

DRAFT FOR CONSULTATION

Working title: Demystifying Circular Economy Finance

Sub-title: Scaling up the financial sector's contribution to the circularity of economies

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2 Foreword & Post Pandemic Relevance of Circular Economy

2.1 Foreword

Harnessing finance to build back better for a circular economy redesign.

To be inserted at final editing stage

2.2 Post Pandemic Relevance of Circular Economy: opportunities and threats

The importance of a circular economy (CE) pre-dates COVID-19, but the experience during the pandemic has highlighted the urgency of the CE transition as part of the economic recovery. Recovery plans should be in line with policies and resolutions issued by the United Nations Environment Assembly (UNEA), the world's highest-level decision-making body on environmental policy.¹ The UNEA resolutions strengthen the global governance on sustainable consumption and production, sustainable mobility, sustainable business practices, marine plastic litter and microplastics, solid waste management, management of chemicals, and sustainable nitrogen management.²

Although the effect of COVID-19 lockdowns on global trade volumes and material flows have been significant, under the circumstance, the global trade system has responded relatively well to a crisis of unprecedented global scale. Nevertheless, a spur of trade conflicts over scarce resources (e.g. medical supplies) indicate that our production and consumption patterns will need to transform in order to become more resilient to economic shocks caused by lockdowns. The COVID-19 crisis in 2020 exposed geographically stretched value chains to linear system stresses. The geographical divide between production locations and consumption locations based on a linear system with low inventory, remote production and far-away mining operations adds to the vulnerability of trade.

Several economic recovery plans (e.g. Canada and Europe) connect recovery to addressing climate change and environmental challenges.^{3 4} In some countries, companies receiving government support for post-pandemic economic recovery will be required to publish climate-related disclosures and indicate how their future operations will support environmental sustainability and climate goals. To effectively address these climate and environmental aspects, the CE is a key design feature to build-back-better.

The post-pandemic recovery is a chance to pivot economies towards more sustainable and resilient consumption and production patterns.⁵ There is growing recognition of the need to ensure that recovery packages – and financial sector responses – are used to invest in a low-carbon and resilient economy.⁶ Allocating capital for the longer-term agenda to address climate change, reduce pollution and improve waste management is fundamental to a transformational and sustainable recovery of the places where we live.⁷ Designing resource-efficient, resilient and inclusive value chains is central to delivering the UN Sustainable Development Goals (SDGs) by 2030. After all CE redesign can also contribute to mitigation and adaption to address the climate crisis. Whether we mitigate climate change through alternative energy sources (wind, solar, geothermal, etc..) or whether we adapt our infrastructure to a changing climate (water works, revitalisation of soils and the fight against desertification), CE thinking fosters the mindset to also consider the effects of the resources needed to implement these often far reaching changes.

¹ <https://sustainabledevelopment.un.org/partnerships/unea>

² <https://sdg.iisd.org/commentary/policy-briefs/what-did-unea-4-do-for-the-environment/>

³ <https://pm.gc.ca/en/news/news-releases/2020/05/11/prime-minister-announces-additional-support-businesses-help-save>

⁴ <https://www.europarl.europa.eu/news/en/headlines/society/20200429STO78172/covid-19-eu-recovery-plan-should-include-climate-crisis-action>

⁵ [Resilient People and Places: Why cities should embrace the circular economy to shape our post-COVID-19 future](#)

⁶ [From containment to recovery: Environmental responses to the COVID-19 pandemic](#)

⁷ [OECD Policy Responses to Coronavirus \(COVID-19\) Cities policy responses](#)

While governments in several regions are developing policies to support the shift to a circular economy, most financial institutions are yet to address related risks. One barrier is a perceived lack of financially viable opportunities. This UNEP Finance Initiative (UNEP FI) research on circularity provides insight into finance sector strategies and market practice, policies, geographical variation and metrics as well as issues such as how the lack of risk assessment of linear value chains can have a material impact on financial performance. The report also offers emerging international evidence of how the materiality of circular economy redesign is taking shape.

Why now? Since the industrial revolution, the value chains that make up the largest part of our economies are linked in a linear way to resource use, more economic growth equals more resource usage. If a crisis happens on a global scale, as we have witnessed with COVID-19, events go all the way down the linear and global value chain. Circular economy redesign has the potential to build in "circuit breakers" that mitigate the effects of these chain reactions. One of the proposed routes is to shorten value chains and to onshore production, to increase supply security. Another example is the increased use of single-use plastics in health care, which requires immediate attention for recycling practices. The post-pandemic reality will have many consequences on the use of resources and especially at the locations at which they are used and where wastes originate. Onshoring of production and the increase of disposables are just two of the many effects. Studies by the International Resources Panel (IRP)⁸ and Organisation for Economic Co-operation and Development (OECD)⁹ suggest that a CE transition will primarily reduce the growth of material use. Only for very scarce or toxic materials the CE transition is expected to reduce the absolute amount of materials used itself. Although historically marginalised by conventional, linear economic growth, the transition from a linear to a circular economy started long before the emergence of COVID-19. This resource-centric transition is here to stay and will continue to receive attention from policymakers and the finance community.

While there are opportunities, many barriers and gaps for implementation remain to be addressed. There is a lot of speculation about which business models will prove to be the winners or losers of the post-pandemic economy¹⁰. There are also many mixed signals regarding circular economy, because the crisis has temporarily disturbed waste collection schedules based on fears of collecting contaminated materials. The need for personal protection has also created unexpected volumes of single-use wastes. These short-term disruptions can impose hurdles or even temporary slowdowns in the growth of a circular economy, with continuation of the more wasteful linear take-make-waste principle. For the longer run and a more resilient global economy, the effort to share, recover, reuse, remanufacture, recycle, redesign, and reduce resource use remains key. The insight in this report can guide financial institutions to address the opportunities and threats offered by the circular economy transition in these times of economic opportunity.

⁸ <https://www.resourcepanel.org/>

⁹ <http://www.oecd.org/cfe/regional-policy/roundtable-circular-economy.htm>

¹⁰ <https://www.weforum.org/agenda/2020/04/post-pandemic-economy-favour-fastest-movers/>

3 Executive Summary and recommendations

Formalised financial industry wide support programmes and commitment programmes are not yet in place. Specifically for the CE transition this would be a welcomed step. The financial sector needs to be provided with incentives and the right enabling policy and legislative framework in order to start working on a systematic, concrete and scalable approach to integrating Circular Economy into their financial products and services.

3.1 CE recommendations for market actors in financial sector

The following recommendations focus on the strategies and actions that banks, insurers and investors can take to accelerate financing of the transition towards a circular economy. They can do this by addressing risks/barriers¹¹ and scaling up innovation and opportunities related to products, services, financial instruments/investments. We have outlined these steps to enhance the role of your Financial Institution in the Circular Economy (CE) transition.

Consultation question 1:

Do you consider the recommendations to the private sector concise, relevant and concrete? How would you improve them? (see page 10)

¹¹ <https://www.imf.org/en/Publications/WP/Issues/2019/05/02/Global-Fossil-Fuel-Subsidies-Remain-Large-An-Update-Based-on-Country-Level-Estimates-46509>



Consultation question 2:

Do you consider the recommendations to supervisors and regulators, legislators concise, relevant and concrete? How would you strengthen them? (see page 11)

4 Linear economy versus circular economy (CE) finance

Starting with a general introduction about linear versus circular economy we will take the reader through the key aspects of the Circular Economy that are important to the financial sector. Motives amongst readers of this publication may vary widely from exploring new areas to make money in the circular economy, to managing risks and pitfalls by using the right sectoral CE metrics for steering and decision making.

Box 1 Survey Outcomes

Outcomes related to areas of CE integration for financial institutions: What areas of CE integration do you see already in your financial company?

- A majority of respondents from the financial sector to a UNEP FI survey sees Circular Economy integration in these two areas:
 - Innovation strategy
 - Mitigation of linear risks (take-make-waste)
- More than 35% see integration occurring in the field of:
 - Investment strategy
 - Procurement Policy
- None of the survey respondents see the Circular Economy currently being integrated in pricing of financial services
 - CE integrated in pricing of financial products

Source: UNEP FI Survey Outcomes

4.1 From the take – make – waste economy to a circular economy (CE)

Most financial services currently stimulate economic growth of the linear economy. Linear economy finance grows our economies according to the take – make – waste principle. This ‘principle’ is the outcome of a system in which resource depletion and the environmental costs of waste have been largely ignored. In linear economies, producers take resources to make materials and products, consumers use them and dispose of them as waste. If this all sounds very familiar, then it is because our economies are predominantly organised in a linear way. The take-make-waste triad of our global economy poses increasing risks to the license to operate of the financial sector and its clients because of two reasons:

1. The pace of development and application of safe and environmentally sound disposal methods¹³ has trouble keeping up with the growing volumes of waste from material extraction, production and consumption.
2. The dominant disposal methods are sanitary landfilling and incineration¹⁴ (e.g. waste to energy). These techniques do not generate the highest level of value from these resources. The value retention alternatives (e.g. 9R's) offered by the circular economy can increase economical value and to date remain too little used.

The volume of waste streams is strongly correlated to the pattern of production and consumption that in turn determine the level of use of resources to grow our economies. According to the World Bank¹⁵, the world generated more than 2 billion tonnes of municipal solid waste annually in 2016, with numbers on the rise towards 2050. More than 30 per cent of the solid waste streams do not meet any environmentally safe treatment standard. And while this may imply that the majority of wastes are handled, municipal solid waste represents only a fraction of registered wastes, with enormous amounts of waste being omitted from statistics. These wastes remain unaccounted for and are in some cases illegally dumped.^{16 17} In many cases our global economy geographically displaces the environmental effects of our production. Many linear economy wastes are literally put out of sight of consumers. Especially in emerging economies, investments in urban areas that steer away from informal collection and backyard recycling towards organised circularity can literally change and save lives.^{18 19}

Waste trends underline what can be seen as the waste generation privilege of developed economies. Worldwide, solid waste generated per person per day ranges from 100 grams to 4.5 kilogram per person²⁰, the rate increasing with affluence. While the population of high-income countries represent only one-sixth of the world population, consumers from high-income countries generate more than one-third of global waste. With more of the world's current seven billion people aspiring to obtain higher levels of consumption, the pressure of untreated waste volumes on our environment is a growing challenge, along with related impacts on human health.

The economic growth process is a lumpsum of the production and consumption of many diversified goods and services. There is a tremendous variety of resource intensiveness amongst these different economic activities. The total volume of waste is generally closely correlated to the volumes of material flows to support our economic activity.²¹ The International Resource Panel estimates that global material resource use is likely to more than double by 2050, based on the current linear economy trends²².

¹³ <https://www.oecd.org/env/waste/environmentallysoundmanagementofwaste.htm>

¹⁴ <https://openknowledge.worldbank.org/bitstream/handle/10986/30317/9781464813290.pdf>

¹⁵ What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050

¹⁶ <https://sensoneo.com/sensoneo-global-waste-index-2019/>

¹⁷ <https://www.statista.com/statistics/990529/estimated-number-of-illegal-dumps-in-europe/>

¹⁸ <https://www.mckinsey.com/business-functions/sustainability/our-insights/managing-waste-in-emerging-markets>

¹⁹ <https://www.weforum.org/agenda/2018/03/circular-economy-in-cities/>

²⁰ https://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html

²¹ <https://www.resourcepanel.org/reports/assessing-global-resource-use>

²² <https://www.unenvironment.org/news-and-stories/press-release/resource-use-expected-double-2050-better-natural-resource-use>

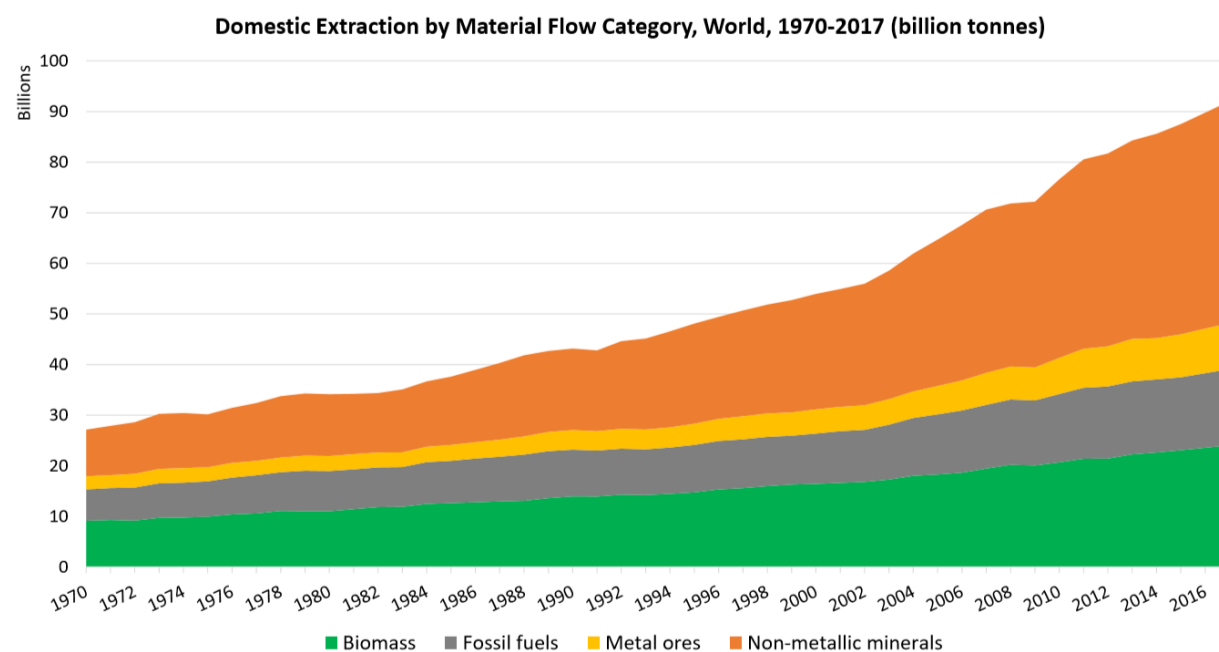


Figure 1 Historical growth between 1970 and 2017, extraction of materials continues to grow
 Source: UNEP Resource Panel

4.2 Drivers of the transition towards circular primary resource use

Important drivers for the transition to a circular economy are: population growth, increase of affluence, increase in man-made chemical substances, ongoing climate change, increase in air pollution and the unsustainable use of fertilisers. Even if the picture is not always simple and clear on how these trends actually drive the CE transition, they make the transition more necessary. These pressures underline the need to address the currently incurred linear damages in light of the planetary boundaries²³.

1. Human population growth drives waste volumes from increased resource consumption and production patterns. The increase in the number of people drives a whole range of human-induced side-effects such as climate change, deforestation, desertification, loss of biodiversity, scarcity of natural resources, pollution. The consequent environmental effects can push ecosystems beyond tipping points and reduce biodiversity and ecosystem services.²⁴
2. Increase in affluence for only a part of our global society in combination with the lack of strong and clearly agreed institutional frameworks are drivers of resource-related conflicts in developing countries, whose development highly depends on the extraction of natural resources.^{25 26} Many of the untapped resources that are yet to be extracted to grow the global economy are found in fragile states. Their jurisdictions do not sufficiently protect citizens, workers and the environment. For a just transition to a circular economy, leaving no one behind is a key principle to achieve the 2030 Sustainable Development Agenda²⁷
3. Increase in man-made substances in the earth's environment. Most heavy metals are present in the earth's environment, but through man-made activities such as extraction, they are released, or transformed, and then have negative impacts on the environment and human health. Examples are per- and polyfluoroalkyl substances (PFAS), ozone depleting substances (ODS), heavy metal compounds and radioactive materials. Despite terrific results achieved by the Montreal Protocol's ban of ODS²⁸, new harmful chemicals and materials that are insufficiently covered in any international agreement keep on appearing.^{29 30} Some of these new substances are potentially harmful chemicals or materials and require additional scrutiny. With millions of new chemicals appearing every year, the scientific funding to research the effects on human health and biodiversity of these new chemicals can simply not keep up.³¹
4. Ongoing climate change and increase in resource usage are highly connected. Circular economy carries a reduction potential of GHG emissions by focusing on material and resource efficiency strategies for mobility, construction, manufacturing, food and agriculture. CE's focus on resource efficiency is key to transition to a low carbon economy and to achieve the goals of the Paris Climate Agreement^{32 33}
5. Increase in air pollution can be linked to growing urbanisation. Urban clusters are typically crowded due to dense population. Economic activity that is constrained to a limited urban surface also means that the side-effects of consumption are more densely concentrated. Human mobility with combustion engine cars or motorcycles concentrates air pollution in geographically confined urban areas. Air pollution is attributable to combustion of fuels and the resulting particulate matter and emissions. Material design, resource efficiency, urban design and

²³<https://www.stockholmresilience.org/research/planetary-boundaries/planetary-boundaries/about-the-research/the-nine-planetary-boundaries.html>

²⁴<https://www.unenvironment.org/resources/global-environment-outlook-6>

²⁵<https://www.resourcepanel.org/>

²⁶<https://www.weforum.org/agenda/2015/08/how-do-resources-create-conflict/>

²⁷<https://unstats.un.org/sdgs/report/2016/leaving-no-one-behind>

²⁸<https://www.nationalgeographic.com/news/2017/09/montreal-protocol-ozone-treaty-30-climate-change-hcfs-hfcs/>

²⁹<https://ec.europa.eu/environment/chemicals/non-toxic/pdf/NTE%20main%20report%20final.pdf>

³⁰<https://www.smithsonianmag.com/smart-news/science-falling-woefully-behind-testing-new-chemicals-180962027/>

³¹<https://esajournals.onlinelibrary.wiley.com/doi/abs/10.1002/fee.1450>

³²<https://www.resourcepanel.org/reports/resource-efficiency-and-climate-change>

³³https://unfccc.int/sites/default/files/english_paris_agreement.pdf

spatial planning play a key role in limiting these emissions. The circular economy principles are increasingly studied in the context of healthy and well managed cities for construction and mobility.³⁴

6. Unsustainable practices in fertiliser use for our food production are a direct driver of soil and surface water degradation. While nitrogen and phosphorus stimulate plant growth, they are by now available in surplus due to human activity. The effects are reactive forms in the atmosphere and overflows to soil and water. These continued reactions and overflows put pressure on the number of thriving species on the planet and can locally push ecosystems beyond tipping points and reduce biodiversity and ecosystem services.³⁵

4.3 Managing linear risks and spotting opportunity with the circularity or 9-R concept

Separate solutions to the resource, waste and environmental degradation challenges have been around for more than half a century now. Only recently have these often marginalised efforts converged under the flag of what we call the circular economy. A common theme is that the circular economy is about combating waste. We can do this by continuously improving and redesigning our economy to keep products and natural resources longer in play in the economy, before we discard them as waste. If we manage to slow down the growth of resource use it also reduces the environmental effects of resource extraction and production. Time plays a key role, because the improvements need to be done in such a way that the pace of the extraction, use and depletion of renewable resources does not exceed the speed of the regenerative cycle for nature to replenish them.³⁶ So similarly to the Brundtland Commission's definition of sustainability in the milestone report Our Common Future, a circular economy is about making sure that our current actions support the quality of life and resource availability for future generations.³⁷

A uniform definition of what constitutes a circular economy (CE) is still lacking as outlined by a recent meta-study of 114 existing CE definitions.³⁸ In this publication we use a set of common economic behaviours Circularity approach based on the 9-R concept as a proxy for the CE definition (see figure below). Circularity is a term commonly used to indicate the toolbox of "R-behaviours" that promote the transition to a circular economy. These behaviours were originally coined as the 3-R concept (reduce, reuse, recycle), further elaborated to constitute the 6-R concept (with the addition of recover, redesign and remanufacture) and later evolved into the 9-R concept (with the further addition of refurbish, repair and refuse). The 9Rs clearly show that CE is about more than waste reduction, although the chemical angle on toxins in our environment should be elaborated more under the 9th R of "refuse". The Ellen MacArthur Foundation's definition of CE includes restoration and regeneration which are not literally included in these 9Rs. The restorative and regenerative nature of outcomes in relation to resource usage form the purpose of the 9R behaviours.³⁹

The key reason for having 'Refuse' as part of the 9Rs within a circular economy, is that it prevents having hazardous chemicals in products that run the risk of being looped back into the circular economy. In particular, some brominated flame retardants, used in electronics products, can be found in toys from recycled materials⁴⁰. They should be removed and replaced, ideally at the design stage. Another possibility that could be encouraged by policy is to remove these substances at the recycling stage, but effective removal is often not technically nor economically viable. So chemicals of concern in products are an impediment to a circular economy, underpinning the importance of refusing and legally banning the use of hazardous chemicals.

The implication for financial risk models is that financial institutions need to familiarise themselves with CE terminology and definitions and integrate the CE terminology and indicators into their operations. CE promoting behaviours related

³⁴ http://www.euro.who.int/_data/assets/pdf_file/0004/374917/Circular-Economy_EN_WHO_web_august-2018.pdf?ua=1

³⁵ <https://ipbes.net/global-assessment>

³⁶ <https://www.ellenmacarthurfoundation.org/circular-economy/concept>

³⁷ <https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf>

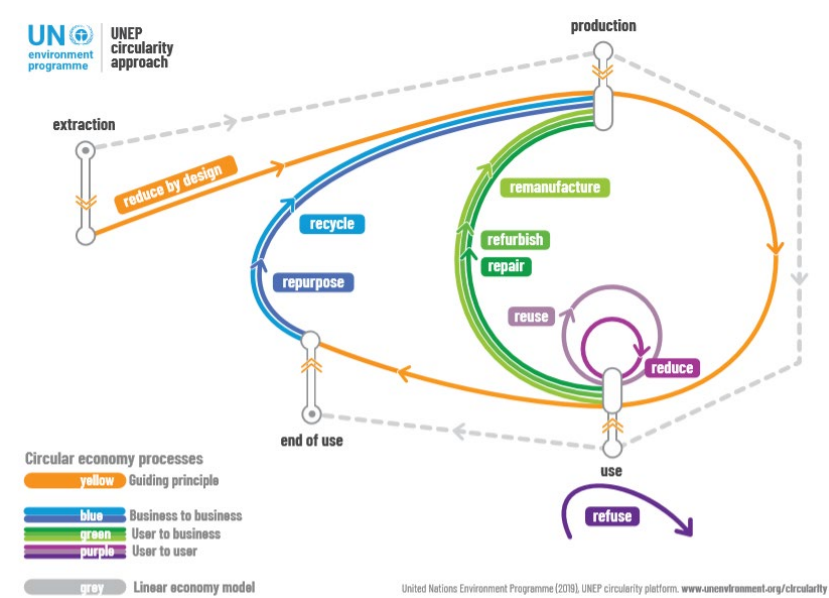
³⁸ Conceptualizing the circular economy: An analysis of 114 definitions, Julian Kirchherr*, Denise Reike, Marko Hekkert

³⁹ <https://www.ellenmacarthurfoundation.org/circular-economy/concept/schools-of-thought>

⁴⁰ <https://pubs.acs.org/doi/10.1021/es9004834>

to the Circularity and 9-R concept serve the double purpose of mitigating linear risks, as well as to identify business opportunities. Circular Economy behaviours tackle complex and systemic challenges by rethinking, reengineering and replacing the design principles of the take – make – waste triad. This redesign is a gradual process best accomplished by supplementing our economies with these virtuous economical “R-behaviours”. The contribution of financial institutions to the transition from a dominantly linear economy to a circular economy is not yet mainstream, despite the growing recognition of the importance of the effects of economic activity on climate, biodiversity, ecosystems, water, soil, air and society over the past two decades. As a rule of thumb, 80% of the financial sector is still too little aware of the potential scale of CE financing opportunities. On the other hand the 20% of the financial sector that is well aware of the CE potential (e.g. for construction and longevity of real estate) struggles with the perceived complexity and the balance between risks and returns.

Figure 2 The UNEP Circularity approach using the 9-R concept



Source: Adapted from UNEP Circularity Platform, 2019

Reduce by increasing resource efficiency during manufacturing or use less natural resources
Refuse and abandon the use of a resource or product through elimination without losing function
Redesign the product or service as a product-as-a service or sharing business models
Reuse of a product that is still functioning for its original purpose
Repair a product in disrepair so it can be reused for its original purpose
Refurbish Restore and increase the quality of an otherwise obsolete product to quality standard
Remanufacture used parts into a just-as-new condition through combination of parts
Repurpose Use a redundant product considered as waste, reprocess and give it a different function
Recycle Recover materials from waste to be reprocessed as inputs for production, excludes energy recovery

Table 1 The UNEP Circularity concept refers to the 9 circular economy R's, the 9 R's⁴¹

4.4 CE business models underlying CE Finance

Circular Economy Finance (CE Finance) is any type of financial service where the money is exclusively used to finance, re-finance, invest in or insure in part or in full, new and/or existing companies or projects in the circular economy.

Two important explanatory notes frame this definition in the right context:

1. The use of the word “exclusively” in the above definition relates to the ability to earmark money in financial institutions that is devoted to promoting the CE. If the amount is not identifiable, the impact of the money cannot be judged on what it has changed in the real world (e.g. investments that provided that x tonnes of toxins did not enter water streams or x tonnes of recycled materials increase)
2. The essence of CE Finance is how to mainstream the 9Rs and the regenerative and restorative purpose into existing financial instruments. For this to happen CE Finance needs to become an opt out rather than an opt in the mainstream of financial instruments. Similarly to how ESG criteria have mainstreamed in assessing the performance of business. The rules of the mainstream game finance will gradually change when policy support for the CE at multiple layers of government and allows CE business models to become structurally scalable and profitable while at the same time ensuring that robust data is generated to track their impacts.

CE Business models play an important role in coining what is now called CE Finance. CE Finance is primarily focused on facilitating the growth of promising CE business models. In this publication we use the 4 categories of business models as put forward by the EU's Categorisation System for the Circular Economy published in early 2020^{42, 43} which in turn aligns with the Circular Economy Finance Guidelines from 2018⁴⁴ and the Value Hill model from 2016⁴⁵.

⁴¹ The 9R Framework. Source: Adapted from Potting et al. (2017, p.5)

⁴² https://ec.europa.eu/info/publications/categorisation-system-circular-economy_en

⁴³ https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf

⁴⁴ To help financial institutions to develop their business in a circular economy, ABN AMRO, ING and Rabo together with the FinanCE group published the Circular Economy Finance Guidelines

⁴⁵ In 2016 Sustainable Finance Lab, Circle Economy, Nuovalente, TUDelft, and het Groene Brein got together to create the Value Hill. to help businesses position themselves in a circular economy context and to allow businesses to develop future strategies for doing business in a circular economy. Elisa Achterberg, Jeroen Hinfelaar, Nancy Bocken, “The Value Hill Business Model Tool: identifying gaps and opportunities in a circular network” (2016)

Box 2 Proposal for 4 CE business model categories

In March 2020 the EU's CE Finance Expert Group published *"a generic, sector-agnostic circular economy categorisation system that defines distinct categories of activities substantially contributing to a circular economy; a set of minimum criteria to be met by activities under each defined category in order to be considered as substantially contributing to a circular economy; and methodological guidance including an indicative list of typical investments/projects for each circular economy category."*

1. Value and resources recovery business model

- Separate collection and reverse logistics of wastes as well as redundant products, parts and materials enabling circular value retention and recovery strategies. Including biomass waste and residues as food, feed, nutrients, fertilisers, bio-based materials or chemical feedstock, reuse/recycling of wastewater

2. Circular Design and Production business models

- Design and production focused on the increase of material / resource efficiency, durability, functionality, modularity, upgradability, easy disassembly and repair; materials that are recyclable or compostable and process technology that supports these circular benefits

3. Optimal Use Business Models

- Reuse, repair, refurbishing, repurposing and remanufacturing of end-of-life or redundant products and any type of assets with product-as-a-service, reuse and sharing models based on leasing, pay-per-use, subscription or deposit return schemes, that enable circular economy strategies. Rehabilitation of degraded land to return to useful state.

4. Circular support, facilitators and enablers, market places

- Expert knowledge, advice and tools, software applications, market places and enabling services for all other circular economy business models

Source: https://ec.europa.eu/info/publications/categorisation-system-circular-economy_en

Consultation question 3:

Is the difference between linear and circular economy clearly explained? If not what specifically would you like to see in the structure /framing?

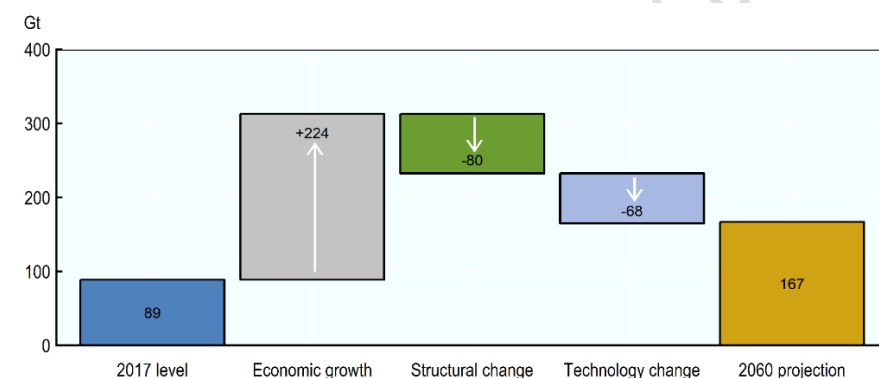
4.5 CE finance: the innovation challenge

The above described circular business models are applicable worldwide and offer a significant innovation challenge. The growth of these circular business models will require structural change of our production and consumption systems as well as corresponding technology change / innovation. All of these innovations require substantial financial resources and form a pathway for more resilient economic growth that enhances system-wide economic efficiency and the optimal use of financial capital.⁴⁶ The change is put into numbers by a scenario for the coming 50 years outlined in the Global Materials Outlook to 2060 and researched by the OECD (see graph below). A linear growth strategy is constrained by finite resources. This graph shows increasing levels of material use:

- In 2017, the global economy used 89 Gt of materials as a starting point for the scenario prepared by OECD
- In 2019, the global economy used 100 Gt of materials (not in the graph)⁴⁷ based on circularity gap research;
- In 2060, the global economy in the OECD scenario would use 313 Gt of materials, based on growth;
- By 2060, the economy can structurally change itself to reduce material use by 80 Gt (systemic shift);
- By 2060, the economy can technologically change to reduce material use by 68 Gt (technology shift);
- By 2060, the outcome for the economy can be 167 Gt of material use instead of a projected 313 Gt.

To achieve the reduction of 80Gt material use by structural changes and a further 68 Gt reduction of material use by technology change and corresponding resource efficiency, our mainstream economic activity should increasingly and steadily focus on the 9-R concept, underpinning the circularity concept. These changes require a tremendous system overhaul from linear to circular and will generate innovations with financing opportunities of trillions of USD, as quantified in the section on the CE growth opportunity.

Figure 3 Structural and technology change is projected to slow down the growth in materials use



Source: OECD - Global Material Resources Outlook to 2060

4.6 CE finance growth scenarios

Alongside environmental benefits, allocating capital to CE business models would generate tremendous macro-economic value to society. For this macro-economic value to emerge many micro-economic business models need to mature and prosper. The macro-economics of the CE are complex and uncertain, the finance sector knows this. The micro-economic growth opportunity depends crucially on resource prices, which have fluctuated wildly in recent years. The presence of

⁴⁶ <https://www.mckinsey.com/business-functions/sustainability/our-insights/mapping-the-benefits-of-a-circular-economy>

⁴⁷ <https://www.theguardian.com/environment/2020/jan/22/worlds-consumption-of-materials-hits-record-100bn-tonnes-a-year> based on researched numbers issued by PACE (Platform Acceleration Circular Economy) in collaboration with World Resources Institute (WRI), The Netherlands Organisation for Applied Scientific Research (TNO), University of Natural Resources and Life Sciences, Vienna (BOKU), The International Resource Panel (IRP), Institute of Environmental Sciences at the University of Leiden (CML), Doughnut Economics Action Lab (DEAL), The Netherlands Environmental Assessment Agency (PBL) and Statistics Netherlands (CBS).

CE policy is key to stimulate circular micro-economic activity for business to generate the macro-economic value. The milestone “Growth within” report from 2015 by the Ellen MacArthur Foundation & the McKinsey Centre for Business and Environment, estimates a potential of 7 per cent additional GDP by 2030 provided the EU-27 adopt policies and targets for material/resource efficiency and system change from a linear to a circular economy.⁴⁸ This study projects growth of resource productivity by up to 3 percent on an annual basis for Europe, equivalent to €600 billion (~USD 550 billion) per year savings on resources by 2030 and in addition €1.2 trillion (~USD 1.1 trillion) of system change benefits (avoided externalities) annually, totalling to €1.8 trillion (~USD 1.7 trillion) of benefits per year. This result was the outcome of the assumption of CE policy support and CE related target setting and is therefore an optimistic scenario.

While the ‘Growth Within’ report is scoped to Europe, Accenture estimated the value to the global economy based on the circular economy transition. According to Accenture’s “Waste to Wealth” research the circular economy could generate USD 4.5 trillion of additional economic output by 2030 on an annual basis. This is economic growth generated by circular business models that decouple economic growth from natural resource consumption. If this opportunity is not seized, it will contribute to a global gap of eight billion tons (Gt) between the supply and demand of natural resources by 2030, resulting in a USD 4.5 trillion of lost economic growth by 2030 and as much as USD 25 trillion by 2050. Based on the annual compounded growth rate of this could constitute a missed opportunity of almost USD 59 trillion USD by 2060, the end date that aligns with the scenario work down by OECD, mentioned above.

The assumptions of the EMF ‘Growth Within’ study for the European economic space are presumably more accurate than the Accenture study that aims to cover a global economy perspective. The larger the scope of any CE macro-economic study, the more uncertain the effects are on both economic activity and employment. Furthermore, an accurate study would require a macro-economic model of enormous sophistication, the presence of which cannot be fully assessed in this case. The OECD has an advanced CE model of this kind, and it is notable that it is difficult on the basis of even the most sophisticated macro-economic model to make accurate pronouncements. There are however sufficient grounds for thinking that these economic effects are positive, if brought about by CE promoting policies and cost-effective CE integration into existing financial services.

The rest of this report mostly covers the micro-economic conditions that are needed for CE finance to be systematically integrated by the mainstream of the financial sector. It is fair to acknowledge that the CE market is still developing and there is only an early track record with evidence of success. Massive opportunity has been identified, and the first successful CE financing cases are emerging, so the time is right to get involved, and to develop CE finance expertise, products and services.

Consultation question 4:

Do you consider the explanation of assumptions behind the used scenarios concise and clear? If not please provide suggestions.

⁴⁸ Ellen MacArthur Foundation, SUN, McKinsey & Co., Growth Within: a circular economy vision for a competitive Europe (2015)

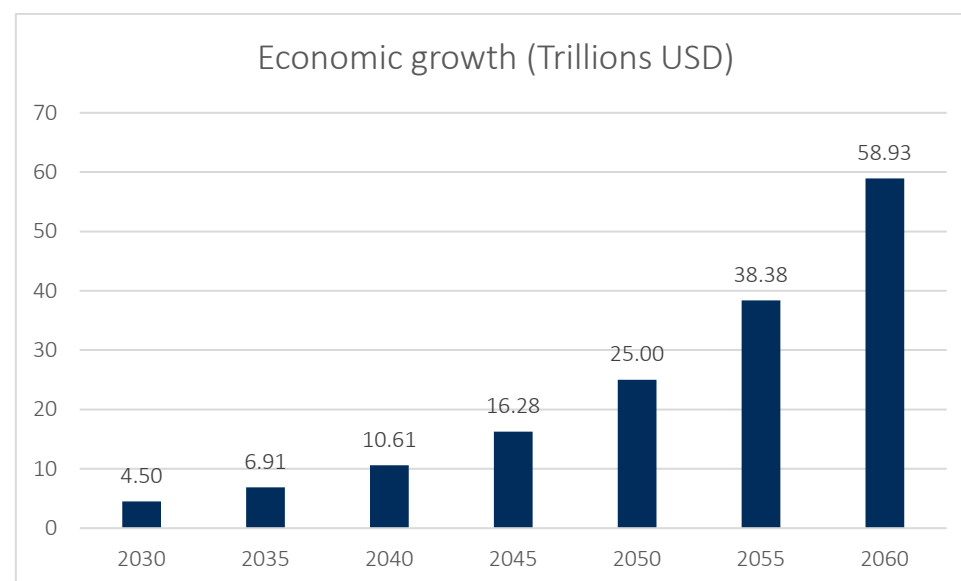


Figure 4 The circular economy unlocks trillions of economic growth by 2060

Source: Accenture Strategy publication, *Waste to Wealth* (2015)

4.7 CE finance job creation and destruction

The creation of new jobs and destruction of old jobs by the many new business models supporting the circular economy is highly relevant to financial institutions. The CE transition sensitizes financial sector specialists to realize that jobs and spending in linear industries can go into decline. The timings of such declines are difficult to predict, but the International Labour Organisation (ILO) has built a basic circular economy scenario that outlines job growth for the circular recovery and resale of secondary materials activities versus a scenario with job decline for linear manufacturing, mining and extraction activities. The ILO estimates that the circular economy model for sustainability in resource use and consumption⁴⁹ could result in a net total of around 6 million new jobs⁵⁰ by 2030, compared with a business-as-usual scenario. In the ILO's circular economy scenario, nearly 78 million jobs will be created and almost 71 million will be destroyed. Growth in CE jobs can also accelerate new circular consumer preferences, while other linear consumption choices decline.

This ILO scenario is based on the following key assumptions:

1. The CE scenario focuses on the effect on jobs of a sustained 5 per cent annual increase in recycling rates for plastics, glass, wood pulp, metals and minerals, replacing the direct extraction of the primary resources for these products.
2. The CE scenario also models growth in the services economy, sharing economy, product-as-a- service, rental and repair services. Services shift ownership structures and according to the used model slow down the replacement of goods at an annual rate of 1 per cent.

Key considerations with regard to the CE job scenario:

1. Regional differences in job creation and destruction are at play. A shift from plastic made from virgin fossil fuels towards the use and production of recycled plastics can shift jobs from the Middle East to the Americas for

⁴⁹ Employment and the role of workers and employers in a green economy – ILO - 2018

⁵⁰ Skills for a greener future – ILO 2019

example. If a shift occurs from extraction of resources via mining towards urban mining and recycling activity, presumably the geography of the job also changes.

2. The decency of the jobs created remains a key item to address, as it was in the business-as-usual scenario. Jobs in CE related services support a more equitable gender distribution for women across sectors and promote highly skilled jobs such as IT, reverse logistics, service quality management, hospitality. However, the circular economy scenario also accounts for a smaller increase in the numbers of workers in waste management for which the importance of decent work policies related to health and safety need to complement policies to promote the circular economy.

4.8 CE Finance and linear / circular risk management

As with any emerging field within our global economy, the circular economy transition is mired with traps and pitfalls for the financial sector. Luckily a better understanding of risk management in the circular economy is a skill set under development. The risk profession has widely embraced climate related risks by now. The risks related to resources and materials are next in line and deserve an increasing amount of attention in the development of financial institutions' risk models in the years to come. From a risk perspective the observations in the financial sector are many-fold:

1. Higher perceived risk of circular economy business models as the new-kid-on-the block. Circular business models are considered risky with uncertain returns and require de-risking through public-private collaboration in the form of first-loss guarantees, government backed loans or participation; This is due to the higher (perceived) risks of innovative business models in general, also those supporting the Circular Economy transition;
2. Lower perceived risk related to the linear economy. Economic risk management does often not pre-empt in a timely manner the effects of policy changes or crisis on existing, mainly linear financial portfolios (e.g. drop or rise in popularity and use of certain mining resources); Transition risk aimed at the avoidance of stranded assets in the financial portfolio are not properly assessed;
3. Physical risks such as noise, environmental damage, air pollution, hazardous materials entering into eco-systems are insufficiently priced into the risk profile of linear production systems; Unknowingly reputation risks are incurred that tarnish financial institution's image by a late adoption of the Circular Economy as a theme for risk management and commercial opportunity; Meanwhile the increased reputation risk goes hand in hand with increased liability risks that hold clients of the financial sector accountable for environmental clean ups.

Consultation question 5:

Do you consider the definition of CE Finance in the report sufficiently clear? If not, please provide suggestions.

5 Contribution of key financial industry frameworks to Circular Economy

5.1 The Sustainable Development Goals SDGs and circular economy



One of the key features of the UN Sustainable Development Goals (SDGs) agreed by 195 countries in 2015 is that the 17 goals and especially the 169 underlying targets focus on the interconnectedness of economic activity of businesses, society at large and the interaction with the environment. Targets 8.4 and 12.2 through 12.5 all set targets for a circular economy, tying directly into the economic growth and job creation agenda. This insight of making decoupling a priority for business and society is reflected in the SDG targets. What if we can decouple our economic growth from environmental degradation (target 8.4) through achieving sustainable management and efficient use of natural materials (target 12.2)?

By mentioning decoupling, the SDGs reflect perfectly the unique times that we live in. Every slump in our economies makes natural resource consumption temporarily go down. We call that a crisis and an economic recession. The rebound effect on the consumption of natural resources over the past centuries has always been greater than the original slump. This rebound effect of growing resource usage also increases environmental degradation. The SDGs acknowledge that this vicious cycle can only be changed into a virtuous cycle, if companies and governments integrate decoupling in their business model and policies. This is the prospect for economic growth and job creation that is more future proof than the current situation. A large part of our economy is still guided by the development rules set out by the first and second Industrial Revolutions, focused on standardisation of manufacturing (concrete, steel, machines, physical products). While the third Industrial revolution brought about the digitisation of our manufacturing systems, the fourth Industrial

revolution challenges our notions of ownership and our consumption patterns. Business are constantly redirecting their strategy to escape commoditisation. The services economy offers this possibility of strategic reorientation. Due to the rise of a services economy, job creation can be decoupled from resource use. For financial institutions the servitization of our economies, spells growth. Still it does matter how this servitization is achieved and targets 12.3 through 12.5 offer further guidance on what type of economic activities, companies and government should strive for. The SDG agenda promotes economic activities that realise decoupling of economy growth from environmental degradation.

There is an important caveat. Although Circular Economy and circularity will focus mainly on the above mentioned SDGs, the SDG agenda is integrated and indivisible across all 17 goals. What we are describing here is merely an SDG focus within the context of interconnectedness of the 17 SDG goals. While circularity and circular economy are easily correlated to the achievements of the targets underlying SDG 8 and 12, the causality of the actions undertaken will reflect a broader impact on more, if not all SDGs. SDG targets 6.4, 6.5, 7.2, 7.3, 9.4, 11.6 are all related to CE. More broadly SDG 14 (Life below water) and SDG 15 (Life on land) are intertwined with the regenerative and restorative aspects of the CE. Since SDGs 14 and 15 explicitly refer to the effect of human activity on terrestrial eco systems (earth, soil, water, rivers, lakes and oceans) and biodiversity, they are in many cases at the end of the chain of environmental effects and impacts caused by achieving or failing to achieve the targets under SDG 8 and 12. In that respect a recommended focus on SDG 8 and 12 for the circular economy is a scoping exercise to keep the target setting manageable for financial institutions and their clients and not a license to ignore negative or positive impacts on any of the other SDGs.

For the financial sector the SDGs are a way to measure, report and steer on the outcomes of their activities. The SDG framework helps the financial sector to assess whether the activities represented on the balance sheet are contributing to positive or negative outcomes for the SDG targets. Whilst measurement, reporting and steering on SDGs is mostly done in the impact investing field⁵¹ on a voluntary basis, the SDGs actually present the financial sector with a “convenient handbook for sustainability”. The specific SDG targets mentioned in this publication help companies to measure whether their commercial activities contribute or steer them away from the outcomes that promote the CE transition.

⁵¹ <https://thegiin.org/research/publication/sdgs-impinv>



To designer: List all mentioned SDG targets in a side-bar – see above and below

12.3 By 2030, halve per capita global food waste at the retail and consumer level, and reduce food losses along production and supply chains including post-harvest losses.

12.4 By 2020, achieve environmentally sound management of chemicals and all wastes throughout their life cycle in accordance with agreed international frameworks and significantly reduce their release to air, water and soil to minimize their adverse impacts on human health and the environment

12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling, and reuse

Figure 5 SDG targets and links to decoupling of economic growth and use of natural resources

Consultation question 6:

Is the tone in the report balanced enough between the positives and negatives of a circular and linear economy? If not, please explain

5.2 Banking industry: CE guidance & Principles for Responsible Banking

More than 170 banks representing some USD50 trillion in assets have signed the six Principles for Responsible Banking since UNEP FI launched them in September 2019 to provide a global framework for a sustainable banking system.⁵² The strategy execution of the first three Principles can concretely stimulate the growth of circular economy finance.

Under Principle 1, signatories commit to aligning their business strategies societal goals, as expressed in the Sustainable Development Goals. Strategically adopting the types of financial services that allocate capital to circular economy business models can contribute to achieving the targets underlying SDGs 8.4 and 12.2 through 12.5. from a circular economy finance perspective.

According to Principle 2 of the PRB, signatories will set, measure and report publicly on their targets. Target setting for financial institutions in line with circular economy objectives, can be done in several ways. First of all financial institutions can focus on resource efficiency and scope out and define circular economy activities supported by their financial services. The categories of the EU's New Circular Economy Action plan⁵³ from 2020 provide generic guidance and inspiration to the financial sector for the categorisation of CE business models. In March 2020 the EU's CE Finance Expert Group published "a generic, sector-agnostic circular economy categorisation system that defines distinct categories of activities substantially contributing to a circular economy; a set of minimum criteria to be met by activities under each defined category in order to be considered as substantially contributing to a circular economy; and methodological guidance including an indicative list of typical investments/projects for each circular economy category." Banks can assess current and potential financing across their portfolios across the four categories of business models - value and resources recovery; circular design and production; optimal use; and circular support, facilitators and enablers, market places. See page x for further details.

After classification of the type of activity, signatories can establish metrics to measure, report and steer their business growth in the various CE categories of business. Some examples are:

- The amount invested in or lent to companies that operate CE business models or run CE projects.
- Avoided material usage
- Avoided polluting outputs to soil, water and air
- Avoided GHG emissions due to circular versus linear business.

Principle 3 of the PRB focuses on the relationship with clients and customers, to encourage sustainable practices. For the commercial dialogue with banking clients on circular economy insights, bankers and relationship managers need to be sufficiently trained on the difference between linear and circular economy models. As a starting point for training employees of financial institutions there are a number of freely accessible Massive Open Online Courses (MOOCs) that cover various aspects of CE.^{54, 55} Commercial staff can explore and learn how to engage in public-private cooperation models such as the Joint Initiative for Circular Economy, that the European Investment Bank (EIB) is managing⁵⁶. This is a cooperation among National Promotion Banks aimed at jointly investing in CE. Customer dialogue itself can integrate a number of questions that explore the circular economy aspects of a client's business, typically focused on value recovery, circular design, optimal use, product-as-a-service and any form of facilitation of circular economy.

⁵² PRB Guidance document

⁵³ https://ec.europa.eu/commission/presscorner/detail/en/ip_20_420

⁵⁴ <https://www.edx.org/course/circular-economy-an-introduction#>

⁵⁵ <https://www.mooc-list.com/course/circular-economy-interdisciplinary-approach-edx>

⁵⁶ <https://www.eib.org/en/publications/joint-initiative-on-circular-economy>

Box 3 Principles for Responsible Banking

More than 180 banks have signed up to six principles:

- 1. Alignment** We will align our business strategy to be consistent with and contribute to individuals' needs and society's goals, as expressed in the Sustainable Development Goals, the Paris Climate Agreement and relevant national and regional frameworks.
- 2. Impact & Target Setting** We will continuously increase our positive impacts while reducing the negative impacts on, and managing the risks to, people and environment resulting from our activities, products and services. To this end, we will set and publish targets where we can have the most significant impacts.
- 3. Clients & Customers** We will work responsibly with our clients and our customers to encourage sustainable practices and enable economic activities that create shared prosperity for current and future generations.
- 4. Stakeholders** We will proactively and responsibly consult, engage and partner with relevant stakeholders to achieve society's goals.
- 5. Governance & Culture** We will implement our commitment to these Principles through effective governance and a culture of responsible banking.
- 6. Transparency & Accountability** We will periodically review our individual and collective implementation of these Principles and be transparent about and accountable for our positive and negative impacts and our contribution to society's goals.

Source: <https://www.unepfi.org/wordpress/wp-content/uploads/2019/07/FINAL-PRB-Signature-Documents-2-Interactive-22-07-19.pdf>

5.3 Investment industry: CE guidance and Principles on Responsible Investing (PRI)

The UN-supported Principles for Responsible Investment now has more than 2,250 signatories, mainly asset owners and asset managers with around USD80 trillion in Assets Under Management.⁵⁷

Box 4 Principles for Responsible Investment

Principle 1: We will incorporate ESG issues into investment analysis and decision-making processes.

Principle 2: We will be active owners and incorporate ESG issues into our ownership policies and practices.

Principle 3: We will seek appropriate disclosure on ESG issues by the entities in which we invest.

Principle 4: We will promote acceptance and implementation of the Principles within the investment industry.

Principle 5: We will work together to enhance our effectiveness in implementing the Principles.

Principle 6: We will each report on our activities and progress towards implementing the Principles.

Source: <https://www.unpri.org/pri/about-the-pri>

The Principles for Responsible Investment can provide a launchpad for investment in a circular economy through Environmental, Social and Governance (ESG) issues covered by Principles 1. Integrating ESG issues into investment analysis and decision-making processes involves addressing a wide range of topics⁵⁸ relevant to CE finance, including;

- Environmental issues composed of factors related to energy consumption, intensity of greenhouse gas emissions, the contribution to climate change, the use of scarce resources such as water, soil and air, waste management and recycling;
- Social issues related to guarantees for health and safety, employee productivity and education, diversity and inclusion, the proficiency in supply chain risk management and human rights, variably including labour and/or land rights;
- Governance reflects the effectiveness of the executive board oversight.

One of the issues to address for the PRI signatories is that circular economy aspects related to the use of scarce resources such as water, soil and air, waste management and recycling are potentially weighed against many other factors. Different organisations use different indicators/metrics to score the ESG factors, in the end there is no standardised system across the investment industry yet for ESG scoring.⁵⁹ Therefore trade-offs within ESG scoring between high or low scores on E, S or G can make the aggregate score hard to interpret.

⁵⁷ <https://www.unpri.org/pri/about-the-pri>

⁵⁸ <https://hbr.org/2019/05/the-investor-revolution>

⁵⁹ <https://www.bloomberg.com/news/articles/2019-12-11/conflicting-esg-ratings-are-confusing-sustainable-investors>

A recommendation for fund and asset managers is to review how ESG methodologies could be designed to contribute to the circular economy, based on relevant classifications. We also acknowledge the role of ESG data providers as many asset managers rely on these datasets rather than having in-house methodologies. For investors it can then become clearer how these ESG investments support the transition towards sustainable production and consumption, resource efficiency, circularity increases or circular economy business models. The financial industry is in the early stages of integrating circularity measurements into ESG approaches. Disclosures on investment strategies related to CE finance are therefore not yet globally standardised. The SDG targets underlying SDGs 8.4 and 12.2 through 12.5, as outlined above, can be used to structure the disclosure towards investors. These disclosures can then be further enhanced with concrete CE metrics related to resource efficiency, avoided polluting outputs to soil, water and air; avoided material usage and avoided GHG emissions.

5.4 Insurance industry CE guidance & Principles for Sustainable Insurance (PSI)

Over 70 insurers, reinsurers and service providers worldwide have adopted the four Principles for Sustainable Insurance (PSI)⁶⁰, launched by UNEP FI in 2012. Signatories represent more than 25% of worldwide insurance premium volume and USD 14 trillion in assets under management. The Principles are also part of the insurance industry questions leading to their scores and position within the industry ranking of the Dow Jones Sustainability Indices and FTSE4Good rating.

Box 5 Principles for Sustainable Insurance

- **Principle 1** We will embed in our decision-making environmental, social and governance issues relevant to our insurance business.
- **Principle 2** We will work together with our clients and business partners to raise awareness of environmental, social and governance issues, manage risk and develop solutions.
- **Principle 3** We will work together with governments, regulators and other key stakeholders to promote widespread action across society on environmental, social and governance issues.
- **Principle 4** We will demonstrate accountability and transparency in regularly disclosing publicly our progress in implementing the Principles.

Source: <https://www.unepfi.org/psi/the-principles/>

The four principles of the PSI can contribute to the expansion of the circular economy through investment and insurance. PSI signatories can contribute to the circular economy by implementing the principles in their strategy execution with a CE focus in three main ways:

- **Investment strategies and policies that reduce pollution, promote alternatives and waste prevention techniques.** For insurers, Environmental Social and Governance (ESG) risk ratings have become an important concept underlying investment activities. For example, for investments in the food and retail sector, companies can be vetted on their ability to tackle pollution, caused by their plastic packaging. This ESG focus by investors can push

⁶⁰ <https://www.unepfi.org/psi/the-principles/>

investees to implement circular economy models and improve recycling and waste prevention infrastructure. The potential CE focus for insurers is well explained in the PSI report on plastic pollution⁶¹ called “unwrapping the risks of plastic pollution to the insurance industry”.

- **Insurance strategy and policies that address the risks associated with pollution in the long run will stimulate pollution and waste avoidance.** Risk assessment of the pollution effects of linear economy practices is the first step towards a circular economy. Assuming that the height of the insurance premium is material, types of insurance that factor in potential liabilities will push companies to be more transparent about pollution risks. The insurance cover makes producers aware of pollution risks and pushes companies to operate more diligently in pollution sensitive activities. Requiring the implementation of CE principles can promote good practices that help avoid frequent claims and also avoid the resulting insurance premium hikes. Claims can result from improper disposal of hazardous and toxic wastes of which asbestos is a very well-known example of an extended list of harmful substances. Some manufacturers handle chemicals that potentially damage the environment if not appropriately stored or disposed of. Underwriting will need to consider toxic spills caused by accidents or abandonment of production assets, as well as proper maintenance and controls as part of the terms and conditions of the insurance. While pollution liability insurance keeps companies protected on top of general liability, it also adds to the cost base of operations and will promote sustainable behaviour.
- **Last but not least, there is the role of insurers in adopting their risk management, underwriting and claims management to stimulate the sharing economy.** When assets are shared between a pool of users the material footprint is lower. A company offering car sharing via an app instead of individual car lease or car ownership will need fewer cars to facilitate the same amount of mobility for the same amount of car users. Surely this can have an adverse effect on the volumes of private car insurance sold by insurers. Although the insurance sector can see this as a threat to existing business, this trend is not driven by the actions of insurers themselves, but by the benefits to society and consumers. This lower material footprint contributes to the underlying principles of a circular economy. One of the conditions that needs to be met for sharing to have a positive impact for the circular economy, is that appropriate insurance is in place. A 2018 Lloyd’s of London report⁶² identified the sharing economy as a massive growth opportunity for insurers. The report cites a PwC survey⁶³ on the sharing economy that found that 89% of consumer panellists agreed the sharing economy marketplace is based on trust between providers and users. Insurers can grow their business by stimulating innovative product and service development, altered underwriting procedures fit for sharing services, which in turn also alters the process of claims management to facilitate the user’s sharing experience.

Consultation question 7:

Do you consider the link with key financial industry frameworks (PRI, PSI, PRB) and circular economy to be clear and concise? If not, what further clarification is needed?

⁶¹ <https://www.unepfi.org/publications/insurance-publications/psi-unwrapping-the-risks-of-plastic-pollution-to-the-insurance-industry/>

⁶² Lloyd’s 2018 “Sharing risks, sharing rewards: who should bear the risk in the sharing economy?”

⁶³ <https://www.pwc.com/gx/en/services/advisory/consulting/risk/resilience/trust-but-verify-why-it-matters-in-the-sharing-economy.html>

6 Sustainable Financial instruments integrate CE

The financial sector already offers sustainable finance services that integrate environmental, social and governance (ESG) criteria into decision making. These ESG criteria and ESG scores are a reflection of how the money is put to work in the economy. Sustainable finance uses various bond instruments, green loans, sustainability linked loans and ESG investment. Often these instruments are issued and traded by financial markets in the same way as conventional, unconstrained financial instruments. The difference is that the money goes to the underlying green or circular economy assets in the real world.

6.1 CE finance with Green Bonds and Green Loans use of proceeds clauses

The Green Bonds and Green Loans Market Summary for 2019 issued by the Climate Bond Initiative (CBI) mentions that the global green bond and green loan issuance was over the amount of USD 250 bn in 2019. This amount was a new global record, up by 51% compared to USD170.6 bn in 2018.⁶⁴ Green Bonds take the lion's share of issuance, because Green Loans in 2019 only accounted for around 4.5% of the number.

The International Capital Market Association (ICMA) has developed The Green Bond Principles (GBP), Social Bond Principles (SBP) and the Sustainability Bond Guidelines (SBG), as a globally recognized framework for the issuance of green, social and sustainability bonds⁶⁵. These principles and guidelines are a set of voluntary practices for issuing Green, Social or Sustainability Bonds. The expansion of the criteria for the issuance Green Bonds has made the underlying metrics more diverse. Industry criticism is that this diversity of metrics has not always contributed to making the environmental value added more clear. In fact the boom in the volume of green bonds has also come with growing concerns of greenwashing, at times expressed by the financial industry itself⁶⁶. When the CE impacts are explained transparently to investors a Green Bond can be a fantastic means to promote the CE transition. What's also important about these bond related principles is that they drive a similar change for commercial loans. ICMA also issued the Green Loan Principles.⁶⁷ Besides bond issuing, the commercial loans market forms an equally important activity in mainstream finance and business. The addition of non-financial criteria to the disclosures of these bonds and loans is a growing trend and expands the CFO's role⁶⁸. Any of these principles have four core components:

1. Use of Proceeds
2. Process for Project Evaluation and Selection
3. Management of Proceeds

⁶⁴ <https://www.climatebonds.net/resources/reports/2019-green-bond-market-summary>

⁶⁵ <https://www.icmagroup.org/green-social-and-sustainability-bonds/>

⁶⁶ <https://www.bloomberg.com/news/articles/2019-10-14/as-green-bonds-boom-so-do-greenwashing-worries-quicktake>

⁶⁷ https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/LMA_Green_Loan_Principles_Booklet-220318.pdf

⁶⁸ [https://www.ey.com/Publication/vwLUAssets/How_sustainability_has_expanded_theCFOs_role/\\$FILE/How_sustainability_has_expanded_CFO_role.pdf](https://www.ey.com/Publication/vwLUAssets/How_sustainability_has_expanded_theCFOs_role/$FILE/How_sustainability_has_expanded_CFO_role.pdf)

4. Reporting

For both bonds and loans the circular economy is addressed through the topics of energy efficiency, the management of wastes and the efficient use of natural resources (forestry, land, soil, water), logistics and technology. The link with circular economy finance can be primarily found in the metrics used to underpin the use of proceeds and the reporting to investors on the management of proceeds. ICMA indicates that related to SDG 12, green bonds can organise their use of proceeds and measure their contribution to the circular economy by reporting on various metrics:

- avoided resource usage and avoided waste
- avoided emissions to air (other than greenhouse gases)
- avoided emissions to water and soil
- secondary materials used
- materials recycled
- absolute or % reduction in local pollutants and reduction of hazardous materials used.⁶⁹

An important aspect of these metrics is to monitor the final state of the contribution to a circular economy transition. Metrics that indicate that goods or materials are potentially recyclable or compostable do not necessarily mean that they are. To secure positive impacts on the circular economy, these indicators can best be supplemented by concrete measurements of materials recycled and composted.

⁶⁹ <https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/June-2019/Mapping-SDGs-to-Green-Social-and-Sustainability-Bonds06-2019-100619.pdf>

Box 6 Sustainability Bond with use of proceeds dedicated to Circular Economy

In the public space the EIB is one of the largest, if not the largest Green Bond emitter. Moreover, EIB has recently launched Sustainability Awareness Bonds, where part of the proceeds are eligible for CE finance.

In the private sector, an exemplary sustainability bond has been issued by the Italian bank Intesa San Paolo to fund projects and businesses under a €5 billion (USD x billion) credit facility to support the circular economy transition.

In collaboration with the Ellen MacArthur Foundation as a circular economy expert, Intesa San Paolo has included in its sustainability bond framework the following circular economy categories for the use of proceeds of the bond:

- Solutions for lifetime extension of goods and materials
- Regeneration of natural capital (e.g. restoration of degraded soils)
- Circular design focused on waste and pollution reduction
- Production processes producing or dependant on recycled resources
- Resource efficiency in the supply chain
- Reverse logistics, Collection, separation and recycling of used materials
- Innovative technologies to enable circular business models (eg. IT, market places)

Examples of associated metrics are:

- Amount of waste reprocessed and used as circular input (tons)
- Amount or percentage increase of biobased/recycled materials utilization (tons)
- Prevented food waste (tons)
- Amount of recyclable/compostable goods produced (tons)

Orders reached over €3.5 billion (\$3.9 billion). Intesa Sanpaolo placed €750 million of bonds at a fixed rate of 0.75%, with a five-year maturity.

Source: https://www.eib.org/en/investor_relations/sab/index.htm#

<https://group.intesasanpaolo.com/en/newsroom/press-releases/2019/11/sustainability-bond-en>

6.2 CE Finance with Transition Bonds

Many companies have targets related to the environment⁷⁰ and some are even aspiring to set and execute upon science based targets⁷¹. Target achievement dates range widely between 2020 and 2050. The strategic decision-making process of executive boards and senior management need to align with these targets. These long term objectives are executed upon by many consecutive practical steps that redirect the allocation of financial capital based on altered policies, circular economy programmes and projects. The transition bonds are too informal a market to accurately measure financial capital that has been reallocated in this way. Also the environmental effects in the real world will need close monitoring. Mines can use the money to change over to renewable sources for their energy supply. They can invest in more sophisticated pollution prevention, reduction, reuse and recycling of water on the mining site or reprocessing and clean-up of tailings. This all still means that the company keeps operating a mine and needs to address the associated risks beyond compliance.

For the circular economy transition to accelerate, companies in resource intensive industries such as manufacturing, extractive industries and chemicals are key players. These companies do not always have sufficiently recognised CE related assets to raise the needed capital for transition under the Green Bond and Green Loan Principles. The nature of their products and services in many cases does not qualify as green.

The Transition Bond principles⁷² aim to achieve that these companies, based on their transition pathway⁷³, also have access to a separate asset class of financial instruments based on the same 4 components of the Green Bond Principles:

1. Use of Proceeds
2. Process for Project Evaluation and Selection
3. Management of Proceeds
4. Reporting

While these transition bonds are primarily presented as a climate finance solution, aimed at GHG emission reductions, they are also linked into the circular economy discussion and can potentially be used in the context of CE finance.

6.3 CE Finance with Sustainability ESG Linked Loans (SLL)

While the use of proceeds clause in the Green Bond, Green Loan, Social Bond, Sustainability Bond and Transition Bond instruments are a great strength to pinpoint the assets involved in the financial transaction, it is also a factor that prevents the financing of more general sustainability improvement initiatives. Unfortunately sustainability is a word these days that can practically mean anything and everything. The terms and conditions in the loan will need to describe the practical environmental benefits delivered by the loan. Specifically for SLL in support of the CE transition, any of the CE metrics discussed further on in this publication can help to transparently quantify environmental targets and impacts in the drafting of the CE promoting SLL. A sustainability linked loan is a general corporate loan that aims at raising capital for specific sustainability programmes of the borrower. The ICMA has issued the Sustainability Linked Loans principles (SLLP)^{74 75}, which have the following four core components:

- 1 Relationship to Borrower's Overall Corporate Social Responsibility (CSR) Strategy

⁷⁰ https://www2.deloitte.com/content/dam/insights/us/articles/5065_Global-resources-study/DI_Global-resources-study.pdf

⁷¹ <https://sciencebasedtargets.org/companies-taking-action/>

⁷² <https://www.environmental-finance.com/content/news/axa-im-pens-transition-bond-guidelines.html>

⁷³ https://realassets.axa-im.com/content/-/asset_publisher/x7LvZDsY05WX/content/financing-brown-to-green-guidelines-for-transition-bonds/23818

⁷⁴ <https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/LMASustainabilityLinkedLoanPrinciples-270919.pdf>

⁷⁵ <https://www.sustainalytics.com/sustainable-finance/sustainability-linked-loans-for-corporates/>

- 2 Target Setting – Measuring the Sustainability of the Borrower based on target progress
- 3 Reporting
- 4 Review

The SLL market is projected to grow at percentages that were previously only witnessed for Green Bonds. The volume of publicly announced sustainability linked loans rose from USD 10 bn in 2017, to more than USD 40bn in 2018 and USD 80bn in 2019⁷⁶. These SLL can be made fit for supporting the CE transition by targets linked to improving resource efficiency, (hazardous) material use, growth of CE business models, emissions control to land, water and air.

6.4 CE Finance and ESG investment strategies

It is very early days, but some ESG investment strategies⁷⁷ have embraced the Circular Economy transition theme. CE themed investment funds were launched by financial institutions like BNP Paribas⁷⁸, Blackrock⁷⁹ and Robeco-SAM.⁸⁰ This is definitely not a complete list. The size of these funds, all of which are in their start up phase, are a tiny part of the activities of these large groups. We start to see that CE is helping to deliver on objectives linked to mainstream ESG finance; CE is also a powerful value driver in the context of pure play circular impact investing⁸¹. In a survey by the Global Impact Investor Network (GIIN) more than 40% of investor mentioned sustainable production and consumption as a key theme for their investments. Both pure play investment and mainstreaming of CE related metrics and scores into broader ESG investment funds need to happen to develop the CE finance market.

For a more large-scale CE uptake within these organisations and within the financial industry at large there needs to be more evidence of cross pollination between the fund management style of these smaller CE funds and the mainstream investment funds. That would mean a move from the millions to the billions and potentially trillions, if true mainstreaming of CE finance into ESG investment strategies is to be realised in the long run.

⁷⁶ https://www.spglobal.com/marketintelligence/en/news-insights/trending/k-9pcy0wyj8v1k_xbrj1lq2

⁷⁷ <https://www.ceguide.org/Strategies-and-examples/Finance/Assess-ESG-risk>

⁷⁸ <https://www.easy.bnpparibas.fr/professional-professional/bnp-paribas-asset-management-launches-first-circular-economy-etf/>

⁷⁹ <https://www.ellenmacarthurfoundation.org/news/the-ellen-macarthur-foundation-partners-with-blackrock-to-accelerate-the-transition-towards-a-circular-economy>

⁸⁰ <https://www.robecosam.com/en/media/press-releases/2020/robecosam-launches-circular-economy-strategy.html>

⁸¹ https://thegiin.org/assets/GIIN_2019%20Annual%20Impact%20Investor%20Survey_webfile.pdf

Box 7 BCF Circular Economy Fund in cooperation with EMF

- How did the BCF Circular Economy Fund come to be?

“In October 2019 Blackrock launched the BGF Circular Economy fund, in collaboration with the Ellen MacArthur Foundation - a global thought-leader on the circular economy. EMF act as our knowledge partner and complement our fundamental research on the broader theme. We believe that the transition is still nascent. We see this structural shift as having the potential to provide longer term investment opportunities.”

- What is Blackrock’s motive /purpose behind the promotion of circularity / CE?

“As it becomes increasingly clear that we are reaching a point where it is necessary to re-think how we are producing and consuming products, the negative impact from the current take-make-waste model can no longer be ignored. We see a reallocation of resources and capital towards more sustainable investing as a key tenet of a transition to a more circular world. Given the rising consumer, corporate and regulatory focus on the circular economy, we have identified it as an emerging opportunity – not just to provide our clients access to a growing theme, but also play our part in accelerating that shift towards a circular economy.”

- How do you think that the capital transition from a linear to a circular would be best accelerated through the Fund?

“There is widespread consensus about the need to move from a linear to a circular economy. This view is supported by business leaders and policymakers. This shift is very important to help deliver the goals on GHG emissions targets, reduction in pollution, and sustainable economic growth. The main challenge now is to scale up targeted solutions and best practices. This involves investing in innovative companies or allocating capital to companies that embrace circular product design and operations. When we look at adoption curves for new technologies, we find that there are typically three forces that support the transition: regulatory incentives, change in consumer preferences and economics becoming more favourable. With the transition to a circular economy we see a convergence of these three forces, which is creating a powerful drive to effect change. Together, these forces shift competitive advantages towards well positioned companies that are earlier in the transition towards circularity.”

Source: Interview with Sumana Manohar, Head of Thematic Research at BlackRock and co-manager of the BGF Circular Economy fund

7 ESG metrics for CE finance

Box 8 Survey Outcomes: Data needs

Outcomes related to areas of CE integration for financial institutions. To the question which non-financial data financial companies need for CE integration? The Top 4 responses included:

- A circularity metric at product level;
- A circularity metric at company level;
- Data on product passport (what is in the product?);
- Data on resource toxicity.

Lack of uniform CE metrics was also the number 1 barrier identified by survey respondents for the question: What are the barriers that prevent CE to grow for your financial company?

Source: UNEP FI Survey Outcomes

7.1 CE finance and non-financial metrics

A focus on circularity and CE can be embedded in the environmental, social and governance (ESG) aspects of financial institutions' strategies and commercial activities. In order to fully integrate the environmental and social aspects of the circular economy into the financial industry, comparable and standardized CE metrics are a key ingredient. Standardisation of CE related metrics is key for CE non-financial data to become scalable in the methodical integration of ESG research. For most integration will be in alignment of policies, processes and research related to ESG performance and non-financial reporting. For clients active in industries that are known for their environmental pressures these non-financial ESG metrics have already become increasingly important to position themselves amongst peers.

Box 9 Non-financial, resource-related metrics for construction and real estate finance

Sector-specific CE metrics are most relevant to high-impact sectors such as construction, which is one of the largest sectors in the world economy. Building activities of homes and real estate are capitalised and serviced by the financial industry on a global scale. The construction sector spends around USD 10 trillion on construction-related goods and services every year.

The circularity of these activities can only be compared by using non-financial metrics. As an example, the choice of building materials and building design have great potential to create value for society by reducing environmental pressures. For financials that are active in the construction industry the environmental impacts of building materials are a key understanding in the evaluation of the circularity of buildings in their portfolio.

The table below outlines the difference in material use based of a unique example, where two completed designs were available for a building with the same square meters. For this particular building, a fully completed linear design was available, years before the actual construction of the building. Due to delay in the construction of the linear building a competing circular design was developed. The circular design was eventually executed. This allows for the comparison of the bill of materials of both plans. The biggest differences are the difference in tonnage of the building's constructive materials: 6,569 tons compared to 4,174 tons through the substitution of concrete by constructive wood. The toxicity of building materials should also be considered.

	Traditional, linear economy design	Circular economy building design
Square meters of plan	2,800 sqm	2,800 sqm (realised)
Total material usage	6,569 tons	4,174 tons
Concrete	5,500 tons	2,750 tons of which 100 tons reused
Wood	0 tons	330 tons of which 30 tons reused
Glass	935 tons	920 tons
Steel	110 tons	110 tons
Other materials	24 tons	34 tons of which 32 tons reused

Source: table adopted from KPMG True Value study of the CIRCL pavilion in Amsterdam, Netherlands

These types of studies are custom made and are too expensive for mainstreaming into the ESG research related to Circular Economy of the financial industry. Standardisation of non-financial metrics drives down cost.

7.2 ISO/TC 323 Circular Economy ISO Standard Committee

A freshly established International Standards Organization (ISO) committee is working on internationally standardised and agreed principles for the terminology and definitions related to a circular economy. The goal is a working ISO management system standard. This work is associated with that of many other ISO committees

to ensure that they align with the business models that support the move from linear to circular. An ISO standard that standardises the measurement and assessment of circularity is key for this transition and will help financial institutions to better orient financial services towards those companies and clients that adhere to these ISO standards.^{82 83}

Importantly the Circular Economy standard ties into the work around already the following, existing ISO standards:

- ISO/TC 6 Paper, board and pulps
- ISO/TC 20 Aircraft and space vehicles
- ISO/TC 59/SC 17 Sustainability in buildings and civil engineering works
- ISO/TC 71/SC 8 Environmental management for concrete and concrete structures
- ISO/TC 207 Environmental management
- ISO/TC 207/SC 5 Life cycle assessment
- ISO/TC 251 Asset management
- ISO/TC 268 Sustainable cities and communities
- ISO/TC 307 Blockchain and distributed ledger technologies
- ISO/TC 322 Sustainable finance
- ISO/TC 324 Sharing economy

7.3 CE related Global Reporting Initiative (GRI) guidance

The financial industry will be able to access information related to circular economy, narrowed down to the waste aspects, for companies reporting their non-financial disclosures according to GRI standard. The GRI Standards Division started work in 2018 on relevant disclosures related to waste. The disclosure standard is now under final review by the Global Sustainability Standards Board (GSSB)⁸⁴. The Reporting standard focuses on waste generation and how the impacts of the generated waste are managed by focusing on three performance indicators:

- Waste generated
- Waste diverted from disposal
- Waste directed to disposal

7.4 Sustainable Accounting standards Board (SASB)

SASB has also included performance indicators related to the circular economy, primarily looking from the waste and recycling angle⁸⁵. Company performance under the SASB standard can be analysed by the following performance metrics:

- Amount of waste incinerated, percentage hazardous, percentage used for energy recovery;
- Percentage of customers receiving recycling and composting services, by customer type;
- Amount of material recycled and composted;
- Amount of electronic waste collected, percentage recovered through recycling.

⁸² <https://www.iso.org/news/ref2402.html>

⁸³ <https://www.iso.org/committee/7203984.html>

⁸⁴ <https://www.globalreporting.org/standards/media/2543/item-03-final-version-of-gri-306-waste-2020.pdf>

⁸⁵ https://www.sasb.org/wp-content/uploads/2019/08/IF0201_Waste-Management_Brief-combined.pdf

7.5 Credit Rating Agencies and linked Sustainability Data providers

The Big Three credit rating agencies Moody's Investors Service (Moody's), Standard & Poor's (S&P) and Fitch Ratings (Fitch) are essential industry players in producing transparent and globally standardised credit ratings. Historically the credit ratings form the financial rating basis, now increasingly supplemented by ESG data. ESG is a relatively new area for these companies. In comparison to the relatively new field of ESG data, the credit ratings themselves are produced by divisions of the ratings agencies with financial regulatory oversight. This oversight contributes to greater alignment of outcomes data, more consistently outlining the financial risks and opportunities. To supplement their data services to the financial industry, all of them have acquired or developed one or more ESG research data specialists:

- Moody's recently acquired the following ESG specialists: Four Twenty Seven⁸⁶, Vigeo Eiris⁸⁷ and acquired a minority stake in Chinese ESG provider Syntao Green Finance;
- S&P acquired Trucost and the ESG rating services of RobecoSAM⁸⁸;
- Fitch has launched the Fitch ESG Relevance Scores⁸⁹.

There is divergence and a variety in methods and outcomes in ESG data. Essentially, more than is the case with traditional credit ratings, there is a lack of standardisation in ESG scores across providers. Hence this divergence is also at play in the circular economy metrics underlying the ESG scores. The fact that major rating agencies are increasingly involved in the ESG market space, can have a very positive impact on convergence of methods and outcomes between the different ESG providers. This is a welcomed effort. Research conducted by MIT Sloan⁹⁰ shows that ESG ratings from different data providers are only aligned in over half of the cases, contrary to credit ratings that show greater alignment.

7.6 WBCSD Circular Transition Indicators (CTI)

The World Business Council on Sustainable Development (WBCSD)⁹¹ has put in a lot of effort from WBCSD members to build the CTI. Some members are financial institutions. With this effort WBCSD nudges the standardisation of CE metrics for decision makers in private companies. The CTI also offer a common set of data that improve transparency in communications about CE efforts to stakeholders. The CTI are focused on:

Indicators that measure the capability of a company to close the resource loop and to use circular inputs as resources for their production processes and generate circular outputs that can be reused, recycled, refurbished, etc... It also includes the degree of renewable energy that is at play in the transformation process of companies.

- % circular inflow;
- % circular outflow;
- % water circularity;
- % renewable energy.

⁸⁶ <https://www.businesswire.com/news/home/20190724005169/en/Moody%E2%80%99s-Acquires-Majority-Stake-Twenty-Leader-Climate>

⁸⁷ <https://ir.moody.com/news-and-financials/press-releases/press-release-details/2019/Moodys-Acquires-Majority-Stake-in-Vigeo-Eiris-a-Global-Leader-in-ESG-Assessments/default.aspx>

⁸⁸ <https://www.spglobal.com/en/research-insights/articles/sp-global-to-acquire-the-esg-ratings-business-from-robecosam-shell>

⁸⁹ <https://www.fitchratings.com/topics/esg>

⁹⁰ <https://mitsloan.mit.edu/ideas-made-to-matter/why-esg-ratings-vary-so-widely-and-what-you-can-do-about-it>

⁹¹ <https://www.wbcd.org/Programs/Circular-Economy/Factor-10/Metrics-Measurement/Circular-transition-indicators>

Furthermore the CTI include indicators that focus on critical production materials and which type of recovery is applied to these critical materials. With critical materials the CTI refer to lists published in the US⁹² and EU⁹³, focusing on those materials that can be scarce in the future and are deemed critical to national security of production right now.

- % critical materials;
- % recovery type.

One of the CTI indicator is also measuring material productivity which connects the circular economy to financial management of the resource demand of any given company

7.7 EMF's Circulytics Score card

The Ellen Macarthur Foundation (EMF) has issued an ambitious circularity measurement tool called Circulytics.⁹⁴ What sets Circulytics apart is that it measure the strategy, target setting, transparency of disclosures to stakeholders and integration in decision making of circular economy metrics rather than just focusing on material in- and outflows of the production processes. It is also one of the few methodologies that publishes an overall score for a company and its sub units. They then further break down the overall score into two sub-scores:

- The Enabler score captures the ability of a company to grasp future circular economy business opportunities in the future. It reflects indicators that measure the capability of a company to transform towards a circular economy model, based on strategic choices and employee awareness and training programmes;
- The Outcome score displays the status of a company's circularity at the time of measurement.

7.8 Limits to Growth (LTG) & Planetary boundaries framework

LTG was published in 1972. It was revolutionary, because with computer aided simulation, it outlined a scenario based on the interplay between exponential population and economic growth and finite resources on Earth.⁹⁵ It documented the pressures of continued growth on the sustainability and availability of the Earth's resources towards the year 2100.

The model studied and continues to track the following boundary criteria. The model has been criticised because the timelines of transgression of these boundaries as predicted in the original report have not all been met. Although important boundaries like climate change, biodiversity loss have been crossed.

- | | |
|------------------------|--|
| • Climate change | Atmospheric carbon dioxide concentration (ppm by volume); |
| • Biodiversity loss | Extinction rate (number of species per million per year); |
| • Biogeochemical | Displacement of nitrogen and phosphorus (millions of tonnes per year); |
| • Ocean acidification | Global acidification of surface seawater (Ph) ⁹⁶ ; |
| • Land use | Land surface converted to cropland (percent); |
| • Freshwater | Global human consumption of water (km3/year); |
| • Ozone depletion | Stratospheric ozone concentration (Dobson units) ⁹⁷ ; |
| • Atmospheric aerosols | Overall particulate concentration in the atmosphere, on a regional basis |

⁹² <https://www.doi.gov/pressreleases/interior-seeks-public-comment-draft-list-35-minerals-deemed-critical-us-national>

⁹³ https://ec.europa.eu/growth/sectors/raw-materials/specific-interest/critical_en

⁹⁴ <https://www.ellenmacarthurfoundation.org/resources/apply/circulytics-measuring-circularity>

⁹⁵ <https://clubofrome.org/publication/the-limits-to-growth/>

⁹⁶ In chemistry, pH is a scale used to specify how acidic or basic, alkaline a water-based solution is

⁹⁷ Dobson Unit = unit of measurement of the amount of a trace gas in a vertical column in the Earth's atmosphere

- Chemical pollution Concentration of toxic substances, plastics, heavy metals contamination

The model issued by Kate Raworth as the Doughnut Economy⁹⁸ can be seen as a simplified and more practical version of the planetary boundaries concept. Recently the Doughnut model has been adopted for the city of Amsterdam’s circular economy strategy and execution, it was renamed to ‘the City Doughnut’.

Box 10 City Doughnut for the City of Amsterdam

A new approach was taken to simply the Doughnut central to Doughnut Economics based on biomimicry insights of Janine Benyus and Kate Raworth, as part of the Doughnut Economics Action Lab in cooperation with Biomimicry 3.8, Circle Economy and C40 Cities, as part of the Thriving Cities Initiative.



Although the quadrants themselves do not yet mention the metrics underlying the measurement, steering and reporting on progress by the City of Amsterdam, this type of custom made frameworks are promising for improving and road testing the standardisation of underlying CE metrics.

Source: <https://www.kateraworth.com/2020/04/08/amsterdam-city-doughnut/>

7.9 Stockholm Resilience Institute Planetary Boundaries

The Stockholm Resilience Institute’s work on the nine planetary boundaries⁹⁹ focuses on the drivers of our Earth system processes that call for a CE transition. Since the Circular Economy uses a resource-based system

⁹⁸ <https://www.kateraworth.com/doughnut/>

⁹⁹ <https://www.stockholmresilience.org/research/planetary-boundaries/planetary-boundaries/about-the-research/quantitative-evolution-of-boundaries.html>

view, the CE transition needs to take into account the control variables that steer the Earth systems in a direction that is favourable to the life and well-being of humans. When put down in metrics, the CE metrics should be tested and validated against physical limits and planetary boundaries. The nine planetary boundaries are:

- 1 Climate change (CO₂ concentration in atmosphere)
- 2 Ocean acidification
- 3 Stratospheric ozone depletion (Ozone Depleting Substances)
- 4 Atmospheric aerosol loading (particulate matter)
- 5 Nitrogen and phosphorus inputs to the biosphere and oceans
- 6 Global freshwater use
- 7 Land system change
- 8 Biodiversity loss
- 9 Chemical pollution

Consultation question 8:

Do you consider the coverage of CE financial instruments and metrics sufficiently complete? If not please provide suggestions.

8 Sectoral focus for CE Finance

The negative impacts of consumption and production based on our current take-make-waste model generates risks that are often addressed defensively in financial institutions' sectoral risk policies. These sectoral risk models drive financial allocation in banking and insurance. The transition to a more circular world requires risk policies to be updated for specific sectors in light of changed consumer demands, health and safety concerns of the general public, competitive CE related offerings and CE regulatory focus. Although the risk profession sounds defensive, it also a catalyst to highlight the emerging opportunities for the financial allocation to specific sectors. CE business models can be found in a range of sectors.

Box 11 Top sectors for CE Finance

Outcomes related to areas of CE integration for financial institutions

- A majority of respondents from the financial sector to the survey sees most opportunity for CE in this sector
 - Building and Construction
- More than 30% see most opportunity for CE in these sectors :
 - Food and Agriculture
 - Chemicals
 - Electronics
- None of the respondents sees that most opportunity for CE lies in the following sectors:
 - Personal care
 - Information Technology

Source: UNEP FI Survey Outcomes

8.1 CE finance for chemicals that are "Benign-by-design"

Every product is made out of chemicals so the chemical sector rightly calls itself the 'industry of industries'. This also means that bad decisions in the production stage of the chemical sector permeate throughout all other manufacturing sectors. As a best practice risk policies of financial institutions should include risk criteria and client questionnaires to assess the maturity of companies in the practice of green and sustainable chemistry (see box below). This applies to

clients active in pharmaceuticals, chemical production and trading and industry at large. Mostly financial institutions will cover policy-related risks caused by hazardous materials in relation to for example the EU Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)¹⁰⁰ regulation or equivalent in other jurisdictions, and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal.¹⁰¹ The most important change in risk policies that the circular economy requires for financial institutions is that they should primarily focus on behaviours that increase circularity. This circular economy focus can tip the balance towards the prevention of pollution of air, water and soil and the avoidance of negative health & safety effects on humans, rather than focusing on mitigation of pollution effects.

This is a tough issue. Governments pledged in an international agreement to minimise by 2020 the risk of man-made chemicals to human health and the environment. The Fifth Session of the International Conference for Chemicals Management (ICCM5) postponed to 2021 was expected to acknowledge the failure of the co-signing governments that took the pledge to reach that goal. ICCM5 is also the start of the next generation of measures needed to contain the issue of man-made chemicals.

The financial due diligence for lending and investment for the chemical and related manufacturing sector is based on the future returns that companies plan to make on the sale of their manufactured (chemical) products. It is in the financial institutions' self-interest to ask questions about the impacts of these products in order to avoid the risk of those products becoming prematurely redundant due to changing societal expectations, market boycotts, changing regulation e.g. as with the ban on plastic microbeads¹⁰² and other known problematic chemicals in products.¹⁰³ The questions asked by lenders, investors and insurers to assess the risks are a powerful motor for change. There are several tools that the financial industry can use to help them in asking the right questions about the quality of chemicals management:

- Chemical Footprint Project¹⁰⁴ already being applied by the Investors Environmental Health Network
- ChemSec's Chemicals Criteria Catalogue for Investors.¹⁰⁵

A barrier to circularity in the chemical sector can be the long technical lifetime of manufacturing equipment. When the financial commitments for lease or loans have been fulfilled on the basis of the economic lifetime of around 5 years, there is often a remaining technical life span of an additional 20, 30, in some cases up to 50 years. Chemical companies can be reluctant to change production protocol because the product still makes some money, where it is not banned yet^{106 107}. For example, machines that produce compounds or products that contain CFCs¹⁰⁸, PFCs¹⁰⁹, PFAS¹¹⁰ continue to operate, even when companies themselves can see the damage the outputs of these machines bring about during production, use and as wastes. Based on sector knowledge and dialogue with industry peers the finance industry is in a unique position to offer financial solutions for early decommissioning of obsolete or harmful chemical production technologies, even before problems become known on a broader scale. Financial institutions that are risk averse can act in their own best interest by talking to the management team of chemical companies as part of financial due diligence and the clients' duty of care commitments. Decommissioning costs of machinery should be an integral part of a pro-active dialogue during the annual review of the financial health and liquidity position of clients.

¹⁰⁰ EU REACH regulation stands for Registration, Evaluation, Authorisation and Restriction of Chemicals. It entered into force on 1 June 2007

¹⁰¹ <http://www.basel.int/>

¹⁰² https://en.wikipedia.org/wiki/Microbead-Free_Waters_Act_2015

¹⁰³ <https://www.unenvironment.org/explore-topics/chemicals-waste/what-we-do/emerging-issues/chemicals-products>

¹⁰⁴ <https://www.chemicalfootprint.org/>

¹⁰⁵ <https://chemsec.org/publication/investors/chemicals-criteria-catalogue-a-guide-for-investors-evaluating-the-chemicals-management-of-chemical-producers-2012/>

¹⁰⁶ <https://www.congress.gov/bill/116th-congress/house-bill/2827>

¹⁰⁷ <https://mfvm.dk/nyheder/nyhed/nyhed/foedevareministeren-er-klar-til-at-forbyde-fluorstoffer/>

¹⁰⁸ <https://www.unenvironment.org/ozonaction/who-we-are/about-montreal-protocol>

¹⁰⁹ <https://www.adidas-group.com/en/media/news-archive/press-releases/2014/adidas-group-marks-breakthrough-progress-in-chemical-management-programme/>

¹¹⁰ <https://www.pfas.gov.au/about-pfas/effects>

Financial institutions can mitigate their financial risks by ensuring they ask robust questions about circularity ahead of time, helping them to back the horses most likely to win. As a further inspiration for asking the right risk related questions, the following list outlines the principles for green chemistry first published in 1998 as “Green Chemistry, Theory and Practice” by Anastas and Warner,¹¹¹ with the principles recategorized in line with the concept of circularity. These principles form the basis for what is sometimes referred to as benign-by-design chemistry. Financial institutions can use this mapping of the principles of green chemistry to the concept of circularity to align their risk policies with the concept of circularity and the circular economy. The prevention of risks occurring can be addressed by stimulating green chemistry amongst clients of financial institutions through integration of these principles in risk and customer acceptance policies.

- Refuse: Prevention — Refuse - make scrutiny of waste prevention activities of chemical clients a mandatory check in risk assessment of clients. Better to prevent waste than to painstakingly recycle it afterwards;
- Refuse: Real-time analysis for Pollution Prevention – monitoring of chemical processes should be established and tested to put instant brakes on pollution, if it does occur;
- Refuse: Inherently Safer Chemistry for Accident Prevention – Accident prevention measures in place are a good indicator for inherent risk to financial institutions;
- Reduce: Safer Solvents – solvents can account for more than 70% of the cumulative life cycle environmental impacts of a standard batch chemical operation. The choice of solvents or elimination of solvents, where alternatives are available can be used to differentiate in risk appetite of financial institutions focusing on circular economy ;
- Reduce: Waste reduction or Atom Economy /reduction of derivatives – refers to resource efficiency at the level of the chemical process – what atoms used in the chemical process end up in the final product and how much is wasted;
- Reduce: Energy Efficiency – the amount of consideration given by the chemicals producer and user to temperature and pressure in light of energy consumption and yield;
- Redesign: Less Hazardous Chemical Syntheses — refers to the design of synthesis methods of chemicals that pose little to no health hazard to human health and safety and the environment;
- Redesign: Designing safer, yet effective chemicals – refers to designing a lower level of toxicity while maintaining effective function e.g. Paints with less toxicity and reduced volatile organic compounds, yet with easy application, durable performance and high aesthetics;
- Redesign: Renewable Feedstocks and biomass – refers to the process of using biomass as a feedstock to replace fossil fuels. From a circular economy risk perspective it should be monitored that the resources used to produce and use the biomass alternative are lower than the fossil fuels alternative;
- Redesign: Design for degradation or recycling – how is the chemical designed to degrade or how can it be reused after first commercial use? Design for recycling was not in the initial list of 12 principles that is shown here, nevertheless chemical recycling is on the rise and depolymerisation¹¹² to basically go back to virgin material may have a great future;

¹¹¹ <https://www.acs.org/content/acs/en/greenchemistry/principles/12-principles-of-green-chemistry.html>

¹¹² <https://www.dovegroupplab.com/>

- Reuse: A catalyst is defined as “a substance that changes the velocity of a reaction without itself being changed in the process”. In essence for the chemical process to reflect the circular economy, it should focus on chosen those catalysts that are reusable.

Box 12 Promising Circular Economy trend in industrial chemicals: Chemical leasing

Since 2004, UNIDO in cooperation with Austria and Switzerland launched a Global Chemical Leasing Programme, promoting a performance-based business model for chemicals shifting the earnings model from quantity to performance.

As the chemicals supplier sells the performance of the chemical rather than a quantity, the functionality and performance of the chemical is the central element in this business model.

This model yields opportunity in the space of sustainable finance for financial institutions. Chemical leasing classifies as an “optimal use” business model according to the generic circular economy finance classification, mentioned earlier. The capital solution can be addressed with a number of conventional financial solutions ranging from financial lease, operating capital to corporate loans and investments.

To align with circular economy finance, the legal documentation to the contract can be structured according to the principles of green chemistry and circularity outlined above.

The attempts to apply chemical leasing models or chemicals as a service have been hampered by the lack of acceptability of new business models in the financial industry. As long as the costs of chemical waste and pollution risks remain external to the financial business case, chemical leasing will remain relatively expensive compared to chemical sales. The height of the cost of responsible waste treatment plays a key role in the viability of the financial business case for chemical leasing. One of the other keys to success for chemical leasing lies in the quality of the service, integration of logistics with the manufacturing plant in order to make sure that chemicals are brought on site, removed, regenerated and brought back again in a responsible and seamless way. For financial institutions this will mean that their contracts will need to cover the eventualities that can occur in the logistical process. The financial contract clauses will really need to reflect the value chain of the manufacturing process and will go beyond plain vanilla covenants.

Source: <https://www.unido.org/our-focus/safeguarding-environment/resource-efficient-and-low-carbon-industrial-production/chemical-leasing>

8.2 CE finance for manufacturing and agriculture and inroads to biodiversity

Manufacturing and industrial agriculture form the mothership sectors for the circular economy. Every output is produced before it can be consumed. The early ideas of William Stahel¹¹³ with his performance economy and the manifesto of the Cradle to Cradle¹¹⁴ Design model issued by Braungart and McDonough pushed technical and agricultural production to expand beyond the 3-R's of Reuse, Reduce, Recycle into what is now a more elaborate circularity concept driving the linear economy to change into a circular economy. Circularity calls for a radical change in the manufacturing industry and industrial agriculture from waste generating to regenerative. The next frontier is the integration of biodiversity and natural capital.

¹¹³ <https://www.ellenmacarthurfoundation.org/news/the-circular-economy-a-users-guide-by-walter-stahel>

¹¹⁴ https://en.wikipedia.org/wiki/Cradle_to_Cradle:_Remaking_the_Way_We_Make_Things

Traditionally, financial institutions focus on avoiding financial losses due to earlier than expected write-downs, revaluations or producer liability. The circular economy concept helps financial institutions to identify stranded assets by addressing their exposures to linear risks.¹¹⁵ As outlined above existing financial instruments already offer opportunity for the financial sector to service incremental changes to move from a linear to a circular model.

The financial sector should also increasingly focus on innovation that aligns manufacturing with respect for the biosphere¹¹⁶, biomimetics, biomimicry¹¹⁷, natural capital¹¹⁸ and nature-based solutions supporting biodiversity¹¹⁹. This implies identifying those manufacturers with an ability to learn from nature, instead of focusing on what can be directly extracted from nature. Solving human problems with this mindset, yields inspiration for manufacturing techniques that are friendly to biotic life on earth. It also means that the impact on water, soil and air is used as an ecological standard to judge the sustainability of innovations in manufacturing. This implies that the financial industry should not only track climate policy outcomes, but also should monitor the policy outcomes of the Conferences of the Parties (COPs) to the Convention on Biological Diversity (CBD), which will be of increasing importance for the future. Biodiversity impacts, gains and losses have been too little addressed in finance.¹²⁰

Box 13 Increasing the link between CE finance and positive impacts on biodiversity

The focus of CE finance is on decoupling economic growth from resource usage through the increase of circularity of processes. This decoupling can also have positive impacts on biodiversity, which are often harder to quantify. The impacts on soil, air and water can however be the link between measuring effects of a circular economy that tie in the more complex science of biodiversity and ecosystem services.

For the financial sector, active in offering circular economy financial services, it is crucial to track the policy recommendations originating from the biodiversity COP meetings. The Biodiversity COP is the conference of parties to the UN Convention on Biological Diversity (CBD). Some 195 countries and the European Union are now party to the agreement. Only the United States and Vatican City have not ratified the CBD to date.

The CBD was agreed at the Earth Summit in Brazil in 1992 and has three objectives:

- the conservation of biodiversity
- the sustainable use of its components, hence the link with circular economy
- the sharing of benefits from the use of natural and genetic resources.

The next COP, expected to be held in Kunming, China in 2021, will lead to a f the Post-2020 Global Biodiversity Framework as a stepping stone towards the 2050 Vision of “Living in harmony with nature”.

Source: <https://www.cbd.int/doc/secretariat/es/es-briefing-2019-march-august-en.pdf>

<https://www.cbd.int/conferences/post2020>

¹¹⁵ <https://www.ceguide.org/Strategies-and-examples/Finance/Stranded-asset-management>

¹¹⁶ <https://hbr.org/2008/02/the-biosphere-rules>

¹¹⁷ <https://www.ellenmacarthurfoundation.org/circular-economy/concept/schools-of-thought>

¹¹⁸ <https://naturalcapitalcoalition.org/>

¹¹⁹ <https://www.cbd.int/doc/legal/cbd-en.pdf>

¹²⁰ <http://sdg.iisd.org/news/oecd-launches-tool-to-analyze-sdg-finance/>

8.3 CE finance for the electronics sector: scarcity and pollution liability coverage

For Financial institutions that manage their country risks and political risks well, financial exposures related to electronic products show many vulnerabilities that can affect supply of critical rare minerals which are essential to the manufacturing process. The work done by the British Royal Society of Chemistry to assess the supply risk of the elements in the periodic table is a good eye opener. Investors should ask the right questions to be aware of such vulnerabilities that can become liabilities due to changing politics, conflict and social unrest. The work is of interest to the financial sector, as a step towards integrating resource and CE related metrics in risk assessment and financial decision making. The publicly available source consists of these parameters for supply risk for each element in the periodic table¹²¹:

- Relative supply risk
- Recycling rate
- Substitutability
- Production concentration
- Reserve distribution
- Top producers & reserve holders
- Political stability of top producer and top reserve holder

Rare earths metals¹²² and metals in general are increasingly used in the electronics industry. Rare earths are commonly used in electric appliances, electric vehicles, smartphones, computer hardware and data storage and network telecommunication systems.¹²³ Rare earth mining is highly concentrated in China¹²⁴ and generates surface water pollution by added chemicals during extraction and also radioactive by-elements, which poses an extra challenge for management of mine tailings and sludge.¹²⁵ While rare earths are not rare across the Earth, it is very rare that they are mined in an environmentally sustainable way. The cheaper techniques to separate the rare earth metal from the soil involve both water and large amounts of chemicals. This forms a threat for soil and water quality.¹²⁶

Less than 5% of rare earths are recycled from electronic goods¹²⁷, R&D activity is underway to more effectively recycle rare earths from electronic waste streams.¹²⁸ The most advanced research focuses on next generation urban mining with robotised disassembly and recovery routines. The return of valuable materials from any electronic equipment reduces pollution and increases strategic national reserves of scarce minerals and metals.

The end-of-life disposal and recycling of electronic equipment carries considerable risk. It is far from clean and can pose health risks to workers and the environment. Common ingredients of electronics are lead, cadmium, mercury and tin. All of these heavy metals are classified as hazardous waste and can cause contamination and adverse health effects¹²⁹. Recyclers take out extra pollution liability insurance that goes beyond general liability clauses. Instead of ever higher insurance premium pricing insurance companies will spend more effort and

¹²¹ <https://www.rsc.org/periodic-table>

¹²² <https://geology.com/articles/rare-earth-elements/>

¹²³ <https://phys.org/news/2019-08-electronic-rare-earth-elements.html>

¹²⁴ <https://e360.yale.edu/features/china-wrestles-with-the-toxic-aftermath-of-rare-earth-mining>

¹²⁵ International Resource Panel - Mineral Resource Governance in the 21st Century

¹²⁶ <https://www.theguardian.com/environment/2012/aug/07/china-rare-earth-village-pollution>

¹²⁷ <https://recyclinginternational.com/non-ferrous-metals/rare-earth-metals/19629/>

¹²⁸ <https://www.adir.eu/adir/project-details/>

¹²⁹ https://www.who.int/ceh/capacity/heavy_metals.pdf

energy on risk prevention and risk mitigation for the industries related to electronics production that take out pollution liability insurance.¹³⁰

Box 14 E-waste pollution requires insurance to step up, similar required efforts on plastic pollution

Similar to the recommendations outlined in the UNEP report “Unwrapping the risks of plastic pollution to the insurance industry” insurers can take an equally active role in addressing the risks related to e-waste pollution and contribute to global efforts to reduce it. Steps to be taken to tackle and prevent e-waste pollution:

- Lead by example: Introduce internal policies to reduce e-waste from own operations;
- integrate e-waste into ESG scoring and sustainability ratings of clients, champion, understand and prevent pollution risks by actively engaging with clients on the topic of e-waste;
- Support research and promote awareness amongst clients, industry and government;
- Adapt the risk assessment models for insurance and investment activities to e-waste specifics by developing relevant risk reduction measures, such as elimination of harder-to-recycle components, less hazardous materials and recovery of rare earths that are polluting during the mining and extraction stage. particularly for physical risk, transition risk, reputation risk, liability risk;
- Design innovative, prevention focused insurance products to address the risks associated with e-waste;
- Support innovations in the value chain of the electronics industry that increase refurbishment, reuse, repurposing;
- Report on e-waste related risks as part of the financial institution’s reporting framework;

Source: <https://www.unepfi.org/publications/insurance-publications/psi-unwrapping-the-risks-of-plastic-pollution-to-the-insurance-industry/>

8.4 CE Finance for circular buildings and circular construction

Energy efficiency measures and renewable energy have been the mainstay of sustainable building finance and insurance for the past decades. More recently the concept of circular buildings has emerged as architects and designers have come up with creative solutions to tackle the material and waste footprint of buildings. In addition to the energy performance of buildings, the design focuses on the amount of material used, the

¹³⁰ <http://www.oecd.org/finance/financial-markets/1939368.pdf>

presence of harmful chemicals, design for disassembly and choice of biobased and reused or reusable materials.¹³¹

Because circular building techniques are not (yet) the mainstay of the construction industry, there is a premium for buildings costs that at the moment deteriorates the financial business case. The dilemma for the financial industry and the real estate sector involves hard decisions around short term money, made by saving on construction cost versus long term viability of buildings, made by the ability to more cheaply adapt, retrofit, disassemble and reuse materials.

One alleyway for CE integration into construction and real estate finance is via the integration of CE metrics into mainstream building certificates widely used in the construction sector. Many ESG related sustainable investment and finance policies and instruments already focus on the use of existing certificates such as Building Research Establishment Environmental Assessment (BREEAM¹³²), Global Real Estate Sustainability Benchmark (GRESB¹³³), Leadership in Energy and Environmental Design (LEED¹³⁴), or the lesser known and more holistic WELL¹³⁵ to determine the level of sustainability of a building.

All these certificates are due to be amended with circular building criteria along the lines of the concept of circularity and fitting metrics:

1. Reduce - Material usage for construction, the search for lighter, less carbon intensive materials e.g. by using wood instead of concrete;
2. Refurbish - Upgrade existing buildings to avoid starting from scratch e.g. restoration or stripping of facades and outer layers of the building to maintain the constructive core;
3. Retrofit – Design the building for future disassembly e.g. by developing and using non-destructive connections between various building materials;
4. Reuse – Design the building with as much reused material as possible e.g. adding a percentage of reused material to concrete;
5. Redesign – Use biobased materials or lighter materials or materials that are easier to disassemble;
6. Refuse – avoid using chemicals harmful to humans and the environment. This applies to builders, users and those involved in demolition.

Once these criteria are added to the mentioned building rating schemes or certificates, then what is now called sustainable finance with its focus on energy efficiency and renewable energy, can be labelled as circular economy finance. However, many gaps remain to be addressed for circular building to take off and mainstream¹³⁶:

1. For the financial picture to work out the environmental costs (externalities) of the construction industry need to be included. Only in those cases can the measurement of the financial benefits of circular buildings really take off. Lower upfront investment costs for conventional run-of-the-mill buildings, unconstrained by costs of externalities, will keep on attracting investors with a short-term agenda. An accounting method that accounts for the true cost is therefore advisable to underpin the

¹³¹ <https://www.arup.com/perspectives/publications/research/section/realising-the-value-of-circular-economy-in-real-estate>

¹³² <https://www.breeam.nl/content/breeam-nl-english>

¹³³ <https://gresb.com/>

¹³⁴ <https://www.usgbc.org/leed>

¹³⁵ <https://www.wellcertified.com/>

¹³⁶ <https://www.circle-economy.com/insights/building-value>

business case. "True cost or price" is the difference between the market price and the weighing of cost and benefits to society. These methods generally account for the missing or hidden costs that are not reflected by the unconstrained market price.^{137 138} We talk about this more in the section on cross cutting innovations;

2. Development of markets for secondary materials and building components. Without efficient market places for second hand building materials, the costs of planning and designing circular buildings will be higher than a conventional building (take-make-waste). Recycled materials can potentially be more expensive due to the efforts required for retrieval, logistics and cleaning. This aspect should be reckoned with in the financial business case;
3. Agreement on the timing of the future availability of building materials can potentially be facilitated by financial forward contracts. These forward contracts on building materials could financially settle the right to harvest the materials in a building as a financial and transferrable contract between building owner and the reusing party. These forward contracts on building materials would make a case for planned obsolescence of buildings contrary to the feeling that buildings should be built for eternity;
4. Accounting (e.g. the amount to be written down) and valuation methods (e.g. residual value) need to be adopted to the creation of a market for secondary materials;
5. Material passports¹³⁹ need to standardise. Also practical alignment of the use of the materials passport with the reduction of maintenance cost of the building is needed (e.g. reduce cost through planned preventive maintenance and the reduction of cost of solving incident-based maintenance).

¹³⁷ <https://trueprice.org/>

¹³⁸ <https://home.kpmg/nl/en/home/services/audit/sustainability/true-value.html>

¹³⁹ <https://www.metabolic.nl/news/circular-economy-materials-passports/>

Box 15 Material passports and building material databases are key to circular building growth

Around the globe a number of local material market places are developed for exchange of secondary materials (e.g. Michigan Material Exchange in the US, Excess Materials Exchange from Europe). The prime prerequisite for such an exchange for the construction sector is that a material passport issued to a building or part of a building to facilitate resource identification. This material passport contains the description of all the materials in the building and their ability to be reused, remanufactured or repurposed in another building.

These material passports go under various names such as the circularity passport and "buildings as material banks (BAMB)". The common aim of these database is to reduce and prevent demolition waste, all the while reducing the use of building materials and construction waste and making the design of new buildings based on secondary materials an achievable option.

Financial institutions through partnering with knowledge hubs and builders can integrate the material passport into their financial services. The residual value, the ability to disassemble and reuse the circular materials should be taken into account for the finance or investment in circular real estate.

Sources / References:

<http://www.c2c-centre.com/news/circularity-passports-powered-cradle-cradle>

<https://www.bamb2020.eu/>

<https://www.madaster.com/en>

<https://michigan.materialsmarketplace.org/>

<https://excessmaterialsexchange.com/>

8.5 CE Finance for fashion and textiles

The fashion industry is the second-biggest consumer of water and produces 20% of global wastewater. Textile dyeing is the second-largest polluter of water globally.¹⁴⁰ The industry emits up to 10 per cent of global greenhouse gas (GHG) emissions - more than all international flights and maritime shipping combined, and releases half a million tons of synthetic microfibers into the ocean annually.¹⁴¹

The average consumer buys 60 per cent more clothing items than 16 years ago and keeps each item for half as long. Garments can be used just 7 to 8 times before being discarded.¹⁴² The number of garments made has doubled from 50 billion to 100 billion since 2000, according to the Ellen MacArthur Foundation. Sales and

¹⁴¹ <https://www.unenvironment.org/news-and-stories/press-release/un-alliance-sustainable-fashion-addresses-damage-fast-fashion>

¹⁴² <https://www.mckinsey.com/business-functions/sustainability/our-insights/style-thats-sustainable-a-new-fast-fashion-formula>

consumption of clothes has increased by more than 50 % in the same period,¹⁴³ while less than 1 % of textiles is recycled into new garments.¹⁴⁴

The industry is ripe for the transition to a circular economy and halt its environmentally and socially destructive practices. Fast fashion has speeded up over the past 20 years according to a UNEP¹⁴⁵ and the Ellen MacArthur Foundation¹⁴⁶. The risk of reputation damage and the liability risk due to mismanagement in the fashion and apparel industry has increased due to transparency.¹⁴⁷ After the Rana Plaza incident more health and safety checks were introduced by financial institutions servicing the fashion industry. In a similar way, ahead of the curve and not awaiting a token incident of environmental destruction in the fashion and textiles industry, financial institutions should integrate circularity related metrics in the risk assessment of their clients, such as:

1. Reduction of water use and the strengthening of waste water– management. Ask clients or portfolio companies about water use, wastewater management and plans to benchmark performance against peers. Water management is part of the license to operate of textile and fashion companies, especially in geographies where water is scarce.
2. Design for Recycling and Reuse – assess the maturity of the deposit and collection schemes that enable the recycling of fibres in the textiles and garments industry. The circularity of a brand will be based on its ability to prevent textiles and garments going to waste too early. Unused garments can be recycled into feedstock for new collections. Assess the company's ability to design garments, textiles for optimal reuse.¹⁴⁸ These secondary material streams have a clear residual value component, that affects the financial business case and creates secondary cash flows to those from sales;
3. Refuse toxins – in textiles, because of their proximity to skin, it is instrumental to avoid using chemicals harmful to humans and the environment. Recycling will require chemical substances to be kept to a minimum to avoid recycling toxins.¹⁴⁹ The presence of toxic elements can reduce the residual financial value of secondary material streams.

¹⁴³ <https://www.worldbank.org/en/news/feature/2019/09/23/costo-moda-medio-ambiente>

¹⁴⁴ <https://www.ellenmacarthurfoundation.org/assets/downloads/A-New-Textiles-Economy.pdf>

¹⁴⁵ <https://www.unenvironment.org/news-and-stories/press-release/un-alliance-sustainable-fashion-addresses-damage-fast-fashion>

¹⁴⁶ <https://www.ellenmacarthurfoundation.org/assets/downloads/A-New-Textiles-Economy.pdf>

¹⁴⁷ <https://www.ft.com/content/7ec413ec-46e6-11e8-8ee8-cae73aab7ccb>

¹⁴⁸ <https://www.cbi.eu/market-information/apparel/recycled-fashion/market-potential/>

¹⁴⁹ <https://chemicalwatch.com/80723/feature-tackling-hazardous-chemicals-in-the-textiles-supply-chain>

Box 16 Innovation in subscription based finance for fashion rental

Finance fashion rental or fashion library models are emerging. Especially in the luxury brand segment these rental models show strong potential with good margin. Nevertheless, subscription services are struggling to build loyalty amongst their subscriber base compared to traditional sales-based retail. The advantage to the circular economy of a rental based model is that consumers can change their wardrobe fast based on a lower material footprint. These models are fairly new and still need to prove their ability to lower the material footprint for the industry at large. At moment this is niche, but is predicted to grow. The financial model that best aligns with this new circular economy sharing business models is subscription-based finance. The risk model for the financial institutions will have to address the following topics as part of the customer relationship:

Financial services for innovation in the apparel industry will generally be more risky and might not be suitable for the moderate risk profile of mainstream finance. Financial contracting should manage the financial risks of these innovative subscription based fashion rentals up close to be successful due to fierce competition and the fast moving, innovative aspects of the fashion rental business. Financial institutions can integrate the following criteria to better align their fashion or garment industry portfolio with the goals of the circular economy:

- the minimum level of recurring revenue
- the minimum expected period of customer retention
- churn and renewal rates of the user base
- level of digital innovation of the rental provider
- Strategic and variable pricing towards competing rental offers

Sources:

<https://www.bloomberg.com/press-releases/2019-08-20/global-online-clothing-rental-market-2019-2023-growing-trend-of-sustainable-clothing-to-boost-growth-technavio>

8.6 CE Finance for plastics and the relevance of legislation

A lot of what was written in the section on the chemical industry applies to plastic producers as well. There are some specifics for plastics¹⁵⁰ in relation to the circular economy that influence the financial business case:

¹⁵⁰ <https://www.hermes-investment.com/eos-insight/eos/investor-expectations-for-global-plastics-challenges/>

- How does the plastic producer hedge against the fluctuations in raw material prices for its the feedstock? What is the balance between recycled plastics and virgin materials. How do they make sure that the recycled content is not contaminated with harmful substances? Clients can be asked to do measurement, target setting and reporting on their production and use of recycled and virgin plastic volumes;¹⁵¹
- What are the plans and intended production volumes to shift from fossil fuel feedstock to biobased materials? Biobased inputs can lower the greenhouse gas emissions of production when they substitute fossil counterparts. The financial component of this can be related to prices of inputs, but also the susceptibility to carbon taxing of the business model, operated by the client;¹⁵²
- What are the revenues originating from products with intentionally added microplastics?¹⁵³

Financial institutions can contribute to the circular economy transition, particularly by engaging with their client relations in the packaging industry. It is not just bans that investors are exposed to but plastic related legislation in general (e.g. inclusion of x% of recycled material in packaging). Investors need to understand what the implications are of these legislations to the companies and how the companies are ready to respond (risk perspective).

- A first step is to explore the collection, deposit and incentive schemes for plastic packaging in the legal context of the clients' markets. Single-use packaging alone has been estimated to be responsible for USD 40 billion in external costs not born by the producers. The total external cost is likely to exceed the profits of the packaging industry, which makes single use plastics a very contentious subject, up for an increasing amount of production and usage bans around the globe.¹⁵⁴ ¹⁵⁵ Some questions for financial institutions to ask are:
- What type of single-use plastic packaging does the client produce? How does the company tackle the incompatibility of plastics? What are the annual volumes of the common types of plastics that are produced?¹⁵⁶ The compatibility of plastics plays a key role here and the chemical formula used by the upstream producer of the plastics determines downstream success for recycling. There's the challenge that new plastic packaging is put on the market but incompatible with the current recycling facilities, which cannot adapt fast enough to keep up with the new products.
- What investments are done publicly and privately to incentivize consumers and producers to return plastic as a feedstock for recycling? Recyclability is not a good measure for plastic recycling, it is the actual amount of plastic that gets recycled that contributes to a truly circular economy.
- What investments go into R&D and redesign to shifting to packaging models that require less packaging material or in the end none at all?¹⁵⁷

¹⁵¹ <https://www.plasticdisclosure.org/>

¹⁵² <https://www.ellenmacarthurfoundation.org/publications/reuse>

¹⁵³ <https://ec.europa.eu/environment/chemicals/reach/pdf/39168%20Intentionally%20added%20microplastics%20-%20Final%20report%2020171020.pdf>

¹⁵⁴ <https://www.unepfi.org/wordpress/wp-content/uploads/2019/11/PSI-unwrapping-the-risks-of-plastic-pollution-to-the-insurance-industry.pdf>

¹⁵⁵ Landon-Lane, M. (2018). Corporate social responsibility in marine plastic debris governance. Marine Pollution Bulletin

¹⁵⁶ <https://waste4change.com/7-types-plastic-need-know/>

¹⁵⁷ <https://www.cnn.com/2018/09/06/carlsberg-replaces-plastic-wrapping-on-its-six-packs-with-glue.html>

Box 17 Single use plastics and consequence for finance and insurance

Ministers adopted a Ministerial Declaration that commits to significantly reduce single-use plastic products by 2030 at UNEA-4 in March 2019 in Nairobi, Kenya, which was themed, ‘Innovative Solutions for Environmental Challenges and Sustainable Consumption and Production’.

Financial institutions should be aware of the increasing amount of bans on single use plastics in light of the sustainability of the finance to the plastic producing customer base that they finance. The increase in producer liability risk should also be further documented and explored by financial institutions.

Based on UNEP research about 112 countries, states and cities around the world have already imposed bans on various single-use plastic goods. Of these measures, 57 are national and 25 are in Africa. And the list of these restrictions continues to grow.

The concern is that the bulk of plastics wasted into the environment do not biodegrade but instead decompose in microplastics, which can be traced into many organisms on Earth by now. The effect of these microplastics to human health are not fully documented and the precautionary principle should be at play for financial institutions when engaging with producers of single use plastics. A scrutiny of pro-active behaviours to prevent plastic waste and risks related to uncontrolled wastes should be part of client onboarding and KYC procedures for financial institutions in light of the rise of the many legal restrictions popping up worldwide.

Sources:

https://wedocs.unep.org/bitstream/handle/20.500.11822/25496/singleUsePlastic_sustainability.pdf?isAllowed=y&sequence=1

<https://sdg.iisd.org/commentary/policy-briefs/what-did-unea-4-do-for-the-environment/>

8.7 CE finance for the food and agriculture sector

One-third of all food produced in the world is lost or wasted every year and this results in US\$1 trillion in economic losses per year. Between planting seeds and the moment when the crop is served or sold as food for a meal, approximately 1.3 billion tonnes of food with a value of more than US\$1 trillion is wasted.¹⁵⁸

Financial institutions wanting to contribute to the circular economy transition should focus on companies displaying these three circular economy behaviours, that can serve as indicators of long-term financial health of clients¹⁵⁹:

1. Shorter and more resilient supply chains for companies involved in food production¹⁶⁰ This relates to food security and the prevention of shortages and also reduces losses during transport.
2. Focus on prevention of food loss on the producer side. Food loss is what gets lost in the supply chain, it also referred to as harvest loss through landfill or incineration.
3. Focus on prevention of food waste on the consumer and retail side. Food waste is the amount of food that gets wasted due to non-conformity of colour, shape, size, freshness, the best-before date and food wasted by restaurants and households. Look for those companies with zero waste targets.

¹⁵⁸ <http://www.fao.org/in-action/seeking-end-to-loss-and-waste-of-food-along-production-chain/en/>

¹⁵⁹ <https://www.weforum.org/agenda/2019/01/how-to-build-a-circular-economy-for-food/>

¹⁶⁰ http://www3.weforum.org/docs/WEF_RRN_MO_BuildingResilienceSupplyChains_Report_2013.pdf

Box 18 Waste reduction bonds, a potential solution to tackle food waste

According to UBS research from early 2020 only 4% of green bonds issued is related to waste.

Meanwhile the Climate Bonds Initiative has published updated waste Management Bond criteria.

The Waste Management Criteria are made available as a Climate Bonds Standard. These Criteria apply to assets and projects relating to the following aspects of the treatment of waste and could be customized to focus on food waste:

- Collection (including collection infrastructure, containers)
- Sorting to separate recyclables
- Reuse and recycling (including processing into secondary raw materials and repair)
- Composting & anaerobic digestion of green/garden/yard and food waste
- Thermal treatment with energy recovery of residual waste (outside the EU only)
- The installation of gas recovery systems for landfill sites

An example of food waste reduction bonds is a bond issue by the World Bank. In 2019 the World Bank launched the first Sustainable Development Bond to raise awareness of food loss and waste. It raised US\$2 billion equivalent through the issue of 25 Sustainable Development Bonds in ten currencies. The proceeds will be used to finance assets and projects that combat food loss and waste. Food loss and waste should halve by 2030 as outlined in the Sustainable Development Goal target 12.3.

Source: <https://www.ubs.com/global/en/wealth-management/chief-investment-office/investment-opportunities/investing-in-the-future/future-of-waste/2020/future-of-waste-part3.html>

<https://www.climatebonds.net/standard/waste>

<https://www.worldbank.org/en/news/press-release/2019/12/05/pressreleaseworldbankreaches2billioninsdbissuedwhileraisingawarenessfor-flwwithstrongsupportfromjapaneseinvestors>

8.8 Finance for Mining

When we talk about finance for the Circular Economy, we face the dilemma of financial institutions' role in project finance and insurance activity for the mining industry. Increasingly non-financial criteria on social, political and environmental aspects (ESG criteria) are included in the decision making of financial institutions. The advent of the Equator Principles (EPs)¹⁶¹ has introduced a risk management framework for the financial

¹⁶¹ <https://equator-principles.com/>

sector. While originally designed for larger tickets, the insights underlying the Eps are gradually trickling through into mainstream financial offerings.

The circular economy needs responsible extractive industry players to play a productive role in relation to recycled metals and minerals. In any scenario mines are a solution to cover the shortfall of recycled material inventories. There is also the deep sector knowledge of mining companies about minerals and metals that can be used for the efficient industry grade recovery of used minerals and metals.

Recycling of materials requires less energy and reduces GHG emissions. At the same time mines can close the gap by increasing the energy efficiency of their own mining operation and reduce impacts on environment and workers.

One of the most important circular economy criteria that financial institutions can include in their contracts with the mining industry relates to regeneration and restoration. As a minimum financial contracts with the mining industry should contain the requirement to develop the mine in such a way that land reclamation is possible after the mine ceases operation. That means that the mine owner develops the mine in such a way that the land can be restored to nature or reused for another economically viable purpose.

8.9 Finance for the Energy sector and CE

The transition from energy derived from fossil fuels to renewable sources requires one of the largest infrastructure overhauls in recent economic history. For this topic, we cover only the tip of the iceberg and more research needs to be done on the circular economy impacts of the energy transition. The policies regulating the environmental impacts of the decommissioning of drilling platforms and off shore installations are nationally determined.^{162 163 164} For financial institutions CE related concerns are increasingly popping up in their energy portfolios, due to increased decommissioning activity.

The financial ramifications of these decommissioning costs do not only have consequences for the balance sheets and liquidity of energy companies, but they also bring along the direct link to recycling and restoration. Hence the 9Rs are an important consideration in reprocessing the reclaimed steel and removal of the chemicals and hazardous materials. Upon removal of the installations, restoration of the habitats in which the installations were active involve management of physical risks (leakages), liability risks (environmental damages) and reputation risk (public outcry). Depending on the scale of the operation, these risks will be reflected in the financial health of clients in the energy sector.

The same dynamic surrounds renewable energy projects, since for some renewable energy projects decommissioning is already on the horizon. Financial contracts should pro-actively include covenants that address these end of life considerations for the materials involved in solar parks¹⁶⁵, wind turbine farms¹⁶⁶ and hydro dams.¹⁶⁷ A CE rule of thumb for the financial sector's exposure to the energy sector is to start with the end in mind.

¹⁶² <https://www.gov.uk/guidance/oil-and-gas-decommissioning-of-offshore-installations-and-pipelines>

¹⁶³ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32011L0092>

¹⁶⁴ <https://darrp.noaa.gov/what-we-do>

¹⁶⁵ <http://www.pvcycle.org/usa/>

¹⁶⁶ <https://www.gov.uk/government/publications/decommissioning-offshore-wind-installations-cost-estimation>

¹⁶⁷ <https://www.damremoval.eu/>

The switch from fossil fuels (gas, oil and coal) to renewable energy sources will shift economic activity to metals.¹⁶⁸ We are talking about steel, copper, aluminium, silver, gold, cobalt, lithium, graphite, nickel, various magnetic and rare earth minerals. It is important for the financial sector to realize that investments in renewable energy will move our economies away from the linear use of fossil fuels while making the circular use of metals and minerals more important.

- Hardware components of solar PV, wind turbines, cars and geothermal installations
- Electric motors
- Power grids and transmission wires
- Energy storage

¹⁶⁸ <https://www.metabolic.nl/publications/metal-demand-for-renewable-electricity-generation-in-the-netherlands-pdf/>

9 Cross-cutting CE innovation

9.1 CE and the digital revolution

A number of digital and physical tagging solutions have been designed to promote behavioural change in the circular economy. Enhanced traceability can improve the financial due diligence on companies making use of these tracking and tracing techniques for materials. Products, materials and resources are digitally tagged with a unique identifier to be traced down the supply chain. This prevents waste fraud as it monitors users to return the tagged resources for recycling or reuse. The challenge remains to accomplish this in a low-cost way.^{169 170}

There are essentially a number of different ways:

- Software tags registered in a blockchain like ledger that tracks the unique identifier down the supply chain;
- DNA tagging technology has been experimented on for denim cloth. The DNA trace enable the denim to be traced down the supply change with the aim to promote the level of recycling. It can also be used to separate textiles from biological agriculture origins from conventionally produced textiles containing more chemicals;
- Hardware tagging with RFID chips has been used for products, again to prevent losing track of resources that can be recycled or reused;
- The increased use of artificial intelligence and algorithms is also an emerging issue for the financial sector.¹⁷¹

9.2 CE Finance for the services economy

The sharing economy, servitization and product-as-a-service are recognised as intertwined service based business models under various circular economy classification schemes for the finance sector.^{172 173} The sharing economy¹⁷⁴ offers tremendous economic opportunity due to the projected growth of sharing services to above USD 300 billion annually by 2025¹⁷⁵. For financial institutions sharing introduces both economic opportunity and new risks due to shared use of assets amongst a multitude of parties. The word sharing suggest a moral contract between the user and the provider. In many cases the sharing economy does not act upon a moral incentive, but a commercial one. It offers an advanced and flexible rental service, facilitated by some form of IT support.

The circular idea behind the sharing economy, servitization and product-as-a-service (PaaS) is that less resources are needed to supply the same level of service, comfort and experience to larger groups, compared to an ownership-based

¹⁶⁹ https://www.researchgate.net/publication/337203748_Digitalization_circular_economy_and_the_future_of_labor_How_circular_economy_and_digital_transformation_can_affect_labor

¹⁷⁰ https://www.ellenmacarthurfoundation.org/assets/downloads/publications/A-New-Textiles-Economy_Full-Report.pdf

¹⁷¹ <https://www.hermes-investment.com/wp-content/uploads/2019/04/investors%E2%80%99expectations-on-responsible-artificial-intelligence-and-data-governance.pdf>

¹⁷² https://www.abnamro.com/en/images/Documents/040_Sustainable_banking/Publications/ABN_AMRO_Circular_Economy_Finance_Guidelines_2018.pdf

¹⁷³ https://ec.europa.eu/info/publications/categorisation-system-circular-economy_en

¹⁷⁴ <https://www.sciencedirect.com/science/article/pii/S2210422417300114>

¹⁷⁵ <https://www.forbes.com/sites/forbeslacouncil/2019/03/04/the-sharing-economy-is-still-growing-and-businesses-should-take-note/#f204f3a4c339>

model. Via platform apps, consumers and companies grant each other temporary access to under-utilized physical assets. This reduces idle capacity of the shareable good in exchange for money. Typical goods that are currently being **shared** are cars, bicycles, scooters, homes, appliances, camper vans¹⁷⁶.

PaaS is a performance based servitization model that puts the responsibility for the correct functioning of the service with the manufacturer or service provider. For a PaaS offering to reduce waste effects, the business model should be designed to prioritize waste prevention over reuse, recycling before materials flow towards energy recovery by incineration and landfill.¹⁷⁷ Companies that offer PaaS keep ownership of the product and the materials are guaranteed to return to them after use. Hence they will have to cope with costly disposal procedures or maximise the residual value. If designed upfront with waste prevention in mind, PaaS business propositions can integrate the positive impacts of Extended Produced Responsibility (EPR) schemes.

The financial sector has an important role to play here¹⁷⁸, since PaaS requires a new approach to financial due diligence and legal contracts between the client and financial institutions. These three financially related aspects are a minimum that need to be road tested in the context of a service delivery (PaaS with pay-per-use fee) rather than goods delivery (sale with ownership transfer);

- The PaaS P&L scenario will reflect growth and churn of the subscriber base, including seasonality effects. Revenue and cash flow estimation is driven by the number of subscribers, the ability to attract and retain repeat subscribers and the height of the subscription fee;
- The PaaS legal contract offered to subscribers to the PaaS prominently steers the financial assumptions of the underlying business case. Consumer protection laws cover both products and services and should be respected, based on relevant jurisdictions in which the PaaS supplier operates. To avoid stranded assets guarantees, warranties, claims, reverse logistics will all need to be explicitly drafted in legal texts describing the rights and duties of all the parties involved in the PaaS under any given circumstance.
- The balance sheet scenario for PaaS companies is different due to the retained ownership of goods by the PaaS supplier. The balance sheet value will be affected by inventory levels and the depreciation period of the assets in the inventory. A realistic estimate of the residual value at various stages of the life time of the goods offered as PaaS are key elements to estimate the financial viability and sustainability of financing PaaS business models.
- For successful PaaS financing the upscaling and downscaling of the inventory assets (e.g. cars, scooters, bicycles, washing machines, phones, etc...) needs to be flexible and resilient to downturns. The contractual agreement between the PaaS supplier and the manufacturer plays a key role here.

The sharing economy, servitization and PaaS offerings are disruptors to numerous industries. They also bring about new risks that affect the picture for the financial industry. There are issues around privacy¹⁷⁹, worker conditions¹⁸⁰, increase of actual use and lack of achievement of environmental benefits and waste reduction effects. These new business models need to sufficiently integrate the purpose behind the 9-R principles to be classified as circular economy business models. Otherwise they might be hard to differentiate from straight-forward, unconstrained rental business. Growth of these services has challenged policy makers around the world to mitigate public concerns around the mentioned issues¹⁸¹. For

¹⁷⁶ https://www.researchgate.net/publication/271813161_Sharing_Nicely_On_Shareable_Goods_and_the_Emergence_of_Sharing_as_a_Modality_of_Economic_Production

¹⁷⁷ <https://www.sciencedirect.com/science/article/pii/S0959652617300409>

¹⁷⁸ <https://www.circle-economy.com/insights/the-circular-phone>

¹⁷⁹ <https://www.bi.edu/globalassets/forskning/h2020/privacy-working-paper.pdf>

¹⁸⁰ <https://onlinelibrary.wiley.com/doi/abs/10.1111/jems.12299>

¹⁸¹ <https://edu.gcfglobal.org/en/sharingeconomy/legal-and-safety-issues-in-the-sharing-economy/1/>

example, for mobility there are concerns about the erosion of public transport and the disappearance of local taxi services. For real estate and hospitality services there are effects on price levels in housing markets in cities and competition to local hotels. To mitigate these concerns more attention needs to be given to the social, environmental and policy aspects of sharing economy business models.

- Privacy concerns are mitigated by transparency about how data is used. Key questions are: What is the user generated data used for and does it remain stored or not?¹⁸²
- Worker conditions¹⁸³ are improved if employers that operate in the sharing economy, offer even slightly better wages, more reliable work volumes and when employers show the willingness to respond to improvement suggestions for workers' situational needs (e.g. physical and mental health, family situation)
- Environmental concerns related to environmental pressures such as emissions during traffic congestion, can be mitigated through the use of low carbon technologies for shared services (e.g. electrical cars).¹⁸⁴ While electrical cars do not eliminate congestion, they do eliminate the local tail pipe emissions. There are various examples of cities licensing electrical car sharing to reduce environmental burden on their city.¹⁸⁵
- Public transport is one of the early predecessors of the sharing economy and links between sharing services and public transport are logical compliments. The travel experience in public transport can be improved if last or first mile of a journey can be handled by mobility services offered in the sharing economy (e.g. bike or scooter sharing).¹⁸⁶
- Local taxi services have been at a disadvantage due to the technological advance of competing car sharing services. Investments in phone based booking apps by local taxi companies are restoring the balance with technology driven disruptors.¹⁸⁷
- Unwanted effects on housing prices in cities due to sharing economy rentals of properties can be mitigated by city policy and integration in the economical agendas around tourism and travel.¹⁸⁸
- The same demands need to be in place for health and safety for the incumbents in the sharing economy, as the demands in place for the traditional business models that they compete with or replace¹⁸⁹.

¹⁸² <https://www2.deloitte.com/us/en/insights/industry/retail-distribution/sharing-personal-information-consumer-privacy-concerns.html>

¹⁸³ <https://www.ilo.org/global/topics/non-standard-employment/crowd-work/lang-en/index.htm>

¹⁸⁴ <https://www.mckinsey.com/~media/mckinsey/locations/europe%20and%20middle%20east/netherlands/our%20insights/electric%20vehicles%20in%20europe%20gearing%20up%20for%20a%20new%20phase/electric%20vehicles%20in%20europe%20gearing%20up%20for%20a%20new%20phase.ashx>

¹⁸⁵ <https://www.iamsterdam.com/en/business/news-and-insights/news/2018/electric-car-sharing-now-available-at-schiphol>

¹⁸⁶ <https://urbanmobilitydaily.com/has-public-transit-finally-found-its-first-mile-last-mile-partner-in-micromobility/>

¹⁸⁷ <https://le.taxi/>

¹⁸⁸ <https://www.oecd.org/cfe/tourism/OECD-Tourism-Trends-Policies%202020-Highlights-ENG.pdf>

¹⁸⁹ https://oem.bmj.com/content/75/Suppl_2/A517.1

Box 19 Growth opportunity for Fin tech's micro-insurance for the sharing economy / PaaS

In the sharing economy or PaaS there are two users and these users have to trust each other with regard to the shareable good that is rented out on that platform. This two sided market is a source for new social conflict. Under conventional insurance, there are some shortcomings to support the sharing economy, as outlined in the Lloyd's report "Sharing risks, sharing Rewards":

- If you break or damage a shared good, traditional insurance premium pricing will make the premium go up after the damage. Basically that will not create incentive to rent out a shareable good (boat, camper van, car, bicycle).
- Risk is traditionally calculated on the owner instead of the user, which makes sharing of an asset an extra risk for traditional insurance companies. Therefore insurance contracts will often exclude assets for being shares with punitive or restrictive terms and conditions.

Swedish Insurance Fintech Omocon has embraced this new reality and has developed a micro insurance that protects the actual owner of the shareable good. Especially the owner of the asset needs protection against damage. This fintech company therefore collects data on the sharing platform to look into the usage statistics of sharing transactions. This has changed the entire insurance process:

- The underwriting process has changed because under the right conditions, damage claims are actually de-risked by the sharing economy aspects because it is harder to commit fraud when two parties are involved in an arm's length transaction. After all, most users are in nearly all not acquainted, or anonymous to the owner. Omocom uses the usage data to do the risk calculation and the pricing of the insurance. Furthermore the loyalty and historical behaviour of the customer of the platform can be used to create flexible preferential insurance rate conditions. The risk package is priced in accordance with the value of the shareable good and the likelihood of damage occurring, which now is linked to the user and not the owner.
- The insurance letter production process is automated and is digitally customised to refer to the individual asset. If the user rents a lawnmower out, it is a specific insurance number that they can follow throughout the process. The micro insurance is offered as an opt-in schemes or all-in, where the insurance is default as part of the transaction cost. Which is for example the case for an appliance sharing platform, where the insurance is a fixed item on the bill.
- The claims process has also changed, because stories now need to corroborate and can be checked from independent sources (the user and the asset owner side). The two sides of the story are heard and the decision in the claim handling is made. An interesting and maybe unsurprising finding is that the higher the distance between the owner of the asset and the user, the higher the likelihood of damages occurring. From a financial perspective it are these historical statistics that enable them to price the risk correctly.

Source: <https://www.omocom.se/>

9.3 CE Finance and non-financial accounting methods

The accounting profession is changing, this is especially the case for CFO's departments at financial institutions. Due to the conservative nature of the accounting profession, CFOs are definitely unusual suspects. But times are changing and also the awareness about climate and circular economy is growing amongst professional active in the accounting

profession of financial institutions. Without covering the intimate details, we indicate these 5 trends that favour the CE transition in the financial sector, that should be catalysed and professionalised by accountants themselves:

1. The use of financial calculation models to determine the appropriate residual value and depreciation rates for secondary materials and reusable/reused assets (e.g. building materials in existing buildings);¹⁹⁰
2. Tracking and solving contradictions in tax treatment of virgin versus secondary materials, for example double VAT taxation of secondary materials in certain jurisdictions;¹⁹¹
3. Integration of non-financial ESG related metrics by using full cost¹⁹² / true value¹⁹³ / true cost / true price¹⁹⁴ accounting methods;¹⁹⁵
4. Actively work with the audit discipline to improve the assurance and reliability of non-financial numbers;¹⁹⁶
5. Contribution to transparency by including linear risks in their financial reporting, especially in light of stranded assets;¹⁹⁷
6. The increase of the number of members of accounting or CFO led platforms that aim to make sustainable decision making part of the mainstream.^{198 199}

Consultation question 9:

Do you consider the sector coverage of the report sufficiently complete for the financial sector? If not please provide suggestions for further research.

¹⁹⁰ <https://www.tno.nl/en/focus-areas/circular-economy-environment/roadmaps/circular-economy/circular-building/residual-value-calculation/>

¹⁹¹ OECD Urban Studies The Circular Economy in Valladolid, Spain

¹⁹² <http://www.fao.org/nr/sustainability/full-cost-accounting/en/>

¹⁹³ <https://home.kpmg/xx/en/home/services/advisory/risk-consulting/internal-audit-risk/sustainability-services/kpmg-true-value-services.html>

¹⁹⁴ <https://trueprice.org/>

¹⁹⁵ <https://www.wbcsd.org/Programs/Circular-Economy/Factor-10/Metrics-Measurement>

¹⁹⁶ https://docs.wbcsd.org/2019/11/WBCSD_ICAEW_A_buyers_guide_to_assurance_on_non-financial_information.pdf

¹⁹⁷ <https://www.ceguide.org/Strategies-and-examples/Finance/Stranded-asset-management>

¹⁹⁸ <https://www.accountingforsustainability.org/en/index.html>

¹⁹⁹ <https://www.accountancyeurope.eu/good-governance-sustainability/7-ways-accountants-can-help-companies-get-more-sustainable/>

10 CE Finance Policy considerations

10.1 CE policy agenda and climate policy intertwined

For financial institutions the resource policy agenda (SDG 12) is interlinked with the climate policy agenda (SDG 13). FI's should strengthen the link between CE and climate change, as CE can help the private finance sector deliver on their climate commitments and improves risk management.²⁰⁰ The emissions of our global economy exceed the emissions level required to meet the target of limiting a global temperature rise to a 1.5°C under the Paris Agreement on Climate Change. One of the missing pieces of the global puzzle for mitigating emissions is the increased use of resources under a linear economic model. The Circularity Gap Report²⁰¹ addresses exactly this misalignment between the resource policy agenda and the climate agenda. The report calculated that our global economy is less than 9% circular. If we are to respond to evidence-based calls by the Intergovernmental Panel on Climate Change (IPCC) and the consecutive climate COP meetings to strive for "rapid, far-reaching and unprecedented changes in all aspects of society to reach the target limit of 1.5°C global warming", then the remaining 91% of the economy that is linear needs to be addressed. Policy, business and finance leaders need to address the direct relationship between the resource agenda and the climate agenda. Measures need to go beyond the energy efficiency and power production aspects in our economies.

²⁰⁰ <https://www.ellenmacarthurfoundation.org/publications/completing-the-picture-climate-changeCurrent>

²⁰¹ <https://shiftingparadigms.nl/wp-content/uploads/2019/01/CGR-2.0-report-final-reprint-web-20190326.pdf>

Box 20 Africa Circular Economy Alliance integrates Climate and Circular Economy

The African Development Bank (AfDB) turns Nationally Determined Contributions (NDCs) under the Paris Agreement into investment plans. AfDB monitors the execution of Africa's NDCs. By focusing on the sustainable use of natural resources in relation to climate change, AfDB is now exploring Circular Economy opportunities in Africa to contribute to addressing climate change, while at the same time improving livelihoods and ending poverty, under an African Circular Economy Support Programme.

The route taken integrates climate and circular economy policy and will involve the 51 NDCs ratified in Africa. Waste management, energy efficiency, water resource conservation will be included under the climate umbrella, but not necessarily labelled as circular economy. This integration into the NDC programme of Africa is prepared in cooperation with the Africa Circular Economy Alliance along with UNEP and the World Economic Forum. The alliance is co-chaired by Rwanda / South Africa and Nigeria. They focus on what programmes they should focus on related to resource efficiency to integrate with the climate change agenda.

The reason for this integration is the AfDB's ten-year strategy (2013-2022). This strategy aims to change African economies to inclusive green growth by incorporating circular economy principles. The financial strategy is focused on offering financial instruments that de-risk public and private circular economy projects. Five priority areas, called high fives, are: access to energy, agricultural transformation, industrial development, integrating African economies and improving the quality of life of Africans

Green growth is focused on water and soil quality, energy and food security through the promotion of the sustainable use of natural resources. Particularly water infrastructure has a direct relationship to resilience to the effects of climate change.

Source: <https://www.afdb.org/en/about-us/mission-strategy/objectives>

<https://pacecircular.org/african-circular-economy-alliance>

10.2 The circular economy finance opportunity as a result of policy response

Because of the effects of the linear economy on the increase of environmental degradation, policy response triggered by public health concerns has proven to be inevitable. The global policy picture in the waste trade and transportation has been changing rapidly over the last few years, which urges exporters to deal with their own wastes in a more effective and efficient way. Take for example the knock-on effects of Asia's waste export bans²⁰² and the introduction of waste hierarchies²⁰³. These policy changes are great drivers behind the global push for a circular economy. For example, the concept of Circular Economy has been established in Chinese economic policy since 2009 through the enactment of the Circular Economy Promotion Law (see box). Policy changes that lead to onshoring of recycling and waste treatment plants can also create policy driven opportunities for financial industry players.

²⁰² <https://www.economist.com/asia/2019/06/15/south-east-asian-countries-are-banning-imports-of-waste-for-recycling>

²⁰³ https://en.wikipedia.org/wiki/Waste_hierarchy

10.3 CE and Extended Producer Responsibility (EPR) policy

EPR is a policy measure implemented by many governments to promote sound waste management and thus can help to institutionalise related aspects of the circular economy²⁰⁴. It is known to improve recycling and reuse and reduce landfilling and incineration of scarce resources. Especially in the packaged goods industry, EPR policy can be used to enforce the return of packaging to be recycled and reused or reduced at the source²⁰⁵.

EPR holds the producers of a product responsible for the collection and disposal of that product once it has become waste, and can include these costs in the pricing of their products. EPR instruments aim at making producers responsible for the environmental impacts of their products throughout the products' life-cycle, from design to the waste phase. EPR policy seeks to shift the burden of managing certain wastes from municipalities and taxpayers to producers, in line with the polluter pays principle.²⁰⁶

The OECD finds that "Assigning such responsibility to producers could in principle provide incentives to prevent wastes at the source, promote product design for the environment and support the achievement of public recycling and materials management goals."

EPR policies vary around the world. All of them have distinct qualifications that are regionally determined, often at a city level. More uniformity would enable financial institutions to be able to leverage these policies in an optimal way and to integrate it in their risk models. This is a policy risk issue to monitor. For example – if this plastic pollution prevention bill²⁰⁷ passed in some form in the US in the foreseeable future, then from a credit risk perspective financial institutions would want to know the outlay a company is going to have to make to comply with this law.

Box 21 South America and Extended Producer Responsibility (EPR) regulations

Various countries in South America chose for Extended Producer Responsibility (EPR) regulations and recycling laws and do not very often use the term circular economy. The intentions are overlapping.

Chilean and Argentinian EPR bills focus on the production of rubber tyres. The law mandates management systems for used tyres and circular design principles to facilitate recovery of rubber and other tyre components as a secondary material.

Columbia proposed an EPR bill for the collection and treatment of packaging waste by waste management systems; producers will be held responsible for collection and recovery targets.

Brazil has passed several EPR Bills to promote collection of plastic wastes and the use of biodegradable plastic and avoidance of hazardous materials in product design to make material recovery more effective.

²⁰⁴ <http://www.oecd.org/environment/waste/extended-producer-responsibility.htm>

²⁰⁵ <https://ebcd.org/circular-economy-and-packaging-the-role-of-epr/>

²⁰⁶ UNEP Draft practical manuals on Extended Producer Responsibility and on financing systems for environmentally sound management, 2018

²⁰⁷ <https://www.congress.gov/bill/116th-congress/senate-bill/3263>

10.4 CE Finance and Tax laws

For financial institutions it is important to know the taxes that their clients are subject to, in light of the profitability of the companies that they finance. There are various fiscal policy intervention that have been suggested to promote the transition to a circular economy:

- Tax on virgin plastics. To fight plastic waste and to promote a transition to a circular economy for plastics, various tax regimes are proposed by countries in the EC²⁰⁸ (Italy 450€/ton) and recently in the UK (200GBP/ton)²⁰⁹. Plastic has been singled out as a resource because of the waste effects that it has generated. Plastic pollution seems to be hard to contain by behavioural programs and is so wide spread in our eco systems that taxation on the raw materials want to dam the amount of plastic from virgin materials²¹⁰. Over 90% of the plastic volume used in consumption and discarded are not recycled²¹¹.
- Taxes on virgin materials such as sand, gravel and rock used in the construction industry have been introduced by various EU states²¹². A policy that taxes first-time-use, virgin resources stimulates the efficiency of resource use by industries.
- VAT reduction for recycled content and the use of secondary materials has been proposed to EU member states²¹³ and in the United Kingdom (UK)²¹⁴. The lowering of VAT for repair activities would also be a welcome tax shift in favour of the circular economy²¹⁵. This tax change has been implemented in Sweden where citizens are stimulated to repair their goods.²¹⁶ While the Swedish reduction to 12% has been widely communicated and lauded, it is fair to mention that Luxembourg has a VAT rate of 8% for common repair services²¹⁷. Tax exemptions and fiscal compensation are instruments seen across the world to stimulate sustainable behaviour. A concrete example is the Norwegian tax exemption policy, that waves the cost of re-registration tax of used low emission cars (e.g. battery or hydrogen powered) to stimulate the resale.²¹⁸ Fiscal compensation for the scrapping of fossil vans when converting to a zero-emission van.²¹⁹
- Shifting the tax burden from labour to materials. The theory is that secondary materials are labour intensive and therefore incur more tax than virgin materials. Although this has been recommended as an EU policy change, the tax shift from labour to resource use has been effected partially by a very limited set of EU countries. Revenues from labour taxation remain eight times higher than the revenues generated by environmental taxes in the EU.²²⁰ Overall taxes for labour and resources have not been treated as communicating vessels and very little has changed over the years.

²⁰⁸ <https://www.icis.com/explore/resources/news/2020/01/22/10460847/european-r-pet-market-needs-more-clarification-on-italian-virgin-plastics-tax>

²⁰⁹ <https://www.icis.com/explore/resources/news/2020/03/11/10481079/uk-government-announces-plans-for-200-tonne-plastic-tax-during-budget-2020>

²¹⁰ <https://www.nationalgeographic.com/environment/habitats/plastic-pollution/>

²¹¹ <https://www.nationalgeographic.com/news/2017/07/plastic-produced-recycling-waste-ocean-trash-debris-environment/>

²¹² https://ec.europa.eu/environment/integration/research/newsalert/pdf/262na1_en.pdf

²¹³ <https://www.europarl.europa.eu/news/en/headlines/society/20181212STO21610/plastic-waste-and-recycling-in-the-eu-facts-and-figures>

²¹⁴ <https://www.parliament.uk/business/committees/committees-a-z/commons-select/environmental-audit-committee/news/report-circular-economy1/>

²¹⁵ http://www.rreuse.org/wp-content/uploads/RREUSE-position-on-VAT-2017-Final-website_1.pdf

²¹⁶ <https://www.weforum.org/agenda/2016/10/sweden-is-tackling-its-throwaway-culture-with-tax-breaks-on-repairs-will-it-work/>

²¹⁷ <http://www.aed.public.lu/tva/Brochure-FR-2017.pdf>

²¹⁸ <https://www.regjeringen.no/contentassets/7b86180aaa8c4980ac60700c5ded97cd/notifikasjon.pdf>

²¹⁹ <https://elbil.no/english/norwegian-ev-policy/>

²²⁰ <https://www.eea.europa.eu/airs/2018/resource-efficiency-and-low-carbon-economy/environmental-and-labour-taxation>

- Changes in depreciation methods for circular products is also very relevant since depreciation affect the tax base and financial models. The change of accounting methods can already be observed for buildings built from secondary materials, documented with material passports. Not only the building as a whole, but also the components and building materials have a higher value retention. The change of accounting methods can increase the success of secondary material markets in favour of virgin materials.²²¹
- Tax breaks and social security exemptions to companies that hire recent master students or PhD graduates on the circular economy theme. This constitutes financial support to create academic spin-offs and enables private companies to acquire inhouse R&D services from certified and skilled researchers from international universities.²²²

10.5 CE and right to repair policies

Other policy instruments used by governments stress the right to repair, which makes it mandatory for companies to provide spare parts and diagnostic tools that make repair possible²²³. In the US the Motor vehicle owners right to repair act is an example. Both US and the EU are pushing for legislation related to the right to repair for electronics.²²⁴

10.6 CE and international movement of wastes

The Basel Convention²²⁵ is a crucial legislation for the financial sector and clients. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal aims to reduce international movements of hazardous wastes. Specifically it aims to prevent the transfer of hazardous waste from developed to developing countries.

This is particularly relevant for ship finance and ship insurance. Because of the hazardous materials on board of (older) ships, the export of decommissioned vessels is regulated by the Basel Convention. Ship recycling is on the one hand a way to recover the resources of a ship and bring them back into circulation (e.g. steel), on the other hand ship recycling is still often done without environmentally sound infrastructure and with insufficient health protection for ship breakers. A number of financial institutions have therefore launched the responsible ship breaking standard (RSRS) to improve the conditions for recycling of ships by agreeing to a set of common expectations on the sound and safe recycling of ships.²²⁶

From a risk management perspective the financial sector needs to be aware and keep up to date on how clients plan to recycle (part of) their fleet.

10.7 CE and socially inclusive aspects of policy

For financial institutions it is particularly important to focus on the social protection aspects of the work offered by the circular economy and CE-related employment trends and conditions for decent work (SDG 8). Social due diligence will require additional attention during the economic recovery in 2021/22. Flexible and part-time employment might be increasingly related to the CE finance-related business volumes of financial institutions. Therefore social protection of

²²¹ <https://blog.kpmg.lu/circular-economy-calls-for-new-tax-thinking/>

²²² [OECD \(2020\), The Circular Economy in Umeå, Sweden, OECD Urban Studies, OECD Publishing, Paris](#)

²²³ https://en.wikipedia.org/wiki/Motor_Vehicle_Owners%27_Right_to_Repair_Act

²²⁴ https://en.wikipedia.org/wiki/Electronics_right_to_repair

²²⁵ <http://archive.basel.int/pub/simp-guide.pdf>

²²⁶ <https://www.ing.com/Sustainability/ING-ABN-AMRO-and-NIBC-present-the-responsible-ship-recycling-standards.htm>

workers in these industries should be on the watch list of financial institutions, particularly those working with an ESG or social impact approach. Some of these part-time, freelance or zero-hour contract workers might not be sufficiently protected by lack of eligibility for social security, because they do not conform to the minimum demands of social security schemes. Many workers may be left without adequate protections, putting them at risk. Financial institutions should be aware that Article 6 of the ILO's Part-Time Work Convention²²⁷ states that "statutory social security schemes....shall be adapted so that part-time workers enjoy conditions equivalent to those of comparable full-time workers." This should imply that workers should receive adequate protection regardless of their employment contract forms.

Onshoring may also result in a redistribution of wealth across countries, with related adjustments in social inequalities. Both in developed and developing countries, employment aspects – both the level and quality of employment - will require continued policy attention. For the internal job market in developing countries, a circular economy can create more income resilience and better sanitary conditions. For a just circular economy transition^{228 229} to occur, the formalisation of the status of informal waste picker jobs is key. Waste processing highly relies on informal employment for collection services.

10.8 CE & EU Non-financial Reporting Directive (NFRD)

The European Commission is developing policies to influence businesses to measure and report on the circular economy transition. Financial institutions active in the European Union-27 economic space will be required to disclose on activities related to circular economy for financial year 2022. Publication is requested on the course of 2023. An Taxonomy Regulation sets out the framework and environmental objectives for an Taxonomy, as well as new legal obligations for financial market participants, large companies, the EU and Member States.

The development of the EU Taxonomy - classification system setting performance thresholds for sustainable economic activities is one of the first steps under the EU Action Plan for financing sustainable growth²³⁰ and could contribute to mobilizing financing for the EU Green Deal²³¹. The EU Taxonomy will be expanded over the coming years to help investors, companies, issuers and project promoters in the transition to a low-carbon, resilient and resource-efficient economy by providing technical screening criteria.

The EU taxonomy for banking and finance asks financial institutions to establish objectively the "do no significant harm"²³² principle for the circular economy. It also asks to report on significantly positive contributions to all 6 environmental objectives, of which circular economy is one and tied into all five others. Companies subject to disclosure requirements under the revised EU Non-Financial Reporting Directive (NFRD) will need to make disclosures with reference to the Taxonomy, including large banks and insurers.

The regulation identifies six environmental objectives for the purposes of the Taxonomy (Article 5):

- Climate change mitigation ;
- Climate change adaptation ;
- Sustainable use and protection of water and marine resources;
- Transition to a circular economy, waste prevention and recycling;
- Pollution prevention and control.
- Protection of healthy ecosystems

²²⁷ https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:C175

²²⁸ <https://reader.chathamhouse.org/inclusive-circular-economy-priorities-developing-countries#>

²²⁹ <https://www.chathamhouse.org/publication/promoting-just-transition-inclusive-circular-economy>

²³⁰ <https://www.unpri.org/sustainable-financial-system/explaining-the-eu-action-plan-for-financing-sustainable-growth/3000.article>

²³¹ https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

²³² https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-final-report-taxonomy_en.pdf

11 CE Finance & geographic and national variations

National policy drives global business opportunity for financial players. For the financial industry there is business opportunity in the transition from our linear economy to a circular economy. For the financial sector it is important to understand the variety of approaches taken in the world to contribute to the circular economy transition. There is on the one hand the push by national or sub-national policy and on the other hand a focus on business opportunity and material or resource efficiency and in some cases a plan towards system redesign.

At the sub-national level, cities play a crucial role in financing circular economy initiatives and business models. Material loops for 4000 companies requiring copper in their production in Shanghai (China)²³³, as an alternative to virgin copper directly sourced from mines; city wide roll out of collection bins and food waste fees for businesses in Milan (Italy)²³⁴, actively diverting waste from landfills in San Francisco (United States)²³⁵ and San Sebastian (Spain)²³⁶; revolving funds in Amsterdam, (Netherlands) through the Amsterdam Climate and Energy Fund (ACEF)²³⁷; and a CE themed venture capital and growth capital fund in Edinburgh (United Kingdom)²³⁸.

The financial challenges for cities and regions to scale up CE efforts are numerous. Access to funding is a common barrier to launch circular business models.²³⁹ Due to the lack of financial resources for innovators, only small-scale low-risk projects tend to be realised with limited impacts in terms of job creation and a limited scale of positive environmental effects. Coordination across the different levels of government is needed. The climate change agenda needs to become intertwined with the circular economy focus on resources. The Dutch government has made available funds to implement circular economy projects, linked to the annual envelope of EUR 300 million that the government makes available for climate-related actions.²⁴⁰ Subnational government layers have access to this climate-related envelope for CE projects.

Box 22 Survey Outcomes

Outcomes related to areas of CE integration for financial institutions. To the question which geographies offers the most opportunity for CE finance, the respondents chose this top 3:

- Africa
- Europe
- Asia

Source: UNEP FI Survey Outcomes

²³³ <https://www.nature.com/news/circular-economy-lessons-from-china-1.19593>

²³⁴ <https://www.unenvironment.org/resources/report/global-waste-management-outlook>

²³⁵ <https://www.cnbc.com/2018/07/13/how-san-francisco-became-a-global-leader-in-waste-management.html>

²³⁶ OECD (2020), The Circular Economy in Valladolid, Spain, OECD Urban Studies, OECD Publishing, Paris

²³⁷ <http://www.akef.nl/>

²³⁸ <https://circularitycapital.com/>

²³⁹ OECD (2020), The Circular Economy in Groningen, the Netherlands, OECD Urban Studies, OECD Publishing, Paris

²⁴⁰ <https://www.rijksoverheid.nl/actueel/nieuws/2018/03/09/kabinet-investeert-300-miljoen-euro-in-klimaat>

11.1 Asia Pacific

Country specific examples of Asian Circular Economy challenges and progress:

- Japan: The Government introduced a law that favours circular economy in 2000: The Law for the Promotion of Effective Utilization of Resources. The aim of this law is to establish “a *sound material-cycle economic system based on the 3R reduce-reuse-recycle principle*.” (Japan, 2000).
- South Korea: The Government put in place a new circular economy law in 2008, mainly focused on waste recycling (Legislative Council Secretariat, 2012). Despite a high recycling rate in South Korea, Koreans do not live in a circular economy, which requires more system redesign and resource efficiency based on circular economy insights.
- India: The Indian Ministry of Environment, Forest and Climate Change formed the Indian Resource Panel (InRP) on Resource Efficiency in 2015 to promote sustainable development of the country by utilising secondary resources to meet developmental needs. While this does not explicitly mention circular economy as a term, the InRP’s activity forms the basis for further circular economy focused policy development in India.
- China: Since January 2018, the National Sword program of China bans imports of 24 categories of waste due to rising environmental and health concerns. (See box).
- The Australia government started promoting the circular economy through policy initiatives. In 2017, the Australian Government released a National Food Waste Strategy. And in 2018 a new National Waste Policy came out based on circular economy principles. The Strategy aims to halve Australia’s food waste of 7 million tonnes a year by 2030. As a concrete example, Sydney promotes car sharing amongst its inhabitants by designating parking spaces for shared cars²⁴¹;

²⁴¹ <https://www.cityofsydney.nsw.gov.au/live/residents/car-share>

Box 23 China’s Circular Economy Promotion Law and knock on effects

The first step is China’s focus on cleaner production for the industrial sector. In June 2002 , China’s National People’s Congress approved the Cleaner Production Promotion Law. The key features are outlined in Article 28: “Article 28 Enterprises shall monitor resource consumption and generation of wastes during the course of production and provision of services, and conduct cleaner production audits with respect to production and service procedures according to need.

Enterprises that exceed the national or local discharging standards or exceed the total volume control targets for pollutants set by the relevant local people's governments shall conduct cleaner production audits.

Any enterprise using toxic and hazardous materials in production or discharging toxic and hazardous substances shall periodically conduct cleaner production audits, and report the audit results to the relevant administrative departments for environmental protection and the relevant departments for economic and trade under the local people's government at or above county level.”

- The Chinese government’s consecutive policies are shown in the table below.
- The problem for China was twofold: sheer volume and poor quality of imported wastes. Up until National Sword, the volume of imported wastes added more than 10 percent to China’s total waste volume. The poor quality of waste imports made the imported waste more difficult to recycle and consequently reduced the profits for the Chinese companies involved.
- Since January 2018, the National Sword program of China bans imports of 24 categories of waste due to rising environmental and health concerns.
- Since start of 2018 there have been many knock on effects of China’s import ban. This means that wastes are being displaced by China’s ban. This has mainly affected Malaysia, Vietnam, Turkey and India. Due to negative effects of the displacements of wastes also these countries are coming up with their own policy response that are beneficial to a more circular global economy. Exporting countries are now facing their own waste volumes more than ever, which makes circular economy redesign more cost effective and urgent than ever.
- <NOTE TO EDITOR: please add a mention of National Sword Policy Programme for year 2018>

Area	Policy/Law	Year
Cleaner production	Cleaner production promotion law	2002
	Methods of cleaner production audit and review	2004
Pollution and waste management	Law for environmental pollution of solid waste	2004
	Amended law on pollution prevention and control of solid waste	2005
	Laws and regulations for reuse and recycling specific solid waste	ongoing
	Amended law of the prevention and control of environmental pollution by solid waste	2016
	Environmental Protection Tax law	2018
Energy conservation	Law for energy conservation	1997
	Medium- and long-term plan for energy conservation	2005
	Law for renewable energy	2005
Circular economy	Circular economy promotion law	2009

Source: Adapted from Li, Bao, Xiu, Zhang, and Xu [38] and Su et al. [11].

11.2 North America

Canada

Canada is the host of the World Circular Economy Forum in 2021²⁴², which is the first time for the event to take place in North-America.

In 2018, the Canadian Council of Ministers of the Environment (CCME) approved the Canada-wide Strategy on Zero Plastic Waste²⁴³. This nationwide strategy is built around the building blocks of prevention, value recovery, collection and clean up. Canada has a number of circular economy related challenges as the country recycles around 10 per cent of plastic waste with the other 90% going to landfill and incinerators.²⁴⁴

The concepts of urban mining and circular economy have recently gained political attention in Canada, where recycling and repurposing could become a supplementary activity to Canada's traditional role in mining of raw materials. The Canadian government will also give increased attention to the shift to producer responsibility and the need for circular redesign of manufacturing, consumer goods, food production and petrochemicals.

United States

According to the ING research²⁴⁵ on US circular economy policy, the US government is not very involved in legislating the circular economy. Most public policy is not nationally imposed and policies at state or lower level and mostly concern recycling of wastes. Market mechanisms are called upon to shape circular economy in practice, which is mostly referred to as material efficiency. US circular economy related businesses have shaped around the following themes:

- plastics recycling for food grade use;
- compostable and bio degradable plastics;
- R&D into technologies to capture CO₂ directly from the atmosphere, and to use that CO₂ in the synthesis of transportation fuels to replace the use of crude oil;
- recapture and reuse of textile fibres;
- food rescue and distribution, and education;
- reusable consumer goods that replace single-use alternatives;
- drop off locations for repair of broken products;
- market places for second hand goods, either physical or virtual;
- market places for materials salvaged from demolition;
- B2B auction marketplaces for liquidation of customer returns and overstock.

11.3 Latin America & the Caribbean

The circular economy can reduce dependence on imports and exports of oil, metals and minerals. The creation of market places for secondary materials mitigates the exposure to exchange rate fluctuations that make

²⁴² <https://www.canada.ca/en/services/environment/conservation/sustainability/circular-economy/world-forum-2020.html>

²⁴³ https://www.ccme.ca/files/Resources/waste/plastics/1289_CCME%20Canada-wide%20Action%20Plan%20on%20Zero%20Plastic%20Waste_EN_June%2027-19.pdf

²⁴⁴ <https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/consultations/moving-toward-zero-plastic-waste.html>

²⁴⁵ <https://www.ing.com/Newsroom/News/The-US-walking-the-walk-of-a-circular-economy.htm>

imports more expensive. For Latin America and the Caribbean these are key considerations. Some country specific examples of South American Circular Economy challenges and progress:

In Brazil, circular economy models are in early development stages and have primarily been focused on three key sectors:

- Agriculture with regenerative farming practices and Restoration of degraded land;
- Construction with circular design and innovation in the utilisation of buildings and urban planning;
- Electrical and Electronic Equipment Manufacturing with logistical collaboration and circular redesign.

Argentina lacks a solid recycling system that forces more waste to landfills which prevents recycling or reuse (Rademacher, 2018). It is estimated that most of the recycled materials are recovered by informal recyclers. There are approximately 10,000 cartoneros working to clean up about 13% of Buenos Aires' trash (Netwall, 2014).

Mexico is far away from having a circular economy (Rodriguez, 2019). The country has 650 open-air dumpsites and about 200 landfills, and many of them are in poor conditions and lack basic infrastructure to ensure a sound operation and monitoring of the waste streams (Rodriguez, 2019). In 2009, the government developed financial support programmes designed to help modernise the country's waste infrastructure. Grants were issued to upgrade landfills, close open sky dumps and engage in technical landfill studies and municipal waste collection (Rodriguez, 2019).

11.4 Africa & the Middle East

Country specific examples of African Circular Economy Challenges and progress:

- In 2019, Ghana confirmed that 30,000 tonnes solid waste is generated on a daily basis in Ghana and the 3 quarters of this waste is discarded in public dumps or burnt. 3,000 tonnes of plastic waste is generated on a daily basis, of which less than 2% is recycled. More than 80% of the generated waste is recoverable;
- In 2017 Nigeria generated 290,000 tonnes of electronic waste – a 170% increase compared to 2009. (UN environment programme, 2019) The Nigerian Government, the Global Environment Facility and UN Environment have announced a \$15-million initiative to kick off a circular electronics system in Nigeria. Safe e-waste recycling has enormous economic potential, with 100 times more gold in a tonne of e-waste than in a tonne of gold ore. (UN environment programme, 2019);
- The Africa Circular Economy Alliance along with UN Environment and the World Economic Forum is co-chaired by Rwanda, South Africa and Nigeria. The alliance is in an early stage and is focused on sharing best practices for the creation of legal and regulatory frameworks that promote the circular economy.
- Rwanda has set up a National Circular Economy Forum where the public and private sectors exchange on opportunities and challenges (Government of Rwanda, 2019). Production of biogas from urban, domestic and industrial wastes has the current focus;
- South Africa is the EU's main strategic partner in Africa for circular economic promotion. Among the projects already carried out, we can quote (SEED, 2020):
 - Utilization a metallurgical waste product to treat acidic water to potable stage. The treated acid mine water is then sold to mines to save on drinking water costs and reduces the mines' dependency from the municipalities;
 - Utilization of recycled bricks;
 - Manufacturing of building materials from recycled plastic waste;
 - Breeding insects to produce protein rich feed for animals.

Middle East

There is no homogeneous policy across Middle East when it concerns circular economy. We mention Saudi Arabia as an example for the region. As part of its Saudi Vision 2030, the government is supporting the transition to a circular

economy to surmount growing volumes of waste (WFES, 2019). The Capital, Riyadh will become the testing ground for Saudi Arabia's waste management recycling efforts.

Key initiatives include:

- The creation of recycling facilities capable of handling all waste types;
- Effective recycling of construction and demolition waste, currently mostly dumped;
- Upcycling of construction and demolition waste into secondary road and home building materials.

11.5 Europe

The European Union has a long-standing CE related policy, starting by the European Commission's work on a resource efficiency platform in 2011. In 2014 a manifesto and policy recommendation were published to change the macro-economic narrative of the "Resource efficiency platform" into a micro-economic narrative to be able to transition to a circular economy in cooperation with the private sector.

An EIB-EC joint programme called InnovFin Advisory²⁴⁶ developed a first of its kind "access-to-finance study" around 2014, with recommendations that triggered the setup of the CE Finance Support Platform for the financial sector. The introduction of the finance perspective in relation to the CE transition had a strong impact on the thinking and actions of EC policy makers.

In 2015 the European Commission launched the CE finance support platform was a major step in engaging the financial community with other stakeholders towards the CE transition²⁴⁷. The Commission linked the Circular Economy Action Plan in 2020²⁴⁸ to the European Green Deal, which focuses on sustainable growth and a prosperous social and economic agenda for the EU. CE highlights are:

- Enhanced product policy framework to inform consumers and to prevent waste at the product design stage;
- Increased support for services, product-as-service models and digital solutions that reduce or regulate waste;
- Improved functioning of the internal market for high quality secondary raw materials.

From 2020 onwards sustainable finance is the defining narrative that also contains the goal of mainstreaming CE finance. The principles behind the circular economy and sustainable finance for the EU are threefold, the EU wants to improve

- Internationally competitiveness of the EU economy;
- A socially compassionate and equitable society;
- Environmentally sustainable production and consumption.

The role of finance and investment is seen as crucial to mainstreaming the circular economy. Major step forward was taken on the 4th UN environmental assembly. There Asia, US and EU agreed that the issue of resource impact on the environment plays a much larger role than could ever be imagined. It is emblematic how EU policy with regard to resources has refocused from securing access to virgin raw materials, towards the generation and availability of secondary materials. The EU links this to the reduction of environmental pressures and sees the circular economy transition as a catalyst for jobs and growth. The EU focus is mostly on abiotic resources, which are mostly non regenerative within a

²⁴⁶ <https://www.eib.org/en/publications/access-to-finance-conditions-for-financing-the-circular-economy> -

²⁴⁷ https://circulareconomy.europa.eu/platform/sites/default/files/the_eib_circular_economy_guide.pdf

²⁴⁸ <https://ec.europa.eu/environment/circular-economy/>

reasonable timeframe of a year or a couple of years. Biotic resources are mostly considered in the context of biomass for biofuels.

Some EU member countries are accelerating their own national transitions to a circular economy. One such example is the Government of Netherlands with an objective to have a circular economy by 2050.²⁴⁹ Another example is France. For financial institutions that give service to companies subject to French law, there is an interesting development in to the alignment of French environmental law²⁵⁰ with principles of the circular economy. This law title “Fight against waste for the circular economy (lutte contre le gaspillage et économie circulaire) was passed in early 2020. France changed this law with the overarching purpose of achieving a neutral ecological footprint within the framework of respecting planetary boundaries. By doing so, France has pre-emptively taken up a legal position within the EU-27 regarding laws mandating circular economy practices²⁵¹. The 130 articles contain many details on the boundaries and strategic targets to manage and prevent waste production.

The law remains complex with many different underlying timelines and many boundaries between sectors and subsectors:

- France aims at the use of 100% of recycled plastics by 2025 and wants to phase out the use of single use plastics by 2040;
- France legislates to reduce food waste, by 2025, by 50% compared to its 2015 level in the areas of food distribution and collective catering and, by 2030, 50% compared to its 2015 level in the areas of private consumption, production, processing and restaurants;
- France also legislates extended producer responsibility (principe de responsabilité élargie du producteur) regarding obligatory reuse and prevention of waste from commercial goods that run the risk of remaining unsold due to fashion or overstocking.

Consultation question 10:

Do you consider the geographical coverage sufficiently complete? Do you have any other suggestions of examples to include?

²⁴⁹ <https://www.government.nl/topics/circular-economy>.

²⁵⁰ http://www.assemblee-nationale.fr/dyn/15/dossiers/lutte_gaspillage_economie_circulaire

²⁵¹ <https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000041553759&dateTexte=&categorieLien=id>

1. Survey questions

The following questions were asked in the survey to stakeholders from the financial industry:

What is circular economy (CE) ?
The CIRCULAR ECONOMY (CE) is an operationalization for businesses growth to implement the much-discussed concept of sustainable development by keeping resources at the highest possible value during their life time by reducing waste in our economies. In this way CE forms an alternative to linear economy operating from a take-make-waste model that degrades resources to waste faster and in large volumes.

What is circular economy finance?
Circular Economy Finance is the role that the financial sector plays in stimulating economical growth to transition from a linear to a circular economy.

Why this survey?
UNEP is preparing a study with working title “Demystifying Circular Economy Finance”. This survey is part of this effort and serves a double purpose:

1. Raising awareness on opportunities, barriers and gaps for Circular Economy (CE) Finance

2. Polling knowledge level with stakeholders on Circular Economy in relation to the financial sector

How will the outcomes of the survey be used?
Your answers are part of the study. This UNEP research aims to provide insight into the transition towards a circular economy.

What is the focus of the survey?
The focus of this survey is on financial sector CE strategies in combination with CE market practices.

Used Abbreviation
CE = Circular Economy

- About you: Please share your name, function and company name with us (voluntary identification)
 - Name
 - Function
 - Company name
- About you: What business(es) are you active in? (multiple answers possible)
 - Banking
 - Insurance
 - Investing
 - Consultancy / Advisory
 - Other (free format)

- About you: Which of the following industry principles has your company subscribed to?
(multiple answers possible)
 - Principles on Responsible Banking (PRB)
 - Principles on Responsible Investment (PRI)
 - Principles on Sustainable Insurance (PSI)
 - None of the above
- About you: How familiar are you with the circular economy (CE) concept? (one answer possible)?
 - CE Expert
 - a little bit familiar with CE
 - Not familiar at all with CE
- About you: Does CE play a role within your financial company? (one answer possible)
 - Yes
 - I do not know
 - Definitely not
- About you: Has your company already done any assessment related to CE ? e.g. risk assessment of vulnerability of linear take-make waste business models? (one answer possible)
 - Yes
 - No
 - I do not know
- About you: What areas of CE integration do you see already in your financial company?
(multiple answers possible)
 - CE integrated in strategy / commercial targets
 - CE integrated in risk assessment
 - CE integrated in investing strategy
 - CE integrated in innovation strategy
 - CE integrated in pricing of financial products
 - CE integrated in procurement policy
 - CE integrated in mitigation of linear risks (take-make-waste)
 - I do not know
- About opportunity: Which sectors offer most CE related opportunity for the financial sector? (Please chose Top 3 - Multiple answers possible)
 - Chemicals
 - Construction
 - Electronics
 - Household appliances
 - Agriculture
 - Paper and packaging
 - Automotive
 - Health
 - Energy
 - Transportation
 - Nutrition
 - Personal care
 - Machinery
 - Apparel and textiles
 - Mining and metals

- Information Technology
 - I do not know
- About opportunity: Which geography offers most opportunity for CE related financial business? (multiple answers possible)
 - Asia
 - Africa
 - North America
 - Latin America
 - Europe
 - Australia
 - I do not know
- About gaps: What non-financial data do financial companies need for CE integration? (multiple answers possible,)
 - A circularity metric at product level
 - A circularity metric at company level
 - Data on resource scarcity
 - Data on product passport (what is in the product?)
 - Data on resource origin / flows
 - Data on environmental effects of resource flows
 - Data on resource toxicity
 - Data on recycled resource contents
 - Data on recycling rates of resources
 - Data on second hand value of resources
 - I do not know
- About barriers: What are the barriers that prevent CE to grow for your **financial** company? (multiple answers possible)
 - Lack of clear CE definition
 - Lack of uniform CE metrics
 - Lack of CE related customer demand
 - Lack of financial industry level CE dialogue
 - I do not know
- Is there anything this survey on CE has missed that you would like to share with us? (Free format answer)
 - Open entry
 - No comments, everything was covered

2. Acronyms

CE	Circular Economy	FTSE	Financial Times Stock Exchange
SDG	Sustainable Development Goals	GBP	Green Bond Principles
PRB	Principles Responsible Banking	SBP	Social Bond Principles
PRI	Principles Responsible Investing	SBG	Sustainable Bond Guidelines
PSI	Principles Sustainable Insurance	ICMA	International Capital Markets Association
ISO	International Standards Organisation	REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
GRI	Global Reporting Initiative	BREEAM	Building Research Establishment Environmental Assessment
SASB	Sustainability Accounting Standards Board	GRESB	Global Real Estate Sustainability Benchmark
WBCSD	World Business Council Sustainable Development	LEED	Leadership in Energy and Environmental Design
CTI	Circular Transition Indicators	WELL	Building standard with focus on human health and well-being
EMF	Ellen MacArthur Foundation	UNEA-4	Fourth session of the UN Environment Assembly
LTG	Limits to Growth	CBD	Convention on Biological Diversity
UNEP	United Nations Environmental Program	COP	Conference of the Parties
UNEP-FI	United Nations Environmental Program for Financial Institutions	NDC	Nationally Determined Contribution (to climate mitigation and adaptation)
ESG	Environmental Social & Governance criteria	AfDb	African Development Bank
EU	European Union	ADB	Asia Development Bank
EPR	Extended Producer Responsibility	DNA	deoxyribonucleic acid, (nucleic acid that contains the genetic code)
EBRD	European Bank for Reconstruction and Development	RFID	Radio Frequency Identification
DG FISMA	Directorate-General for Financial Stability, Financial Services and Capital Markets Union	VAT	Value Added Tax
EIB	European Investment Bank	GSSB	Global Sustainability Standards Board
OECD	Organisation for Economic Co-operation and Development	IRP	International Resource Panel
UCL	University College London	InRP	Indian Resource Panel
COVID	Coronavirus Disease	SEED	Supporting Entrepreneurs for Environment and Development
GT	Giga Tons	WFES	World Future Energy Summit
ILO	International Labour Organisation		
FAO	Food and Agriculture Organisation		
MOOC	Massive Open Online Course		

Table 2 Table with used acronyms and abbreviations

3. Useful resources

APPENDIX USEFUL RESOURCES: Key initiatives private sector transition and areas of intervention to boost circularity

- UNEP
- One Planet Network
- World Bank Group
- WBCSD circular economy programme
- OECD
- World Resources Institute
- Platform for Accelerating Circular Economy
- Ellen Macarthur Foundation
- World Economic Forum

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