular economy transition through Horizon 2020, Cohesion policy, EFSI and the LIFE Programme[33].

To stimulate investments, the EIB has participated in and contributed to the **Circular Economy Finance Support Platform** chaired by the Commission (DG RTD). The platform has produced recommendations to improve the bankability of circular economy projects, coordinate funding activities and share good practices.

One of the main parts of the Commission's new European Green Deal is the circular economy. The Commission adopted in March 2020 a new Circular Economy Action Plan[34] with the goal to make the economy fit for a green future and strengthen the EU's competitiveness while protecting the environment and giving new rights to consumers.

The **new Circular Economy Action Plan** presents measures to:

- **Make sustainable products the norm in the European Union**. The Commission will propose legislation on Sustainable Product Policy, to ensure that products placed on the EU market are designed to last longer, are easier to reuse, repair and recycle, and incorporate as much as possible recycled material instead of primary raw material.
- **Empower consumers.** Consumers will have access to reliable information and they will benefit from a true 'Right to Repair'.
- **Focus on the sectors** that use the most resources and where the potential **for circularity is high.** The Commission will launch concrete actions on:
  - **electronics and ICT** – a 'Circular Electronics Initiative' to have longer product lifetimes, and improve the collection and treatment of waste
  - **batteries and vehicles –** a new regulatory framework for batteries for enhancing the sustainability and boosting the circular potential of batteries
  - **packaging –** new mandatory requirements on what is allowed on the EU market, including the reduction of (over)packaging
  - **plastics** – new mandatory requirements for recycled content and special attention on microplastics as well as bio-based and biodegradable plastics
  - **textiles** – a new EU Strategy for Textiles to strengthen competitiveness and innovation in the sector and boost the EU market for textile reuse
  - **construction and buildings** – a comprehensive Strategy for a Sustainably Built Environment promoting circularity principles for buildings
  - **food** – a new legislative initiative on reuse to substitute single-use packaging, tableware and cutlery with reusable products in food services

[32] Circular economy package (2015)
[33] Implementation of the Circular Economy Action Plan (COM (2019) 190, 4.3.2019)
[34] Circular Economy Action Plan (COM (2020) 98 final, 11.3.2020)

- **Ensure less waste.** The focus will be on avoiding waste altogether and transforming it into high-quality secondary resources that benefit from a well-functioning market for secondary raw materials.

In total, the action plan has **35 legislative and non-legislative initiatives,** which the Commission will implement in 2020-2023.

Many **EU funds** will be used to support the transition to a circular economy – EU cohesion funds, the European Regional Development Fund, the LIFE programme, and spending under the social, research and innovation programmes.

The **Just Transition Mechanism** could support projects focusing on the circular economy. The Action Plan also includes actions to mobilise private financing for the circular economy through financial instruments such as InvestEU.

Some key actions under the previous Circular Economy Action Plan focused on plastics. The **European Strategy for Plastics in a Circular Economy**[35], which was adopted in January 2018, states that all plastic packaging on the EU market will be recyclable by 2030, the consumption of single-use plastics will be reduced and the intentional use of microplastics will be restricted. The strategy is intended to lay the foundation for a new circular plastics economy, and drive investment towards it.

The **Single Use Plastics Directive**[36], which was adopted in June 2019, targets single use plastics and fishing gear. It focuses in particular on 10 single-use plastic products most often found on Europe‘s beaches and seas, as well as lost and abandoned fishing gear. Where alternatives are easily available, and affordable, single-use plastic products will be banned by 2021.

The Commission updated its **Bioeconomy Strategy**[37] in 2018 to contribute to the United Nations Sustainable Development Goals and to the Paris Agreement. The update proposed 14 measures with these priorities: strengthen and expand the bio-based sectors, unlock investments and markets, deploy local bioeconomies rapidly across the whole of Europe and understand the ecological boundaries of the bioeconomy. One of the measures involved the Commission and the EIB setting up the European Circular Bioeconomy Fund.[38] The fund aims to provide financing for innovative circular bioeconomy companies and projects.

35 https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1516265440535&uri=COM:2018:28:FIN
36 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019L0904&from=EN
37 Bioeconomy strategy (COM (2018) 673, 11.10.2018)
38 ECBF

Annex 4 Circular economy and climate change mitigation

(for sources see Annex 1)

Title, author and year of publication	Sector/circular economy strategies	Geographical scope	Main messages/reduction in greenhouse gas emissions
The circular economy – a powerful force for climate mitigation, Material Economics, 2018	Four largest materials in terms of emissions (steel, plastics, aluminium and cement) and two large use segments for these materials (passenger cars and buildings)	EU/world	In an ambitious scenario, as much as 296 million tonnes of CO_2 emissions, out of 530 Mt in total (- 56%) can be cut per year in the EU by 2050 – and some 3.6 billion tonnes per year globally.
Circular economy potential for climate change mitigation, Deloitte, 2016	Food sector: reduction of food waste, recirculation of key nutrients (nitrogen, phosphorous) through their recovery from food waste or wastewater Construction sector: recycling, product reuse Automotive sector, electrical and electronic equipment (EEE): large-scale, systematic recycling, product reuse and lifetime extension	EU	Across all three sectors studied, the potential for a reduction in greenhouse gas emissions is 22%-33%, compared to 2007 levels, depending on circular economy scenarios considered (savings between 230-335 $MtCO_2eq$ annually). By sector: – Food: between 12%-14% reduction (55-64 $MtCO_2eq$ annually) – Construction: between 17%-34% reduction (26-75 $MtCO_2eq$ annually) – Vehicle production: between 45%-66% reduction (84-123 $MtCO_2eq$ annually) – EEE production: between 43%-50% reduction (65-75 $MtCO_2eq$ annually) Altogether, the circular economy may lead to a reduction of 550 $MtCO_2eq$ annually, a 33% reduction of the emissions related to the production of goods consumed in the EU.
The circular economy as a key instrument for reducing climate change, CE Delft, 2016	Municipal solid waste recycling	EU/world	Increased recycling of 2/3 of municipal solid waste (from current levels) can reduce global greenhouse gas emissions by 6% (2.3 $GtCO_2eq$ annually). The EU's greenhouse gas emissions could be reduced by 4% (180 $MtCO_2eq$ annually).
Implementing Circular Economy globally makes Paris targets achievable, Circle Economy and Ecofys, 2016	Recovery and reuse, lifetime extension, sharing and service model, circular design, digital platforms	World	The circular economy has the potential to close approximately 50% of the emissions gap between current policies and the 1.5°C target (15 $GtCO_2eq$).
Growth Within, A Circular Economy Vision for a More Competitive Europe, Ellen MacArthur Foundation, McKinsey Center for Business and Environment, Stiftungsfonds für Umweltökonomie und Nachhaltigkeit (SUN), 2015	Mobility sector: electric, shared and autonomous vehicles Food sector: food waste reduction, regenerative and healthy food chains, Built environment: passive houses, urban planning and renewable energy	EU	Across the three sectors, potential CO_2 emission reductions are 48% by 2030 (31% on the current development path) and 83% by 2050 (61% on the current development path), compared to 2012 levels.
The Circular Economy and Benefits for Society, Club of Rome, 2015	Material efficiency in manufacturing in general ("+25% overall increase in material efficiency + 50% of all virgin materials being replaced by secondary materials + doubling the product life of long-life consumer products compared to today")	Finland, France, the Netherlands, Spain and Sweden	The material efficiency scenario is likely to cut carbon emissions in all the countries by between 3% and 10% (~75 $MtCO_2eq$) by 2030. By country: Finland: -4%, France: -5%, Netherlands: -3%, Spain: -10%, Sweden: -5%.

Annex 5 Typical circular economy investments and generic guidance

1. Circular design and production

Activities contributing to circular design and production aim at increasing resource efficiency through circular economy strategies listed in Annex 2 that (i) apply design innovation, process innovation and re-engineering and/or material innovation and substitution and (ii) enable higher resource value retention and recovery throughout product value chains.

Circular categories	Guidance
1.a Design and production of products and assets that enable circular economy strategies through e.g. (i) increased resource efficiency, durability, functionality, modularity, upgradability, easy disassembly and repair; (ii) use of materials that are reusable, recyclable or compostable	Examples of typical investments/projects: - RDI programmes and infrastructure, including pilot and demonstration facilities, enabling activities under circularity categories 1.a, b, c, d, e - Scale-up and deployment of new technology and/or facilities at commercial scale supporting activities under circularity categories 1.a, b, c, d, e - Design and construction of new buildings and infrastructure incorporating circular products, materials (including recycled materials), construction processes and technologies including circular categories 1.a, b, c, d, e Term definitions: - 'Bio-based material': material of biological origin excluding material embedded in geological formations and/or fossilised - 'Compostable' means biodegradable in conformity with the criteria set out in the European standard EN 13432.2000 or equivalent standard - 'Substance of concern' means any substance, other than the active substance, which has an inherent capacity to cause an adverse effect, immediately or in the more distant future, on humans, in particular vulnerable groups, animals or the environment and is present or is produced in a biocidal product in sufficient concentration to present risks of such an effect (as defined in EU BPR 528/2012/EC) - 'Secondary raw materials' are recycled materials/substances that meet end-of-waste criteria as defined in the Directive 2008/98/E on waste - 'By-product' means a substance or object, resulting from a production process, the primary aim of which is not the production of that item, and does not constitute waste (as defined in Directive 2008/98/E on waste)
1.b Development and deployment of process technologies that enable circular economy strategies	
1.c Development and sustainable production of new materials (including bio-based materials) that are reusable, recyclable or compostable	
1.d Substitution or substantial reduction of substances of concern in materials, products and assets to enable circular economy strategies	
1.e Substitution of virgin materials with secondary raw materials and by-products	

2. Circular use

Activities contributing to circular use aim at **increasing resource efficiency through (**i) product and asset lifecycle extension and/or (ii) product and asset use optimisation based on circular economy strategies listed in Annex 2.

Circular categories	Guidance
2.a Reuse, repair, refurbishing, repurposing and remanufacturing of end-of-life or redundant products, movable assets and their components that would otherwise be discarded	Examples of typical investments/projects: - Refurbishment, retrofitting and remanufacturing of end-of-life or redundant products/movable assets - Construction, expansion or retrofitting of manufacturing facilities, ancillary equipment and technology for refurbishing and remanufacturing purposes - Establishment of small-scale businesses or not-for profit organisations for the reuse and repair of consumer products (e.g. clothing, furniture, bicycles, household appliances) Term definitions: 'Reuse', 'Repair', 'Refurbish', 'Remanufacture', 'Repurpose': see definitions in Annex 2 Note on second-hand assets and their eligibility for EIB finance: Product reuse and life extension strategies (repair, refurbishing, remanufacturing) are value retention strategies substantially contributing to a circular economy. The acquisition of second hand assets may have important advantages for businesses, in particular SMEs, such as lower investment cost, avoidance of initial depreciation, holding equipment value longer, etc. Second-hand assets can be eligible for EIB financing under certain conditions. Further details on this topic can be provided on request.
2.b. Refurbishment and repurposing of end of design life or redundant immovable assets (buildings/infrastructure/ facilities)	Typical investments / projects may involve public, residential, commercial or industrial buildings for instance: - refurbishment (including retrofitting) of end of design life or abandoned/unoccupied residential buildings for the purpose of bringing them back into use as residential buildings; - refurbishment (including retrofitting) of abandoned/unoccupied commercial or industrial buildings and facilities, bringing them back into use with the same or different purpose, including residential. Note that for a building refurbishment project to count as substantially contributing to the circular economy, it needs to be "circular" by design and demonstrate substantial improvements in (material) resource efficiency through circular economy strategies, and not just improvements in energy efficiency and/or building quality/resilience. The following are typical features for circular refurbishment projects: - Circular design/construction enabling easy disassembly, reuse, repair and/or recycling including through the use of construction materials that are reusable, recyclable or compostable (see categories 1a, 1c, 1d) - Use of reused and/or recycled materials and components in construction (see category 1e) - Additional investment for implementation of product-as-service solutions for selected building components (see category 2d) - Equipment and technology for harvesting rainwater and recycling/reuse of grey water for water supply in the building (see category 3d) - Equipment and technology for on-site black water treatment for nutrient recovery (see category 3c)

	- Equipment and technology for on-site high quality fertiliser/compost production for use in gardening (see category 3c) - Selective deconstruction of building components, sorting and refinement of construction and demolition waste to facilitate recycling (see category 3a) - Creation of a material passport/inventory for the refurbished object (see category 4a)
2.c Product-as-a-service, reuse and sharing models based on, inter alia, leasing, pay-per-use, subscription or deposit return schemes that enable circular economy strategies	<u>Examples of typical investments/projects</u>: - Investments in businesses applying product-as-a-service, reuse and sharing models based on, amongst others, leasing, pay-per-use, subscription or deposit return schemes <u>Term definitions:</u> - Product-as-a-service (PaaS) is a circular economy business model by which a company sells the services and outcomes a product can provide rather than the product itself. Generally, the manufacturer or service provider continues to own and maintain the product, and the customer leases it for use or subscribes to a menu of services. PaaS can take the form of leasing, sharing and subscription models amongst others. One of the main differences between leasing and sharing is that the typical period of usage for sharing platforms is much shorter. The number of users of assets in a sharing platform is also much greater. Subscription models are also similar to leasing but allow for more flexibility, giving users access to a wider range of alternative product models which can be used interchangeably on demand, generally for a fixed fee. PaaS may generally result in resource efficiency improvements by avoiding the need for each potential user to buy and own a product, which is then inefficiently used. However, truly circular PaaS achieves additional resource efficiency gains by extending the life of products and ensuring recovery of materials after end of life, for instance through: (i) leasing products with circular design (e.g. increased durability, modularity, easy disassembly and repair); AND/OR (ii) using predictive maintenance systems aimed at extending the life of the product/asset (e.g. involving intelligent data management and ICT systems), AND/OR (iii) applying contractual provisions for product/asset return at the end of the first lease lifecycle with subsequent refurbishment/repair to enable re-lease for additional lease lifecycles in “as new” quality condition. - Leasing: Under leasing, the owner of an asset (the lessor) conveys the right of use of the asset to another party (the lessee) for an agreed period of time in return for a fee. There are two types of leasing models, as summarised below: - Financial lease: Risks and rewards of asset ownership are transferred to the lessee. Ownership may be transferred to the lessee, usually at the end of the lease period, which is long, often equal to the economic life of the asset. Assets are usually accounted for on the lessee’s balance sheet, which makes a financial lease similar to a loan. - Operating lease: Few if any of the risks of asset ownership are transferred to the lessee, and ownership of the asset remains with the lessor. The lease period is usually short, assets are accounted for on the lessor’s balance sheet, and the lessee treats the leasing fee as an operating cost. Together these features make an operating lease similar to rental. The following leasing models are eligible for EIB financing: - The lessor’s purchase of assets for lease; - The lessee’s financial lease of assets in cases where the assets are accounted for on the lessee’s balance sheet.

2.d Rehabilitation of degraded land to return to a useful state and remediation of abandoned or underutilised brownfield sites in preparation for redevelopment	Examples of typical investments/projects: - Investments aimed at the rehabilitation or remediation of land for subsequent reuse/redevelopment. - The refurbishment/repurposing of existing buildings and infrastructure on the site shall qualify as a circular activity where it meets the criteria for circular category 2.b. Replacements with new buildings and infrastructure shall qualify where it meets the criteria for circular category 1.a. Term definitions: - 'Land degradation' is defined as "the reduction or loss of the biological or economic productivity and complexity of rain-fed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from land uses or from a process or combination of processes, including processes arising from human activities and habitation patterns" (from the text of the United Nations Convention to Combat Desertification, UNCCD) - A 'brownfield site' is defined as "previously developed land" that has the potential for being redeveloped. It is often (but not always) land that has been used for industrial and commercial purposes and is now derelict and possibly contaminated with pollutants or hazardous waste - 'Redevelopment' specifically refers to the real estate development process as applied to a site that has already been developed (i.e. built on), which may include the replacement, rehabilitation, or repurposing of existing buildings and infrastructure. Redevelopments may maintain or modify the original use given to the site for residential, commercial or industrial purposes, but also as open spaces for recreation, conservation, woodland and other community areas

3. Circular value recovery

Activities contributing to circular value recovery aim at increasing resource efficiency through the recovery of wastes in preparation for reuse and recycling or other circular economy strategies listed in Annex 2. Such interventions typically take place during the after-use phase of products and assets.

Circular categories	Guidance
3.a Separate collection and reverse logistics of wastes as well as redundant products, parts and materials enabling circular value retention and recovery strategies	Examples of typical investments/projects for reverse logistics systems: - Any physical equipment, transport and building infrastructure needed to organise the take-back and reverse flow of products and materials to relevant facilities for repair, refurbishing, remanufacturing or recycling Examples of typical investments/projects for separate waste collection: - Movable equipment (bins, containers) - Waste collection and transport vehicles - Supporting infrastructure for waste collection, transport and temporary storage (e.g. civic amenity centres, transfer and reloading stations, vehicle depots, facilities for refuelling/recharging, washing, maintenance and repair) Term definitions: - 'Reverse logistics' – generally defined as supply chains dedicated to the reverse flow of redundant or discarded products and materials for the purpose of returns, repair, remanufacture, and/or recycling (as defined by APICS) - The 'collection of wastes' – regulated services provided by specialised operators under public or private service contracts to households and businesses for the safe and efficient management

	and treatment of wastes. Separate collection schemes target both recyclable wastes and bio-wastes intended for subsequent material recovery and recycling operations - 'Waste' means any substance or object which the holder discards or intends or is required to discard (as defined in EU Directive 2008/98/EC on waste) - 'Redundant product, part or material' means a product, part or material that is no longer needed by or of use to its holder but is suitable for reuse (i.e. possibly after repair, refurbishment or remanufacturing). See definitions for reuse, repair, refurbishment and remanufacturing in the introductory section
3.b Recovery of materials from separately collected waste in preparation for circular value retention and recovery strategies (excluding feedstock covered under 3.c)	<u>Examples of typical investments/projects</u>: - Material recovery facilities (MRF), process technology and mobile equipment, involving manual, semi-automated and/or fully automated mechanical processes (dismantling, separation, sorting, crushing, shredding, cutting, post-treatment technologies, etc.) - Chemical recycling plants involving various types of technologies and processes (e.g. depolymerisation, solvolysis, gasification, pyrolysis, etc.) <u>Term definitions:</u> - 'Waste' means any substance or object which the holder discards or intends or is required to discard (as defined in EU WFD 2008/98/EC) - 'Material recovery' means any recovery operation, other than energy recovery and the reprocessing into materials that are to be used as fuels or other means to generate energy. It includes, amongst others, preparing for reuse, recycling and backfilling (as defined in EU WFD 2018/851)
3.c Recovery and valorisation of separately collected biomass waste and residues as food, feed, nutrients, fertilisers, bio-based materials or chemical feedstock	<u>Examples of typical investments/projects</u>: - Bio-refinery facilities and process technology for the extraction of bio-based products and feedstock from bio-wastes and residual biomass, wastewater and sludge of organic origin - Anaerobic digestion and composting plants utilising the resulting digestates/composts as fertilisers/soil conditioners. <u>Term definitions:</u> 'Biomass waste and residues' – any type of biodegradable waste or residue from municipal, commercial, industrial or agricultural sources. This includes, amongst others: o 'bio-waste' as defined in EU Directive 2008/98/EC, which means biodegradable garden and park waste, food and kitchen waste from households, offices, restaurants, wholesale, canteens, caterers and retail premises and comparable waste from food processing plants o organic by-products directly deriving from or generated by agriculture (agricultural crop residues, e.g. straw, bagasse, husks), aquaculture, fisheries and forestry as well as from related industries and processing o 'organic sludge' meaning residual, semi-solid material that is produced as a by-product during treatment of industrial or municipal wastewater
3.d Reuse/recycling of wastewater	<u>Examples of typical investments/projects</u>: - Equipment and technology to collect, treat and distribute wastewater in order to reuse it for household, industrial or agriculture purposes instead of discharging it For the sake of clarity, only the additional investment cost related to the objective of reusing the wastewater is included. The mandatory on-site treatment of wastewater is not included.

4. Circular support

Activities in the circular support category group aim at enabling other circular activities/projects and thus indirectly contribute to increasing resource efficiency through the circular economy strategies listed in Annex 2.

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Circular categories	Guidance
4.a Development/deployment of tools, applications and services enabling circular economy strategies	Examples of typical investments/projects: - ICT tools for predictive maintenance and repair to extend the life of products - Digital tools and applications to enable reverse logistics (tracking, take-back of products for reuse, repair or recycling), improve resource efficiency and avoidance of waste production (e.g. food waste in restaurants and shops) - Virtual marketplaces for secondary raw materials or second-hand/repaired/upgraded products - Digital material passports and related data repositories to facilitate the tracing, marketing and trade of secondary raw materials in end-of-life products and constructions - Methodological frameworks and tools for measuring and monitoring of progress in the transition to a circular economy - Digital tools and applications for consumer awareness raising/education on the application and benefits of different circular economy strategies - Advisory services to companies and public authorities for devising, preparing and implementing circular economy transitions.

The EIB Circular Economy Guide

Supporting the circular transition

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