



Access-to-finance conditions for

Projects supporting Circular Economy

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Inno**/**Fin Advisory



Assessment of access-to-finance conditions for projects supporting Circular Economy

Final Report



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Foreword

The circular economy aims to keep products, components and materials in the economy for as long as possible through re-use, repairing and recycling. It has enormous potential for creating a sustainable and competitive advantage for Europe in global markets, but it will not be an easy task to achieve a circular economy without fundamental changes in the way we work and how we design, produce, consume and finance our activities. Innovation will play an integral role in stimulating these changes, by helping to maximise their potential and mitigate any risks. We have the choice to either continue our business as usual, or to embrace the change – to lead, be frontrunners and reap the benefits.

I attach great importance to putting in place the right framework conditions to create an environment in which innovations can develop, reach the market and become widely used. The regulatory environment should not only be stable and predictable, it has to be flexible enough to adjust to new developments as well. This is a prerequisite for investor confidence. Innovators also need access to risk finance to bring new ideas to the market. For this reason, I am convinced that we need to adjust the range of financial instruments to best respond to the demands of the circular economy.

This report, 'Assessment of access to finance conditions for projects supporting circular economy', leads the way in analysing the characteristics of the circular economy and its implications for financing requirements to help us build a more sustainable future. It will provide the basis for raising awareness and mobilising investment, clearly positioning the circular economy as an investment opportunity. Following the recommendations in this report, the Commission has already introduced changes to broaden InnovFin's eligibility criteria allowing greater access to risk finance for circular economy projects. Together with other actions under the Circular Economy strategy, this will result in a faster transition to a more competitive resource-efficient economy.

Carlos Moedas

European Commissioner for Research, Science and Innovation







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1. Executive summary

About Circular Economy and its 'value proposition'

"The concept of Circular Economy attempts to encompass all economic systems where the resources used for a **product or a service** are maximally **reduced and/or recycled**, while either maintaining to the best extent possible their **economic value** at all times and/or ensuring that they are **biologically degraded**. CE-related projects focus on **re-thinking and re-designing products, processes, value chains, business and service models** in order to achieve the above-specified purpose.¹"

The circular economy has been well illustrated by the Ellen MacArthur Foundation (see figure below).

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Source: Ellen MacArthur Foundation, 2013

"A circular economy seeks to rebuild capital, whether this is financial, manufactured, human, social or natural. This ensures enhanced flows of goods and services. The system diagram illustrates the continuous flow of technical and biological materials through the 'value circle'."² The circular economy aims to optimise the entire system of resources and materials flows, by emphasising that

¹ Working definition as agreed between the European Commission Services and the EIB at the start of the horizontal activity.

² Available at <u>http://www.ellenmacarthurfoundation.org/circular-economy/interactive-diagram</u>







technical materials, just as biological ones, can be part of endless cycles of use, reuse, remanufacturing and recycling.

The transition towards a circular economy ("CE") is complex and multifaceted but imperative in view of its acclaimed substantial economic and societal benefits. According to several reports by the Ellen MacArthur Foundation in cooperation with McKinsey and Company and the World Economic Forum, a global transition to a CE could add USD 500 million to the global economy by 2025 and create 100,000 new jobs within 5 years. Emerging economies (like the BRICS countries) with rapidly growing middle-classes experience a strong increase in local consumption and an increasing demand for raw materials. This will result in worldwide reduced availability and upward pressure on the price of raw materials (including rare earth materials), strengthening the incentive for Europe to become more circular and less dependent on external suppliers.

Creating new jobs whilst transitioning towards a circular economy also entails some job destruction in linear businesses, with the net job creation impact still to be quantified. **Clearly, there will be 'winners' and 'losers' throughout the economy**. Some economies and some companies will be the winners and others will be the losers of this trend and the individual impact that this may have on particular EU Member States and regions needs to be taken into account. It will hence be equally important to be aware of the possible negative 'externalities' (which may prove to be extremely challenging) before being able to fully assess the 'net' impact of this transition. These externalities also need to be assessed in the financial sector as they may impact the quality of existing and future financial portfolios.

InnovFin Advisory mandate on Circular Economy

In the context of the Horizontal Advisory assignment on CE (implemented on behalf of and in close collaboration with the European Commission, DG R&I) InnovFin Advisory carried out a study on the role of finance in the transition to a CE. The study has been implemented on two levels: 1) EU level, and 2) a review of the pilot initiative, implemented by the Luxembourg Government to promote circularity in its economy. It encompassed different activities, including literature review, bilateral consultations with companies and financial institutions as well as active participation in the CE Finance subgroup (led by PGGM in The Netherlands), and the screening of existing and new options potentially available for the financing of CE projects.

EIB's advisory work assessed the role of finance in making the circular economy a reality, while aiming to place the concept within an adequate framework, and establishing the appropriate metrics needed to prove its economic and, ultimately, societal value. Next to dealing with finance-related challenges, the transition to a CE also requires attention for the broader framework conditions, including the build-up of intelligence and knowledge on the specificity of CE, as well as the creation of awareness on the importance and value added of circular properties. **Transiting to a circular economy requires a systemic approach and a new 'mind-set'.**

In the context of this study, EIB contributed to the **Public Consultation on circular economy launched by the European Commission in the interval 28.05.2015 – 20.08.2015.** Furthermore, EIBs technical experts (Projects Directorate) conducted an internal screening and analysis of EIB projects **that could be classified as CE projects under the different studied CE business models** (which also lead to various technical and regulatory insights). A further empirical analysis was carried out by EPEA Internationale Umweltforschung GmbH (under InnovFin Advisory's supervision) through a survey among companies with strong circularity-related business models.







The InnovFin Advisory mandate created **external awareness among key policy makers, business leaders and financial market participants**, and has paved the way for further targeted support towards the realisation of the circular economy concept and the role EIB can play in accelerating this process. The advisory work also raised awareness within EIB Services that a holistic and integrated approach is also needed in the way the Bank supports CE projects. **This mind-set change is needed to ensure that the EIB proactively seeks**, **as part of its advisory and appraisal work**, **that promoters include circular elements in their projects**. InnovFin Advisory actively contributed to the Innovative Enterprise Presidency conference under the Luxembourg Presidency of the EU, an event dedicated to the financing of the circular economy which will take place on 10 December 2015. InnovFin Advisory also organised a side event on the same topic targeting the financial community which will take place on 9 December 2015. Both events will be hosted at the EIB headquarters in Luxembourg.

Key conclusions

1. The transition towards a circular economy is complex but imperative to pursue: only a 'systemic approach' will be effective.

The transition towards a CE is complex and multifaceted but imperative in view of its acclaimed major economic and societal benefits. At the same time it is important to also consider the potential negative externalities of the transition, mitigate them where possible, and better assess the 'net' impact of this transition. Next to dealing with finance-related challenges (as illustrated by the analysis of the different CE business models), the transition to a CE requires a systemic perspective, with attention for the broader framework conditions, including regulatory, and the build-up of intelligence, knowledge and awareness of the specific characteristics of circularity. In our recommendations below we further reflect on how this 'systemic' view can be incorporated.

2. Market forces alone could create a circular economy but with the risk of a slow transition and high opportunity costs.

A cost-benefit analysis always lies at the core of a company's decision to make an investment towards circular economy. Cost of capital and raw materials' and commodities' price fluctuations play an essential role. In view of the uncertainty, however, with respect to the timing and the severity of such price increases, **public sector intervention and support is essential in order to:** (i) pre-empt potential supply crises (ii) reduce EU's dependence on strategic imported resources, and (iii) achieve the societal and environmental benefits that a transition to a circular economy should entail.

3. EIB has built a track record in financing circular economy projects through its standard lending practices, but there is more that needs and could be done to support CE transitions.

The EIB provides direct loans and guarantees to a wide range of beneficiaries across the EU and outside, provided that the projects meet minimum size requirements, are economically viable and bankable with returns that are commensurate to the risks taken by the EIB. Therefore, the EIB does not often finance directly smaller circular economy projects (often originated by SMEs), i.e. the bulk of circular economy projects which have huge impact both on a social and an environmental level. The EIB Group (including its subsidiary EIF) can however support such projects via its intermediaries through global loans for SMEs, framework loans extended to







commercial banks and, increasingly, through its risk-sharing, portfolio guarantee and securitisation products. Over time, a number of projects with circularity elements have been supported by the EIB, but more must be done to embed CE-related considerations and approaches in the EIB's lending and advisory activities. As we will also discuss in our recommendations (see below), the EIB Group has some capacity to finance higher risk circular economy projects through its special activities or risk-sharing and blended products set up in partnership with the European Commission under InnovFin and more recently also under EFSI (see also conclusion 6).

4. InnovFin – EU Finance for innovators can support some circular economy projects but its support could be broadened and enhanced.

To the extent that a circular economy project entails "technological innovation", the existing InnovFin products are fit-for-purpose. However, **InnovFin products have a limited capacity to support non-technological (organisational or business model) innovation**, which is often associated with circular economy projects (Please see Recommendation 1 on how to address this shortcoming).

5. EFSI could further boost EIB's lending and risk-taking capacity in supporting higher risk circular economy projects with the aim of mobilising private capital.

Since circular economy projects do not always entail innovation as defined by the InnovFin range of products, EFSI could serve as a complementary financing tool. **CE projects are eligible to be financed via EFSI (as confirmed by the preamble of the EFSI Regulation³) and EFSI could provide the EIB with considerable capacity to support a variety of relevant projects.** However, just as in the case of InnovFin, using EFSI to support smaller CE projects (such as those promoted by MidCaps and SMEs) would require significant resources and/or different lending structures, due to the expected smaller average transaction size.

6. A systemic and integrated approach is needed in order to accelerate the transition to a circular economy.

The complexity of the CE is high and different aspects need to be taken into account and aligned in order to successfully make this transition. Some categories of CE projects (by looking at the different business models examined above) seem to be marked by higher risks and therefore an increased cost of capital. In particular in relation to industrial symbioses, new financing solutions for supply chains appear necessary. New financing solutions require demonstration projects, in order to build a track record, understand which risks are associated with CE projects and how these can be mitigated. **CE projects can span the entire risk spectrum**, meaning that different forms of capital, involving not only bank finance, but also grants, equity, crowd funding, etc. will be needed. Leaving aside financial solutions, significantly more progress must be made with respect to **intelligence building and gathering**, **information sharing and awareness raising** to create circular-friendly demand. Last but not least, regulation and public policy could further help create a new 'mind-set' in order to screen for and appraise circularity in all economic processes. Hence, an **integrated and systemic approach is needed**, which can be partly built through the development of a multilateral platform, such as the one suggested in Section 6.8.

³ Available at <u>http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ%3AL%3A2015%3A169%3ATOC</u>







Key recommendations

In light of the analysis undertaken by InnovFin Advisory, and the conclusions presented above, this study leads to the following recommendations:

1. Expand InnovFin's eligibility criteria to include non-technological innovation.

CE is closely linked to innovation, and CE models often involve business model innovation, organisational innovation or technological innovation (or a combination thereof). **Broadening InnovFin's eligibility criteria to include non-technological innovation would be a major step forward**, allowing InnovFin to support a wider universe of circular economy projects, thus resulting in a faster transition to a circular economy.

Such amendment would bring InnovFin in line with the H2020 Regulation, provide integrated support to non-technological innovations, and set a good practice for the post-H2020 period. It is important that the wider innovation eligibility criteria are embedded on a sustainable basis into the financing products for Research, Development and Innovation ("RDI").

The InnovFin amendment is furthermore important for the internal coherence of our various InnovFin instruments. For instance, InnovFin SME Venture Capital does not face the limitations that the other InnovFin products do. More particularly, InnovFin SME Venture Capital's beneficiaries are funds whose investment strategy focuses on H2020's societal challenges or who, otherwise, promote "technological, non-technological, organisational or social innovation". A similar definition of InnovFin's global eligibility criteria would strengthen the positioning of the InnovFin 'family' by acknowledging that CE transitions require ongoing investment over their various growth/life cycles, and hence providing the necessary support throughout this life cycle (equity to SMEs, debt to large companies).

2. Consider expanding, at the end of the pilot period, the eligibility criteria for the InnovFin Energy Demo Projects facility to cover also circular economy-relevant areas.

The Energy Demo Projects facility enables the EIB to finance innovative first-of-a-kind demonstration projects in the field of renewable energy and hydrogen/fuel cells, two areas that are already relevant for CE. Expanding the spectrum of this facility to other areas would allow the financing of a broader range of first-of-a-kind demonstration projects in other sectors as well. However, as this facility has recently been set up and it is only a pilot, more time is needed in order to determine the potential impact and feasibility of broadening its scope.

3. Further explore the creation of a dedicated circular economy labelled platform bringing together the European Commission, the EIB, National Promotional Banks ("NPBs") and private sector investors in order develop knowledge, intelligence and create awareness among the different stakeholders involved (business and financial communities).

In view of circular economy's systemic nature and its overarching importance to EU's Growth and Jobs agenda, the creation of an **EU-wide circular economy platform bringing together the European Commission, the EIB Group and NPBs merits further investigation.** Such platform (see Section 6.8 for further elaboration) could play an important role in supporting the systemic transition that is needed to make the circular economy reality. Through its different pillars (**think tank and monitoring, information dissemination, advisory and potentially financing**) it would have a strong signalling and mobilising effect for the private sector and underline the fact that the public sector stimulates CE transition not only through policy measures but potentially also through a set of integrated measures destined to support the investments triggered by new







regulatory requirements. This would indeed underline the true systemic approach and associated paradigm shift that is needed to make the circular economy a reality.

The platform should start with building awareness and expertise, facilitating information exchange and academic research, and providing technical assistance where needed as this study has clearly identified these issues to be equally important for the purpose of developing 'demand'.

Under the advisory pillar of such a platform, CE projects could be developed (by identifying and introducing circularity elements) and supported with respect to access to finance and technical, CE-focused, project preparation. The capacities and capabilities of already constituted advisory services like InnovFin Advisory, JASPERS, and the expertise provided by the EIB technical experts (the Projects Directorate), could be mobilised. Requests for assistance could be received through the European Investment Advisory Hub and additional budgetary resources may need to be mobilised.

4. Continue monitoring and assessing the rollout of InnovFin and EFSI.

As mentioned above, CE business models and associated transitions are not yet sufficiently understood to expose the potential gaps and shortcomings of existing instruments that can already be used to finance CE projects. In order to better develop the pipeline of CE projects it is important to continue offering project preparation and associated advisory services, and to subsequently monitor and analyse the extent to which the current projects can or cannot be financed under existing instruments (including InnovFin, EFSI and other EIB instruments). Obviously, this can only be done in close collaboration with the financial sector and industrial players. Therefore the first three pillars of the proposed platform will play a central role in helping define a potential financing gap.

Throughout this study, it has become clear that many of the barriers of a CE transition are not finance-related *per se*. Financial support should be accompanied by policy measures in other areas. Based on their review of EIB's experience with previous transactions, EIB technical experts (Projects Directorate) highlighted a **number of recommendations** which are also included in the EIB's contribution to the CE Public Consultation. While such policy-related recommendations span a wider range of issues (please refer to Section 5.1), some of the key ones are summarised below:

- 1. Support the development of circular economy projects through technical assistance programmes for project preparation, possibly taking advantage of the newly set up European Investment Advisory Hub.
- 2. Support the market penetration of innovative projects through labelling, certification and standards, public procurement for innovation, etc.
- **3.** Provide more CE-relevant information to consumers, for example on expected lifetime of products or availability of spare parts.
- 4. Support the creation of secondary markets for products and sharing platforms.







- 5. Ensure the clarity, credibility and relevance of consumer information related to the circular economy (e.g. labels, advertising, marketing etc.) and protect consumers from false and misleading information in this respect.
- 6. Organise EU-wide awareness campaigns to promote the circular economy.

Recommendations 1, 2, and potentially 6, could be taken up by the earlier mentioned platform in case further analysis confirms the feasibility and justification thereof.





2. Introduction

2.1. The Business case for Circular Economy

Circular Economy ("CE") entails deep transformations of production chains and consumption patterns so that the value of end products, components, materials and resources is maintained throughout the value chain and the products' economic life. Consequently, CE aims at decoupling the creation of wealth and jobs from the consumption of resources (e.g. natural resources, primary raw materials, energy and water), by maximising resource productivity and minimising waste generation and resource extraction. The transition to a CE is expected to create an important disruption and transformation in the existing industrial value chains and will require multiple changes in various parts of the production and consumption system at the same time.

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Such decoupling between economic growth and resource consumption is already taking place, albeit at too slow a rate. According to the OECD, "between 1980 and 2010 the material productivity of the global economy improved by almost 30%, rising from \$0.70 per kilogram [...] in 1980 to \$1 per kilogram by 2010 – meaning that the global economy generated 30% more economic value with a kilogram of material resources in 2010 than in 1980".⁴ However, the usage of material resources continues to increase. According to the same OECD study, the average person is using 29 kilograms of resources per day, but the consumption per capita in OECD countries is 60% higher than the global average.

Therefore, further steering Europe towards a CE is expected to boost recycling and prevent the loss of valuable materials by designing for longevity (design for re-use and remanufacturing); to stimulate jobs creation and innovation and to reduce greenhouse emissions and environmental impacts by using raw materials, energy and water more efficiently. However, CE does not entail only a reduction of the economic activity's negative environmental impact and resource consumption. In addition, it potentially involves an increased emphasis on generating positive impact and amplifying it in a manner that is consistent with economic principles.

In addition, according to a recent ING study on CE^5 (based on internal research) there is evidence that companies that are leading in sustainability are more innovative, show better financial performance and have better credit ratings, although the correlation may also involve causation. This is particularly the case for high sustainability companies, which (moderately) outperform their counterparts over the long-term, both in terms of stock market and accounting performance. The latter is even more remarkable in B2C sectors (as compared to B2B), as companies there mainly compete on the basis of brands and reputations, and the products depend largely on natural resources⁶.

Various national and European initiatives have been launched to encourage investment in CE. As part of the EU initiatives to improve resource efficiency, the European Commission has presented a communication signalling that it intends to present a new and more ambitious CE strategy (including a legislative proposal) in late 2015, in order to transform Europe into a more competitive resourceefficient economy, addressing a range of economic sectors, including waste. This followed the

⁴ *Material Resources, Productivity and the Environment*, OECD, available at <u>http://www.oecd.org/env/material-resources-productivity-and-the-environment-9789264190504-en.htm</u>

⁵ Rethinking finance in a circular economy, financial implications or circular business models, report prepared by ING Economics Department, May 2015

⁶ Eccles, R., I. Ioannou, and G. Serafeim (2011), The impact of a Corporate Culture of Sustainability on Corporate Behavior and Performance', Working Paper, 12-035







withdrawal of the last Commission's Circular Economy Package that was presented in July 2014. The Horizon 2020 Societal Challenge –"Climate action, environment, resource efficiency and raw materials" is covering CE while there are a lot of interactions with the other pillars of Horizon 2020. Thus, the Circular Economy package aims to be in line with the waste hierarchy principles (as illustrated below).





Source: EU - Towards a circular economy: A zero waste programme for Europe. Brussels 2.7.2014 COM (2014) 398 Final

The long term business case for a CE seems to be compelling, although short term considerations may not be encouraging in view of the associated investments. According to several reports by Ellen MacArthur Foundation in cooperation with McKinsey and Company and the World Economic Forum, the transition to a CE could add USD 500 million to the global economy by 2025 and create 100,000 new jobs within 5 years globally.⁷ These reports argue that, by transitioning to a CE, EU manufacturers in sectors such as automotive or consumer electronics could potentially realise net materials cost savings worth between USD 380 billion and USD 630 billion per annum after 2020.⁸ According to the same sources, CE has the potential to increase economic growth by 1% to 4% over a period of 10 years⁹. Moreover, producers of fast moving consumer goods worldwide (e.g. food and beverages, apparel, and packaging) may potentially be facing a cumulated economic opportunity worth more than USD 700 billion per annum¹⁰.

Based on the above, Circular Economy is well worth pursuing, but more studies need to be undertaken in order to confirm these figures and it is still unclear to what extent recent downward trends in commodity prices may impact these estimates. As it will be detailed below, Circular Economy entails promising perspectives, but it also raises challenges and perhaps unexpected downsides. One would need to fully take into account all externalities entailed by CE transitions before being able to measure their impact, but such externalities need to be identified and

⁷ Towards the Circular Economy 3, Accelerating the scale up across global supply chains, January 2014, Ellen MacArthur Foundation , available at http://www.ellenmacarthurfoundation.org/business/reports/ce2014

⁸ Towards the Circular Economy 1: Economic and Business Rationale for an Accelerated Transition; January 2012, Ellen MacArthur Foundation, available at http://www.ellenmacarthurfoundation.org/business/reports/ce2012

⁹ According to Ellen MacArthur Foundation and TNO

¹⁰ Towards the Circular Economy 2: Opportunities for the Consumer Goods Sector, January 2013, Ellen MacArthur Foundation, available at http://www.ellenmacarthurfoundation.org/business/reports/ce2013







quantified, which may prove to be extremely difficult. This report therefore provides an assessment of access to finance issues related to Circular Economy projects, while acknowledging that more needs to be done to place Circular Economy into an adequate conceptual framework and establish the appropriate metrics that should be applied in order to prove its economic and, ultimately, societal value. As will be argued below, transiting to a circular economy requires a systemic approach and a new 'mind-set'.

2.2. Overview of the Circular Economy mandate

2.2.1. Two dimensions

The scope of InnovFin Advisory's ("IFA") assignment related to CE is two-fold, as illustrated below.



Figure 2 – Overview of the two interrelated levels of the InnovFin advisory mandate

The first dimension concerns a horizontal assessment of the access to finance and related conditions for CE projects at the EU level. This entails an analysis of the CE models' characteristics and the mapping of the financial products that are used currently. As foreseen by its work programme, the scope of this assignment entails the following activities to be undertaken by InnovFin Advisory:

- Bilateral meetings with relevant EC services, private companies, public authorities engaged in CE activities;
- Consultations on CE investment plans and access-to-finance conditions with relevant sample companies investing in those key areas;
- Identification and description of existing financing mechanisms (grants, equity, hybrid, loans, crowdfunding, leasing, impact financing) along the value chain;
- Identification of the funding challenges and key risks facing circular economic activities from early stage research to commercialisation for a select group of companies/projects;
- Subject to demand and available resources, Light Project Advisory ("LPA") projects to assist companies and local authorities in Luxembourg (and adjacent regions where







relevant) on access-to-finance, consulting and advisory to financial intermediaries on how risk-sharing financing products could further stimulate more funding of CE-related projects. The LPA will also provide valuable lessons for the wider horizontal market assessment. It is expected that the LPA and capacity building will take place in 2016 once the overall framework conditions are better understood as a natural consequence of the current work;

• Development of information/training for EIB Group partner banks and funds (financial intermediaries) on CE business models (to be implemented at a later stage).

The second dimension pertains to advising the Government of Luxembourg with respect to access to finance conditions for CE projects in Luxembourg and, consequently, identifying potential impediments that need to be overcome or incentives that need to be put in place in order to facilitate the implementation of Luxembourg's CE strategy. This endeavour follows a 2014 initiative of the Luxembourg Ministry of Economy, which requested that a study be undertaken for the purpose of investigating CE opportunities in the Grand Duchy. The study was realised by EPEA Internationale Umweltforschung in cooperation with Returnity Partners, under the supervision of the Luxembourg Ministry of Economy, Ministry of Sustainable Development and Infrastructure and the Eco-innovation Cluster. Apart from assessing CE opportunities, the study proposes a roadmap towards a CE in Luxembourg, including priority areas, next steps, low hanging fruits and political actions that are required for a successful implementation. However, a successful implementation of CE projects assumes an appropriate access to the necessary sources of finance. It is in this context that InnovFin Advisory's involvement was requested, in order to determine how the transition to the CE can be supported and accelerated through existing and possibly newly developed financial products.

In what follows, we provide an overview of the different sets of activities that InnovFin Advisory undertook in relation to the mandate and scope of work described above. First the activities undertaken under the Luxembourg dimension of the advisory assignment will be discussed, followed by the activities pertaining to the EU dimension. Furthermore, 'serving' both dimensions, an internal analysis of EIB's past experience with CE projects, and an assessment of its current financial products have been carried out.

2.2.2. Activities under the EU CE advisory assignment

Setup of a working group on definition and categories of CE

A dedicated Working Group was created, including experts from the European Commission (DG RTD) and the EIB (Advisory Services Department and the Project Directorate, PJ). The purpose of the Working Group was to define the substantive scope of the assignment, by agreeing on a definition of CE and of CE-related projects and by identifying the main categories of business models that should constitute the focus of subsequent actions/analyses.







The working definition agreed by the Working Group is the following:

"The concept of Circular Economy (CE) attempts to encompass all economic systems where the resources used for a **product or a service** are maximally **reduced and/or recycled**, while either maintaining to the best extent possible their **economic value** at all times and/or ensuring that they are **biologically degraded**. CE-related projects focus on **re-thinking and redesigning products, processes, value chains, business and service models** in order to achieve the above-specified purpose."

The main categories of CE models that have been agreed upon and selected for further analysis are the following:

- 1) **Product to Service**: transition from the manufacturing of a particular product and its sale to the provision of a service based on the use of the same product.
- 2) **Collaborative models or industrial symbioses:** collaboration between different companies to coordinate activities so as to share natural resources, by-products, water, energy, services, etc. in order to add value, reduce costs, reduce waste generation or turn waste into a resource.
- 3) Product and process innovation models: entailing new product design to make the product easier to maintain, repair, upgrade, dismantle, remanufacture or recycle and/or use less resource intensive materials, and the development of underlying new processes that increase the re-use potential and recyclability.

Consultations with financial sector institutions

As a result of InnovFin Advisory's outreach activities, the EIB was invited to join the CE Finance Working Group in The Netherlands led by PGGM and comprising several Dutch banks. The working group members are engaged in an assessment similar to that of InnovFin Advisory's, destined to gauge the implications of the CE on the business and financing models of companies and to determine how the transition to a CE can be supported and incentivised through financial products. Similar consultations are taking place on a bilateral basis between the EIB and other European financial institutions.

Some of the important feedback EIB has received is that InnovFin's eligibility criteria are adequate for innovative companies, but they are not sufficiently flexible to support the entire spectrum of CE projects, i.e. also those CE transitions in non-innovative companies (on the basis of the earlier mentioned eligibility criteria). Another financial institution's experience with the financing of CE-type projects (in this case carried out mostly by SMEs, associations or local public authorities) is that many of such projects, relying on SMEs, need small and intermediate-sized financing. The purpose of the financing can vary from a project to another: improvement of production processes, development of new business lines, etc., thereby also emphasising the importance of a clear-cut definition for future monitoring purposes. The same institution also stressed the very low, if not non-existent awareness of CE among its commercial units, despite being a provider of CE-type financing (yet not expressly defined as such).







Consultations with companies

In order to expand the scope of the consultations, beyond the consultations already carried out by IFA in the context of the Luxembourg dimension (see below), IFA has commissioned EPEA - Internationale Umweltforschung to carry out a wider survey among a diverse group of 28 selected companies who have made or may be interested in making Circular Economy-related investments, in order to: a) test the preliminary findings with respect to access-to-finance conditions for CE-related projects, and b) identify and explore new issues. The list of selected companies is presented in Annex 3. The key findings are presented in Section 5.2.

Contribution to the European Commission Public Consultation on Circular Economy

Several conclusions of this internal review were also communicated to the European Commission via a submission in the framework of the Public Consultation on the Circular Economy which took place in the interval 28.05.2015 – 20.08.2015.

2.2.3 Activities under the Luxembourg CE advisory assignment

Participations to 'local' awareness raising events

Presentations of the CE assignment and of EIB's advisory capacities were given by the Head of InnovFin Advisory, Shiva Dustdar, at the conference entitled "Development Potential of Circular **Economy**" organised by the Luxembourg Ministry of Economy on 9 February 2015 and at the conference entitled "Circular Economy – Preparing the Luxembourg Financial Sector for Take-off", organised by KPMG on February 12, 2015.

The participation in these events was also destined to initiate contacts with companies and banks that were keen to learn more about CE opportunities or already had experience implementing CE projects. Such contacts have proved extremely useful for organising the set of consultations referred to below.

Consultations with 'local' financial sector institutions

A workshop, "Time for Action – are banks ready to finance Circular Economy projects", with Luxembourg's banks was organised on 9 June 2015, under the aegis of ABBL (Luxembourg Bankers' Association) and in collaboration with KPMG. A leading flooring solutions company presented its experiences in moving from a linear to a circular model and the associated difficulties/challenges faced, also with respect to the financial implications. Subsequently, a presentation was given by InnovFin Advisory explaining the different InnovFin financial products and hands-on advisory support that can be provided. Following this presentation, a roundtable discussion took place among the participants on the challenges and possible solutions associated with the financial support of companies that envisage a CE transition. An important point was the lack of knowledge (track record) on the specificities of CE projects and the difficulty to identify and understand the associated risks.







Further bilateral consultations took place between the EIB and Banque de Luxembourg, Banque Internationale à Luxembourg, ING Luxembourg, as well as SNCI (Société Nationale de Crédit et d'Investissement). The results of the bilateral discussions are summarized below.

- Banks generally need to rely on historic data and benchmarking in order to appraise certain categories of projects. Even if CE-related projects are not completely new, and have been undertaken successfully in the past, the historic data are not sufficient to provide banks with adequate comfort or modelling possibilities. Furthermore, the public sector support could encourage banks to venture into financing of CE-related projects, thus contributing to the creation of a critical mass of knowledge that will in the future ease the banks' assessment of CE projects' risks. Finally, relatively poor demand for finance related to CE projects further contributes to the lack of a track record, creating a vicious circle: lack of data hampers access to finance, which, in turn, hampers CE projects' possibility of being implemented, thus restricting the likelihood of creating a track record.
- Products such as direct loans for development, direct loans for research, development and innovation or loans for innovative companies appear well tailored so as to allow significant support for CE-related projects. However, such loans have relatively low ceilings, which may limit the number of CE projects that could be eligible.
- Overall the demand for financing of CE projects in Luxembourg is low and in general Circular Economy projects are not easy to get off the ground because of the novel elements many of them involve. Because of the increased risks involved in many Circular Economy projects, the demand for equity investments appears higher than the demand for debt. At the same time, unsurprisingly, smaller companies are the ones who face higher obstacles to finance their projects. Many projects appear to not have sufficient equity in order to leverage the debt funding necessary for scaling up CE projects.
- It was estimated that the Government of Luxembourg's "Fit for Circularity" programme will lead to an increase in the demand for credits to support CE transitions, some of which could also fall under the existing InnovFin SME Guarantee provided by the EIF.
- Overall, InnovFin's Advisory's findings in relation to the challenges and inherent risks pertaining to CE transitions were confirmed.

Consultations with local companies

A series of bilateral consultations was initiated by the EIB with relevant companies operating in Luxembourg, such as Tarkett, Goodyear, ArcelorMittal, Aperam, and Dupont. These discussions were guided by a series of propositions and questions on the CE transition experiences, financing bottlenecks and solutions. Currently, with the support of the European Commission, the number of company consultations and the level of detail is further expanded to other sectors as well (e.g. the agro-food industry, where the potential savings and opportunities are considered significant). The findings on the basis of these preliminary discussions are reflected in the next section.





3. Circular economy from a dynamic perspective

3.1 Circular Economy – the concept, market dynamics and trends

While the concept of CE is 'simple' and the overall societal advantages of implementing it seem to be self-evident, its simplicity renders it applicable to various economic systems at a multitude of levels. As a result, assessing the way in which CE models can be implemented entails a complex analysis of a wide range of materials, products, services and stakeholders, with different potential for circularity across different economic sectors and value chains. In other words, the simplicity of the concept renders its implementation a challenge, because of the multitude of instances where it can be applied. Moreover, creating a CE in the EU is a challenging endeavour also because of the variety of stakeholders involved (European Commission, Member States, local authority, private sector, citizens).

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The opportunities for circularity vary considerably depending on sectors, companies, products services and value chains. Moreover, the need for public sector involvement and the degree of such involvement will also vary according to the particular circumstances. In some areas, the transition to a CE might happen without intervention while in other areas public support (or other kind of public intervention) is needed.

The complexity of the CE universe is well illustrated in the (simplified) diagram below.



Figure 3 – Illustration of the CE universe

Source: P. ten Brink, P. Razzini and E. van Dijl (IEEP), 2014







The starting point of this CE mandate has been the formulation of a working definition of what CE could entail among EIB and EC services for the purpose of this assignment. This is an important aspect in view of the definition of future eligibility criteria for CE projects and associated investments, but also for the correct assessment of the future economic and societal vale that can be captured from CE transitions.

For example, the following features and markets could be considered to fall under an evolving CE definition¹¹ (hereby taking a more dynamic perspective).

- **Rapidly renewable resources.** For economies to transit from extracting non-renewable resources to re-using renewable resources at 'sustainable' levels, the new marketplace is generating those resources on a large scale. New sources in the hundreds of billions of tonnes will be required, and are foreseen using existing and near-to-market technologies.
- Generate, store and use renewable energy. The new energy marketplace is integrating renewable energy generation with storage and re-use. Various companies stated in their CE questionnaire that they used renewable energy. The renewable energy transformation is accelerating rapidly. Storage is seen as a pre-requisite for reliability and improving efficiency. Those methods are materials-intensive.
- Materials quality. It is universally agreed that materials are core to the circular economy. The draft definition could evolve to explicitly include materials quality as an integral part of CE. For example, the 'content' of 'recycled content' for products in buildings has a primary influence on indoor air quality. Human beings spend up to 85% of their time indoors i.e. in built environments, and those environments account for most materials use in society. As a result, healthy materials and products are a value proposition for circular economy in buildings, and cannot be separated from the human productivity question.

Notwithstanding the diversity that characterises the CE universe, CE is born under the sign of innovation. CE models are neither sector specific (although the transition itself might bring along varying challenges in different sectors) nor material specific, yet they involve business model innovation, organisational innovation or technological innovation. Transformative technologies will have a substantial impact on CE development, its key characteristics and its transformative possibilities. In what follows we provide a few examples on ways in which technologic trends might play a role in CE transitions.

3.2 Examples of technology trends impacting CE over time

Many studies have been conducted on the potential impacts of new technology and social trends. Among the leading potential impacts of transformative technologies on the CE are:

- Shorter product cycles due to products improving more quickly. The trend is not new but is accelerating rapidly, not only for fast moving products but also for interiors of buildings and ships.
 - Shorter product cycles challenge the regulatory focus on 'durability'.

¹¹ Results of the study on the assessment of access to finance conditions for projects supporting Circular Economy implemented by EPEA Internationale Umweltforschhung GmbH, commissioned by EIB – InnovFin Advisory.







- Technology might also re-direct 'durability' towards improving 'materials integrity'. For example, instead of the product being durable, its component materials and additives will be suitable for recovery and re-use.
- **Production moves closer to the markets** where products are used, due to the advantages of 3D manufacturing. Local materials loops might be easier to implement due to proximity.
 - The trend towards 'on-shoring', already underway, might accelerate to eventually replace 'offshoring'. As a result materials' flow patterns might be transformed.
 - Feedstock designed for healthy circular 3D manufacturing and de-manufacturing (3DD) integrated in the same machines. 3D is one of the fastest growing industries but only a tiny fraction is designed for circularity. 3D de-manufacturing is entering the marketplace but is often toxic. Feedstock designed for circularity is a solution.
- New technological solutions may lead to a rapid increases in materials' complexity e.g. in composites. The trend to more complex composites and additives might frustrate CE proponent attempts to establish large flows of 'pure' materials.
 - Renewal and durability do not have to compete against each other. Instead durability
 might be transferred to another part of the cycle; where the integrity of the component
 materials is maintained for next use, instead of trying to maintain the integrity of
 complex products that become obsolete. In this scenario, durability becomes more
 specialised so a product is durable in the context of the function it was designed for. The
 approach is referred to as 'defined for use'.
- Accelerated materials throughput and production due to rising demand for products driven by rising standards of living in many economies and shorter product cycles. The 'Internet of things' is an example where digitalisation is presented as a way of reducing consumption, but billions of devices powering and utilising the Internet are accelerating demands for rare materials and driving greater throughput. In this context, the often-repeated perception that the Internet leads to reduced consumption deserves careful re-evaluation. For instance, the dramatic decrease in paper usage (do the advance of online newspapers) is counterbalanced by growth in electronics, something which entails a shift in demand from renewable to non-renewable resources.
 - Due to increases in throughput, the risk is that consumption of non-renewable resources accelerates unless rapidly renewable feedstock and rapidly recyclable materials are scaled up. The challenge is worsened by the short-term fall in commodities prices, which is increasing pressure to support business-as-usual. Those trends might disrupt the core CE aim of 'decoupling wealth generation from consumption'.
 - Realigning renewal with durability is a different approach from the philosophy of extending the lifetime of products, and might receive objections from those who believe that product durability will solve environmental problems, and that planned obsolescence is a bad thing. However, re-aligning renewal with durability might be an effective response to the technological reality.
 - Tech firms and online retailers will continue to make inroads into offering banking services, especially payment services (such as, Apple, Google, Amazon, Alibaba, etc.). Having access to a wealth of their customers' financial data and impressive data crunching capabilities, these companies have the potential of being instrumental in stimulating CE transitions and influencing the behaviour of their supply chains.







A number of new technologies is beginning to penetrate and dominate the economy. The following examples have clear CE characteristics and scale-up potential, and were described also by the interviewees approached in the earlier mentioned EPEA study.

- **De-composable composites.** Composites are dominating the automotive and ship building industries today but are not decomposable. The solution is developed through decomposable resins.
- Intelligent software for manufacturing, finance, and calculating the benefits of integrating value propositions. Intelligent software presently dominates most trading on stock exchanges yet is almost unused as a tool among CE practitioners.
- Feedstock designed for healthy circular 3D manufacturing and de-manufacturing (3DD) integrated in the same machines. As mentioned above, 3D is one of the fastest growing industries but only a tiny fraction is designed for circularity.
- **Rapidly renewable feedstock** that does not compete against food production, including algae, CO₂ re-use, synthetic photosynthesis and cellulosics.
- **Robot-human collaboration for rapid assembly and disassembly**. Touch-sensitive robotics allows humans to work safely in close proximity to robots. Recently, rapid assembly and disassembly of complex products was demonstrated by manufacturers, opening the door to cost-effective disassembly.

Those technologies are each being accelerated by digitalization. For example, as mentioned above, intelligent software is crucial to different processes. Particularly interesting is also the development of **circularity passports**. In order to integrate the diverse CE value propositions that together make products and services profitable, a vehicle is required to bring them together electronically, so that various stakeholders have access to them and are able to weigh their relative benefits. The approach is especially valuable for calculating residual value of materials as they move in and out of buildings and products throughout the cycle. Materials assessments are part of passports but presently the assessment approach is slow for suppliers and assessors. It is a high priority to use intelligent software as well as online data entry tools to speed and automate the assessment process. Assessing materials for their intended use is a core competency for the CE to work.

As exemplified above, CE goes hand in hand with innovation and CE transition opportunities can be further enhanced through technologic, organisational and business innovation. However, it would be wrong to conclude that all projects involving a transition to a CE are innovative or that they are implemented by innovative/leading companies. Some companies prefer to be followers. Increased resource efficiency, higher residual value and many other CE goals can be achieved by such "followers" which simply adopt, extend or optimise existing technologies (not necessarily the latest) and existing models. For this reason, the CE spectrum goes beyond cutting edge R&D and innovation in the strict sense. This is in many respects the case for post consumption waste recycling, where collection systems and material refinement and recycling facilities exist to varying degrees in different EU member states, but with varying degrees of efficiency. There is thus need and room for continued efforts and investments to increase both the quantity and the quality of recycled materials and in parallel boost the EU demand to increase the viability of recycling also in times of fluctuating raw material prices.







3.3 Macroeconomic considerations

While the environmental benefits deriving from a transition to a circular economy seem to be intuitive, this is not the case in relation to the economic and social gains. As already mentioned in the introduction to this report, various studies have indicated that CE transitions could lead to significant savings and job creation. However, creating new jobs in CE also entails destroying jobs in linear businesses and the net job creation impact of the CE still needs to be quantified. Clearly, there will be winners and losers throughout the economy. Some economies and some companies will be the winners and others will be the losers of this trend and the individual impact that this may have on individual EU Member States and regions needs to be taken into account. This topic goes beyond the scope of this study and merits more study by policy makers and economists in the coming years.

A recent study conducted by Rabobank's Economic Research Department¹² examines the possibility of measuring the benefits that transitions to a circular economy could create in the Netherlands. One of the base scenarios described in the study leads to the conclusion that the GDP and job growth resulting from the CE transition would more than offset the GDP and the jobs lost as a result of abandoning linear models. However, this entails an important detail: "note however that the number of jobs elsewhere in the world would most likely decline." This would probably also hold true in the EU context, in the sense that, at least in the short term, some EU regions would win while others would lose from a generalised transition to CE.

¹² The potential of the circular economy, Hans Stegeman, Economic Research Department, Rabobank, available at <u>https://economics.rabobank.com/publications/2015/july/the-potential-of-the-circular-economy</u>







4. Key CE business models and their financial implications

As indicated above, CE projects can be grouped into the following three main categories: 1) **Product to Service**, 2) **Collaborative models or industrial symbioses** and 3) **Product and process innovation models**.

Based on the explorations so far, it has become clear that next to these three separate categories of CE-related business model transitions, there are different hybrid forms possible as well. In other words, in some instances there seem to be interdependencies between CE transition types. For example the earlier mentioned Tarkett case pointed out to the fact that the transition from a product to a service based model was associated with product and/or process innovation. It moreover involves certain collaborative models in their value chain, thereby actively involving actors from adjacent value chain segments (suppliers and clients). This interrelation poses increasing challenges (to be explored further), also with respect to the financial support that is needed to successfully make the transition to a CE company. The complexity is further illustrated in the figure below.



Figure 4 – Overview of the three main categories of CE transitions and their interrelation

4.1. Product to Service transitions

Product-to-Service transitions entail a (partial or total) conversion from manufacturing (and selling) a product to the following:

- 1. Providing renting, lending, taking-back and sharing services as an alternative to owning products;
- 2. Services to facilitate maintenance, repair and reuse: e.g. exchange services/stations where individuals can leave their after-use products for re-use by others;







3. Services to facilitate the tracing, the marketing and the trade of secondary raw materials: e.g. 'product passports' and material databases to guide traceability of materials and inform on quality of those materials.

In a service-based model the producer remains the owner of its materials/products for a number of years (sometimes 10 years or more), enabling easier return, refurbishment, remanufacturing and reuse. This principle is not new and it is well known for durable assets, like machines and cars. However, in the CE context it can start to be applied to new asset classes, like cleantech or digital assets. In general, there are financial implications with respect to the changing nature of cash flow, increasing capital needs to pre-finance clients, balance sheet extensions, revised view of residual value and related challenges in product tracking, and legal issues surrounding collateral and its value. Furthermore, there are specific risks associated with e.g. the attitude of the consumer, or in a broader sense, market-related risks. In view of the importance of the role of the consumer and the importance of leasing arrangements, we present below a range of different aspects and considerations.

The consumer's/lessee's perspective

There may be many instances when consumers (in B2C contexts) prefer to rent rather than purchase; in particular for bulked products that are difficult to store and for products that are used infrequently. However, the actual decision on what is best will depend on the exact terms of each lease or service proposal. The fact that leasing or offering a service has a positive societal impact is less likely to be the determinant factor that will convince individuals or businesses to start renting rather than acquiring.¹³ Therefore, companies that want to transition to this CE model need to offer benefits to their clients that compensate for some of the advantages of owning products. For example, if companies are able to make products that are easy to disassemble and refurbish (which might require product and process innovation), their production costs may decrease and they may be able to offer rental products at a much lower cumulated cost for the customer as compared to buying the relevant product.

In B2B contexts, companies may also prefer to rent assets rather than purchase them, because operating leases do not have to be included in their balance sheets. Moreover, other companies may prefer renting some assets because this would put less pressure on their cash flows.¹⁴ The lessors must be aware that some of their new clients will be cash strapped companies that may struggle to survive, which brings along a whole category of specific risks. The table below shows the different impacts that operating leases and capitalised/finance leases would have on various financial ratios, but the impact of finance leases can also be extrapolated to capital expenditure. Therefore, the changes to financial ratios mentioned in the second column also reflect the impact of purchasing an asset.

¹³ With the notable exception of products bearing "fair trade" labels (although the quality of the products still plays an important role in the consumers' choices)

¹⁴ The Impact of Accounting Rules and Practices on Resource Efficiency in the EU, report related to a study by Ricardo-AEA for the European Commission, DG Environment, December 2014







Table 1 – Effects of operating leases and capitalised finance leases¹⁵

Ratio	Effect of Operating Lease	Effect of Capitalized Lease
Return on Capital (ROC)	 Decreases EBIT through lease expense Capital does not reflect leases ROC is higher 	 Decreases EBIT through depreciation Capital increases through present value of operating lease ROC is lower
Return on Equity (ROE)	 Net income lowered by after-tax lease expense BV of Equity Unaffected ROE effect depends on whether lease expense > (imputed interest + depreciation) 	 Net income lowered by after-tax interest expense and depreciation BV of Equity unaffected ROE effect depends on whether lease expense > (imputed interest + depreciation)
Interest Coverage	 EBIT(1-t) decreases Interest Exp. unaffected Coverage ratio generally higher 	 EBIT(1-t) decreases Interest Exp. increases Coverage Ratio generally lower
Debt Ratio	Debt is unaffectedDebt Ratio is lower	 Debt increases (to account for capitalized leases) Debt Ratio is higher

Clarification of acronyms: EBIT – Earnings Before Interest and Tax; BV – Book Value;

As one can see, apart from improving the cash flow, an operating lease may make more sense than purchasing an asset when there is an interest to keep the debt ratio lower and/or the ROC higher. On many occasions though, the most important consideration will be given to the lease expense and to how it compares with depreciation plus the imputed interest. In order to attract more clients a lessor would need to focus on achieving efficiencies that would allow it to drop the lease it charges to a level that would make it compare favourably to the depreciation plus the imputed interest.

The service provider's/lessor's perspective

Operating leases

As opposed to the various benefits that consumers may have, the business case for companies wanting to transition to this type of model is not easy to make. Products which otherwise would have been sold would, in principle, remain on the company's balance sheet. The renting out of such products would translate into operating leases which would, in most accounting systems, be recorded on the lessor's balance sheet as if the product were still owned. A direct consequence of this sort of transition is a marked increase in the size of the company's operating assets. In most cases such an increase in the size of the operating assets also leads to a decrease of the average liquidity of the company's overall assets. Lower asset liquidity seems to be generally associated with

¹⁵ Dealing with Operating Leases in Valuation, Aswath Damodaran, New York University Stern School of Business available at http://people.stern.nyu.edu/adamodar/pdfiles/papers/oplev.pdf







an increased cost of capital¹⁶. Should the company want to finance the transition through debt, it should expect an increase in its borrowing costs.

A possible counterargument to the above hypothesis is that having more assets on the balance sheet provides the possibility of offering more security to a lender (therefore decreasing the borrowing costs). However, this would involve taking into account the depreciation of the operating assets. The value of the assets offered as security would drop in time and a lender will want the security cover ratio to remain constant. Therefore, the depreciation rate of the operating assets should be equal to/lower than the loan repayment rate. However, it is difficult to control the gradual drop in the residual value of a leased product, since such residual value depends on the conditions of use of the relevant asset and of whether the lessee respects the regular maintenance requirements. A periodic evaluation of the relevant assets should be undertaken, and if, following such evaluation it is confirmed that the security cover ratio decreased, it may be necessary to request additional security.

A worst case scenario would involve factoring in only the value of the materials that can be recovered once the relevant assets are scrapped. This requires a solid understanding of the materials contained by the respective assets, the associated recovery costs, and of the market price at which such materials can be disposed of. Commodity prices are highly volatile and this will add an important element of uncertainty to the equation, so appropriate hedges must be put in place. However, one must take into account that the exact moment when the assets may have to be scrapped cannot be foreseen (as they will be scrapped only if the borrower defaults on the servicing of its debt and if the assets are no longer functional – or are more valuable if scrapped). Therefore, hedging will likely be expensive and this will translate into an increase in the borrowing costs, perhaps even beyond the cost of an unsecured loan (assuming that there are lenders willing to provide loans on an unsecured basis).

Another potential solution is the securitisation of the future receivables from the subscriptions purchased by the clients. This in principle would allow a lowering of the borrowing costs but would suppose that banks have the appropriate tools to model the expected revenues. The lack of a track record could be substituted by analogies with peer companies, but only to the extent that such peer companies which offer comparable services exist. This may create difficulties in situations when the service in question is innovative, which is likely to be the case in most CE-related contexts. In lack of appropriate metrics, such securitisations may need credit enhancements that might increase the borrowing costs beyond acceptable levels.

Finance leases

In most accounting systems, finance leases would trigger a recording on the balance sheet of future lease receipts and of any sale value of the asset at the end of the lease term as a receivable (as if the product were sold).¹⁷ So there may be some incentives for lessors to structure their offering to the customers in ways which would allow them to categorise the renting of their products as finance leases. Moreover, lessors will likely be inclined to offer such finance leases over longer time periods, as these would increase their recorded profits.¹⁸

However, it may not always be possible to consider the service provided by the lessor a finance lease, especially in the CE context. According to the IFRS, a finance lease transfers to the lessee

¹⁶ Asset Liquidity And The Cost Of Capital, Hernán Ortiz-Molina, Gordon M. Phillips, Working Paper 15992, available at http://www.nber.org/papers/w15992

¹⁷ The Impact of Accounting Rules and Practices on Resource Efficiency in the EU, report related to a study by Ricardo-AEA for the European Commission, DG Environment, December 2014

¹⁸ Idem







"substantially all the risks and rewards of incidental ownership".¹⁹ For instance, if a lease term covers the most of the leased asset's economic lifetime, chances are that it will qualify as a finance lease.²⁰ In many instances, however, consumers which want to use a good for its entire economic lifetime will prefer to purchase it, instead of renting it (with the exception of leasing in a B2B context, as referred above and those customers which cannot afford the purchase a good and choose to pay per use). Therefore, not all companies that want to transition to a service-based model will be able to avoid categorising their services as operating leases.

Cash flow considerations

Regardless of their different accounting treatment, both operating and finance leases put the same pressure on the lessor's cash flow. Manufacturers that want to transition to a service based model need significant cash buffers to deal with the longer cash-to-cash cycles which characterise the newly adopted model. Instead of purchasing the product for its full price beforehand, customers will pay smaller subscription/rental fees.





As can be seen in the diagram above, once they transition to a service-based model, the manufacturers front the costs and they recoup them in small increments over longer time periods. Potential upsides consist of an increase in the client base and more revenues in the longer term. However, the transition requires considerable financial resources in a context which can lead to a higher borrowing cost if the company does not have the means to finance the transition through own resources. This pressure on cash flows not only requires in many cases access to external finance sources, it may also increase the reluctance of banks to lend to a cash strapped company, which presents perhaps a solid balance sheet but a discouraging cash flow statement.

A possible solution for a company attempting a product to service transition would be partnering with a bank willing to share such risks by providing customised products such as factoring and reversed factoring adapted to the specificities of a service based model. For instance, a bank could finance the company's clients and advance to the service provider the equivalent of several months' subscription in order to reduce the impact on cash flows and take away some of the client risk.

¹⁹ IFRS 17 ¶8

²⁰ IFRS 17 ¶10 (c)



We illustrate above how a factor could help reduce the impact of a subscription-based service on cash flows. Reverse factoring could have the same impact upstream, with respect to the service provider's relationship with the suppliers. In this case, by providing support both upstream and downstream, a bank acting as a factor could significantly help in reducing the pressure on cash flows.





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However, this supposes that commercial banks will be willing to absorb the risks involved. As discussed in the later sections of this paper, this could be a potential area where the public sector could intervene to enhance commercial banks' risk tolerance.

Figure 8 – Illustration of the potential way in which the EIB Group could support factoring and reverse factoring



Legal risk considerations

In addition, this model assumes an extensive and prolonged contact with the clients. The leased product must be maintained periodically and taken back after a while. As opposed to the classic model, where the seller-buyer relationship is relatively short and the seller's liability only covers the guarantee period, a lessor – lessee relationship is much longer and involves more obligations on both sides. The lessor must guarantee the functioning of the good throughout the duration of the contract, must repair it, maintain it, replace it if it ceases to function, etc. The lessee must also store it and exploit it diligently, with the due standard of care, follow the operation requirements of the manufacturer, respect the maintenance requirements, etc. Consequently, the lessor will have to deal with various lessees which will have different incentives to treat the rented products carefully (hence maintenance costs will vary) and will need to ensure that the residual value of the products is as high as possible. The legal risks deriving from such lengthier relationships which also involve a higher diversity of obligations than a regular sale increase the overall operational risk to the lessor.

Client risk considerations

As mentioned above, a transition to a service based model entails a significant change in the client base. Consumers who make heavy use of a product will still prefer to buy it rather than renting it. They may buy the product from the same manufacturer if it is still available for sale, thus they represent the relatively stable part of the clientele. Those customers characterised by moderate use will no longer buy but would start renting instead. There is a risk that the net present value of the total fees they will pay for the service in the future will not exceed the price they would have paid for the product had they purchased it. This loss needs to be offset by the expansion of the client base with infrequent customers who would have never bought the product but who decide to rent it from now on. Associated with this is the risk linked to the uncertainty of correctly setting contract prices and the "contracting risk"²¹, as there is uncertainty related to operating costs and maintenance costs. Modelling the costs is more challenging for longer-lived products, especially where 'track records' are inexistent. However, the latter category may also include many clients who have limited financial resources and who can only afford occasionally renting the relevant product rather than buying it. As

²¹ Sonerud, B. (2014), Meeting the financing needs of circular business, report submitted in partial fulfilment of the requirements for the MSc and/or the DIC.







opposed to the classic model, where once the product was paid for the "client risk" was gone, this service model entails the risk that the client does not respect his obligations, that the product gets damaged, or that maintenance costs exceed the initial estimates. Hence the risk of customer default also needs to be factored into the analysis. Moreover, while we can witness an increasing shift towards access rather than ownership (such as leasing cars, mobile phones, and providing software as a service), consumer acceptance still needs to grow and the uncertain evolution of the client base is a significant risk.

Finally, on the basis of the scarce evidence available in literature (not referring to the empirical findings related to the ongoing consultations with financial institutions and companies), it seems that quite often internal funding is the main source of financing the transition from a product to a service model. When there is external funding involved, bank loans appeared to be the most important source (important to consider here is that these results are based on the analysis of the transition made by large companies)²².

Summarizing overview of opportunities and risks

In the figure below we present a preliminary summary analysis of the opportunities and risks (threats) associated with the transition from a product to a service based business model and the potential impact on various financial parameters.



Figure 9 – Summary overview of opportunities and risks related to Product to Service transitions

4.2. Collaborative models/industrial symbioses

This type of collaborative models relies on the creation of new value chains based on CE principles. They could involve innovative organisation and/or coordination of economic activities that would lead to a reduced consumption of primary resources and related reduced negative impact on the

²² Ibid. op cit. Henriksen et al., 2012







environment and/or lead to quality and performance improvements, thus creating products with a higher residual value at the end of their life cycle. An important objective here is to increase the possibilities of transforming waste into a resource. The two types of impact are illustrated below.





Many of the opportunities to cut costs and increase resource efficiency can only be realised within collaborative models. A company's ability to innovate and change is often dependent on the capacity of its upstream and/or downstream partners to follow suit. The relationship between the various actors in the value chain can be an important driving or limiting factor with respect to the realisation of CE opportunities.

The current economic situation provides a good opportunity for encouraging businesses to become more resource efficient and to look for CE potential in their respective value chains. As previously mentioned, EU manufacturers in sectors such as automotive or consumer electronics could potentially realise net materials cost savings worth between USD 380 billion and USD 630 billion per annum after 2020.²⁴ It is likely that the cost saving potential in many other sectors is comparable. The National Industrial Symbioses Programme UK facilitates symbiotic exchanges among companies belonging to different industries across the country. Total savings²⁵ for the members go up to GBP 860 million while the programme safeguarded or created 8,770 jobs, boosted the UK economy by GBP 1.5 billion and brought a total economic value of GBP 900 million in new sales for its members. There is thus a clear value proposition to be made, but the key question is how should this proposition be defined?

The cost savings associated with efficient resource use should be a considerable incentive for businesses to act. However, this is not sufficient. Industrial symbiosis may still entail high up-front costs. A successful circular value chain would foster growth and reduce vulnerability to resource shortages/sudden price fluctuations. But in the short term, significant up-front investment will be necessary for e.g. for retooling machines to make them compatible with the upstream or

²³ Luxembourg as a knowledge capital and testing ground for the circular economy, National roadmap to positive impacts, report to the Luxembourg Ministry of Economy, prepared by EPEA Internationale Umweltforschung GmbH in association with Returnity Partners, 2014

²⁴ Towards the Circular Economy 1: Economic and Business Rationale for an Accelerated Transition; January 2012, Ellen MacArthur Foundation, available at http://www.ellenmacarthurfoundation.org/business/reports/ce2012

²⁵ Green Business Model Innovation, Empirical and Literature studies, Nordic Innovation Report, 2012






downstream partners' requirements, relocating plants, building new distribution and logistics networks, and retraining the workforce.

More importantly, companies that want to form a circular value chain (or at least that seek some form of advanced co-operation) will do so based on the long term prospects of such co-operation. The changes required may entail investments that will diminish the company's capacity to act opportunistically on the market (because its products are specialised for a particular kind of process downstream or because its processes can only accept a particular type of secondary raw material input from upstream). Such loss of flexibility needs to be compensated through long and secure business relationship(s) with the relevant partner(s) in the value chain or mitigated by the existence of many other potential partner(s) in the same ecosystem (or material loop) which would increase the possibility that existing partners could be replaced. Ideally, the collaborative model would involve several upstream and downstream partners for each company. As the number of value chain actors increases, so does the challenge in aligning interests and incentives to realise CE opportunities.

However, it is difficult to trigger this kind of change. A powerful actor in the value chain can initiate CE innovations and stimulate other actors to take steps towards CE as well (this has also been confirmed in a few of the exploratory interviews we have had). In value chains without a particularly powerful actor, a catalyst, there may not be sufficient incentives or opportunities for the various entities to co-operate simply because becoming too reliant on a supplier or a customer can have a significant impact on a particular company's power in the value chain itself.

Financing such adjustment to an industrial symbiosis will require an extensive analysis not only of the borrower but of the value chain itself. Loan pricing is currently based on the creditworthiness of the borrower rather than on solidity of the value chain it belongs to. Once entered into a collaborative model, the borrower's creditworthiness will be strongly correlated with the solidity and reliability of the value chain and the main uncertainty will be whether the relationship with the value chain partner(s) will last long enough to pay off. This will likely lead to increased cost of capital unless appropriate purchase/supply commitments can be put in place to mitigate the value chain risk.

Just like in the case of product to service models, the creation of circular value chains which entail longer relationships between business partners and the legal framework supporting such relationships will become even more important than beforehand. One is to expect longer term intake/off-take agreements needed to mitigate the downsides of specialisation, and various other legal arrangements destined to add more certainty to a longer co-operation of the various partners. As companies and their incentives and economic realities change, these longer term agreements add a significant number of variables that need to be factored in when assessing credit risks. It is important to consider that industrial symbiosis or other types of collaborative models between actors within or across value chains will be instrumental towards moving from a product to a service business model (cf. above).





Summary overview of opportunities and risks

In the figure below we present a preliminary summary analysis of the opportunities and risks (threats) associated with the transition to a more direct interrelation between partners in the value chain (industrial symbioses).

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4.3. Product and process innovation models

In the CE context, product innovation or eco-design entail designing products that are easier to maintain, repair, upgrade, dismantle, remanufacture or recycle and/or use less resource intensive materials (i.e. using cradle to cradle principles), which is an important condition for moving towards circularity. In the same context, process innovation concerns creating processes that increase the re-use potential and recyclability of industrial and other products, by-products and waste streams.

Both models are characterised by significant technologic and operational risk. In the case of process related risks, some processes are based on specific inputs and would not be guaranteed in case of a modification of the feedstock. New technologies have no performance track record and hence entail ramp-up/construction risks, to which one can add the related uncertainty about operational costs. In addition, investments related to product innovations are also characterised by business risks such as:

- 1. Competition with existing/alternative materials/products;
- 2. Uncertainty of feedstock specifications and flexibility in operation;
- 3. Uncertainty about product specifications, performance, customer acceptance and related regulations;
- 4. Uncertainty with respect to the residual value of the new products (when applicable);
- 5. Risks that a company will not achieve cost-effective repair, reuse and remanufacturing (when applicable).







These projects often require high up-front investments destined to reduce the raw material needs or to increase the residual value of the products at the end of their economic life. However, such investments have a risk profile which very slowly declines with time. While implementation and performance risks are extremely high right from the start, the risk level drops only gradually following project implementation. There are nevertheless differences between process and product or service innovation. Existing evidence²⁶, however, suggests that process innovation is the most acknowledged form of green business model innovation application within a company's long term cost reduction plans and that companies perceive this type as requiring a lower level of upfront investments, in comparison with product or service innovation. The investments related to a new product are considered to be substantially higher (as they also involve costs for market research, product design, new production technologies and marketing).

In addition, one needs to make a distinction between (i) those high up-front investments that yield fast results right from the start of the production process (for instance after the retooling of a plant) and (ii) those investments that target resource efficiency (where the reduced cost of goods sold gradually offsets the investments). The low level of upfront investments is an important factor as 90% of the surveyed companies²⁷ claim to finance general green business model transitions through in-house resources. The second most important source of investments is conventional loans, followed by equity and national government grants²⁷.

Summary overview of opportunities and risks

In the figure below we present a preliminary summary analysis of the opportunities and risks (threats) associated with intensified and CE targeted process and product innovation.





Our analysis of the implications entailed in transitioning to one, or a combination of the three aforementioned business models brings forth a variety of financial (and other) considerations. CE transitions present varying implications with respect to a.o. the nature and volume of future cash flows, increasing capital needs to finance investments and/or clients, and balance sheet increases

²⁶ Green Business Model Innovation, Empirical and Literature studies, Nordic Innovation Report, 2012

²⁷ Ibid.







combined with uncertainties about the residual value of the materials used in the relevant economic activity. Large companies with several business lines would likely be capable of cross subsidising the set-up of a new circular business model with the cash generated from their existing linear activities,. However, smaller companies with a narrow activity range are not able to do the same and are likely to face several financial challenges.

In what follows, in the next chapter, we further confront these theoretical insights with 'real life' experiences. Two lines of analysis have been followed here. The first concerns the identification and analysis of Circular Economy projects dealt with (funded and not-funded) by the EIB (by the experts of the EIB Projects Directorate). The second line of analysis and testing of the above discussed insights has been done through a dedicated survey of companies (28 interviews on the basis of a structured questionnaire) with strong circular characteristics (implemented by EPEA Internationale Umweltsforschung GmbH). The obtained insights are discussed below.

5. Empirical confrontation and analysis

5.1. EIB's experience with Circular Economy

5.1.1. EIB's track record in financing CE projects

In order to better understand the financial and non-financial challenges that CE projects are confronted with at EU level, the EIB experts (the Projects Directorate) conducted an internal review destined to gauge its experts' experience with CE as well as a market exploration destined to provide a complementary, outward looking angle to the assessment. Several conclusions of this internal review were also communicated to the European Commission via a submission in the framework of the Public Consultation on the Circular Economy which took place in the interval 28.05.2015 – 20.08.2015.

A main conclusion of the internal review was that the EIB has been supporting in the past decades a wide array of projects that nowadays could be placed under the CE label and could fall under one of the previously discussed business models. CE is already covered by a number of eligibility criteria on which the EIB bases its lending operations, primarily environmental protection and innovation, enabling the financing of, *inter alia*, natural resources and agro-industry, paper, resource efficiency, energy efficiency and RDI projects (depending also on the perimeter set through the CE definition).

The table below provides a list of CE-related projects grouped by, sector, type of EIB loan and indicative number of operations approved/signed in the last five years.



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Table 2 – List of EIB CE-projects

Project	Type of Loan	No. of projects
Waste management sector		
Solid waste collection system improvement	direct loan/FL	3
Solid Waste Material Recovery Facilities (MRF)	direct loan/FL	2
Anaerobic digestion	direct loan/FL	3
Composting	direct loan	1
Mechanical Biological Treatment (MBT)	direct loan/FL	>5
Renewable energy recovery from incineration	direct loan	>5
	L	
Water management sector		
Leakages reduction	direct loan	>10
Wastewater reuse for domestic, agriculture or industrial purposes	direct loan	3
Heat recovery from sewage	direct loan	1
Nutrients (Phosphorus and Nitrogen) recovery from sewage sludge	direct loan	1
High-quality fertilizer production from sewage sludge: several projects – direct loan to water companies	direct loan	>10
Biogas recovery from Anaerobic Digestion of sewage sludge for cogeneration of electricity and heat	direct loan/FL	>10
Natural resources and agri industries sector		
RDI in new application for cork by-products	direct loan	1
Green chemistry / Bio-refineries	direct loan	2
Bio-based packaging	direct loan	1
Paper Recycling	direct loan	3
Ashes conversion	direct loan	1
Waste gas for cogeneration of Heat and Power	direct loan	1
Renewable energy FL and GL	FL/GL	5
Small biogas plants	FL	2







Industry and services sector		
RDI related to treatment and reuse of metallurgical slags – creating value out of waste	direct loan	1
RDI related to extending lifetime of natural resource deposits – use of low grade ores and secondary raw materials currently disposed as waste	direct loan (InnovFin)	1
RDI in efficiency of the solid waste management system, minimization of residuals, and recovery of recyclables	direct loan	1
Product-to-service type of projects		
RDI to help move from sale to life-cycle services - equipment for mineral and metallurgical processing: part of 1 RDI project	direct loan	1
Car sharing programme in Paris	direct loan	1

Based on the above referenced projects and on their overall experience, the EIB's experts have highlighted that in terms of existing practices and standards, the EIB already incorporates the notion of environmental and social externalities in its assessments and understands the long-term benefits of development towards a circular economy and application of innovative circular business models. From a purely financial viewpoint, the EIB's risk taking capacity is not always sufficient to support CE projects with obvious societal benefits. This aspect stresses the need for new ways of providing public sector guarantees that could absorb part of the risk and catalyse more investments in this space. An illustrative case is presented below.

Case A (Due to the inclusion of business sensitive information the name has been anonymised)

Company A is a leading renewable chemicals SME that develops and commercializes a next-generation of biobased plastics and chemicals. Since its foundation in 2000, Company A has built a world-leading technological capability in advanced catalysis research which is the basis for the development of innovative technologies.

Company A has two business units that originate from its leadership position in advanced catalysis R&D. The business unit Catalysis provides catalysis R&D services and systems to the world's largest energy, chemical and renewable companies. This is a profitable and cash-flow generating business that finances its own growth. Company A invests in its other business unit to develop and commercialize PolyEthylene Furanoate ("PEF"), a novel and 100% bio-based polyester. Company A's lead over competing technologies is protected by an extensive IP portfolio and by strong knowledge and expertise in the production and application of FDCA and PEF.

The commercialisation prospects for PEF come from penetrating the PET bottle market, which represents a market opportunity of USD 35-40 billion (>18 million ton production per year). PEF has two main advantages:

- 1) Performance: PEF barrier and thermal properties are superior to those of PET;
- 2) Sustainability: PEF bottles are 100% bio-based, allowing branding advantages for its customers (branding premium).

In 2014, Company A approached the EIB to finance the scale-up of its production facilities required to produce







commercial quantities of PEF. The total financing needs to achieve this objective are approximately USD 200 million. Due to the innovation content of Company A's investment plans, such investment does not pose any question mark with respect to its eligibility under EIB's InnovFin financing programme. However, despite Company A's strong management team, support by reputable shareholders and the high level of product innovation, the company has not succeeded, so far, to raise the targeted financing.

From EIB's perspective, the main requirements for considering a potential financing were the following:

- An adequate equity commitment to close any financing gap and fully fund the project;
- Hard off-take agreements;
- Proper EPC documentation.

The absence of all of the above mentioned points, which are typical of a standard project finance transaction, prevented the EIB from launching the appraisal/due-diligence of the project. So far, the company has not succeeded in launching its investment programme due to its difficulties in raising the required funding.

5.1.2. Observations in the 'water sector'

Circular economy in the water sector entails treated wastewater reuse for industrial, agricultural and urban water supply purposes, leakages reduction, the use of sewage sludge as fertiliser, and recovery of energy (e.g. biogas recovery from anaerobic digestion and thermal hydrolysis of sludge to cogenerate electricity and heat, heat recovery from sewage in homes, buildings and treatment plants, hydroelectric power from sewage) and raw materials (e.g. phosphate for fertilizers, nitrogen for ammonia compounds, cellulose for bioplastics, etc.) from wastewater streams.

Opportunities:

- Biogas recovery for cogeneration of energy and heat at wastewater treatment plants is widely used in Europe and is generally a component of EIB financed projects;
- The transformation of water treatment plants into green energy factories can make them 100% energy-autonomous and also allow for energy supply to the power grid;
- Implementing heat recovery from the sewer system through heat exchangers and heat pumps can replace fossil fuel sources for heating public buildings, preheating domestic hot water, etc., thus increasing resource efficiency in urban areas;
- The transformation of urban water systems into "smart" systems requires adequate framework conditions in the field of regulations, ranging from local permits for industry, to urban planning directives, etc;
- With regards to phosphorus recovery from wastewater, several technologies have been tested at wastewater treatment plants and are ready for large-scale implementation. These can provide phosphorus in marketable quality, converting it into stable, transportable and storable forms, thus enabling distribution and storage to match the regional and seasonal demand of agriculture and safeguarding the soils against pollution and pathogens;
- The diversion and reuse of urine also allows for recovery of nutrients (mainly nitrogen and phosphorus) and use as fertiliser in agriculture, while saving energy at wastewater treatment plants;
- For many industrial, agricultural and domestic purposes, the use of drinking water is not necessary. Groundwater resources are often overexploited, leading to a quantitative and qualitative deterioration of aquifers. The use of alternative water resources can significantly reduce pressure on natural surface and groundwater bodies and help improving their status.







Among those, the most important contribution to circular economy can come from reuse of treated wastewater;

 Avoiding the waste of treated water, thus the waste of energy and chemicals involved in the treatment process, through physical losses reduction in distribution networks represents an important contribution to resource efficiency in water systems and is generally part of EIBfinanced water programmes.

Challenges:

- Regulations requiring the recovery of nutrients from waste streams are absent in the EU. For example, the use of imported phosphate rock for fertilizers production is still favoured over recycled sources. Moreover, recovered phosphorus is classified as waste, making its handling subject to more obligations, according to the Waste Framework Directive;
- The lack of legal and financial conditions that would support wastewater re-use at large scale (e.g. currently there are low or no abstraction charges for farmers irrigating with ground or river water).

5.1.3. Observations in the 'Natural resources and agro-industry sectors'

Circular economy projects are of utmost importance in reducing the utilization of natural resources such as land, soil, marine environment, as well as materials. Paper recycling is an example of an existing and well developed circular economy sector, whose model could be replicated for other resources/ sectors. Biogas plants from manure and agricultural by-products as well as biofuels from waste steams (e.g. used cooking oil and animal fat) result in environmental benefits (e.g. recovery of nutrients such as nitrogen and phosphorus) and GHG savings. Bio-economy and green chemistry will allow substitution of fossil fuel based products with biological materials.

Opportunities:

- Increased investment in Biogas plants from agricultural waste for the production of electricity, heat and substitute natural gas;
- Substitution of traditional fertilizers (from fossil fuel or mining of materials) with products resulting from the recovery of nitrogen and phosphorus from biogas plants;
- Reduction of food and agricultural waste and increased efficiency of the agricultural value chain;
- Increased revenues for farmers due to higher demand of products and by-products from agriculture for the production of green products (Bio-economy);
- Increased collection of used cooking oil and animal fats for the production of biodiesel.

Challenges:

- Technical: processes need to be developed/ adapted starting from a waste which is generally lower quality than "virgin" material;
- Economic Viability: in general production process are less (resource / energy) efficient if using recycled material as compared to using raw materials because they need additional steps of treatment. Therefore, a process using recycled material will need to provide savings in terms of avoided use of natural resources (i.e. materials, energy, land, soil, water etc.) including externalities. A concept similar to the Life Cycle assessment shall be developed in order to ensure viability of such innovative process/ products;







- Cost of circular economy products: if the innovative circular economy process/ product is not competitive with the traditional process which uses raw material, it will be difficult to replicate and spread around the world;
- Quality: same level of quality or better quality will be required in order to sell the "circular economy" products.

5.1.4. Observations in the 'waste sector'

Opportunities:

- Expanded and improved separate collection systems will increase both quantities and qualities of collected recyclable materials and bio-waste;
- New material recovery facilities for refinement of recyclable materials will increase the quantities that can be recycled;
- New anaerobic digestion and composting plants will increase the recycling of bio-waste and for digestion facilities also recover renewable energy.

Challenges:

- Feedstock security is a challenge for waste treatment facilities receiving commercial and industrial waste. Such new facilities will need to be backed by e.g. credible collection schemes (including return logistics, see below) or a portfolio of supply contracts. Feedstock security can also be an issue for new unproven separate collection systems for municipal waste;
- Circular economy projects are often comparably small and may not have a sufficient size for stand-alone investment loans;
- Incentive schemes need to be established in order to minimise commercial and industrial waste, and to increase the levels of recycling and recovery;
- New logistics channels need to be established to increase the demand for secondary rawmaterials. This should be supported by other demand boosting measures.

5.1.5. Observations in 'industry'

Opportunities:

- Industrial CE projects entail the production of products with 'intelligent' product design (i.e. design for re-use);
- Increased use of existing, alternative and renewable raw materials or feedstock that need to be produced, prepared and processed in a smarter way and ensure the feedstock is used for the most value-added process;
- Closed cycle manufacturing and extended product life cycles, using waste streams as feedstock (optimal valorisation of waste and recycled end-of-life materials) or looking into product design to not only select the 'right' materials but also enhance recyclability/repair;
- New separation, extraction and pre-treatment technologies to enhance the availability and quality of recovered/recycled materials;
- Industrial symbiosis projects: e.g. waste/ waste heat from one company that can be used in another company or even new products from old processes (e.g. production of concentrated solar-dish systems on existing car production lines).







Challenges:

- Lack of long term and affordable access to renewables or waste feedstock (as also mentioned under waste);
- Insufficient infrastructure: e.g. collection and recycling facilities, transport (see opportunities and challenges waste);
- Availability of local, national, global market for recycled/remanufactured, renewable or waste-based products (also already mentioned under waste);
- Lack of clear and favourable policy framework, especially in relation to putting products from waste freely on the market;
- Access to suitable finance for companies to implement investments bringing to market innovative and more productivity-enhancing technologies;
- Small and dispersed nature of most investments;
- Risk profile of operations and project promoters.

5.1.6. Observations in 'secondary raw materials'

With respect to secondary raw materials, EIB technical experts are of the opinion that the points listed and discussed below are the main obstacles for development of markets for secondary raw materials in EU, in particular regarding bio-nutrients, critical raw materials and some plastics, which currently are recycled to a low extent, are critical for EU industry, or experience a low demand in the EU:

- Lack of EU-wide quality standards for recycled materials: Quality standards and end-ofwaste criteria would contribute to an increased acceptance of and demand for secondary raw materials.
- Poor quality of recycled materials (e.g. containing unwanted substances/high contamination): Unknown and unwanted contamination is a clear deterrent for increased use of secondary raw materials, in particular for plastics which are a very heterogeneous group of materials. An ambitious implementation of the REACH directive will contribute to de-toxification of recyclable materials and improve their quality. By mandating the use of markers for non-desirable additives in e.g. plastics, traceability throughout the value chain would increase. In addition, it would be difficult to produce at quality standard in case of contamination of the feedstock.
- **Poor availability of waste/material to be recycled:** There are still large amounts of materials to be recycled in the waste discarded and thus a great need and potential for increasing the levels of recycling in many EU countries. This calls for increased efforts to expand and improve separate collection systems and build awareness to participate in such systems.
- **Poor reliability of supply for recycled materials:** This is an important stumbling block for increased use of secondary raw materials in production. It also negatively affects the financial viability and financing of material recovery and recycling plants that do not benefit from long-term secured feedstock supply. Any ways and means to increase the certainty of supply of secondary raw materials would increase their use in production and facilitate the financing of material recovery and recycling plants.
- Low demand for recycled materials (e.g. on the EU market): This is an important inhibiting factor for further development of recycling. Measures to increase the demand, e.g. through green procurement, promotion of eco-design, eco-labelling, economic incentives such as VAT/EPR fee rebates, and voluntary or possibly even mandatory requirements for minimum content of secondary raw materials in certain product types would contribute to increase the demand for recycled materials.



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- **Cost differential between primary and secondary raw materials:** This is an issue and obstacle that is further aggravated by the fluctuating raw material prices. Mechanisms supporting internalisation of relevant externalities in the prices of products with no or low content of secondary raw materials, and introduction of economic incentives for use of secondary raw materials, such as VAT and EPR fee rebates and possibly minimum required content of secondary raw materials in certain product types would contribute to increase the resilience of related markets and the viability of recycling companies and facilities. The rationale for better control and possibly regulation of exports of secondary raw materials outside the EU should also be assessed.
- Insufficient cooperation/exchange of information along the value chain (e.g. between producers, recyclers and authorities responsible for waste management): There is room for considerable improvement in the cooperation between different stakeholders, something that would contribute to better exploitation of synergies and consideration for factors that enable and promote further development towards a more circular economy.
- Lack of reliable data on secondary raw material flows: Reliable data on secondary raw material flows both with regard to quantities and qualities is necessary for companies to plan investments for use of such resources. Establishment of quality standards and better ways of collecting and disseminating data on material flows would be needed to address this obstacle. There is also a need to harmonise the reporting on recycling to achieve more comparable and reliable basis for waste planning and investment decisions. EU grants, for example, in some instances appear to financially incentivise setting-up recycling facilities in less developed regions and in turn encourage the sourcing of waste from across the EU, at times from more developed regions despite being economically inefficient. As such, local/regional waste treatment could be further incentivized.

5.1.7. Priority product categories and markets

The EIB technical experts furthermore believe that the most important product categories from a CE perspective during the next few years are:

- **Small electronics:** This product category contains large amounts of rare metals that should be recycled to a larger extent considering their depletion and increased cost and externalities of extraction.
- **Packaging materials:** The packaging waste recycling is limited in many EU Member States, regardless of existing recycling targets. There is a need to increase both the quantities and the quality of packaging waste recycled, in particular plastics, something that likely will require further focus on expanding and improving separate collection systems, increasing awareness, and providing economic incentives to consumers. There is also a need to take measures to increase the EU demand for recycled packaging materials. Clearer and more harmonised EPR rules would be beneficial, as would incentives for increased use of deposit refund systems that could contribute to improving the quality of collected plastics.
- **Food discards:** The large amounts of food that are discarded every year in the EU represent considerable waste not only of natural resources but also of water. Disposal of food waste leads to generation of landfill gas, which is a potent greenhouse gas.
- **Construction and demolition materials** (see paragraph 5.1.6)
- Water sector/sewage treatment: Increased water and wastewater reuse and increased recycling of digested sewage sludge and recovery of phosphor from such sludge are highly justified measures that would contribute to the circular economy.



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Plastics: Plastics have lower recycling targets than other packaging material and are also recycled to a lesser degree in spite of the great potential to recycle a large share of post-consumer plastics. Increased recycling would reduce the consumption of the oil required for the production of plastics. There is a need for increased separate collection and focus on improving the quality of recyclables. Raised recycling targets for plastics would increase supply. This needs to be complemented with efforts to build and sustain the demand (as discussed above), together with encouragement to deal with own waste regionally avoiding long distance transportation. On the other hand, there is a potential market for bio-plastics which is currently in the early stage of development and is expanding.

For other product categories, general measures should be taken that promote use of secondary raw materials, efficient use of resources, long product life, reparability and recyclability.

5.1.8. Additional suggestions for future EC support

In their responses to the EC Circular Economy public consultation, EIB has already emphasized a number of key messages and recommendations.

Additionally, the following points were highlighted in the response to the survey that was carried out in the context of this advisory assignment:

- The EC could establish new and update existing regulations (Fertilisers Regulation, Waste framework Directive, etc.) to remove legislative barriers around waste materials and stimulate the development of a market for recycled/recovered raw materials.
- Given the lack of a functioning market for recycled raw materials, innovative incentives schemes could be set up to provide a stable and predictable off-take price.
- The tendency to not price water abstractions for agriculture diffused in the EU Member States, especially in water-stressed areas, hampers the efficient use of water resources. The implementation of alternative solutions such as wastewater reuse schemes should result from the enforcement of the Water Framework Directive in terms of cost recovery, both financially and with respect to environmental and resource costs.
- Turning solid waste into resources requires both actions at the product design stage (business side) and on the user side. Regulations should create right incentives for businesses (if the economics of the process does not), and education/sensitisation should target end-users.
- Other incentives could be (i) specific targets similar to those for Renewable energy and (ii) grants for RDI and first-of-a-kind projects (similar to the FDP facility that is only for energy projects).

Products design: set standards on use of recycled materials in new products, and recyclability or repair ability (the updated Ecodesign Directive will/can include this). Standards like this reduce the risks of implementing new materials/technology.







5.1.9. Awareness raising and consumer behaviour

EIB experts underlined that the following measures may strengthen the business case for material oriented CE transitions.

- Provide more information relevant to the Circular Economy to consumers, for example on expected lifetime of products or availability of spare parts: Clearer and more harmonised eco-labelling schemes would contribute to building awareness and guide consumers to make purchase decisions that support a Circular Economy. In addition to information related to lifetime and availability of spare parts, information on the share of secondary raw materials in a product could contribute to an increased demand for such materials.
- Ensure the clarity, credibility and relevance of consumer information related to the Circular Economy (e.g. via labels, advertising, marketing etc.) and protect consumers from false and misleading information in this respect.
- **Organise EU-wide awareness campaigns to promote the Circular Economy:** A coherent and convincing EU-wide campaign highlighting the rationale for and the benefits of a more circular economy in EU and the role consumers have in its development can be an effective way to promote circular economy principles. However, care and sufficient resources must be allocated to ensure a good impact.
- Encourage financial incentives to consumers at national level (e.g. by differentiated taxation levels depending on products' resource efficiency): Financial incentives like VAT or EPR fee rebates for products with secondary raw material content, possibly set in relation to the share, could be efficient ways of influencing consumer decisions.
- Take measures targeting public procurement (e.g. through criteria for Green Public procurement): Considering that the public purchase of goods and services has been estimated to account for 16% of GDP in EU, requirements or incentives for green public procurement, with e.g. minimum required content of secondary raw materials in certain product groups, would be an effective way of supporting the EU demand for secondary raw materials.
- **Encourage waste prevention (e.g. minimising food waste):** Waste prevention is the best waste management option and an important aspect of a circular economy. A large share of food is discarded, which represents a considerable waste not only of natural resources but also of water. Disposal of food waste leads to generation of landfill gas, which is a potent greenhouse gas. Measures to promote waste prevention of in particular food waste should thus be high on the circular economy policy agenda.

5.2. Market exploration: key results from the EPEA study

In order to expand the empirical results further, a consultant (EPEA Internationale Umweltsforschung GmbH) was engaged to carry out a number of in-depth interviews with selected CE companies. This process was fully designed and guided by IFA. A total of 28 interviews were conducted. The survey questionnaire is available upon request. For confidentiality reasons, the main conclusions set out below will not be linked to individual companies (except for publicly available information) but will rather be presented on an aggregate level.







A. Financial innovation is already taking place to compensate for banks' risk adversity

A number of larger companies find it necessary to leverage their own resources to make it easier for customers or suppliers to support circularity. Borrowers can be supported to optimise their leasing models based on principles of the Circular Economy. Other initiatives undertaken by the companies surveyed as part of the above-mentioned study include subsidising the assessment of their suppliers' products or product-to-service funding mechanisms. Some of these companies claim to **jump into a gap left by commercial banks** that are either not able or not used to lending to groups of companies, but rather want to see a single identifiable borrower. A few companies also include the **customer as a potential investor as well as candidate for investment**.

B. Higher barriers to entry for SMEs

Large companies interviewed seem to mostly use their own resources for the funding of CE transitions. In most cases this seems to be done from current revenues. Large companies also have substantial lines of credit because their collateral and reputations are well established. The interviewed mid-sized SMEs have less flexibility and vary in their ability to get credit depending on their business and collateral. Small SMEs are restricted in what they are able to get due to a lack of track record, cash flow issues, etc., and have to look farther for finance. These findings are also confirmed by a recent SME-focused study²⁸. The upfront costs of any type of investment and the anticipated pay-back period are particularly important for SMEs, which are generally more sensitive to additional financial costs resulting from green business compared to large enterprises. SMEs often face difficulties in obtaining the collateral or guarantees required by the banks²⁹.

A second important finding confirming earlier assumptions is that the preferred and most effective route for SME funding seems to be integrating grant funding with equity and debt, so that there is less dependence on one funding source. There has to be a funding 'continuum' made available to SMEs in order to support their investments in CE. In the early days of the organic agriculture movement in Germany, Luxembourg, and The Netherlands, when traditional banks did not respond, alternative banks like GLS Bank, Triodos, as well as the financial NGO Etika were founded. These are central players in enabling SMEs to implement circularity, by providing the debt element of funding.

C. CE models' benefits are more difficult to quantify because most companies rely on both linear and circular models

Most companies surveyed rely on a mix of circular and linear models. A frequent observation of large and mid-sized SME companies is that CE activities are sourced from on-going revenues, but also are hard to pinpoint on the balance sheet because they are often taken from a range of sub-budgets ranging from energy to procurement and CSR. As a result, the financial benefits arising from those expenditures are also challenging to pinpoint and more often than not, do not show up in financial statements. However it is not always the case that CE activities are hard to quantify. One of the interviewed companies has good records of CE investments because those are part of its core activities (i.e. furniture design). Quantification of CE expenditures and related revenues is affected by whether the CE is considered core to the business, a pilot, or a CSR activity. As already mentioned, the classification of companies as CE core businesses has significant impacts on calculating the size of the present circular economy.

Ibid

²⁸ CEPS (2015), "The Circular Economy: Barriers and Opportunities for SMEs", No. 412 / September 2015

²⁹







D. Awareness by companies of each other's CE financing options is low

Companies interviewed often do not seem to be aware of information on how others working on the CE are accessing CE funding, regardless if they are part of CE groupings like the CE100 or Circle Economy. Big companies use their own cash flow, traditional lending or innovation funding, and SMEs don't see the relevance of large companies' financial sources to their own operations. However, many SMEs also seem unaware of the potential of public and commercial banks already used by some CE frontrunners. The lack of information-sharing between CE frontrunners on financing accessibility might be an area of future action.

E. Banks risk-aversion is considered the main obstacle

There is a widespread perception that banks are yet more risk-averse than they used to be, and that the central banks' monetary intervention since the financial crisis has had unintended effects. Several of the big companies that were interviewed shared a similar view. There was furthermore agreement that the knowledge of potential lenders about CE and the business of specific companies in general is low (according to the experiences of the interviewees).

F. Accounting and budgeting challenges

Accounting methods were described in various interviews as having big impacts on CE investing. It is apparent from these many observations that a type of 'new balance sheet' will be beneficial for scaling up the CE. Accounting rules influence the selection of investment instruments (e.g. different types of leasing have different accounting implications).

The need to develop methods for valuing positive impacts appears important. Many of the positive impacts are currently not reflected in accounting. CE value propositions often result in benefits across the cycle for multiple stakeholders, but traditional accounting does not measure this across companies. For example, design for disassembly generates value downstream for flexible use, maintenance and recovery of materials. A main tool used to evaluate impacts of activities is Life Cycle Assessment (LCA). Because LCA is designed to measure negative environmental impacts rather than positive economic, cultural or environmental impacts, there is not an established practice of valuing positive impacts on balance sheets.

Subsequently, residual value improvements are often not rewarded in accounting (as also discussed above). The residual value of a building or product after usage is not quantifiable, except as waste. Instead, the opposite occurs where the value of the resource is depreciated as a write-off, so the value for reuse is not shown and not regarded when an investment takes place. Mechanisms and tools are needed to better reflect this aspect. Banks should acknowledge if a building is designed for circularity and therefore the material resources are easier accessible after usage.

The measurements for human productivity improvements, often the result of CE transitions, are lacking. For a building financed by one of the interviewees, the value of the productivity of the occupants was a leading factor in calculating the value of improvements to the building. The approach is new to accounting for buildings and deserves careful study.







6. Possible implications for the financial support of CE transitions

6.1. Circular Economy from a cost – benefit perspective

As mentioned above, CE principles can be applied in a variety of circumstances spanning a wide range of sectors, products, materials and value chains. Many of the barriers faced by various CE projects are specific to particular materials, products or sectors; requiring different measures at the EU, national, regional and local level. In what follows we will focus on whether financial products could support CE projects and what would their impact be when combined with policy measures that could be implemented by the competent authorities. Are financial products necessary and do they have the potential to become a game changer in fostering a circular economy?

In this context, a key consideration is whether market forces alone could create a CE. Is there a market failure that needs to be addressed through public sector intervention or will the simple pressure of increasing commodity prices and security of supply concerns drive businesses towards circularity?

According to the G20 Study Group on Commodities, "The past decade was characterized by large fluctuations in commodity prices. (...) The large swings in commodity prices over the last five years have been associated with heightened short-term volatility. In particular, volatility rose sharply during the fall in commodity prices in 2008."³⁰ However, according to the same study "recent trends in the price level and volatility of major commodity groups appear less unusual in a long term perspective. In real terms, the level of many commodities is still below their averages in the first decades of the postwar era and well below their historical highs and it is not clear whether the recent increase marks an end, or even a reversal, of the secular decline in real commodity prices observed during the last century".³¹ The report was written in 2011 and more recent IMF data³² indicate that indeed, the overall trend of commodity prices is downward.

Price volatility is also mentioned as an important factor to be considered in the context of a Circular Economy.³³ However, even if certain time intervals are characterised by high volatility in commodity prices, there seems to be little upward or downward trend in volatility over longer time periods.³⁴

Without a doubt, the clock is ticking. Population growth, urbanisation, and upward social mobility (strong expansion of the middle-class) in emerging countries (like the BRICS countries) and markets will continue to put pressure on resource consumption and availability while at the same time resource extraction costs will continue to rise. The increasing consumption in emerging countries and economies is expected to lead to lower raw material availability (possibly even scarcity), as many of these countries will have to use their resources to keep up with local demand, instead of exporting. Stronger demand and potential scarcity will have obvious security of supply and price implications.

³⁰ Report of the G20 Study Group on Commodities, November 2011, available at <u>http://www.cmegroup.com/education/files/G20Nakaso-November202011.pdf</u>

³¹ Idem

³² Commodity Market Monthly, IMF Research Department, Commodities Team, July 16, 2015, available at http://www.imf.org/external/np/res/commod/pdf/monthly/071615.pdf

³³ Growth Within, a Circular Economy Vision for a Competitive Europe, Ellen MacArthur Foundation and the McKinsey Center for Business and Environment, June 2015, available at <u>http://www.ellenmacarthurfoundation.org/publications/growth-within-a-circular-economy-vision-for-a-competitiveeurope</u>

³⁴ Are Commodity Prices More Volatile Now? A Long-Run Perspective, World Bank Policy Research Working Paper, Oscar Calvo-Gonzalez, Rashmi Shankar, Riccardo Trezzi, available at http://documents.worldbank.org/curated/en/2010/10/12916918/commodity-prices-more-volatile-now-long-run-perspective







The private sector as a whole is by nature geared towards short term gains and many businesses are likely to wait until high commodity prices create the business case for CE transitions.

From a private sector perspective, Circular Economy is a matter of cost-benefit analysis. If the total investment cost of a CE transition is higher than the overall price of a resource saved over a certain defined time interval, businesses have no (financial) incentive to undertake the CE investment required other than to increase their certainty of a stable resources supply and increase their resilience to fluctuating resource prices.

Cost CE TRANSITION > Price SAVED RESOURCE

However a CE transition would make business sense if the relevant commodity price increases to such an extent that the relationship depicted above is reversed, i.e.:

Cost CE TRANSITION < Price SAVED RESOURCE

Alternatively, even if there were no change in commodity prices, the resource savings can be increased through innovation up to the point where the cost of the CE transition becomes lower than the price of the total saved resource. This shows that not only upcoming rises in commodity prices can lead to CE transitions but also advances in innovation, thus underlining the very strong relationship between Circular Economy and innovation.

However, innovation is in many cases demand driven. As commodity prices increase, so will the demand for innovations that increase resource efficiency. Therefore, without disregarding the innovation's role, commodity prices still play a key role in driving CE transitions. Relying exclusively on market forces to prompt a generalised CE revolution entails waiting for such increases, which would expose the European economy to unwanted potential shocks. Public support is therefore necessary to encourage a long term view of commodity price evolutions so as to pre-empt potential supply crises and to reduce EU's dependence on external resources.

How should such public support manifest itself? As underlined in the **Scoping study to identify potential circular economy actions, priority sectors, material flows and value chains** (the "**Scoping Study**") the transition to CE "requires a mix of complementary instruments and approaches" such as "regulatory measures, economic incentives, targeted and increased funding, efforts to engage and link actors along the value chain and initiatives to raise awareness of the benefits of the CE and available solutions".³⁵ The exact impact of each of these measures applied separately will likely be difficult to quantify and the cumulated impact will be greater than the sum of these various measures' separate impacts. Therefore, an exclusive assessment of how financial products could drive on their own the transition to CE is difficult. For this reason, even if this study is mainly geared towards assessing the access to finance issues that CE projects entail, some policy-related considerations are necessary as well.

³⁵ Scoping study to identify potential circular economy actions, priority sectors, material flows and value chains, IVM Institute for Environmental Studies, Policy Studies Institute, EcoLogic, Bio Intelligence Service, Institute for European Environmental Policy, August 2014, available at <u>http://www.ieep.eu/assets/1410/Circular_economy_scoping_study_</u> <u>Final_report.pdf</u>







6.2. EIB's potential role in supporting CE projects

As previously mentioned, the EIB already provides loans and guarantees to a wide range of beneficiaries across the EU and beyond. The lending priorities of the Bank have been developed on the basis of the provision of Article 309 TFEU, which states that the EIB can provide loans or guarantees for, among others "projects for modernising or converting undertakings or for developing fresh activities called for by the establishment or functioning of the internal market".

In this context, CE projects could be potentially eligible for EIB financing from its own resources under a combination of the following criteria:

- Environment and sustainable communities including resource and energy efficiency, substitution;
- Innovation and skills research and innovation;
- Support to SMEs no boundary on activities (except excluded sectors).

With respect to the joint financial products developed together with the European Commission, the EIB Group counts among its guarantee and debt financial products the following:

- COSME Loan Guarantee Facility a guarantee instrument destined for SMEs in general which do not otherwise qualify for financing under the InnovFin SME Guarantee;
- InnovFin SME Guarantee a guarantee instrument targeting innovative SMEs;
- InnovFin MidCap Growth Facility (InnovFin MGF) a debt facility destined to innovative MidCaps;
- InnovFin MidCap Guarantee Facility (InnovFin MCG) a guarantee instrument for innovative MidCaps;
- InnovFin Large Projects a debt instrument for innovative projects with a total cost between EUR 50 – 600 million;
- InnovFin Energy Demo Projects a thematic debt instrument for innovative renewable energy projects;
- EFSI an instrument launched in July 2015 under the Investment Plan for Europe, with a wide range of eligibility criteria, aimed at corporates of all sizes and targeting, among others, projects concerning the development and the modernisation of the energy sector, renewable energy, security of energy supply and resource efficiency.

The diagram below provides an overview of EIB Group's guarantee and debt products and how CErelated projects could benefit from the support of such instruments.







In addition, the European Investment Fund ("EIF"), which is a part of the EIB Group, also invests in venture capital funds, growth funds and mezzanine funds that support SMEs. Such investment activities improve the availability of risk capital for high-growth and innovative SMEs and are not depicted in the diagram above because the risk profile and the amount of the investments made by the intermediary funds vary significantly.

6.3. Standard EIB lending

As specified above, the EIB can support CE projects based on the following broad eligibility criteria:

- Environment and sustainable communities including resource and energy efficiency, substitution;
- Innovation and skills research and innovation;
- Support to SMEs no boundary on activities (except for excluded sectors).

Assuming that project size is acceptable but the risk is too high, the EIB could explore the possibility of financing the project using the InnovFin Large Projects Facility (which is more risk tolerant) but in this case the basic eligibility criteria will change (see below). In addition, existing EIB structures (some of which are illustrated in Annex 4) have also significant potential to support CE projects to the extent that the eligibility criteria already related to these structures are met.

6.4. Using InnovFin to finance CE projects

As previously mentioned in this paper, CE is closely linked to innovation, and CE models often involve business model innovation, organisational innovation or technological innovation. To the extent that a CE project (for InnovFin Large Projects) or a CE-focused company (for the other financial products in the InnovFin line up) complies with the relevant InnovFin eligibility criteria, one of InnovFin's range of products can be used to support CE transitions. However, InnovFin does not go quite as far as it







could when it comes to supporting non-technological innovation or high risk projects such as first-ofa-kind CE demonstration projects.

For instance, in order to qualify for InnovFin MCG or InnovFin MGF, a company:

- (i) Must be "fast growing"³⁶, or
- (ii) Must have significant innovation potential or be an "R&I driven enterprise"³⁷, or
- (iii) Must intend to invest in producing or developing "products, processes and/or services that are innovative *and where there is a risk of technological or industrial failure* as evidenced by the business plan"

This last requirement means that a company which does not qualify as "fast growing" or "R&I driven" can only be supported through InnovFin if its projects concern innovative products, processes or services exposed to technological or industrial risks. This rules out organisational or business model innovation.

Therefore, an adjustment of InnovFin's eligibility criteria destined to add "business risk" to the types of risk mentioned above could significantly improve InnovFin's capacity to support Circular Economy projects.

This amendment would bring InnovFin in line with the H2020 Regulation, provide integrated support to non-technological innovations, and set a good practice for the post H2020 period. It is important that the wider innovation eligibility criteria are embedded on a sustainable basis into the financing products for RDI, such as InnovFin (thereby acknowledging the long-term endeavour that will be needed to transform to a CE).

An additional argument supporting this approach is the fact that InnovFin SME Venture Capital does not face the limitations that the other InnovFin products have. More particularly, InnovFin SME Venture Capital's beneficiaries are funds whose investment strategy focuses on H2020's societal challenges or who, otherwise, promote "technological, non-technological, organisational or social innovation". ³⁸ Implementing the adjustment suggested above would therefore bring coherence to the InnovFin family of products, by enabling all of them to support non-technological innovation. Such amendment would strengthen the positioning of the InnovFin 'family' by acknowledging that CE

one hundred or more employees at the beginning of the observation period.

³⁶ A company is "fast-growing" if

⁻ it has an average annualised growth in turnover of at least 10% over a three year period; or

⁻ it has an average annualised growth in Full Time Equivalent employees of at least 5% over a three year period and with

³⁷ A company can be described as such if it fulfils any of the following criteria:

⁻ it has R&I expenses/investment in the latest financial statements in an amount at least equal to 5% of its annual turnover;

⁻ it undertakes to spend an amount at least equal to 80% of the Operation or transaction amount in R&I expenses/investment in the next 36 months as indicated in its business plan;

⁻ it has been formally awarded grants, loans or guarantees from European R&I support schemes (e.g. Horizon 2020 or FP7) or through their funding instruments (e.g. Joint Technology Initiatives, "Eurostars") or through a national or regional research or innovation support schemes over the last 36 months;

⁻ it has been awarded an innovation prize over the last 24 months;

⁻ it has registered at least one patent in the last 24 months;

⁻ it has received an investment from a private-equity fund or from a business angel being a member of a business angel network; or such a private equity fund or business angel is a shareholder of the GFI or MCI Final Recipient at the time of its application for the GFI Operation or MCI Transaction;

⁻ it has its registered seat in a science, technology or innovation park or technology cluster or technology incubator, in each case with activities relating to R&I; or

⁻ it has benefited from tax credit or tax exemption related to investment in R&I in the last 24 months.

³⁸ Operational Guidelines with respect to InnovFin SME Venture Capital







transitions require ongoing investment over their various growth/life cycles, and hence provide the necessary support throughout this life cycle (equity to SMEs, debt to large companies).

In addition, it could be appropriate to consider extending the eligibility of the InnovFin Energy Demo Projects facility to also include more categories of CE projects than just renewable energy.

6.5. Using EFSI to finance CE projects

As depicted in the diagram below, Circular Economy projects do not always entail innovation as it is defined by the InnovFin range of products³⁹. As previously mentioned, an important feedback from EIB's consultations with financial institutions was that InnovFin eligibility criteria are adequate for innovative companies, but they are not sufficiently flexible to support the entire spectrum of CE projects, i.e. also those CE transitions in non-innovative companies.

One can imagine many instances when the promoter of a CE project would not fulfil any of the InnovFin criteria referenced above, even if the project it intends to implement is perfectly in line with CE principles. For instance, some projects may concern only the upgrading of manufacturing facilities or Product to Service transitions that do not concern innovative services. Some industrial symbiosis-related projects may also involve only purchase/supply agreements or retooling of facilities with no innovative elements per se (unless this actually entails a form of organisational innovation). Projects aimed at sorting and refining recyclable materials or treating bio-waste are also often not fulfilling InnovFin criteria while clearly contributing to a CE. However, EFSI is a new joint instrument created by the European Commission and the EIB Group for the purpose of stimulating investments, and it has substantial potential to complement InnovFin in supporting CE projects.

Figure 14 – EFSI eligibility main criteria and expected deployment



³⁹ Please see Annex I for the complete text of Article 10 (Innovation criteria) of the Annex A to the Delegation Agreement between the European Union and the European Investment Bank and the European Investment Fund in respect of the Financial Instruments under Horizon 2020







The preamble of the EFSI Regulation⁴⁰ provides, in paragraph 13, that "[a]t the same time, the EFSI should be able to support environmentally sound projects and benefit industries and technologies with high growth potential and *contribute to the transformation into a green, sustainable and resource-efficient economy* [emphasis added]. By overcoming the Union's current investment difficulties and reducing regional disparities, the EFSI should seek to contribute to strengthening the Union's competitiveness, research and innovation potential, economic, social and territorial cohesion, and *to support an energy- and resource-efficient transition, including as regards infrastructure transition, towards a sustainable, renewable-based circular economy...*[emphasis added]".

Therefore, ESFI could be deployed, in principle, to support CE projects and it could, potentially, be the answer to three gaps that have been identified up to now:

- a) The main gap seems to cover CE projects or MidCap circular companies that would require loans below EUR 25 million and which would not otherwise be eligible for any InnovFin instrument.
- b) A second gap would concern the CE equivalent of InnovFin Large Projects. EIB could finance with its Special Activities envelope projects that, in terms of "technical" eligibility criteria, would qualify for its standard lending operations, but that would involve a higher risk level than normally accepted for standard lending. The amounts normally set aside for such Special Activities before EFSI's creation were extremely limited, and this is where EFSI may greatly improve the Bank's capacity to support riskier CE projects.
- c) With respect to support for SMEs, those SMEs that could access the COSME Loan Guarantee Facility would be able to finance their CE projects via this financial product. However, transactions under EFSI that would act similarly to the InnovFin SME Guarantee would be able to broaden the support for SMEs interested in the opportunities offered by the CE.

EFSI could provide the EIB with considerable financial and advisory capacity through the Advisory Hub to support a variety of relevant projects. However, just as in the case of InnovFin, using EFSI to support smaller CE projects (such as those promoted by MidCaps and SMEs) would require significant resources, due to the expected smaller average transaction size). Such small projects could also be supported through framework loans, global loans or funds.

6.6. Other potential ways forward: integrated approaches

Even if it is difficult to attribute common characteristics to CE projects, some categories as the ones we analysed in Section 4 above seem to be marked, in general, by higher risks and therefore by an increased cost of capital. This in particular applies to CE transitions towards service-based models and industrial symbioses, or combinations thereof, where companies and projects face risks that are challenging to mitigate. In particular in relation to industrial symbioses, new and innovative financing solutions for supply chains seem to be needed in order to support different players in the value chains (in view of their strong interdependence).

Moreover, there is a major difference between most CE projects and demonstration projects concerning new technologies. In the latter case, one single successful commercial-scale project may be sufficient to prove the usefulness of the relevant technology, and the positive results obtained are more easily replicable in a follow-on project. On the contrary, many CE projects based on non-

⁴⁰ Available at http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ%3AL%3A2015%3A169%3ATOC







technological innovation will likely be less replicable because they may concern different transition styles, forms of innovation, markets, industries, types of companies involved in industrial symbioses, etc.

As a result, a demonstration effect related to a certain transition style/business model will likely not be established after the implementation of only one relevant CE project. One would have to wait until several similar projects are implemented before being able to draw conclusions and apply them with respect to other projects under development.

This is not to say that all CE projects are risky. Other CE-related projects may be implemented by promoters who prefer to risk less. Once the frontrunners have tested some models, "followers" may decide to also transition to CE and such "follow on" projects will involve fewer risks.

However, the fact that CE projects can span the entire risk spectrum means that CE transitions need to be financed by different forms of capital, involving not only bank finance, but also grants, equity, crowd funding, etc. Different types of instruments are needed to adequately support various types of transitions at successive stages in a company's life cycle. A systemic view is necessary in order to catalyse the resources of all the players who could make a difference in the CE space (as illustrated below).

Figure 15 – Illustration of the CE funding ecosystem



However, since the transition to a CE involves a paradigm shift, this systemic view should take into account not only financing options. It should start with building awareness and expertise, facilitating information exchange and academic research, providing technical assistance, and, of course, it should also include tailored financial support where necessary.

As mentioned above, CE transitions require a set of complementary instruments and approaches. The entrepreneurs across Europe need to become more aware of CE's advantages and downsides and of EU-wide partnership opportunities. Smaller entrepreneurs could also benefit from more CE-oriented technical advice at project preparation stage. Last but not least, new and innovative financing solutions such as vendor finance, inventory financing, finance leases, factoring, or crowdfunding show that the financial sector has reacted to the needs of new business models and







has already taken first steps which need to be encouraged. These market-based financing solutions need to be supported and scaled up so as to facilitate and accelerate CE transitions.

As past experience has proven with respect to other EU priority areas, the EC, the EIB Group and the National Promotional Banks (NPBs) could, through concerted actions, mobilise the desired financial and non-financial resources necessary to accelerate advances in relevant EU priority areas.

Having regard to their strong focus on societal and environmental gains, the alignment of interests of the EC, the EIB and the NPBs in supporting CE transitions is self-evident. As a consequence of EFSI and other initiatives, the EIB's cooperation with NPBs has developed significantly in the recent months. The EIB not only co-financed projects with the NPBs but has a long standing co-operation with them which also extends to advisory activities and staff exchanges. Moreover, the EC - EIB – NPB co-operation already includes the establishment of multilateral platforms where both the EC and the EIB are involved alongside several NPBs (please see figure below for examples).

Figure 16 - Examples of multilateral platforms



As already mentioned above, EFSI and InnovFin (with some slight modifications) could provide the EIB with adequate tools to tackle different types of CE projects. However, these are not purpose built instruments so they do not have the awareness raising impact that a dedicated CE instrument could have. The creation of a multilateral platform such as the one mentioned above, bringing together the EC, the EIB and as many NPBs as possible could raise the visibility of the CE in the overall financial landscape and could catalyse more investment in this space. At the same time it could send a strong message to the private sector (companies and financial institutions) that the EC joins forces with the EU Member States in spearheading the transition to CE.







As for the eligibility criteria related to the projects that could benefit from funding under the multilateral platform, circularity assessment tools⁴¹ have already been developed and the EIB together with the European Commission could build on the existing work in order to set up eligibility criteria that would be compatible with the European Union's policy goals.⁴²

Therefore, in line with the systemic approach and transformation that is needed, a potential way in which CE projects could be generated and supported in an integrated manner would be through the creation of a CE multilateral platform, with several pillars each fulfilling different functions:

- I. A forum of CE experts who could set the basis of a pan-European Circular Economy intelligence unit, integrating relevant academic research activities and market intelligence and constituting a repository of CE-related trends and know-how (*the 'think tank and monitoring' pillar*).
- II. A platform for building awareness, disseminating CE-related information and enabling pan-European partnerships' creation; one could consider the possibility of building on the already existing infrastructure offered by the Enterprise Europe Network that actively reaches out to the SME community (*the 'information dissemination' pillar*). Particularly relevant here is the European Resource Efficiency Excellence Centre, developed under the Green Action Plan, that will advise SMEs on the variety of resource efficiency programmes and actions throughout Europe, (such as analyse the barriers to greater SME resource efficiency, map eco-industry clusters in Europe and support international missions for eco-innovative SMEs that want to enter international markets.
- III. A CE investment advisory service destined to support CE projects with respect to access to finance and technical, CE-focused, project preparation. The capacities and capabilities of already constituted advisory services like InnovFin Advisory, JASPERS, and the expertise provided by the EIB technical experts (the Projects Directorate), could be mobilised to this purpose. Requests for assistance could be received through the European Investment Advisory Hub (*the 'advisory' pillar*) and additional budgetary resources may need to be mobilised.
- IV. As mentioned above, CE business models and associated transitions are not yet sufficiently articulated and mainstreamed to expose potential gaps and shortcoming of instruments that today can already finance CE projects. In order to better develop and articulate the pipeline of CE projects it is important to offer project preparation and associated advisory expertise, and to subsequently monitor and analyse the extent to which these projects can or cannot be financed under existing instruments (including InnovFin, EFSI and other EIB instruments). This could potentially lead to the creation of additional financial instruments destined to offer support to selected CE projects, focused in particular on SMEs and MidCaps, which seem to face the most significant access to finance obstacles (the 'financing' pillar).

⁴¹ Two of which are available at <u>http://circulareconomytoolkit.org/Assessmenttool.html</u> and at http://www.ellenmacarthurfoundation.org/circular-economy/metrics

⁴² See Annex II for examples of possible eligibility criteria.



The first three pillars of this platform could be set up building on existing structures/services already available at EU level. They do not necessarily entail creating new structures/services, but simply adding new functions to existing ones. The fourth pillar, the financial instrument, requires a more indepth analysis of the market gap in order to ensure maximum additionality and catalytic effect. As mentioned throughout this study, CE is a relatively new concept spanning a wide variety of sectors, therefore more information and research is necessary to identify the particular access-to-finance obstacles faced by CE projects and to precisely pinpoint the 'market gap'. However, the information gathered by the first three branches will also enable, in time and when justified, the creation of a CE-focused financial instrument optimally tailored to achieve its purpose. Therefore, the creation of the first three branches should be treated as a priority.





7. Conclusions and recommendations

7.1 Conclusions

This report reflects the key findings resulting from the EIB InnovFin Advisory mandate (developed and implemented in close collaboration with the European Commission, DG R&I) on the broader access to finance conditions related to Circular Economy investments. The scope of work implemented had two distinctive, but at the same time mutually reinforcing, levels:

Inno/Fin

Advisory

- 1) The **European level**, in which the broader considerations and issues related to access to finance for CE projects were considered from a European perspective.
- 2) A review on the level of the **pilot initiative by the Luxembourg Government to promote circularity in its economy**, which looked at the specific financial ecosystem in Luxembourg and the way in which this ecosystem supports companies that want to incorporate CE-based principles in their businesses.

A wide range of research activities has been conducted, including a broad literature review, a screening of existing financial products, a survey among companies that have incorporated CE-principles in their businesses, and several in-depth bilateral consultations with companies and financial sectors institutions. In addition, the internal EIB knowledge and expertise has been consolidated through a targeted internal survey carried out by the technical experts from the EIB Projects Directorate. Part of this technical knowledge has already been shared with the European Commission in the framework of the Public Consultation on the Circular Economy which took place in the interval 28.05.2015 – 20.08.2015. Finally, InnovFin Advisory initiated a co-operation with the CE Finance Working Group in The Netherlands (coordinated by PGGM), and has encouraged a debate among several key financial players on the relevance and importance of finance for enabling the transition of EU's economy towards circularity.

The InnovFin Advisory mandate has raised awareness among key policy makers, business leaders and financial market participants and has paved the way for further targeted support towards the realisation of the Circular Economy. The advisory work also raised awareness within the EIB Services that a holistic and integrated approach is also needed in the way the Bank supports CE projects. **This mind-set change is needed to ensure that the EIB proactively seeks, as part of its advisory and appraisal work, that promoters include circular elements in their projects.** InnovFin Advisory strongly contributed to the Innovative Enterprise Presidency conference under the Luxembourg Presidency of the EU on the December 10th dedicated to the Financing of the Circular Economy, and has organised a side event on the same topic targeting the financial community on December 9th. Both events will be hosted at the EIB headquarters in Luxembourg.

In what follows, we provide an overview of the key conclusions that InnovFin Advisory's assessment has led to.

1. The transition towards a Circular Economy is complex but imperative to pursue: only a 'systemic approach' will be effective.

Transiting to a circular economy requires a **systemic approach** (involving various actors on diverse levels) and a **different 'mind-set'**, a mind set in which all relevant actors involved (policy makers, intermediate organisations, R&D centres, companies, financial institutions, etc.) actively search for, and reward, 'circularity' elements in projects and initiatives (see also conclusion 7 on how this could be further supported).







According to several reports by Ellen MacArthur Foundation in cooperation with McKinsey and Company and the World Economic Forum, the transition to a CE could add USD 500 million to the global economy by 2025 and create 100,000 new jobs within 5 years. Emerging economies (like the BRICS countries) with rapidly growing middle-classes experience a strong increase in local consumption and an increasing demand for raw materials. This will result in a worldwide pressure on availability and prices of raw materials (including rare earth materials) strengthening the case for Europe to become more circular and less dependent on external suppliers. For individual companies, especially SMEs, the value proposition is more difficult to articulate, although several studies already show that companies that lead in sustainability (especially in B2C sectors) show better financial performance and have better credit ratings. For society and for the environment, the benefits are understood to be significant as well, but harder to quantify and monetise. In any case it is **important to take into account all transition 'externalities'** (which may prove to be extremely difficult to quantify) before being able to measure the 'net' impact of such a transition.

2. Market forces alone could create a Circular Economy but with the risk of a slow transition and high opportunity costs.

Price levels and volatility are important factors to be considered in the CE context. Based on the interviews conducted by EPEA and InnovFin Advisory it has become clear that companies, with notable exceptions, make a cost-benefit analysis before deciding on investing in a CE project. If the total investment cost of a CE transition is higher than the overall price of the raw material saved over a certain defined time interval, businesses have no (financial) incentive to undertake the CE investment required.

The simple pressure of increasing commodity prices and security of supply concerns will invariably drive businesses towards circularity, but no one knows what will be the severity of such price increases or their timing. Hence relying exclusively on market forces to prompt a generalised CE revolution might confront the economy with undesired and unexpected shocks. Public sector intervention and support is therefore essential in order to (i) pre-empt potential supply crises (ii) reduce EU's dependence on strategic imported resources (as discussed above), and (iii) realise the societal and environmental benefits from a transition to a circular economy.

3. EIB has built a track record in financing circular economy projects through its standard lending practices, but there is more that needs and could be done to support CE transitions.

The EIB provides direct loans and guarantees to a wide range of beneficiaries across the EU and outside, provided that the project meets minimum size requirements, is economically viable and bankable with returns that are commensurate to the risks taken by the EIB. Therefore, the **EIB does not often directly finance smaller circular economy projects (often originated by SMEs)**, **i.e. the bulk of circular economy projects which have huge impact both on a social and an environmental level.** The EIB Group (including its subsidiary EIF) can however support such projects via its intermediaries through global loans for SMEs, framework loans extended to commercial banks and, increasingly, through its risk-sharing, portfolio guarantee and securitisation products. Over time, a number of projects with circularity elements have been supported by the EIB, but more must be done to embed CE-related considerations and approaches in the EIB's lending and advisory activities. As we will also discuss in our recommendations (see below), the EIB Group has some capacity to finance higher risk circular economy projects through its special activities or risk-sharing and blended products set up in







partnership with the European Commission under InnovFin and more recently also under EFSI (see also conclusion 6).

4. InnovFin – EU Finance for innovators can support some circular economy projects but its support could be broadened and enhanced with some relatively minor amendments.

To the extent that a circular economy project entails "technological innovation" the existing InnovFin products are fit-for-purpose. However, **InnovFin products have a limited capacity to support non-technological (organisational or business model) innovation**, which is often associated with circular economy projects (Please see recommendation 1 on how to address this shortcoming).

5. EFSI could further boost EIB's lending and risk-taking capacity in supporting higher risk circular economy projects with the aim of mobilising private capital.

Since circular economy projects do not always entail innovation as defined by the InnovFin range of products, EFSI could serve as a complementary financing tool. **CE projects are eligible to be financed via EFSI (as confirmed by the preamble of the EFSI Regulation⁴³) and EFSI could provide the EIB with considerable capacity to support a variety of relevant projects. However, just as in the case of InnovFin, using EFSI to support smaller CE projects (such as those promoted by MidCaps and SMEs) would require significant resources and/or different lending structures, due to the expected smaller average transaction size.**

6. A systemic and integrated approach is needed in order to accelerate the transition to a Circular Economy.

The complexity of the CE is high and different aspects need to be taken into account and aligned in order to successfully make this transition. Some categories of CE projects (by looking at the different business models examined above) seem to be marked by higher risks and therefore an increased cost of capital. In particular related to industrial symbioses, new financing solutions for supply chains seems to be needed. New financing solutions require demonstration projects, in order to build a track record, understand which risks are associated with CE projects and how these can be mitigated. **CE projects can span the entire risk spectrum**, meaning that different forms of capital, involving not only bank finance, but also grants, equity, crowd funding, etc. will be needed. Leaving aside financial solutions, significant more progress must be made with respect to **intelligence building and gathering**, **information sharing and awareness raising** to create circular-friendly demand. Last but not least, regulation and public policy could further help create a new 'mind-set' in order to screen for and appraise circularity in all economic processes. Clearly, an **integrated and systemic approach is needed**, which can be partly built through the development of a multilateral platform, such as the one suggested in Section 6.8.

⁴³ Available at http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ%3AL%3A2015%3A169%3ATOC







7.2 Recommendations

The main conclusion arising from the findings of this study is that there are 'access to finance challenges' involved in the transition to a Circular Economy, as well as many other dimensions of challenges. Such an encompassing transformation of our economy can only succeed through orchestrated actions in different policy areas. The overall framework conditions, including the financial ones, need to be supportive towards making the transition possible. **Next to the 'hard' factors that need to be in place, like regulation, there is a lot of work to be done on the 'soft' side, like information sharing, advising and supporting intermediaries, companies and financial actors to develop a 'circularity reflex'.**

Since the focus of this study was however placed on access to finance issues, below we summarise (a more detailed discussion and argumentation is provided in the previous chapter) a series of finance-oriented recommendations, complemented to a lesser extent by policy-related recommendations relying on the experience of the EIB experts in the Projects Directorate. These latter recommendations were also included in the EIB's contribution to the CE Public Consultation.

7.2.1 Access to finance related recommendations

- 1. Expand InnovFin's eligibility criteria to include non-technological innovation, such as business model innovation, thus enabling it to support a wider universe of circular economy projects and a faster transition to more a circular economic system.
- 2. Consider expanding, at the end of the pilot period, the eligibility criteria for the InnovFin Energy Demo Projects facility to also cover circular economy relevant areas.
- 3. Further explore the creation of a dedicated circular economy labelled multilateral platform bringing together the European Commission, the EIB, National Promotional Banks (NPBs) and private sector investors in order develop knowledge, intelligence and create awareness among the different stakeholders involved (business and financial communities). The platform could have four different pillars: think tank and monitoring, information dissemination, investment advisory and potentially financing.
- 4. Continue monitoring and assessing how the rollout of InnovFin and EFSI contribute to leveraging private investment in the CE space and continue active engagement with the financial sector and industrial players to understand if EIB's funding tools are fit for purpose. Here InnovFin Advisory can continue to play a role alongside other EIB and EC services.

These recommendations are discussed in more detail in chapter 6.

7.2.2 Broader policy-related recommendations

1. Support the development of circular economy projects through technical assistance programmes for project preparation, possibly taking advantage of the newly set up European Investment Advisory Hub.







- 2. Support the market penetration of innovative projects through labelling, certification and standards, public procurement for innovation, etc.
- **3.** Provide more information relevant to the Circular Economy to consumers, for example on expected lifetime of products or availability of spare parts.
- 4. Support the creation of secondary markets for products and sharing platforms.
- 5. Ensure the clarity, credibility and relevance of consumer information related to the circular economy (e.g. labels, advertising, marketing etc.) and protect consumers from false and misleading information in this respect.
- 6. Organise EU-wide awareness campaigns to promote the circular economy.

Recommendations 1, 2, and potentially 6, could be taken up by the earlier mentioned platform in case further analysis confirms the feasibility and justification thereof.







Annex 1 – InnovFin's innovation related eligibility criteria

Annex A - Article 10 – Innovation Criteria

"An eligible [InnovFin MGF or InnovFin MCG] Final Recipient either:

(a) intends to use the GFI Operation or MCI Transaction to invest in producing or developing products, processes and/or services that are innovative and where there is a risk of technological or industrial failure as evidenced by the business plan; or

(b) is a "fast-growing enterprise", measured as follows:

- an enterprise with average annualised growth in turnover of at least 10% over a three-year period; or

- an enterprise with average annualised growth in (Full-Time Equivalent (FTE)) employees of at least 5% over a three-year period and with one hundred (100) or more employees at the beginning of the observation period; or

(c) is an enterprise that has a significant innovation potential or is an "R&I-driven enterprise", satisfying at least one of the following criteria:

1) its certified accountant(s) have highlighted R&I expenses/investment in the latest financial statements in an amount at least equal to 5% of its annual turnover;

2) it undertakes to spend an amount at least equal to 80% of the GFI Operation or MCI Transaction amount in R&I expenses/investment in the next 36 months as indicated in its business plan;

3) it has been formally awarded grants, loans or guarantees from European R&I support schemes (e.g. Horizon 2020 or FP7) or through their funding instruments (e.g. Joint Technology Initiatives, "Eurostars") or through a national or regional research or innovation support schemes over the last 36 months;

4) it has been awarded an innovation prize over the last 24 months;

5) it has registered at least one patent in the last 24 months;

6) it has received an investment from a private-equity fund or from a business angel being a member of a business angel network; or such a private equity fund or business angel is a shareholder of the GFI or MCI Final Recipient at the time of its application for the GFI Operation or MCI Transaction;

7) it has its registered seat in a science, technology or innovation park or technology cluster or technology incubator, in each case with activities relating to R&I; or

8) it has benefited from tax credit or tax exemption related to investment in R&I in the last 24 months."







Annex B - Article 5.2 Eligibility criteria of RSI Final Recipients

In addition, an RSI Final Recipient must comply with at least one of the innovation eligibility criteria:

(a) The RSI Final Recipient is an SME and intends to use the RSI Final Recipient Transaction to invest in producing or developing new or substantially improved products, processes or services that are innovative and where there is a risk of technological or industrial failure as evidenced by an evaluation carried out by an external expert, or

(b) The RSI Final Recipient is a "fast-growing enterprise", which is an SME or a Small Mid-cap operating in a market for less than 12 years following its first commercial sale and with an average annualised endogenous growth in employees or in turnover greater than 20% a year, over a three-year period, and with ten or more employees at the beginning of the observation period, or

(c) The RSI Final Recipient is an SME or a Small Mid-cap that has been operating in a market for less than 7 years following its first commercial sale and its R&I costs represent at least 5% of its total operating costs in at least one of the three years preceding RSI Final Recipient's application for the RSI Final Recipient Transaction, or in the case of a start-up enterprise without any financial history, in the audit of its current fiscal period, as certified by an external auditor, or

(d) The RSI Final Recipient shall have a significant innovation potential or be an "R&I-intensive enterprise", by satisfying at least one of the following conditions:

1) The RSI Final Recipient's R&I annual expenses are equal or exceed 20% of the RSI Final Recipient Transaction amount as per RSI Final Recipient's latest certified financial statements, under the condition that the RSI Final Recipient's business plan indicates an increase of its R&I expenses at least equal to the RSI Financial Recipient Transaction amount; or

2) The RSI Final Recipient undertakes to spend an amount at least equal to 80% of the RSI Final Recipient Transaction amount on R&I activities as indicated in its business plan and the remainder on costs necessary to enable such activities ; or

3) The RSI Final Recipient has been formally awarded grants, loans or guarantees from European R&I support schemes^ or through their funding instruments^ or regional, national research or innovation support schemes over the last thirty-six (36) months, under the condition that the RSI Final Recipient Transaction is not covering the same expense ; or

4) The RSI Final Recipient has been awarded an R&D or Innovation prize provided by an EU institution or an EU body over the last twenty-four (24) months; or

5) The RSI Final Recipient has registered at least one technology right (such as patent, utility model, design right, topography of semiconductor products, supplementary protection certificate for medicinal products or other products for which such supplementary protection certificates may be obtained, plant breeder's certificate or software copyright) in the last twenty-four (24) months, and the RSI Final Recipient Transaction purpose is to enable, directly or indirectly, the use of this technology right; or

6) The RSI Final Recipient is an early stage SME and has received an investment over the last twentyfour (24) months from a venture capital investor or from a business angel being a member of a business angels network; or such venture capital investor or business angel is a shareholder of the RSI Final Recipient at the time of the RSI Final Recipient's application for the RSI Final Recipient Transaction; or







7) The RSI Final Recipient requires a risk finance investment which, based on a business plan prepared in view of entering a new product or geographical market, is higher than 50% of its average annual turnover in the preceding 5 years;

8) The RSI Final Recipient is an SME and its R&I costs represent at least 10% of its total operating costs in at least one of the three years preceding RSI Final Recipient's application for the RSI Final Recipient Transaction, or in the case of a start-up enterprise without any financial history, in the audit of its current fiscal period, as certified by an external auditor; or

9) The RSI Final Recipient is a Small Mid-cap and its R&I costs represent:

(a) Either, at least 15% of its total operating costs in at least one of the three years preceding the RSI Final Recipient's application for the RSI Final Recipient Transaction

(b) Or, at least 10% per year of its total operating costs in the three years preceding the RSI Final Recipient's application for the RSI Final Recipient Transaction







Annex 2 – Examples of possible eligibility criteria⁴⁴ - for illustrative purpose only

Maximum score	Minimum score		
Design, Manufacture and Distribute			
No material is used in excess, product is totally dematerialised	High waste of material, could be reduced through redesign		
100% Biodegradable	High percentage of technical, non-biodegradable materials		
100% Recycled materials used	High percentage of virgin, non-recycled materials		
No scarce materials used in product	Scarce materials in product, e.g. Antinomy, Cobalt, Gallium, Geranium, Indium, Platinum, Palladium, Niobium, Neodymium and Tantalum		
Materials are highly eco-efficient (low energy and carbon emissions to produce)	Materials used have poor eco-efficiency		
No toxic materials in product	Excess toxic materials in product		
Zero waste factory; all waste is used as input to another process/factory	Significant waste sent to landfill from factory		
Usage(by the customer)			
Product failures rarely occur	Product failures are frequent		
Product has a very long lifetime	Product has a short lifetime		
Product uses no, or close to theoretical minimum power	Product is energy and resource wasteful		
Repair/Maintenance of the product			
Cost of repair far outweighs cost of product	Cost to repair is small in comparison to the product cost		
Suitable maintenance/repair service already offered (could include repair, servicing, spare parts, diagnostics, technical support, installation and warranty)	No maintenance/repair service offered		

⁴⁴ Based on the criteria available at <u>http://circulareconomytoolkit.org/Assessmenttool.html</u>







Difficult to get access to internal workings	Easy to get access to internal workings	
Complex workings, difficult to understand	Simple workings, easy to understand	
No components, connectors, modules or leads are standardised	All components, connectors, modules and leads are standardised	
Difficult to find fault	Easy to find fault	
Reuse/Redistribution of the product		
No market for second hand sales	Good market for second hand sales	
Comprehensive second hand sales already offered	No second hand sales offered currently	
Product has a very long lifetime	Product has a short lifetime	
Remanufacturing/ Refurbishment of product or part		
Cheap refurbishment/ remanufacturing costs	Expensive refurbishment/ remanufacturing costs	
Cheap collection costs to return product to factory	Expensive collection costs to return product to factory	
All products are returned and refurbished/remanufactured	No refurbishing or remanufacturing currently undertaken	
Easy to disassemble	Difficult to disassemble	
No damage caused to product or part when disassembling	Significant damage caused to product or part when disassembling	
Easy to identify parts once disassembled	Impossible to identify parts once disassembled	
Many parts are modular, allowing switch in-switch out	No parts are modular, preventing switch in-switch out	
Possible to upgrade to parts	Impossible to upgrade parts	
Few mechanical connections	Many mechanical connections, e.g. welds, screws, rivets, etc.	
Few tools required to disassemble	Many tools required to disassemble	
Products as a Service		
Good market to sell products as a service	No market to sell products as a service	
No products currently sold as a service	All products already sold as a service	






Product Recycling at end of life

Few material combinations used in the product

High number of material combinations used in the product

No encased materials(e.g. if materials are easy to separate at recycling)

Many encased materials







Annex 3 – List of companies interviewed by EPEA

	Droduct turo	Which of the three	Ongoing (E project)
Compony #	Circularity Activities	EID circularity aspects	
Company #	Drosont Status	ao they cover	In planning:
	Present Status	(1,2,3)	(Ongoing/Planning)
1	Furniture.		
	Leasing, DfD* and recyclable materials.	1,2,3	Ongoing
	Functioning today.		
2	Use of C2C certified products.	2.2	Dlanning
2	Functioning today.	2,5	Plailling
	Bedding.		
3	Healthy recyclable materials. Takeback	1 as take back 2 2	Ongoing
	guarantee system	I do lake-Dack,2,5	Ongoing
	Functioning today.		
	Brick construction systems.		
Л	Clickbricks mortarless for fast and clean	23	Ongoing
4	disassembly and rapid assembly.	2,5	Ongoing
	Functioning today.		
	Lighting systems		
5	DfD, service, recyclable, demountable,	1,2,3	Ongoing
5	piloting Circularity PassportsTM.		
	Functioning today.		
6	Personalised design, less waste.	3	Ongoing
Ŭ	Functioning today.	-	
	Garments		
7	Textiles for circularity.	N/A	Planning
	Planning.		
	Packaging and Beverages		
	Circular supplier community for		
8	packaging.	2,3	Ongoing
	Functioning today. Greenfibre bottle in		
	planning		
0	Buildings designed for healthy	122	0
9	circularity. Supplier community.	1,2,3	Ongoing
	Functioning today.		
10	Floor coverings.	122	0
10	Air cleaning carpets, recyclable	1,2,3	Ongoing
	Circularity convice financing		
11	Circularity service financing.	1, 2	Ongoing
	Supporting C2C cortified products		
12	Engineering for circularity	2.2	Ongoing
	Eugineering for circularity.	2,5	Ongoing
13	Cleaning products designed for his		
	cycle, packasing for technical cycle	2	Ongoing
15	Eunctioning today	5	Ongoing
14	Textiles for Furniture and interiors		
	Textiles for the biological cycle	23	Ongoing
	Functioning today	2,5	CHECKIE
15	Chairs for circularity		
	Functioning today	1,2,3	Ongoing
	Air handling systems for circularity		
16	Functioning today	2,3	Ongoing
		l	







Company Name	Product type, Circularity Activities, Present Status	Which of the three EIB circularity aspects do they cover presently?** (1,2,3)	Ongoing CE project? In planning? (Ongoing/Planning)
	Architectural tiles		
17	DfD recyclable materials.	2,3	Ongoing
	Functioning today.		
18	Personalised design. Functioning	1,3	Ongoing
	Organic wholesaler agricultural		
19	community, quality label. Functioning	2.3	Ongoing
1.5	today.	_/-	0808
20	Light leasing. Functioning today.	1,2,3	Ongoing
	Water, bio-energy, hospital products		Ongoing
21	Biodegradable hospital products,	1 7 2	
21	wastewater recycling, bioenergy.	1,2,3	
	Functioning today.		
22	C2C optimized products. Functioning	2,3	Ongoing
	today.	,	
23	Waste management for circularity.	N/A	Planning
	C2C certified beverage can	3	Ongoing
24	Eunctioning today		
	Functioning today.	5	ongoing
	Engineering services		
25	Engineering chemicals leasing.	1,2,3	Ongoing
	Functioning today.		
	Windows and Doors	2,3	Ongoing
26	Certified for circularity. Functioning		
	today.		
27	Supplier<>customer paper cascade	1,2,3	Ongoing
	community. Functioning today.		
20	Flooring products	2,3	Ongoing
20	acoustics Functioning today		
29	Focus on phosphorous recovery	N/A	Ongoing
30		N/A	01.801.8
	Circularity garments.	,	a .
31	Functioning today.	3	Ongoing
22	Metal recycling from secondary raw	2,3	
52	material sources. Functioning today.		
33	Conveyor systems	1,2,3	Ongoing
	DFD recyclable, modular repairs.		
	Functioning today.		
34	Municipal Buildings		
	Buildings designed for healthy	1,2,3	On a l
	circularity. Circularity financing.		Ongoing
	i unctioning today.	1	







Company Name	Product type, Circularity Activities, Present Status	Which of the three EIB circularity aspects do they cover presently?**	Ongoing CE project? In planning? (Ongoing/Planning)
		(1,2,3)	(01.501.15) 1 101111.15)
35	Buildings designed for circularity, innovative financing. Functioning today.	2,3	Ongoing
36	N/A	N/A	Ongoing
37	Cleaning products Content for the biological cycle. Packaging for the technical cycle. Functioning today.	2,3	Ongoing

Note: the names of the above companies have been removed for confidentiality reasons.







Annex 4 - Illustrations of particular existing EIB tools that could support Circular Economy projects

In what follows we provide short descriptions of existing EIB tools that could be deployed towards supporting CE projects, to the extent that the projects eligible for benefitting from such tools also entail CE-related elements. At a later stage, depending on market needs, one could explore whether they need to be expanded to CE projects in general.

(a) One of the tools that the EIB disposed of it the provision of credit enhancements for Project Bonds, (so-called Project Bonds Credit Enhancement). The following diagram illustrates this structure.



Figure 14 – Project Bonds Credit Enhancement structure

By providing this type of credit enhancement, the EIB helps private investors mobilise the required funds for supporting projects in the areas of trans-European networks of transport (TEN-T) and energy (TEN-E) as well as broadband and information and communication technology (ICT). The EIB plays a catalytic role, increasing, through its intervention, the credit rating of the bonds issued, thus encouraging more investors to purchase them.

(b) Climate Awareness Bonds

Generic EIB bonds have attracted increased demand from Socially Responsible Investors ("SRIs"). Moreover, in 2007, the Bank started to widen its appeal for SRIs as the first supra national borrower to issue an environmental-themed bond - the Climate Awareness Bond (CAB). With the first CAB issue, the EIB also pioneered the ring-fencing of proceeds. CAB funds raised in the market are allocated to a specially created and segregated sub-portfolio within EIB Treasury. These funds are







earmarked to match disbursements to EIB lending projects that contribute to climate action. Pending disbursements, the sub-portfolio is invested in money market instruments.

(c) Energy Demo Projects

InnovFin Energy Demo Projects enables the EIB to finance innovative first-of-a-kind demonstration projects in the field of renewable energy and hydrogen/fuel cells. During the design, construction and early operation phase the implementation and performance risks are borne in proportion of 95% by the European Commission, while thereafter the EIB takes 100% of the operating and market risk. This enables the financing of new technologies for the purpose of achieving a demonstration effect that would facilitate the financing of further similar projects.

Figure 15 – Energy Demo Projects





Inno**/Fin** Advisory



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