Quick Scan - Taxonomy Circular Economy
Analysis based on input from Dutch financial institutions

Report commissioned by the Ministry of Infrastructure and Water Management from the Netherlands

Amsterdam, 29th of May 2019
AH/lk/19-369.1
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Executive summary

As the necessity to diminish Europe’s (EU) dependency on natural resources continues to increase, the circular economy has captured the attention of policy-makers, NGOs and businesses. The current ‘take-make-waste’ approach has not only become untenable, but the prospect of a circular economy also seems to reveal a multitude of opportunities in regard to sustainable growth, jobs and competitiveness. As financial institutions play a pivotal role in encouraging and enabling this journey towards circularity, the European Commission (EC) aspires to develop a EU taxonomy that proposes a classification system for climate, environmentally and socially-sustainable activities.

This study aims to provide direction on how to further develop a EU taxonomy from the perspective of Dutch financial institutions, enabling various parties to determine how activities can be classified as sustainable from a circular economy point of view. During interviews with a variety of Dutch financial institutions, input was obtained on their approach to assess economic activities for sustainability levels and/or contribution to the circular economy. In addition, the usability, feasibility and design of an EU classification system were discussed.

Interview results show that Dutch financial institutions largely adopt a holistic and qualitative approach to classify economic activities as green/sustainable and/or of contribution to the circular economy. No evidence was found that financial institutions make a distinction between product – and service categories. A few of the institutions have also developed their own metrics or indicators following risk based approaches with subsequent ambiguity in terminology and methodology. These metrics and indicators rely on non-financial data while norms for disclosing such information are currently still heterogeneous. The result is a fragmented market, with uncertainty and discouragement for investors, which produces a barrier for the transition towards a circular economy. Supervisory authorities could play an important role in maturing non-financial data reporting and thereby providing trustworthy and reliable data for the EC to establish taxonomy indicators.

Another complicating factor, mentioned during various interviews, is that the interpretation of sustainability and circularity is considered as constantly subject to change. What is regarded by organizations as sustainable or circular today, can be viewed entirely different in a few years’ time. Due to increased scientific and societal attention, evolving methods for data gathering and analysis and common frameworks, a higher level of uniformity has been reached about the concepts. How these developments are subsequently interpreted and incorporated within various financial institutions is currently still highly divergent. As a result, the development of a clear-cut classification system can not only be difficult but, according to some, also be too early.

This study makes three recommendations to support the development of an EU taxonomy from a circular economy perspective in the context of shifting definitions and divergent frameworks:

1. Adopt a sector prioritization

The first recommendation is to retain the Statistical Classification of Economic Activities in the EU Community1 (NACE) industry classifications as a focal point in the EU taxonomy, but to prioritize those sectors that are expected to have the highest impact on the transition towards a circular economy. By setting clear priorities, it will not only be possible to identify the level of circular improvements that can be achieved per NACE sector, but it will also enable governments to develop incentives focused on the relevant sectors. The prioritization mechanism should, at a minimum, align to the priority (sub)sectors as identified by the EC and Dutch government. Some examples of priority (sub)sectors include; biomass and food, plastics, manufacturing industry, construction sector and consumer goods. Further prioritization can take place based on two key drivers for the circular economy; levels of material intensity and levels of waste.

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Material intensity gains insights into scarce materials required to produce, process and dispose units required for products or services. This is suitable to measure beneficial developments over time as it identifies which sectors mostly rely on scarce materials. Focusing on the level of waste is useful as the circular economy aims to maximize the value of materials retained in the economy while increasing the reusability of waste and/or minimize waste levels.

2. **Adopt a criteria centered approach**

Next, in its current form, the EU taxonomy is activity focused. Limitations due to the lack of measurability and comparability of data currently make it difficult to design a comprehensive list of activities that classify as green/sustainable from a circular economy perspective. Also, an activity based approach can result in the exclusion of activities that could generate a meaningful contribution to the circular economy. Instead, an EU taxonomy would be most helpful for market practitioners when it is inclusive, encourages companies to contribute to a circular economy but such that it will prevent greenwashing. It is therefore suggested to not develop an exclusive list of activities for the circular economy, but to adopt a criteria centered approach.

First, it is recommended to use the strategic goals with regard to raw material usage from the program ‘A Circular Economy in the Netherlands by 2050’ as a requirement to classify an economic activity as circular. These goals state that i) raw materials in existing supply chains should be utilized in a high quality manner, ii) in case new raw materials are needed, fossil-based, critical and non-sustainably produced materials are replaced by sustainably produced, renewable, and generally available raw materials, and iii) we should develop new production methods, design new products and organize areas differently as well as to promote new ways of consumption.

Second, it is recommended to establish a list of criteria based on negative selection to prevent economic activities are classified as circular or as a contribution to the circular economy while they are harmful or only an improvement to the linear economy.

Third, the 9R framework is recommended to use to assess the level of circularity, running from fully linear to fully circular strategies (recover, recycle, repurpose, remanufacture, refurbish, repair, reuse, reduce, rethink, refuse).

Fourth, it is proposed to adopt the criteria from the Ellen MacArthur Foundation to also measure the impact of investments. They have operationalized the R principles by formulating indicators that measure how effective a company is in making the transition from linear to circular models. Study results shows that these criteria are best for fit given current market maturity levels as these criteria are focused on key drivers of the circular economy: material utility and waste utility. In sum, the Ellen MacArthur criteria follow a risk based approach that measures how much a product’s materials circulate by looking at the virgin feedstock, waste, linear flow and utility, minimum drivers for change, and benefits of circular models.

3. **Adopt a dynamic and phased approach to measure the impact of economic activities**

It is important to realize that we will not become fully circular when the criteria centered approach is adopted and the EU taxonomy comes into force. A growth model will be necessary to stimulate circular investments and transition from a linear to a fully circular economy while preventing greenwashing. As a result, this study recommends a four phased growth model approach to set standards per criterion and to be able to measure improvements in steps that organizations take to contribute to the circular economy transition. A phased approach is required to encourage innovation, leave room for the needed adjustments and to grow with market and non-financial data maturity levels. Ultimately, setting such short and long term standards will create the required flexibility to ensure the taxonomy remains useful and applicable as it leaves room for improvement for those moving towards higher levels of circularity instead of anchoring fully circular activities. The proposed phases are as follows:
The first three phases of this approach are established based on the preferred risk based method for financial institutions to make investment decisions. The final phase builds on the theory of necessary system change of the circular economy.Whilst phase 1 to 4 suggest a sequential approach, all phases can be executed simultaneously.
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1. Introduction

1.1 Background
The EC formulated the Action Plan on Financing Sustainable Growth. It presents a plan that focuses on sustainable investments in order to achieve sustainable growth. In addition, it aims to foster transparency in financial and economic activities and manage financial risks that arise from, for example, environmental degradation and climate change. The action plan outlines ten actions. The development of a EU classification system (e.g. taxonomy) is flagged as the most important and urgent action to start with and will be the a reference point for other actions from the Action Plan.

A group of experts, the Technical Expert group on Sustainable Finance (TEG), has been appointed to assist in the development and implementation of the EU taxonomy. The objective of the taxonomy is to, from the financial institutions’ point of view, help classify economic activities as environmentally sustainable for investment purposes, to contribute to EU energy and climate targets and the transition to a low carbon and more environmentally sustainable economic model. It will include commonly agreed upon principles, reliable and comparable information on sustainable investments, a description of areas that are in need of investments, and investor duties for private, public and financial companies. By design, the taxonomy aims to enhance transparency on sustainable opportunities and risks for investors to act upon. After finalization, the taxonomy will be integrated into EU law.

1.2 Challenges
The Dutch Social and Economic Council (Sociaal Economische Raad - SER) believes that sustainable investments will be the key driver for sustainable growth and the transition towards a circular economy. Yet, it currently still proves difficult to receive investments for circular initiatives because of increased exposure to financial risk. Some examples are: increasing cost prices (more social costs discounted in prices), instability of government policies (subsidiaries under pressure), information asymmetry with regard to circular economy definitions, risk profiles, assessment methods and the absence of a proven track record. The Dutch SER does believe that the majority of circular economy business models can be financed through existing constructs, but they are currently financially less interesting than other investment opportunities.

Another factor that limits growth of investments in sustainable and/or green economic initiatives is that terminology around circular economy varies widely. Some Dutch financial institutions already assess economic activities on a voluntary basis to determine the level of sustainability and/or circularity. However, metrics and criteria used vary widely, which make these assessments costly. Apart from a lack of cost-efficiency, it also proves to be burdensome in terms of time. An unambiguous classification system to decrease this complexity in the field would therefore be helpful.

1.3 Objectives of this study
The Ministry of Infrastructure and Water Management (I&W) has commissioned this study to provide input for the EU taxonomy from the perspective of the circular economy while enabling the financial sector to assess economic activities as sustainable in regard to their contribution to a circular economy. As a result of this objective, this research mostly relies on insights from desk research, the Dutch financial sector in regard to the circular economy and circular economy experts. This report has the following scope:

- Outline frameworks and guidelines from the EC, Dutch Central Government and Dutch financial institutions that assess sustainable and/or green economic investment opportunities from a circular economy perspective;
- Provide concrete suggestions from Dutch financial institutions’ point of view for criteria to determine whether an economic activity can be classified as green/sustainable and/or of contribution to the circular;
- Outline whether it is necessary to define a classification for various products and service categories, and if so, how;

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1 Introduction chapter based on proposal and information as provided by I&W
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- Provide quick scan results of existing structures and classification systems in the Dutch financial services market and recommendations for a taxonomy design

1.4 Reading guide
This report follows a funnel-like approach, from rather broad and academic findings based on desk research, to more specific information and recommendations from eight interviews with a variety of Dutch financial institutions, a workshop (with participants from the Ministry of Infrastructure and Water Management, the expert group, and reflection group) and stakeholder consultations.

In chapter two, the background and definition of a circular economy as used in this report is elaborated upon based on desk research. Chapter three describes relevant frameworks and guidelines established by the EC, the Dutch Government and Dutch financial Institutions to provide insights into the steps being taken in the transition towards a circular economy. This chapter includes results from desk research, interviews and stakeholder consultations. In chapter four, the main criteria to label activities as sustainable (or green) and/or of contribution to the circular economy are described. Findings in this chapter are further supplemented with perspectives from interviewees, workshop participants and various stakeholders. In chapter five, a selection of existing classification systems/taxonomies from financial institutions are evaluated together with a progress update on the EU taxonomy design by the TEG. This chapter also includes results from desk research, interviews, the workshop and stakeholder consultations. Using key findings from academic papers, interviews with eight Dutch financial institutions and the workshop, conclusions and recommendations for a taxonomy design are provided in chapter six.

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6 Banks, institutional investors, private equity funds, venture capital funds and crowdsourcing platforms
2. Setting the Scene

2.1 Background and definition

Sustainability and circularity related topics are increasingly gaining attention from academia, governments and public and private institutions. In setting frameworks and guidelines, different institutions use a wide variety of definitions. This chapter therefore describes the background and definitions used in this study.

Many see sustainability as environmentally friendly or green. It is also used for strategy purposes in terms of sustainable competitive advantage, to point towards a sustained favorable position over competition. Even though these two interpretations seem worlds apart, the commonality is found through the notion of sustenance. First formulated by the Brundtland Commission, sustainable development is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

In literature and practice, a circular economy has been viewed as a condition for sustainability, a beneficial relation or even a tradeoff. To prevent vagueness and to underline the holistic nature of both concepts and their activities, this study regards sustainability as an umbrella term.

When looking at the definition of the circular economy, it is important to understand the difference between economic models. The EC has defined three economic models:

- Linear economy: raw materials from the earth are disposed after usage
- Reuse economy: the majority of the raw materials are re-used
- Circular economy: raw materials are never wasted. Growth in natural resources is linear with economic growth

Given the fact that global demand for natural resources is expected to grow faster than supply can grow, the need for a transition from a linear economy towards a circular economy is evident. This, together with the risks of soil exhaustion, increased environmental pressure and geopolitical tensions, has made the transition towards a circular economy a top priority for global, EU and national politicians.

Although economic models are well thought through, definitions of a circular economy vary widely. In this report, the circular economy definition and the figure below of the Netherlands Environmental Assessment Agency (PBL) are used (figure 1 and 2). According to PBL, the circular economy can be defined as "the optimal (re-)use of raw materials and resources and the prevention of waste and harmful emissions to soils, water and air wherever possible: resources continue to be applied in a way that generates the highest economic value and the least environmental damage". The taxonomy should define circular economy in a way that provides sufficient incentives to become fully circular. In other words; investments in the circular economy should not only minimize any negative impact, but to also maximize positive impact. Thus, only economic activities which actually contribute to the circular economy should be classified as circular. For example, incinerating unsorted household waste for energy generation cannot be qualified as circular, since it does not retain the use value of the materials. This would be an investment in the linear economy creating a lock-in preventing the transition to a circular alternative. In the below figure, 'R9. Recover energy' is an example of the linear economy.

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7The Circular Economy – a new sustainability paradigm?: https://www.repository.cam.ac.uk/bitstream/handle/1810/261957/The%20Circular%20Economy%20-%20a%20new%20sustainability%20paradigm_accepted%20version.pdf?sequence=1&isAllowed=y
8 What is sustainable development: https://sites.hks.harvard.edu/sustsci/ists/docs/whatissD_env_kates_0504.pdf
9 The Rio declaration on environment and development: http://www.unesco.org/education/pdf/RIO_E.PDF
10 The Circular Economy: a new sustainability paradigm: https://www.repository.cam.ac.uk/bitstream/handle/1810/261957/The%20Circular%20Economy%20-%20a%20new%20sustainability%20paradigm_accepted%20version.pdf?sequence=1
Figure 1: a circular economy is about more than recycling (generic view by PBL)\(^\text{11}\)

Figure 2: Circular economy strategies, within the production chain, in order of priority (PBL)\(^\text{12}\)

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\(^{11}\) Opportunities for a circular economy: [https://themasites.pbl.nl/circular-economy/](https://themasites.pbl.nl/circular-economy/)

2.2 Opportunities

The transition to a circular economy will significantly contribute to the EU sustainability efforts. Such a transition not only reduces environmental pressures, but also minimizes the EU’s dependency on imports. As the EU’s economy remains very resource-dependent, volatility of prices and scarcity of resources to a great extent impact its competitiveness. By protecting businesses from these risks the EU’s resilience can be invigorated. Proponents of a circular economy highlight the opportunities in regard to business model innovations that produce more efficient ways of consuming and producing. Besides stimulating growth, under the right rules, innovation can also create jobs, as a circular model will mean a transition from a labor-scarce raw material sector to a labor-intensive recycling sector.

Initial estimates by the Netherlands Organization for Applied Scientific Research (TNO) show that becoming circular in the Netherlands could generate additional turnover of €7.3 billion, 54,000 jobs, 100,000 kilotons reduction in raw materials (accounting for 1/4th of the total annual import) and €1.5 up till 8.4 billion growth in GDP for the Netherlands only. In the EU, a circular economy can lead to additional economic growth of €550 billion (which accounts for 2 million jobs).

As the pressure to diminish dependence on natural resources continues to increase, the idea of a circular economy is progressively becoming a compelling alternative model for decision-makers in governments, NGOs and businesses. Its potential to boost competitiveness, create jobs and foster sustainable growth has encouraged many to rethink conventional linear ‘take-make-dispose’ approaches. At the same time, the multitude of actors involved play a great part in creating the right conditions for the circular economy to grow and prosper. The engagement of a wide range of actors has produced diverse initiatives and partnerships that each promote circular strategies in different levels and sectors, which will be further addressed in the next chapter.

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13 Closing the loop – An EU action plan for the Circular Economy: https://eur-lex.europa.eu/resource.html?uri=cellar:8a8ef5e8-99a0-11e5-b3b7-01aa75ed71a1.0012.02/DOC_1&format=PDF
14 Circular Economy to have considerable benefits, but challenges remain: https://www.eea.europa.eu/downloads/29d98ab55d1f4eac958ae412804315eaa/1472648268/circular-economy-to-have-considerable.pdf
3. Policies, guidelines and frameworks

3.1 Background
A large amount of circular economy policies, guidelines and frameworks have been established over the past few years as the circular economy has gained more attention. For the scope of this study, this chapter provides the main conclusions based upon relevant policies, guidelines and frameworks from the EC, the Dutch Government, and Dutch financial institutions\(^{17}\). More details on these documents are provided in appendix 7.1. Most often, Dutch financial institutions have not established a circular economy specific policies, guidelines or framework, but address circular elements in their sustainability documents. When considered relevant for this study, conclusions upon a selection of these frameworks and guidelines are also discussed.

![Figure 3: overview of major circular economy policies, guidelines and frameworks\(^{18}\)](image)

3.2 European Commission
In response to the challenges that modern societies are facing, the EC has published various policies and reports on the circular economy. Overall, the EU Action Plan for the Circular Economy and Circular Economy Package reflect the direction the EC aspires to go, such as changing the way we design, produce, use and recycle plastics, making it valuable frameworks to consider in this study. In addition, the EC has outlined several priorities and underlying objectives related to plastics usage, food waste, critical raw material usage, construction and demolition, and biomass and bio-based products. These priorities put a clear emphasis on building a strong foundation on which investments and innovation can thrive\(^{19}\). By keeping these priorities in mind, the taxonomy will not only assist financial institutions in determining sustainable and/or green economic investment opportunities but will also contribute to the EC’s continuous effort to transform EU’s economy into a closed loop circular economy.

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\(^{17}\) Banks, institutional investors, private equity funds, venture capital funds and crowdsourcing platforms

\(^{18}\) Deloitte analyses

3.3 Dutch government

In the government-wide program A circular economy in the Netherlands by 2050\(^20\), the Dutch government presents its plans to achieve a circular economy in which raw materials are used in the smartest possible way. To reach this goal, the Dutch government has formulated the ambitious plan of having a circular economy by 2050 and a 50% reduction in the use of primary raw materials by 2030. Besides exploring the challenges and possibilities of realizing such an objective, the program also identifies five key priority sectors (biomass and food, plastics, manufacturing industry, construction sector and consumer goods), which could have the largest impact in the transition towards a circular economy.

Key for this study is that the program acknowledges that circular economy activities have different risk profiles, depreciation periods and business models, which is important to consider in a taxonomy design. In addition, it provides insights into those sectors that are considered to be most ready to transition to circular. Furthermore, it underlines the need for incentives to stimulate investments in the circular economy, emphasizing the need for a uniform classification system to enhance transparency in the market and facilitate financial decision making. For this reason, the focus areas set in this program are important elements to consider in this study.

3.4 Financial Institutions

Financial institutions play an important role in encouraging and enabling the journey towards circularity. By focusing on long-term value investments, financial institutions can encourage the transformation to a low carbon and circular economy. More financial institutions now understand the added value of sustainable or circular investments, and more importantly, understand that engaging in non-sustainable or non-circular investments generate risks. An example of such risks are investments into assets (e.g. fossil fuel) that are at risk to no longer earn an economic return prior to the end of their economic life and become stranded assets on the balance sheet.

Although the Dutch financial sector acknowledges investment opportunities and benefits of circular business models, financing such initiatives comes with barriers\(^21\). Developing a solid and viable business case that is able to compete with linear business can be troublesome. After all, circular businesses not only have different risks profiles than other linear investments, they also produce distinct cost-benefit distributions, revenue models and depreciation terms. At the same time, negative environmental externalities in linear business are often not taken into account whereas uncertainties about the future value of resources and materials can impact the decision-making of financial institution\(^22\). Not being able to make a solid risk analysis of circular investments as well as uncertainties around the viability and overall risks of circular initiatives have made financial investments challenging to obtain for circular initiatives. To properly deal with these issues, the financial sector has taken steps to develop customized solutions. As a result, policies, guidelines and frameworks have been developed to encourage a sustainable future through financing, investments and other projects. A few institutions also translated these guidelines and frameworks into assessment tools, performance indicators to measure (the level of) circularity or classification systems. Later in the report, some examples of classifications systems are further elaborated on. Although societal orientation is increasing, practical implications still remain in an early development stage for the majority of Dutch financial institutions. Research shows that those who do have assessment tools, performance indicators or classifications systems in place, largely focus on more general sustainability measurements. Two examples are: the UN’s Sustainable Development Goals (SDGs), measuring the impact of an economic activity or organization on (one of) these SDGs, and the Environmental, Social and Governance factors (ESG), measuring the risks faced in relation to (one of) these factors when investing in or financing an activity or company. If (the level of) circularity is assessed, Dutch financial institutions largely build on the circular economy business models, a life cycle analysis, or the 9R framework as guidelines to enable a qualitative, risk-based assessment. More expertise and knowledge will be necessary to fully make use of the sectors’ ability to put the circular transition higher on the list of priorities\(^23\). This will require a new way of thinking in which financial institutions stimulate companies to think of their linear business risks and methods to mitigate them. It should however be noted that there are also several examples of assessment tools that already apply criteria that are specifically geared towards circularity. For the purpose of this study, these criteria will serve as input for the taxonomy design recommendations and are further elaborates upon in chapter 4 and 5 of this study.


4. Criteria to classify activities

4.1 Background
To gain a better understanding of current classifications used by Dutch financial institutions, this chapter will map existing criteria that label activities as sustainable (or green) and as circular or contributing to the circular economy. A review of indicators described in the frameworks and guidelines of Dutch financial institutions are supplemented with findings from the interviews conducted with eight financial institutions. Although the main focus of this study is the circular economy, it is relevant to also review activities from a sustainability perspective to determine if the impact of an activity is sustainable. The relevance of impact assessments is also emphasized by the majority of financial institutions who argue that the impact of the activity should be sustainable in order for that activity to classify as circular and/or of contributing to the circular economy. This means that both the positive as well as negative impact should be considered when labeling activities as green, sustainable, and contributing to the circular economy.

4.2 Criteria to classify activities as green/sustainable
Subsequent criteria to analyze and measure the contribution to sustainable development have been proposed by the United Nations (UN). These SDGs serve as a blueprint to achieve a better and more sustainable future for all, addressing key challenges the world faces. Some example goals include zero hunger, responsible production and consumption, climate action and life below water. Through the SDGs, sustainability is linked to the circular economy as the latter is a way to influence these goals. Circular economy according to the SDG’s is defined in terms of optimal (re-)use of raw materials to prevent harmful emissions. In the frameworks and guidelines of Dutch Financial Institutions we often see four SDGs linked to the circular economy:

- SDG 12 – Responsible production and consumption: recycle paper, plastic, glass & aluminum
- SDG 13 – Climate action: educate young people on climate change to put them on a sustainable path early on
- SDG 14 – Life below water: avoid plastic bags to keep the oceans safe and clean
- SDG 15 – Life on land: plant a tree and help protect the environment

Next to the SDGS, the ESG criteria are a common metric used by Dutch financial institutions to determine the (financial) risk level of an investment or other economic activity. This development is in line with one of the goals in the Action Plan for Sustainable Financing that states the EU wants to strengthen its financial stability by incorporating ESG factors into investment decision making. A complication of using ESG criteria is the complexity to both include a financial institution’s social or environmental contribution as well as financial performance in the same metric. Another major challenge is the availability of generally accepted metrics, frameworks and measurement instruments. Usually, organizations use a single production factor to measure their contribution to the goal, such as a CO2 reduction per year, or waste recycled per year.

The majority of the Dutch financial institutions that were interviewed for this study also use SDGs or ESG criteria to assess projects, loans or other activities. In case SDGs are used, most often a qualitative estimation is made of how much the particular activity will contribute to (one of the) SDGs. When using ESG criteria, the majority of institutions also adopt a holistic approach with the biggest emphasis on the “E” (environmental), as this topics has increasingly gained attention over the past few years. An ESG score is then provided based on the level of (financial) risk faced when engaging in the particular economic activity. These qualitative ratings are often provided on client conversation(s). The main reason why qualitative assessments are chosen over quantitative methods, is because the majority of indicators are currently difficult to quantify. For example, to finance the Lingewaard floating solar park, ING values the balance between renewable energy use and the impact of floating panels on the eco-system compared to conventional solar panels, for which data is absent. Some frontrunners managed to already quantify some indicators, other Dutch financial institutions are taking value steps in making indicators quantifiable, but expect this to take some time to materialize.

When using ESG criteria or SDGs in investment decision making, some financial institutions do not only assess the design, production and construction of the product or service, but also make estimates regarding its outcome or impact. The main reason

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24 The Sustainable Development agenda: https://www.un.org/sustainabledevelopment/development-agenda/
26 Netherlands home to first floating solar park in Europe: https://www.ing.com/Newsroom/All-news/Netherlands-home-to-first-floating-solar-park-in-Europe.htm
for doing so is that, for example, the process to manufacture a product can be circular, but the product itself (e.g. outcome) is not sustainable. If we take ice cream as an example product, the production itself can be sustainable or circular. However, the product itself cannot be perceived as sustainable and thus the overall sustainability score will be lower than those of products that do have a positive impact on society. It does appear to be challenging for Dutch financial institutions to assess each component of the value chain, and, for the majority of activities, to measure the impact.

Another method for a broader assessment of environmental impacts is the Life Cycle Assessment. LCA is a tool that assesses the entire lifecycle of a product or service in each step of the value chain to determine environmental impact. Also called a cradle-to-cradle analysis. It tries to identify all steps a product or service has to go through from its conceptual phase to its eventual use. It includes the extraction of resources, production, transport, use and waste management of the product or service. However, it is hard to identify the exact boundaries of the product system. When does any supporting activity start and stop? Does the vehicle in which a product is transported increase the products footprint? What about the production of the tires on the vehicle? Although financial institutions agree that LCA is a useful method to classify activities, they acknowledge the difficulty to determine exact boundaries and recognize that the process can be time consuming and costly. Again, uniformity in method and regulations are complicating factors that make LCA highly volatile and costly.

A last relevant tool that assists companies in measuring their impact is the eco-efficiency analysis (EEA). The term 'eco-efficiency' was coined by the World Business Council for Sustainable Development (WBCSD) and relies on the idea of achieving more value from lower inputs of energy and materials, while also reducing emissions. Its related tool is meant to help companies and external stakeholders by measuring progress towards economic and environmental sustainability. Similar to the LCA method, the EEA runs into its own set of problems. Despite the availability of data, it can be difficult for larger companies to compile information to measure eco-efficiency performance. In practice, most companies and their systems are not set up to produce the required information for the enterprise as a whole. Instead information is often tracked on a process or sub-process level. In addition, data might not be disaggregated adequately to identify the needed number of indicators for specific products or process. No Dutch financial institution interviewed confirmed that they use the eco-efficiency analysis.

Next to the most frequently used criteria, various other indicators have been presented by academia, governments and (financial) practitioners. As it is not within the scope of this research to discuss all the proposed criteria in detail, relevant criteria that provide a comprehensive view of the most used criteria in the market are summarized in table 2 (appendix 7.3).

### 4.3 Criteria to classify activities as circular or of contribution to the circular economy

Multiple criteria and scoreboards have been developed to measure performance in various areas that contribute to the development of the circular economy. Existing assessment criteria generally focus on different spatial levels, each producing their own assessment indicators. At the same time, there is no clear-cut separation between the different levels, as the various categorizations also reflects an overlap.

#### Background

To start, macro level indicators are used to evaluate, monitor and improve the circularity of policies and programs. By promoting circularity, sustainable production and consumption activities are stimulated to create a recycling-oriented society. In some cases, macro level indicators also focus on the characteristics of a country or region in relation to other countries. For instance, in 2018 the EC proposed the Circular Economy Monitoring Framework that identifies success factors in Member States and assesses the progress towards a circular economy. Two other high profile examples of a macro level measurement framework are developed by the Chinese and Japanese governments. Based on the 3R principle (framework that prioritizes according to the level of circularity), China developed the Circular Economy Promotion Law in 2008 that promotes circularity as a national regulatory

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30 Indicators for a Circular Economy: https://cirec.europa.eu/has/sites/default/files/summa_-_indicators_for_a_circular_economy.pdf
policy priority. Under the Japanese Basic Law for Establishing a Material-cycling Society\textsuperscript{34} (2000), indicators have been developed to measure the efficiency of resource recovery, societal efforts towards circularity and material flows compared to the rest of the world.

Meso level indicators mostly analyze on an inter-firm level by focusing on the development of eco-industrial parks and networks. Sharing local infrastructures and the exchange of byproducts are two examples of meso level approaches. To illustrate, in the United Kingdom, a network of more than ten thousand industrial companies participate in the National Industrial Symbiosis Program\textsuperscript{35}. The network aims to identify mutually profitable transactions to improve the use of undervalued or underused resources such as waste. By zooming in on industries, branches of production, categories of consumptions and materials, the measuring indicators attempt to control and enhance performance.

Lastly, micro level indicators analyze on a company, product or consumer level. Besides analyzing the adoption of circular economy principles and the execution of strategies to increase circularity of production systems, indicators on a micro level also devote attention to a company’s supply chain. To achieve effective circularity, it is regarded as essential to consider the possibilities for waste avoidance and reduction from the development to the end-of-life stages of the life cycle. An example of a used measurement tool for product circularity performance is the Circular Economy Toolkit (CET) that identifies the potential for improvement in a product’s circularity. As a result, it provides information at every stage of the lifecycle. A complete overview of relevant circular economy criteria can be found in Table 3 (appendix 7.4).

\textit{Interview results}

In reviewing existing criteria of financial institutions, hardly any reference was found of companies that have developed a set of criteria to label activities as circular or of contribution to the circular economy. Similar to sustainability criteria, the level of circularity by Dutch financial institutions is largely determined through a holistic, qualitative assessment. Circularity is then part of the ‘E’ within the ESG rating provided to a project, investment or other activity. In some cases, (elements from) the 9R framework are used to access the level of circularity. Some financial institutions also attempt to assess circularity or try to predict circular improvements by looking at a company’s business model. They then compare a company’s business model to the circular economy business models (most common circular economy business models further explained in appendix 7.3) to assess if operations are circular. Although circular economy business models can be a valuable tool to use, they do show some limitations. The product as a service business model for example offers products through rental payments or on lease terms, which could lead to less sustainable product use (e.g. a lease contract for a car does not automatically lead to lower pollution levels). Another valuable instrument to assess a company’s movements towards a resource-efficient, circular economy business model is the so-called Product Service System (PSS)\textsuperscript{36}. PSS is defined as ‘tangible products and intangible services designed and combined so that they jointly are capable of fulfilling specific customer needs’\textsuperscript{37} and can include various business models ranging from pure product to pure services. By reviewing frameworks and guidelines of Dutch financial institutions, no evidence was found that PSS is broadly used in the market yet. This finding was also confirmed during interviews with a variety of stakeholders in the financial sector, who also indicated that they currently do not make a distinction between product and service categories when assessing an economic activity for its contribution to the circular economy. Product and service categories, as well as the PSS model are further explained in appendix 7.2.

Much research has been conducted to determine criteria that assess whether an activity is circular. Although this has resulted in a multitude of valuable criteria, it has also made it challenging to make comparisons\textsuperscript{38}. The playing field lacks transparency and practical applicability as necessary information to determine the scores of various criteria is often absent. These obstacles could explain why financial institutions hardly make use of established indicators to determine whether an activity, besides being sustainable, also contributes to a circular economy. There is a need to formulate clear and simple criteria that take this lack of information into account. Interview results showed that currently Dutch financial institutions assess investment opportunities based on qualitative considerations. During these assessments, the extent to which activities contribute to sustainability goals is

\begin{footnotesize}
\begin{enumerate}
\item National Industrial Symbiosis Program: http://www.nispnetwork.com/
\end{enumerate}
\end{footnotesize}
leading. Circularity is often not a distinct consideration, with the exception of a few frontrunners in the field. The criteria that will be selected should therefore enable financial parties to make a qualitative assessment of an activity’s contribution.

**Recommendations following interviews**

There are a number of strategic goals established for the transition to the circular economy in the Ellen MacArthur Foundation\(^{39}\) and the program ‘A circular Economy in the Netherlands by 2050’\(^{40}\). In order to establish circular economy criteria for investment purposes, this study recommends to use these goals as a requirement to classify an economic activity classifies as circular. These goals include:

- **Raw materials in existing supply chains are utilized in a high quality manner.** Increase in efficiency can lead to a decrease in the demand for raw materials in existing supply chain;
- **In cases in which new raw materials are needed, fossil-based, critical and non-sustainably produced raw materials are replaced by sustainably produced, renewable, and generally available raw materials.** Generally available raw materials are the raw materials that nature needs for life (iron, silicon, carbon, magnesium, sodium, potassium, calcium, nitrogen, oxygen, phosphorus, sulphur, hydrogen, no biomass). This preserves our natural capital and enables us to make our economy more future-proof and less dependent on (the import of) fossil sources;
- **Develop new production methods, design new products and organize areas differently. We also promote new ways of consumption.** This leads to different supply chains that give additional impetus to the desired reduction, replacement and utilization.

This study proposes to establish a list of negative criteria, preventing some activities from being classified as circular. Activities should only be qualified as circular;

- If they prevent waste and harmful emissions; and
- Optimize the (re-)use of raw materials and resources.

These negative criteria can be defined with help of the guidelines from the program A Circular Economy in the Netherlands by 2050\(^{41}\) and the Ellen MacArthur Foundation\(^{42}\). More examples include;

- Substances used in manufacturing should be safe and sound. They should not damage health or harm the functioning of ecosystem;
- Products should be fully reusable and recyclable or can be safely released into our environment as ecologic raw materials
- Circular economy products and services should prevent pollution in order to save money spent on water purification and over time, save on the costs of clean-up and health;
- Products or services should not have a negative impact on safety;
- Should not harm or abuse people; and
- Should not harm human health.

Lastly, this study proposes to build on the 9R criteria and criteria established by the Ellen MacArthur Foundation (summarized in table 1) to also measure improvements from linear to circular. In line with the results of the desk research and financial market preferences, it is argued that the 9R approach will be the most fitting framework as it is widely used in practice and has sound academic foundation. The Ellen MacArthur Foundation further builds on the 9R framework to measure how well a product or company performs in the transition from linear to circular economy business models\(^{43}\). Relying on such comprehensive research will contribute to the adoption of the taxonomy as it provides an acknowledged and well used model. Another important argument


for such a choice is that the Ellen MacArthur Foundation criteria have been established in close collaboration with companies to reflect current industrial reality and needs regarding product circularity44.

The Ellen MacArthur criteria are developed on a product and a company level and focus on the degree to which linear flows have been minimized and restorative flows maximized for their component materials. The company-level methodology builds on the idea that material circularity of a company can be built up from the material circularity of the company’s products. This means Material Circular Indicators (MCIs) for all product types are aggregated and suitably weighed45. The MCI gives a value between 0 and 1 where higher values indicate a higher circularity. The following inputs are used to calculate the MCI for a product:

- Input in the production process (e.g. input coming from virgin and recycled materials and reused components);
- Utility during use phase (e.g. the intensity and duration the product is used, compared to an industry average product of similar type);
- Destination after use (e.g. amount of material going into landfill);
- Efficiency of recycling (e.g. efficiency of the recycling processes used to produce recycled input).

In addition, the MCI proposes complementary risk indicators and impact indicators. The complementary indicators consist of the minimum drivers for change and aim to gather additional information on potential risks in relation to business priorities (e.g. scarcity and toxicity). The idea is to give an indication of the urgency of implementing certain circular practices46. Impact indicators (e.g. energy usage and CO2 emissions) provide insights to determine how levels of material circularity affects other impacts of interest to businesses and their stakeholders. To be specific, it discusses the benefits of circular models. As a result, circularity is not measured as an objective in itself, but is related to the impact and change it creates. Important to note is that when the required information is not available, generic industry data or best approximations may be used instead47. By doing so, the Ellen MacArthur Foundation acknowledges an observation made by various financial institutions in this study, namely that there is still a lack of non-financial data available. The assessment tool therefore also leaves room for future improvements.

In addition to the Ellen MacArthur criteria, supplementary criteria were proposed by various interviewed parties during this study:

- infrastructure intensity (travel distance for a product / service);
- retained value in the chain.

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### Table 1: Ellen MacArthur criteria to measure circularity

<table>
<thead>
<tr>
<th>Type of indicator</th>
<th>Indicator</th>
<th>Required data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General MCI Indicators</strong></td>
<td>Virgin Feedstock</td>
<td>The virgin feedstock is the fraction of feedstock from virgin sources. Any product that contains no virgin feedstock, is completely collected for recycling or component reuse.</td>
</tr>
<tr>
<td></td>
<td>Unrecoverable Waste</td>
<td>Unrecoverable waste includes waste going to landfill, waste to energy and any other type of process after the use of a product where the materials are no longer recoverable.</td>
</tr>
<tr>
<td></td>
<td>Linear Flow Index</td>
<td>The proportion of material flowing in a linear fashion, that is, sourced from virgin materials and ending up as unrecoverable waste.</td>
</tr>
<tr>
<td></td>
<td>Utility</td>
<td>The utility of a product measures how long and intensely it is used compared to an average product of the same type. The utility is derived from the lifetime and functional units of a product (compared to an industry-average product of the same type).</td>
</tr>
<tr>
<td><strong>Complementary Indicators</strong></td>
<td>Material Price Variation Risk</td>
<td>Provides an indication of the change in material price for a given product, on an annual basis and a given time horizon. It also provides statistical analyses to indicate the trend over the same period</td>
</tr>
<tr>
<td></td>
<td>Material Supply Chain Risks</td>
<td>Risks concerning the continuity of supply of a material for a product are related to the availability of that material for purchase by the product's manufacturer.</td>
</tr>
<tr>
<td></td>
<td>Toxicity</td>
<td>This includes identifying materials and/or substances that may fall under legislation or standards that may restrict their use in products (e.g. through EU REACH, EU RoHS Directive).</td>
</tr>
<tr>
<td><strong>Complementary Indicators</strong></td>
<td>Energy Usage and CO2 Emissions</td>
<td>The calculation of this requires knowledge of the energy and carbon intensity of materials as well as the energy used in the product’s manufacture and disposal (e.g. through LCA method).</td>
</tr>
<tr>
<td></td>
<td>Water</td>
<td>The calculation of this for products requires knowledge of the water intensity of materials (e.g. through ISO standard for reporting water footprints).</td>
</tr>
</tbody>
</table>

Although the criteria from the Ellen MacArthur Foundation are widely supported and used, they mostly focus on the materials present in a final product. As a result, waste and retained value in the supply-chain is not adequately weighed when making an assessment. Due to a lack of available data, such an approach is comprehensible. Yet, to ensure that the supply-chain is taken into account to some degree, infrastructure intensity and retained value in the chain should be considered. As non-financial data gradually becomes more mature and available, the selected criteria can be enhanced and fine-tuned.

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5. Taxonomy design

5.1 Background
As described in the previous chapters, the majority of Dutch financial institutions largely adopted a holistic and qualitative approach to assess if economic activities are green/sustainable and/or contribute to the circular economy. Some of these institutions developed their own metrics or taxonomy with subsequent ambiguity in terminology. The result is a fragmented market, with uncertainty and discouragement for investors which produces a barrier to transition towards a sustainable economy. This chapter describes a selection of the taxonomies and indicators used by the eight Dutch financial institutions that were interviewed for this study. In addition, this chapter provides insights into the progression of the TEG to develop a EU sustainability taxonomy and describes perspectives on the feasibility and design of a uniform sustainability taxonomy that includes the circular economy.

5.2 Taxonomies developed by Dutch financial institutions
In absence of a common EU approach, the majority of Dutch financial institutions interviewed for this study have either developed their own assessment tools or have adopted existing standards and taxonomies. A review of a selection of taxonomies, including its structure and underlying criteria, are described below.

ASN Bank: Sustainability Criteria
ASN Bank has formulated the objective to be carbon neutral by 2030 for all its loans and investments. To achieve this objective, the bank only invests in companies that fit with its sustainability mission and vision (e.g. companies should contribute to the transition to a sustainable society). The contribution of a company is assessed by analyzing its activities, determining whether there is no (serious) misconduct, and reviewing if its policy is sufficient with respect to the high sustainability risks connected with its activities.

To determine this risk, ASN has formulated guidelines and assessment criteria for activities and its investments. The ASN Sustainability Policy is founded on three pillars: climate change, human rights and biodiversity (visual shown in figure 9 of the appendix). These pillars are also subdivided into subthemes such as rules of ethical conduct, forced labor and environmental policy. In addition, the criteria for these three pillars have a distinct impact depending on the sector and issue. Based on these criteria, ASN determines in which sector a company operates. Assessment criteria are then used to review whether a company is involved in risk countries, risk sectors and risk activities. The thoroughness of this review and the admission criterion depends on the company’s size.

The circular economy is addressed in the biodiversity pillar. ASN Bank aspired to generate a net positive result on biodiversity in 2030 (e.g. growth in biodiversity) whereas they view circularity as the mean to reach this goal. The bank established various guidelines and criteria to maintain and strengthen biodiversity and ecosystems. Some examples are described below:

- The bank only approves countries that actively contribute to the conservation or protection of biodiversity. Indicators include; low levels of nuclear energy products per capita and levels of waste disposed on land per capita;
- ASN finances renewable energy projects such as wind energy and solar energy generation solutions if they comply with their biodiversity policy about nature conservation areas;
- ASN invests in company shares based on risk analysis to measure those countries where biodiversity is at higher risk. In addition, they expect companies to have a policy in place when operating in sectors posing a threat to biodiversity;

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The bank has formulated activities to be excluded and avoided that harm biodiversity (such as livestock farming and overfishing) or formulated principles an activity should apply to at a minimum.

**Triodos Bank: Impact investments in shares and bonds and financing criteria**

When determining its impact investments, Triodos Bank only invests in corporate shares and bonds that, through their products, services and manner of business, contribute to the creation of a sustainable society. Through an analysis of global trends and challenges, Triodos has formulated seven sustainable investment themes that play a major role in the transition to a sustainable system. By focusing on these themes, Triodos identifies companies that fulfill its criteria and derive over half of their revenue from sustainable activities, or are expected to do so within the next three years. Companies can also be selected due to their leading role in corporate social responsibility within their respective industry. This strategy is referred to as the Socially Responsible Investment (SRI) strategy.

As illustrated in figure 10 of appendix 7.5, the circular economy is one of the transition themes identified by Triodos. Each transition theme is analyzed based on relevant Sustainable Development Goals. With regard to the circular economy, four specific SDGs have been selected to assess Triodos’ investment agenda. These include: responsible production and consumption: recycle paper, plastic, glass and aluminum (SDG 12), climate action: educate young people on climate change to put them on a sustainable path early on (SDG 13), life below water: avoid plastic bags to keep the oceans safe and clean (SDG 14), and life on land: plant a tree and help protect the environment (SDG 15). Triodos identified various business models that are aligned to the circular economy principles and that they would like to support through their SRI’s. The bank also invests in companies that enable and stimulate the transition towards a circular economy (such as companies that develop Internet of Things solutions to track raw materials and products).

In determining the eligibility for finance, the bank starts by assessing whether a company is active in a sustainable sector. The three identified sustainable sectors are: culture and well-being, nature and environment and the social economy. Next, an exclusion policy is applicable that stipulates a negative screening based on which Triodos decides whether it should refrain from finance. Examples are companies involved in environmentally hazardous substances and nuclear energy. The bank will not finance companies and project that are involved for more than five percent in activities related to non-sustainable products and services or unsustainable work processes. Lastly, the bank will monitor whether the granted financial means are used for their sustainable purposes.

**PGGM & APG: Sustainable Development Investments (SDIs)**

Pension fund managers PGGM and APG have collaboratively developed multiple taxonomies to bridge the gap between the UN’s SDG targets and tangible investment opportunities. The taxonomies aim to standardize the identification of SDG-linked investment opportunities, which are called Sustainable Development Investments (SDIs). To assess whether companies qualify as a SDI, the positive contribution the UN SDG goals is assessed. In essence, SDIs are investments that meet financial risk and return requirements and contribute to an SDG by supporting the generation of positive social and/or environmental impact through their products and services.

The taxonomies are structured based on thirteen of the United Nations’ seventeen SDGs. Each taxonomy illustrates areas where PGGM and APG perceive potential investable solutions to contribute to the selected SDGs. This contribution is determined based on a decision tree that presents a systematic approach to evaluate possible investments as shown in figure 11 of appendix 7.5. Each investable SDG is specified through various investable targets and supplemented with economic activities and examples that can be linked to them. A picture of the twelfth element, ‘responsible consumption and production’ is shown in figure 12 of

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51 Impactbeleggen via beursgenoteerde aandelen en obligaties: https://www.triodos.nl/downloads/sri-whitepaper?id=cafc884f81d4
52 Triodos Bank. Dit zijn onze criteria voor financiering: https://www.triodos.nl/downloads/criteria-voor-financiering?id=a760f651b944
53 Sustainable Development Investments: https://www.apg.nl/en/publication/SDI%20Taxonomies/918
54 Taxonomies: https://www.apg.nl/en/publication/SDI%20Taxonomies/918
appendix 7.5. Although the taxonomies do not specifically address the circular economy, they are closely related to circularity as they aims to, among other things, reduce waste generation through prevention, reduction, recycling and reuse and to achieve the sustainable management and efficient use of natural resources.

Besides the contribution to a SDG, the framework also assesses how significant the effect is in terms of scale, duration, depth and rate. Due to a lack of publicly available data to measure these aspects, PGGM uses sales figures to assess the extent to which the desired impact is a core function of the business or its market share (e.g. a company has a large market share or has a unique solution to particular problem)\(^{55}\). In addition, the taxonomy also classifies based on Global Industry Classification Standard, a four-tiered hierarchical industry classification system focusing on: sectors, industry groups, industries and sub-industries.

**Achmea: Climate Bonds Taxonomy**

For its Green Bond Fund, Achmea uses the Climate Bonds Taxonomy developed by the Initiative Climate Bonds to determine whether investment are eligible for climate Bonds financing. The taxonomy is meant as a guide for institutional investors wanting to identify which projects, assets and activities are compatible with the two-degree global warming target set by the COP21 Paris Agreement\(^{56}\).

The taxonomy distinguishes eight sectors for which sub-sectors, asset types, asset specifics and screening indicators are presented. The taxonomy does not explicitly addresses the circular economy, but does include themes that are of high contribution to the transition towards a circular economy (such as marine renewables and waste recycling). The taxonomy adopts a traffic light system that determines the compatibility to the two-degree target. A Green Light is automatically compatible, Orange Light is potentially compatible (depending on whether more specific criteria are met), Red Light is incompatible. A Grey circle is used to indicate where further work is required to determine which traffic light color is appropriate for a specific sub-set of the activities. A figure of the climate bond taxonomy is provided in figure 13 of appendix 7.5.

The Climate Bonds Standard Sector Criteria are used to provide sector-specific eligibility criteria. For instance, as illustrated in figure 14 of appendix 7.5, in the waste sector, ‘gas capture’ is used as an indicator to determine the compatibility with a 2-degree trajectory. Sector-specific criteria are determined through a multi-stakeholder engagement process that includes technical and industry working groups and are subject to public consultation. The criteria are revised and updated periodically\(^{57}\).

### 5.3 Update on the EU Taxonomy

As explained in the introduction chapter of this study, the TEG has been appointed to assist with the design and implementation of the EU taxonomy. On the basis of the information market participants disclose, investors will be able to see what percentage of holdings of companies are environmentally sustainable in terms of their economic activity, as well as the share of funding towards environmentally sustainable activity as a percentage of all economic activity. The taxonomy will not be an exhaustive list of sustainable activities to invest in nor will the taxonomy imply any requirements in which funds to invest in.

To achieve such usability, the taxonomy requires specific characteristics. The TEG formulated a proposition as to what these characteristics are supposed to be. Firstly, the taxonomy needs to include requirements and principles to assess what activities are included in the taxonomy. The TEG propose that there are six different activities of interest to environmental objectives, of which the circular economy is one:

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56 Taxonomy: https://www.climatebonds.net/standard/taxonomy

- Climate change mitigation: the stabilization of greenhouse gas concentrations in the atmosphere at a level which prevents dangerous anthropogenic interference with the climate system by avoiding or reducing greenhouse gas emissions or enhancing greenhouse gas removals;
- Climate change adaption: where an activity contributes substantially to reducing the negative effects of the current and expected future climate or preventing an increase or shifting of negative effects of climate change;
- Sustainable use and protection of water and marine resources;
- Transition to a circular economy, waste prevention and recycling;
- Pollution prevention control;
- Protection of healthy ecosystems.

The TEG proposes that a taxonomy should test to what extent an economic activity contributes or harms any of these six objectives. An economic activity is classified as environmentally sustainable when it substantially contributes to and if it does not significantly harm any of these environmental objectives.\(^{58}\)

The transition to a circular economy, waste prevention and recycling is one of the six environmental objectives. The TEG established a list of criteria to help determine if an economic activity can be considered to contribute substantially to the transition to a circular economy, waste prevention and recycling, whereas that activity contributes substantially to that environmental objectives if it:  

- Improves the efficient use of raw materials in production, including through reducing the use of primary raw materials and increasing the use of by-products and waste;
- Increases the durability, reparability, upgradability or reusability of products;
- Increases the recyclability of products, including of individual materials contained in products, inter alia through substitution or reduced use of products and materials that are not recyclable;
- Reduces the content of hazardous substances in materials and products;
- Prolongs the use of products including through increasing reuse, remanufacturing, upgrading, repair and sharing of products by consumers;
- Increases the use of secondary raw materials and their quality, including through high-quality recycling of waste;
- Reducing waste generation;
- Increases preparing for re-use and recycling of waste;
- Avoids incineration and disposal of waste;
- Avoids and cleans-up of litter and other pollution caused by improper waste management;
- Uses natural energy resources efficiently.

These criteria are consistent with the information obtained in the literature review and were broadly confirmed by Dutch financial institutions during interviews. They generally also align to the 9R principles and Ellen MacArthur criteria. As these indicators match with the market view, they can be seen as a good starting point to assess economic activities. Further work is required to establish a more detailed list of criteria, most useful if further building on existing classifications (see table 4 of appendix 7.6 for an overview of indicator sets). When looking closer into the criteria set by the TEG it is important to acknowledge that not all stages from the 9R model are included. The stages of recovery and repurpose are not included. Furthermore we conclude that the criteria themselves are not adequate in order to determine if an activity contributes to the circular economy. For example upgradability itself is not circular per se. The impact of the activity on material intensity, waste generation and/or waste treatment should be considered. Also, the criteria do not take the supply chain as a whole into account. We believe that managing the supply chain as

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a whole is necessary to make real improvements. In the next chapter we will make recommendations how to include these elements as well as how to implement the criteria in the market by using four phases growth model.

Resulting from the interviews, some additional high level complementary criteria are (also described in chapter 6):

- Reduces material intensity of (the) production process(es);
- Avoids harmful waste;
- Increases the disassembly possibilities of products;
- Reduces the content of critical materials used in products;
- Reduces the level of infrastructure intensity (e.g. necessary travel distance of a product);
- Increases the value retained in the chain.

As the taxonomy it is supposed to cover the entire economy, it is deemed important to identify a sector framework. Similar to the two developed taxonomies by financial institutions taxonomies, the TEG adopts an industrial classification, in this case from the NACE as established by EU law. It is compatible to international and member state frameworks and comprehensive in its coverage of the EU economy. The NACE system is already adopted by EU institutions, such as Eurostat, that also publish data of those sectors. In addition, As the GICS system, a global industry taxonomy, is often used in the financial sector, the TEG also intends to develop a translation tool to assist users more familiar to this system. The TEG proposes that the taxonomy should be able to select certain sectors from the NACE framework. The methodology in their current draft includes selecting the highest-emitting NACE macro sectors and selecting the sectors that enable substantial greenhouse gas emissions. That data is made available through Eurostat’s data collection.

In one of the first reports published by the precursor of the TEG, a preliminary taxonomy was proposed (shown in figure 4)\(^6\). The taxonomy visualizes the NACE sectors and criteria ranging from explicit climate change, to broader environmental sustainability and social sustainability.

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The current state of affairs of the TEG is that a first report with climate mitigation activities and do no significant harm criteria (per activity) are described for each of the NACE macro-sector. For some sectors, a first proposal for the no harm criteria in relation to the circular economy objective, is made (overview of current state of criteria shown in table 4 of appendix 7.6). In summary:

- There are no criteria yet established for activities in the agriculture, forestry & fishing sector
- Criteria established for some of the activities in the manufacturing sector largely build upon improvements in the durability, reparation and recyclability of products manufactured and on minimizing early stage failures of component/products in the field
- Criteria established for some of the activities in the electricity, gas, steam & air conditioning supply sector currently focus on waste reduction, waste recycling, reparation, accessibility, -and exchangeability of components, durability and low degradation of expected lifespan, and prevention of failures
- For the transportation and storage sector, circular economy do no harm criteria largely build on waste collection, waste recycling and materials re-use

Quick Scan - Taxonomy Circular Economy | Taxonomy design

- The construction and real estate sector criteria focus on material re-use opportunities, waste minimalization, demolition, deconstruction and material life span improvements.

These criteria are largely confirmed by literature and supported by various stakeholders during interviews. Similar to criteria established by a few Dutch financial institutions, some key components that enable the transition towards a circular economy, are waste reduction, life span improvements and product- and waste recycling. Contrary to observations in the Dutch financial market, some of the no harm criteria with regard to the circular economy focus on early detection of faults or minimizing early stage failures.

5.4 Market perspectives and recommendations
Together with the guidelines set by the EC and on a national level (as discussed in chapter three), the usability, feasibility, preliminary design of the EU taxonomy, and ways to include the circular economy in this design, have been discussed with various market participants for the scope of this study. The paragraphs below describe the main findings of these discussions, including recommendations.

**Usability**
Similar to the usability defined by the TEG, financial institutions interviewed for this study believe a taxonomy should serve as a guidance to label activities as sustainable. In addition, it should enable to measure the level of circularity or contribution to the circular economy. By labelling activities and measuring the level of circularity, the taxonomy will aim to prevent wrongful green and circular claims of shares and bonds that in fact finance polluting and harmful activities. An optimal taxonomy design should be able to serve as a basis for a future standard/reference frame for sustainable and circular activities. Policymakers could employ the taxonomy when developing frameworks that determine the eligibility for subsidies of sustainable initiatives that can be regarded as circular. In addition, it should be able to serve as a reference point for financial market participants to undertake sustainable and circular activities, and guidance on how to become eligible for funding. Important to notice is that activities are evaluated on their total impact by financial institutions. For example some climate mitigation activities contribute a circular economy and/or vice versa. If the framework does not provide the tools for a holistic evaluation additional risks arise when activities prove to be harmful on different terrains than stated in the framework.

**Feasibility**
Complicating factors to design a EU wide sustainability taxonomy include a lack of commonly agreed metrics, principles and non-financial data as to whether economic activities can be considered environmentally sustainable, specifically for creditability in terms of investments. Various Dutch financial institutions have also expressed their concerns about the timing of development giving the high level of ambiguity around circular economy, and sustainability definitions, as well as maturity levels of non-financial data. In addition, the readiness of the sector to prioritize sustainable, green or circular investments is questioned. Financial institutions appear to have more focus on sustainable, green or circular activities. However, bottom-line, traditional indicators (such as risks and return of investment) still remain the decisive factor for the majority of financial institutions. It is therefore important for the TEG to align to the preferred risk based approach from financial institutions. Some financial institutions believe a taxonomy might not be the right incentive to stimulate sustainable, green or circular activities. Instead, the government could ease its burden on illiquid investments, as sustainable, green or circular activities can be more illiquid by nature than other investments. Illiquidity is largely because of the absence of a track record and relatively small market size for green investments. On the other hand, financial institutions acknowledge that green investments can also have a low risk profile due strategic and sustainable results. Lastly, financial institutions acknowledge the difficulty to design a uniform taxonomy that is feasible to all financial institutions, given the large differences in organizational models. A non-feasible design may result in resistance to use it, which could lead to the perception that the taxonomy is another regulatory burden.
**Recommendations for design**

As stated, although a sectoral classification can be usable when developing the taxonomy, it also has its limitations. To start, it lacks a holistic approach, commonly used by financial institutions. In addition, although an industry classification is supported by the majority of the financial institution, the selected NACE classification might not be fully applicable to all parties (such for institutional investors). The fact that the nature of a taxonomy for a bank can be considerably distinct from a taxonomy for investors should therefore sufficiently be taken into account when proposing a comprehensive design. Lastly, a sector classification can also be problematic as in certain sectors it will be more difficult to reach higher levels of circularity. For instance, the impact of packaging materials for consumer products will considerably deviate from the impact of packing materials for windmills. The taxonomy design should reflect this deviation by clearly distinguishing the focal points for the EC. As previously mentioned in this chapter, this study proposes a four phased approach at recommendations to be able to adjust to sector maturity levels.

Next, it is important to understand that financial institutions often rely on traditional pillars or indicators for investment decisions, such as liquidity, return on investment or other financial indicators. A pillar or indicator that has recently become more important for investment decisions is sustainability. As previously explained in this report, it should be noted that circularity is often not included as a separate criteria. Due to the administrative burdens of adapting these pillars, including circularity will be most useful if the criteria included in the taxonomy are straightforward and easy to measure. In line with the results of the desk research, it has been argued that aligning to the goals set in the program; ‘A Circular Economy in the Netherlands by 2050’\(^{62}\), adopting a set of negative selection criteria, and the 9R and Ellen MacArthur Foundation frameworks will be the most fitted frameworks to achieve this goal. Reflecting on the circularity criteria set by the TEG, as stated on earlier, not all stages of the 9R framework and Ellen MacArthur Foundation framework are included.

Another important factor in the ongoing development for a taxonomy will be the balance between the administrative burden of reporting for companies and the ultimate value of the information that the indicators produce\(^{63}\). During the interviews it became clear that the financial market in general is not intrinsically motivated to prioritize the circular economy with the exception of a few that derived their revenue model based on sustainability principles. Due to societal and regulatory pressure, many financial institutions do take some sustainability initiatives. In order to stimulate sustainable, green or circular investments and financing, it will be important to create extrinsic incentives, such as tax benefits or positive media attention for those companies that take extra steps to promote sustainable, green or circular investments.

A final important incentive to stimulate sustainable investments or investment in the circular economy would be to reduce the voluntary aspects of the requirements to disclose non-financial information. A legislative framework on non-financial information disclosure such as the Global Reporting Initiative (GRI), enhances the transparency of sustainability data for businesses and ultimately contributes to more accountable and responsible business environments\(^{64}\). The assurance on non-financial information is currently still insufficient for financial institutions to rely on in the evaluation of economic activities.

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\(^{64}\) Global Reporting Initiative: A smart EU policy approach to non-financial information disclose: [https://www.globalreporting.org/SiteCollectionDocuments/GRI-non-paper-Report-or-Explain.pdf](https://www.globalreporting.org/SiteCollectionDocuments/GRI-non-paper-Report-or-Explain.pdf)
6. Recommendations and conclusions

6.1 General
An increasing number of financial institutions recognize that sustainable or circular investments can drive value and that engaging in non-sustainable or non-circular investments can have a negative impact. Investments can, for example, lead to stranded assets; obsolete or non-performing assets that result in a loss. The EC and Dutch Central Government have established ambitious sustainability and circular economy policies, guidelines and frameworks for financial institutions to build upon when making investment decisions. In order for the TEG to develop a uniform and feasible taxonomy to stimulate green investments, it will also be key to deliver on these goals. The taxonomy should, at a minimum, enable the implementation of the EU energy and climate targets for 2030, strategic goals from the program ‘A Circular Economy in the Netherlands by 2050’, the transition towards a low carbon-economy as well as the transition towards a more sustainable economic model. It should also align to more specific goals related to the way we use raw materials, municipal waste and product packaging, diverting waste from landfill, changing the way we design, produce, use and recycle plastics, food waste, critical raw material usage, construction and demolition, and biomass and bio-based products. Desk research and interviews with eight Dutch financial institutions reveal that these types of goals and priorities are often only partially integrated in taxonomies and criteria used by financial institutions. Taxonomies and criteria set by financial institutions should therefore be reviewed by a leading authority, in order to align them with EC goals.

Next, results of this study indicate that the Dutch financial sector large builds upon risk and return analyses using peer and/or sector comparisons to make investment decisions. The literature review (chapter 3.4) and interview results (chapter 4) reveal that a risk based approach is also preferred when evaluating sustainable and/or circular economic activities for investment purposes. The downslide of this risk based approach from a sustainability and circular economy perspective is that it heavily relies on non-financial data. Standards for disclosing such information are currently still fragmented and heterogenous, but a shift is visible towards a more formalized and harmonized approach with the establishment of various international reporting standards. The recommendations in the next few paragraphs of this study therefore propose to mature non-financial information reporting to be able to further build on the preferred risk oriented approach to evaluate economic activities from a circular economy perspective.

6.2 Recommendations
To deliver upon sustainability and circular economy goals to stimulate green investments, and to align with the preferred risk based approach to evaluate economic activities, this chapter proposes three recommendations that aim to stimulate the development of a taxonomy from a perspective of the circular economy. Although the taxonomy ultimately should only classify pure circular economic activities as ‘green’, it should also stimulate the transition towards a circular economy while preventing greenwashing.

The first recommendations support the chosen sector based approach from the TEG in the current taxonomy design while recommending to prioritize sectors based on important circular economy drivers; material intensity and waste intensity. The second recommendation states that is optimal to adopt a criteria based approach to evaluate economic activities for investment purposes. This recommendation proposes to i) use the strategic goals from the program ‘A Circular Economy in the Netherlands by 2050’ as pre-conditions to decide upon investments, to ii) adopt negative selection criteria to prevent money being invested in linear, re-use or non-circular business models, to iii) to use the 9R criteria to measure how well a product or company performs in the transition from linear to circular, and iv) the Ellen MacArthur Foundation criteria to also measuring the impact of investments. The last recommendation proposes a four phrased approach to be able to gradually stimulate circular investments in line with financial market maturity levels. The figure on the next page visualizes these recommendations, which are further elaborated upon in the next paragraphs.
Recommendation 1: adopt a sector prioritization

In its current form, the taxonomy design for climate mitigation activities, proposed by the TEG, envisions an industrial classification. Through the NACE classification, clusters of economic activities are identified per sector. It is important to note that although the selected classification system is the European standard used by financial institutions to report, it is not by default used to make finance and investments decisions. Desk research and interviews conducted for this study indicate that the majority of Dutch financial institutions do adopt an industry classification to evaluate economic activities from a sustainability or circular economy perspective. The selected NACE classification by the TEG is not fully applicable to and supported by all financial parties interviewed, but the majority confirmed that an industry classification is a logical starting point for the taxonomy. The NACE industry classification is thus supported. Yet, the results have also shown that by classifying sectors and their activities, the taxonomy could run the risk of excluding sectors where progress needs to be achieved. As a consequence it is useful to identify sectors that could have the biggest impact in the transition towards a circular economy as it will be beneficial to prioritize those sectors for financing and investments.

In line with this finding, a first recommendation is to retain industries as a focal point in the EU taxonomy, but to adopt a sector prioritization. It is therefore recommended to align with circular economy priority (sub)sectors (e.g. sectors where the biggest impact can be made or those that are raw material intensive) as identified in policies, guidelines and frameworks of the EC and Dutch government (chapter 3 of this study). Some examples of priority (sub)sectors include; biomass and food, plastics, manufacturing industry, construction sector and consumer goods. Additionally, it will be beneficial to identify the level of circular improvements possible per NACE sector in order to determine which other (sub)sectors could have the biggest impact in the
transition towards the circular economy. It will be essential to give priority to those sectors that are viewed to have the highest impact on the transition to a circular economy, and companies within these sectors that are willing to take valuable steps to become more circular (such as companies willing to decrease its material intensity).

A prioritization mechanism could be established based on three critical drivers of the circular economy: levels of material intensity, use of scarce resources and levels of waste. The level of material intensity can be identified by determining which sectors use most resources per value added. Prioritizing these material intensive sectors and sectors which use scarce resources will be essential. After all, industries relying on scarce resources will have considerable potential for change when it comes to the circular economy. Clearly considering waste will also be valuable. By mapping out the waste intensity per sector, waste streams can be prioritized. In doing so, it will be especially important to prevent the spread and dilution of hazardous or toxic waste. Avoiding the use of hazardous substances has also been acknowledged by the TEG. Such an emphasis will be essential, as limiting waste flows is at the core of the circular economy.

**Recommendation 2: adopt a criteria centered approach**

The second categorization that can advance the development of a taxonomy from a circular economy perspective is similar to the climate adaption approach proposed by the TEG. This approach recognizes that climate adaptation is context and location specific. It requires the use of a more process focused (e.g. criteria centered) approach in which criteria will be reviewed to help determine if an activity can be classified as green or sustainable instead of proposing a list of activities that classify as such. An activity based approach, as proposed by the TEG for the taxonomy on climate mitigation, will be too narrow as it risks the creation of an inexhaustible list of activities that qualify as circular. At the same time it might exclude developments that also generate a meaningful contribution to the circular economy. An example could be an activity that might not classify as ‘green’ yet, but can be considered as ‘light green’ as some clearly visible improvements are made towards more circularity (e.g. a production process with less residual waste than before). Thus, to prevent the exclusion of initiatives that are making good progress and are in the initial stages of transition, a criteria centered approach should be adopted to include circular economy aspects into the EU taxonomy. Well formulated lists of criteria related to circularity are currently often absent in the assessment tools of Dutch financial institutions. The market is still very heterogenous and immature. In addition, views of what can be regarded as circular are not only very broad but, in some cases, also rather unclear. To further enhance the usability of the taxonomy for financial institutions, a common framework of criteria, instead of activities, is a preferable approach. Criteria should be developed in line with for example the cradle-to-cradle principle such that they are sustainable and considerate of the environment and future generations. In addition, it will be key to establish a certification system to measure circularity levels as well as to mature the assurance of non-financial information. As previously explained, norms for non-financial information disclosure are becoming more mature, but additional attention from policy makers and/or governmental institutions could enhance corporate accountability and responsible behavior.

This study proposes four steps in adopting a set of criteria for the EU taxonomy. First, it is recommended to use the strategic goals with regard to raw material usage from the program ‘A Circular Economy in the Netherlands by 2050’ and the Ellen McArthur Foundation as a requirement to determine if an economic activity classifies as circular. These goals state that (more information on these goals can be found in chapter 4.3)

1. raw materials in existing supply chains should be utilized in a high quality manner,
2. in case new raw materials are needed, fossil-based, critical and non-sustainably produced materials are replaced by sustainably produced, renewable, and generally available raw materials, and
3. that we should develop new production methods, design new products and organize areas differently as well as to promote new ways of consumption.

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Second, as it should always be prevented that economic activities are being classified as circular or as of contribution to the circular economy while they are actually harmful and/or generate a negative impact from a circular economy perspective, it is proposed to develop a set of criteria based on negative selection. In addition it should be prevented that economic activities are classified as circular while they are only contributing to improvements from for example linear to re-use. Thus, greenwashing should be prevented.

Therefore the study recommends to establish a list of negative criteria, preventing some activities from being classified as circular. Activities should only be qualified as circular if they prevent waste and harmful emissions; and optimize the (re-)use of raw materials and resources.

More examples of negative selection criteria can be found in chapter 4.3.

As a third step, it is useful to use the 9R framework as the basis to determine whether an activity contributes to the circular economy. The levels of this framework are based on increasing circularity, running from fully linear towards fully circular strategies: ‘useful application of materials’ (recover, recycle), ‘extend lifespan of product and its parts’ (repurpose, remanufacture, refurbish, repair, reuse) and ‘smarter product use and manufacture’ (reduce, rethink, refuse). The 9R framework also leaves room to invest in companies for which circularity does not belong to the core of the companies’ products or services. Instead of putting an emphasis on activities that are regarded as circular, criteria can assess the extent to which various activities apply the R principles.

Further building on the 9R framework, the Ellen MacArthur Foundation has taken the first steps to operationalize the R principles by formulating indicators that can measure how effective a company is in making the transition from ‘linear’ to ‘circular’ models. The fourth step is therefore to use the Ellen MacArthur Foundation criteria as a framework for financial institutions to measure the impact of investments. Results of this study have shown that these criteria are best for fit given current market maturity levels of Dutch financial institutions to invest in circular initiatives as these criteria are focused on key drivers of the circular economy: material utility and waste utility. In sum, the Ellen MacArthur criteria can measure how much a product’s materials circulate by looking at the virgin feedstock, waste, linear flow and utility (e.g. MCI), look at minimum drivers for change (e.g. complementary risk indicators) and look at benefits of circular models (e.g. complementary impact indicators) (Ellen MacArthur criteria further summarized in table 1).

We advise the TEG to expand on the criteria set by the Ellen McArthur foundation. A more detailed analysis on the Ellen McArthur criteria is out of scope for this study, but it is advised to set criteria per industry together with a standard on the level of improvement needed per activity to prevent greenwashing. Reflecting on the circularity criteria set by the TEG it is concluded that this is a missing element. When classifying activities, the impact on material use and waste generation of the activity is essential in assessing its contribution to the circular economy or meeting ‘do not harm’ criteria.

**Recommendation 3: Adopt a dynamic and phased approach to measure the impact of economic activities**

A taxonomy that takes the circular economy into account, should be developed such that it anticipates change and leaves room for improvement and modifications. Interviewees and stakeholders also support the view of the TEG that the taxonomy design is an evolving framework and not set in stone. In addition it is important to realize that we will not become fully circular when the criteria centered approach is adopted and the EU taxonomy comes into force. A growth model will be necessary to stimulate circular investments and transition from a linear to a fully circular economy while preventing greenwashing. As a result, this study recommends a four phased approach to measure improvements in steps that organizations take to contribute to the circular economy transition. The first three phases of this approach are established based on the preferred risk based method for financial
institutions to make investment decisions. The final phase builds on the theory of necessary system change of the circular economy. Each step does not specifically have to follow in linear order.

The recommendations are not only an advice for the TEG for the development of a EU taxonomy but can also be used for the evaluation of economic activities with a long term investment horizon to measure their progress towards full circularity (this usability is not examined in detail).

The four recommended phases are:

- **Phase 1: Determine minimum standards and measure improvement to the current situation in the organization**
  First, measures can be taken on an intra-organizational level. This means that the assessed activity shows an improvement compared to the current situation on the level of the organization at hand with regards to material use and waste prevention. Evidently, in this phase not every slight improvement can be classified as a sustainable and circular activity. For that reason, standards must be set to determine the (minimum) level of improvement on material use and waste prevention/treatment that has to be achieved in order to qualify as circular. Due to information asymmetry, such a standard will have to be set per sector. For every sector a clear a bottom line will have to be defined for the selected criteria. In addition, a dynamic character will also be essential. What will be regarded as a relative improvement today will be seen differently in a few years’ time due to progresses made. Differentiating between short term and long term standards will create the required flexibility to ensure the taxonomy remains applicable. Beside sector-specific requirements, the TEG can be requested to formulate proposals for the applicable criteria. These criteria can be used to determine if economic activities can be considered to substantially contribute to the transition to a circular economy. At a minimum, all activities are required not to create lock-in, violate the no substantial harm principle or use hazardous or chemical substances that harm people and/or the environment. For avoiding the use of hazardous or chemical substance, the toxicology criterion set by the Ellen McArthur foundation can be used to set standards.

- **Phase 2: Measure improvement to the current situation compared to other organizations**
  As more organizations gather and share data related to the circular economy, it will be possible to relate organizational data on an inter-organizational level. The EU taxonomy can facilitate this process as a clear and common list of criteria, as proposed in this study, increases the comparability of organizations. Measuring improvement to the current situation as well as compared to other organizations, will result in comparative insights for companies eager to increase their circular performance.

- **Phase 3: Measure improvement compared to the best practice (per sector)**
  A process of measuring improvements within organizations and between organizations, will in the longer term facilitate the identification of best practices. These best practices provide financial institutions with the ability to develop a standard when it comes to making the transition to a circular economy. Pioneers that show a higher maturity and more systematic approach to circularity will determine the required level of circular performance. Due to this dynamic aspect, the standard will gradually shift as the identified best practices demonstrate higher performance. Such an approach will also encourage companies to step up their efforts to ensure their transformation complies with (industry) standards.

- **Phase 4: Measure improvement in the supply chain**
  Lastly, the level of impact could be measured on the level of the supply chain impact. Meaning that the activity should considerably reduce the negative impact or increase the positive impact on the entire supply chain. Since more information is becoming available on a product level in regard to circularity, the taxonomy should focus on the products related to the focus set by the EC. By setting a direct link, the criteria to determine whether an activity is circular will truly contribute to the direction set by the EC.
Although it would be preferred to take chain effects into consideration from the start, issues concerning the measurability and comparability of data prevent such an approach at this moment. Currently, the absence of information in most sectors would call for a qualitative approach. Various Dutch financial institutions aim to make quantitative assessments possible in the future, illustrated by several valuable initiatives such as the development of own sustainability classification systems. It is therefore expected that, when measurement instruments are established, data sources can be linked to each other, and non-financial data disclose policies have become more mature, the market will prefer to move to a quantitative approach. We recommend the TEG to assess the availability of data per industry per circularity criterion to determine maturity levels and be able to set standards per sector. In addition, supervisors could play an important role in helping non-financial data to become more transparent and reliable to support the taxonomy development.

Lastly, it is important to note that each sector of the NACE sector classification differs in maturity level. The proposed phased approach is therefore not applicable to the entire market. For example; in some sectors it will be possible to apply the criteria (as outlined in recommendation 2) by looking at improvements compared to the sector’s best practice (phase 3), while for other sectors the minimum standard per each criteria should still be determined to be able to measure improvement to the current situation in the organization (phase 1).

**Figure 6: proposed phased approach to measure the impact of economic activities**

The first three phases of this approach are established based on the preferred risk based method for financial institutions to make investment decisions. The final phase builds on the theory of necessary system change of the circular economy. Whilst phase 1 to 4 suggest a sequential approach, all phases can be executed simultaneously.

### 6.3 Concluding remarks

Various policies, guidelines and frameworks by Dutch financial institutions acknowledge the importance of valuing the impact of an economic activity for investment and financing purposes. However, the impact of products and services is often not emphasized by financial and/or economic indicators, that largely focus on the operational impact of organizations. Financial institutions indicated the difficulty of measuring the impact of products and services as a reason for this absence. Lack of (quality of) non-financial data, expertise and time have been mentioned as obstacles for a thorough review of economic activities. In addition, various interview respondents emphasized that the interpretation of sustainability and circularity is constantly subject to change. What is regarded as circular today by organizations, can be viewed differently in a few years’ time. Due to increased scientific and societal attention and evolving methods for data gathering and analysis, a more common ground has been found. This has resulted in valuable definitions (i.e. the Brundtland Commission’s definition of sustainable development) and frameworks (i.e. SDGs, the
government-wide program on circular economy and frameworks of the Ellen MacArthur Foundation) that have created a higher level of uniformity. However, how these developments are subsequently interpreted and incorporated within various financial institutions is currently still highly divergent. As a result, the development of clear-cut classification system can not only be difficult but, according to some, also too early.

Although the EU taxonomy will help financial institutions to determine if activities are green or sustainable, it is important to realize that more factors play a role in making activities financially sustainable. Results of this study indicate that the majority of financial institutions in the Dutch market still rely on traditional assessment tools when making financing and investment decisions. Financial external impulses, such as tax rates, are therefore important to take into account. A good example is that circular activities are often more resource intensive than non-circular activities (due to for example disassembly of second handed products), while tax rates on labor are higher than those on materials.

In addressing the circular economy, it is important to clearly consider these challenges. This study has made three recommendations to ensure that economic activities can be classified as green/sustainable from a circular economy perspective. By prioritizing sectors, focusing on criteria rather than activities and adopting a phased approach to measure improvement, a EU taxonomy can be developed that is inclusive and encourages companies to contribute to a circular economy. Rather than anchoring fully circular activities, room for improvement is created for those moving towards circularity, while making sure that linear activities will not be supported. Ultimately, a clear and shared strategy is identified for companies and investors to make the transition to a circular business model. This study provides input for a taxonomy to classify activities as sustainable from a circular economy point of view. It is clear that further research and expertise on the circular economy is required in order to prioritize sectors, and set standards for the criteria per sector as an important step towards a circular economy.
7. Appendices

7.1 Circular economy frameworks and guidelines
To below chapters provide additional context to the conclusions drawn on frameworks and guidelines from the EC, Dutch government and Dutch financial institutions as described in chapter 3 of this report.

7.1.1 European Commission
In response to the challenges that modern societies are facing, the EC has published various policies and reports on the circular economy. In 2015, an overarching framework, The Circular Economy Action Plan, is introduced with the purpose of returning the EU continent to a path of economic growth. This growth is stimulated through the intelligent use of natural resources and recycled materials, investments in research and new technologies, and a greater involvement of citizens in sustainable development and social and economic value creation. The Action Plan contains 54 measures, with timelines running from 2015 to 2019. The proposed actions are aimed at supporting the circular economy in each step of the value chain, ranging from production to consumption, repair and remanufacturing, waste management, and secondary raw materials. Besides these action areas, horizontal enabling measures in areas such as innovation and investments were included to positively impact the transition to a circular economy.

In July 2018 another significant step towards a circular economy was taken as the EU’s Circular Economy package came into force. The package consists of four new directives amending existing directives on waste management, landfill, packaging and packaging waste, end-of-life vehicles, waste batteries, and waste electrical and electronic equipment. Three notable consequences of this revision are:

- Under the revisions to the Waste Framework Directive, Member States will have to ensure they recycle at least 55% of their municipal waste by 2025. This target rises to 60% by 2030 and 65% by 2035;
- Under the revisions to the Landfill Directive further pressure will be exerted to divert waste from landfill. The target is to cut landfill municipal waste to 10% by 2035;
- Member States will be required to ensure that 65% of the overall product packaging is recycled by 2025, rising to 70% in 2030.

The guidelines described in the Circular Economy package also discuss concrete targets and present critical reports on raw materials and oxo-plastics. In addition the package produces two significant developments. The first being a EU-wide Strategy for Plastics in the Circular Economy. The strategy focuses on changing the way plastics and plastic product are designed, produced, used and recycled in order to reduce the negative impact of single-use plastics. However, it is argued that achieving this objective will require major investments in both infrastructure and innovation. Therefore, the development of a classification system for investments is regarded as crucial to effectively implement the strategy. In addition to the Strategy for Plastics, the Circular Economy Package also contains a commitment from the EU to develop a monitoring framework on the progress towards a circular economy at EU on a national level to assess how the various elements of the circular economy are developing over time, to help identify success factors in different Member States and to determine whether sufficient action has been taken. Based on the four stages; production and consumption, waste management, secondary raw materials, and competitiveness and innovation, a detailed overview is presented for the various Member States.

67 Closing the loop – an EU action plan for the Circular Economy: https://eur-lex.europa.eu/resource.html?uri=cellar:8a8ef5e8-99a0-11e5-b3b7-01aa75ed71a1.0012.02/DOC_1&format=PDF
69 A European Strategy for Plastics in a Circular Economy: https://eur-lex.europa.eu/resource.html?uri=cellar:2df5d1d2-fac7-11e7-bbfs-01aa75ed71a1.0001.02/DOC_1&format=PDF
7.1.2 Dutch government

For each of the five key priorities (e.g. biomass and food, plastics, manufacturing industry, construction sector and consumer goods) in the program, A circular economy in the Netherlands by 2050, the Dutch government formulated a different transition agenda. These agenda’s serve as a guiding framework to reach the ambition of being the frontrunner in all five priority sectors by 2020. To achieve this goal, the program proposes a policy toolkit focusing on the opportunities for the different priority sectors. This toolkit consists of five instruments:

1. Legislation and regulation
   As legislation is often based on prevalent technology or linear insights, current frameworks seem to rely on classical production sectors when organizing the market. To overcome this barrier, a planned action is the promotion of circular revenue models.

2. Intelligent market incentives
   Currently, costs and benefits for the environment are not reflected or only partially reflected in the product prices. The Dutch government, among other things, sees an opportunity in ensuring that these elements play a role in investment or purchase decision. Ultimately, by allocating a value to social effects, closed loop circular business cases can be encouraged.

3. Financing
   Circular products and services have different characteristics than linear businesses. The Dutch government therefore identifies a need for new insights on circular initiatives. The program aims to inform private financers that have limited experience with circular revenue models and regard circular projects as high risk.

4. Knowledge and innovation
   By developing and stimulating the exchange knowledge, the Dutch government aims to provide key players in the circular transition with valuable information to build their decisions on. Measures such as implementing innovative policies and stimulating knowledge networks for companies and start-up enterprises will be taken.

5. International cooperation
   The transition to a circular economy requires EU and global cooperation. As the Netherlands has developed a track record as a frontrunner in the field of circularity, the Dutch government aims to capitalize its knowledge and expertise internationally.

7.1.3 Financial Institutions

The below sub-paragraphs describe some frameworks and guidelines that have been developed by Dutch bank, institutional investors, private equity and venture capitalist funds, and crowdfunding platforms. For the scope of this research, a selection of circular economy initiatives or sustainability initiatives with a circular component are highlighted.

Banking sector

As bank finance is an important source of external finance for the Dutch business community, various financial institutions have initiated their own platforms to assist in the transition from a linear to a circular economy. In this paragraph some significant examples are mentioned.

NIBC, Triodos Bank and ASN Bank have explicitly committed themselves to improving their investments in companies that increasingly make use of recycled materials and promote the concept of a circular economy. NIBC has also committed itself to

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74 Case Study: electronics, mining and urban mining: https://eerlijkegeldwijzer.nl/media/60384/cs_electronics_recycling_and_metals_mining_fbg_fig_150113_samenvatting.pdf
providing its senior management with training on the circular economy and has published whitepapers discussing product-as-a-service business models and innovative forms of financing. Triodos Bank finances entrepreneurs in the circular economy through tailor-made financing formulas and personal support throughout the project. In addition, the bank has supported the development of United Economy, a circular currency for sustainable business networks. In its yearly report, ASN Bank has also formulated its commitment to the circular economy. With the support of circular initiatives through crowdfunding activities of its platform ‘For the World of Tomorrow’ and investments stimulating circular business operations that opt for biodiversity, the bank can be regarded as one of the Dutch pioneers in the circular economy.

The will of the financial sector to contribute to a circular future has also been illustrated by various partnerships. Initiated by the Ellen MacArthur Foundation, one of the leading foundations promoting circular thinking, a significant step was taken by three large Dutch banks. ABN AMRO, ING and Rabobank partnered in July 2018 to present the Circular Economy Finance Guidelines. By providing the debt and equity market with guidelines to determine whether a company or project contributes to the circular economy, the three banks aspire to stimulate and accelerate investments in circular business models. The framework can provide valuable information for the development of a taxonomy as it aims to promote the use of performance indicators to communicate the expected impact of projects or portfolios. To assess the circularity of a company or project, the guidelines propose the assessment of both its business model (seven circular business models are distinguished) and socio-economic impacts. The impact assessment can be conducted by qualitatively and quantitively analyzing the environmental impact. The guidelines propose the Life Cycle Analysis (LCA) method or an equivalent accepted by investors to measure the impact focused on material, energy and water use, waste generation, pollutant emissions, CO2 and other climate relevant emissions. In addition, as the overarching importance of working conditions, human rights, gender equality, health and other determinants of wellbeing are taken into account, a company’s Environmental Social and Governance (ESG) performance over time should be monitored.

ING, Triodos Bank, ABN AMRO and Rabobank also support the Madaster, a repository for building information on materials, components, and products. The Madaster facilitates the construction of circular buildings as databases and so-called Madaster material passports can encourage organizations to make well-founded decisions when it comes to demolition, renovation and reuse. Rabobank, in collaboration with the Radboud University, has also developed performance indicators for the circular businesses. The Circular Enterprise Performance Indicator gives an indication of where a company stand in regard to circular entrepreneurship and where opportunities lie. The indicator analyzes business models based on their: cycles, value creation, business strategy, organizational model and the revenue model.

Public-private partnerships have provided another opportunity to stimulate circular initiatives. With support of the Ministry of Economic Affairs and Climate (EZK) and the Netherlands Investment Agency (NIA), BNG Bank has for instance been able to assist ‘still maturing’ submarkets, involved in the energy transition through subordinated loans. This Guarantee Corporate Financing Energy Transition Financing Facility (GO-ETFF) aims to reduce risks for private financiers, by issuing risk-bearing capital in the form of subordinated loans. Similarly, the Rabobank, with support of the EU Investment Bank (EIB), has been able to offer loans with discounted interest. Companies that have a positive impact and want to stimulate the transition towards a sustainable and circular economy can qualify for the bank’s impact loans. Besides being frontrunners in the field of sustainability, companies have to be in possession of one of the sustainability labels selected by the bank.

Finally, the public and private sector have also joined forces in the development of the Dutch Green Deals. The Dutch government has been using the Green Deal approach since 2011. The Deals comprise of voluntary agreements in which

| Appendices

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75 Pioniers van de circulaire economie kwamen samen in Brussel: https://dekleuvangeld.be/pioniers-van-de-circulaire-economie-kwamen-samen-in-brussel/
79 Klimaatstatement banken: https://www.nvbb.nl/media/document/003468_Klimaatstatement%20banken%202017.pdf
80 Circulair ondernemen: waar liggen uw kansen?: https://www.rabobank.nl/bedrijven/ondernemen/mkb-ondernemers/duurzaam-ondernemen/circulair-ondernemen
81 GO-ETFF: https://www.nederlandsinvesteringsagentschap.nl/binaries/nederlands-investeringsagentschap/documenten/verslagen/2017/juli/06/index/GO+ETFF+F.A.Q.+website+NIA.pdf
82 Geselecteerde duurzaamheidskeurmerken: https://www.rabobank.nl/images/overzicht-duurzaamheidskeurmerken_29949080.pdf
different parties work together to promote innovation and sustainability. With these Deals, the Dutch government intends to offer companies, social organizations and other authorities the chance to indicate bottlenecks and discuss concrete and actionable improvement steps. The Green Deal approach classifies circular activities based on the 9R framework (framework that prioritizes according to the level of circularity). Three noteworthy Green Deals that focus on the circular economy are:

- The Green Deal Circular Procurement\(^83\) has been signed in 2013 by the Dutch banks ABN AMRO and ING and aims to catalyze the transition to a circular economy. The deal encourages purchasing goods that are produced more circular. The Green Deal also calls for active reporting by organisations on how they engage in more sustainable procurement in their processes, policies and strategies.
- The Green Deal Expertise Center Financing Sustainable Energy Projects was signed in 2013 by the banks ABN AMRO, ASN, ING, Rabobank and Triodos\(^84\). The aim of the Green Deal is to share and align financial and technical expertise on financing sustainable energy and energy saving projects.
- The Green Deal Circular Buildings was signed in 2015 by ABN AMRO and SNS Bank\(^85\). By signing the deal, the banks commit to using as little as possible raw materials and keeping products and raw materials in the chain as long as possible. Both the ABN AMRO and de SNS buildings served as a pilot buildings.

**Institutional investors**

Institutional investors, such as asset managers, insurers and pension funds, have also recognized the risks of a linear system. As raw materials become exhausted and the circular transition accelerates, companies that fail to adapt could lose their competitive advantage. Having revenue models based on product with a short lifespan or failing to cooperate within a value chain can be regarded as linear risks that can prohibit the long term financial perspective of a portfolio. Investors have therefore formulated their ambition to design an investment portfolio in which these linear risks are minimized\(^86\). At the same time, The circular economy presents various opportunities for investors searching for competitive return next to social and environmental impact\(^87\). By including sustainability KPIs in the criteria institutional investors tend to make investment decisions and setting sustainability targets for the companies they invest in\(^88\), investors are increasingly acknowledging that social and environmental pressures should be weighed at a portfolio level.

Although various actors have expressed their focus on circular opportunities, integrating the circular economy in investment policies is still at its early stages in the Netherlands. At present, Dutch institutional investors assign a relatively small share of their assets in finance sources such as venture capital and private equity funds that invest in circular models\(^89\). Currently, investors interested in sustainable investments prefer to look into options in renewable energy assets due to their proven business models and bigger ticket sizes\(^90\). The uncertainty of operational costs, the residual value of the new products, the absence of track records and a lack of familiarity with circular business models have often been mentioned as a barrier for investors to translate their interest into concrete investments\(^91\). In addition, institutional investors such as pension funds mention that the average pension fund investment strategy can be a possible barrier. Pension funds often do not invest in specific economic activities but rather in companies. This can be problematic as companies in which circular activities only represent a part of the entire scope of activities are also prominently active in the market\(^82\). Consequently, frameworks and guidelines specifically focusing on the circular economy, rather than on sustainability in general, are still scarce. For instance, major institutional investors in the Netherlands are signatories of the United Nations (UN) supported Principles of Responsible Investments (PRI)\(^93\). The PRI aims to achieve a sustainable global financial system.

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83 Green deal: circular procurement: https://www.circle-economy.com/green-deal-circular-procurement/#.XBucSWhiUk
84 Samenvatting Green Deal 152: https://www.greendeals.nl/green-deals/financiering-duurzame-energieprojecten
91 Access-to-finance conditions for projects supporting the circular economy: http://www.eib.org/attachments/pj/access_to_finance_study_on_circular_economy_en.pdf
93 Principles for responsible investment: www.unpri.org/download?ac=1534
through adoption and reporting on ESG issues by institutional investors as well as by fostering good governance, integrity and accountability. Promotion of circular activity is included in Environmental criteria but is not addressed by the PRI in specific.

Despite its broader perspective, a valuable initiative that can assist in the development of a taxonomy has been proposed by APG and PGGM. The Sustainable Development Investments (SDIs) taxonomies aim to boost the UN SDGs by providing guidance on what type of investments meet financial risk and return requirements and support the generation of positive social and/or environmental impact. The taxonomies zoom in on each SDG in relation to the Global Industry Classification Standard (GICS). In addition, it sets investable sub-goals for tangible investment opportunities. By developing a methodology to identify these opportunities, APG and PGGM intend to kickstart a discussion on market standards. The taxonomies provides meaningful insights for this study as it translated broad sustainability goals to relevant indicators that also bear in mind investors’ needs to have a common language when evaluating the impact of investment portfolios. In addition, the taxonomies also propose various criteria that are closely related to the transition to a circular economy (e.g. waste management, efficient use of natural resources, management of chemicals and wastes throughout their life cycle). These taxonomies will be further discussed later in this report.

Similarly, the insurance sector is exploring its role in the circular economy. After all, anticipating on the risks of circular products and services naturally implicates the involvement of these actors. To illustrate, life insurance policies traditionally focus on property, making risk coverage difficult when multiple individuals share a product. At the same time, circular business models also provide a chance to insure innovative activities that focus on product disassembly, recycling or refurbishments. In response to these developments, various insurance companies have emphasized the necessity to rethink their own products in light of product-as-a-service and innovative sharing business models. Insurers NN Group, VIVAT and Centraal Beheer for instance initiated a partnership, Sustainable Insurance, to investigate what the circular economy can mean for financial services. Similar to pension funds, policy frameworks in the insurance sector mostly focus on sustainable investments. Insurance companies often integrate ESG factors in their investment decision-making process, yet only a few frontrunners incorporate complementary SDGs that cover additional relevant topics. In addition, a 2017 benchmark among insurance companies, conducted by VBDO, concluded that, although a quarter of the insurance companies set targets, they hardly measure the actual impact on society and corporations. To increase the level of sustainable investments, VBDO recommends insurance companies to formulate a long-term vision as well as clear and measurable targets that integrate sustainability. Besides enabling the assessment and improvement of investment policies, using criteria such as the SDGs can create new business opportunities and significantly impact the risk return profile of a portfolio.

**Private Equity and Venture Capital funds**

Over the past few years, private equity (PE) firms have been portraying a gradual development in the area of sustainability and the circular economy. As a result, various funds focus on new forms of energy, nutrition technologies and resource utilization. At the same time, private equity funds are also including the environmental industry as a specific target investment sector and in some cases incorporating sustainability in their investment decisions. Similarly, Venture Capital (VC) funds have taken the opportunity to support start-up and small to medium-sized enterprises with strong growth potential. By providing capital these funds aim to boost the transition from a linear take-make-waste economy to a circular economy.

Besides providing capital, the Working group FinanCE also identifies two other reasons why these actors are uniquely positioned to assist and positively influence the development of circular business strategies. To start, they can use the lens of the circular economy to identify and choose businesses that could benefit from the adoption of the circular economy. Secondly, private equity and venture capital funds can actively engage as shareholders to influence the strategies of business and their adoption of circular economy principles. Nevertheless, PE and VC funding also has its restrictions. They not only require high growth but also entail

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96 Insuring the sharing economy: https://www.aig.com/content/dam/aig/america-canada/us/documents/insights/aig-insuring-the-sharing-economy.pdf
relatively fast payback horizons. Naturally, such requirements can, for most circular businesses, be problematic due to their immaturity and long-term nature.

When assessing Dutch PE and VC guidelines and frameworks that focus on sustainability and a circular economy, it appears that limited concrete viewpoints have been formulated by individual funds. A noteworthy document is the collaborative Code of Conduct\textsuperscript{102} developed by Dutch Private Equity & Venture Capital Association (2016). By signing the documents, members of the association agree to act socially responsible, by taking ESG into account when selecting and managing portfolio companies, and to have a long investment horizon. A review of methods to classify sustainable and circular business models does reflect that circularity is increasingly becoming a topic of interest. Social Impact Ventures for instance invests in Dutch social enterprises with a focus on health and wellbeing, people empowerment and the circular economy. The investment criteria analyze, among other things, the business models and measurable impact on people and/or planet. A valuable measurement system has also been developed by Convent Capital in collaboration with Spring Associates. The Circularity Scan\textsuperscript{103} measures sustainable value creation based on an ESG classification.

\textbf{Crowdsourcing platforms}

Next to these conventional ways of funding, non-conventional ways of private funding in the form of crowdfunding are increasingly active in the Netherlands. Entrepreneurs searching for financing, involvement, or marketing can make use of these platforms. Crowdfunding takes different forms depending on the chosen platform. Two forms of crowdsourcing are:

- \textbf{Peer2Peer Lending}: Through large crowdfunding platforms such as Geldvoorelkaar, Collin Crowdfund or Funding Circle, private individuals can invest in companies and support independent entrepreneurs with their financing. Peer2Peer lending is a rather new market in the Netherlands
- \textbf{Equity Investment}: Equity investment is a financing source for circular initiatives that adapt to ideas that catch on with ‘the crowd’. It is expected that in the long term these sustainable investments will generate a higher than average return

Various Dutch platforms also focus on sustainable initiatives. A few examples are CrowdAboutNow founded in 2009, Greencrowd founded in 2012, and Oneplanetcrowd initiated by StartGreen in 2012. Project of Oneplanetcrowd are supported by the ASN Bank’s community ‘Voor de Wereld van Morgen’ and have to meet the sustainability criteria of the bank.

\textsuperscript{102} NVP-Gedragscode en lidmaatschapscode 2016: http://www.nvpportal.nl/document/18/NVP-Gedragscode%20en%20Lidmaatschapscode%202016-2.pdf
\textsuperscript{103} Circularity scan: http://www.conventcapital.nl/en/esg-scan/
7.2 Circular economy product- and service categories
The below two paragraphs describe various ways to distinct product and services categories. Even though the circular economy is generally built around the environment in terms of waste and designing products to eliminate waste, it is a mistake to think that only products can be circular. Research has shown that there are two ways to look at circularity: from a systems perspective, as well as from a waste-hierarchy perspective\(^{104}\). The latter, even though used by many institutions, is found to be difficult to apply to the non-built environment, whereas the systems perspective does not necessarily apply to the circularity of a certain product. Again, this exemplifies the necessity for a unified taxonomy of how an activity contributes to the transition to a circular economy.

7.2.1 Products
Various academics and practitioners have developed approaches to reduce material- and resource consumption in product chains\(^{105}\). Throughout the years, these approaches have become known as R-frameworks. One of the characteristics of these framework is their hierarchical strategy structure from high- to low circularity. As a rule of thumb, circular strategies that are high up the ladder need less materials and are more often made of recycled materials\(^{106}\). Although the R-frameworks resemble each other, they vary in the number of circularity strategies they present. Throughout the years, 3R, 4R, 10R and many more frameworks have been proposed to capture the core principals of a circular economy.

Despite the advantages of analyzing products based on one of the R-frameworks, their categorization can also produces difficulties. An analysis of 69 academic articles and their conceptualization of R-imperatives, conducted by the University of Utrecht in 2018\(^{107}\), showed that there is a remarkable variety amongst various scholars and disciplines. Besides the different number of strategies, authors also apply different attributes, orders, meanings and units of analysis to their conceptualization. Such a myriad of words cannot only produce an immense variety of frameworks but can also create confusion across different actors that make use of the R-categories.

At the same time, a focus on products can overlook circular initiatives that are based on revenue models that shifts from product ownership to product use. In so-called Product Services Systems, value is based on a combination of a product and service rather than a sole focus on a tangible product\(^{108}\). In practice, this means that provision of services can involve a number of intangible and tangible elements, whereas the supply of products can rely on the culmination of a long series of services. Ultimately, the mix of product and services can specifically be designed and combined to fulfil final customer needs\(^{109}\).

\(^{104}\)The circular economy: New or Refurbished as CE 3.0? — Exploring Controversies in the Conceptualization of the Circular Economy through a Focus on History and Resource Value Retention Options: https://reader.elsevier.com/reader/sd/pii/S0921344917302756?token=C9ABDC7E7359304613C80EE4CEA5C4D09B1AF0D9C985CFB860F6C83192BFCA02E9AB470 39890A878BE00E49A83E76


\(^{107}\)The circular economy: New or Refurbished as CE 3.0? — Exploring Controversies in the Conceptualization of the Circular Economy through a Focus on History and Resource Value Retention Options: https://reader.elsevier.com/reader/sd/pii/S0921344917302756?token=C9ABDC7E7359304613C80EE4CEA5C4D09B1AF0D9C985CFB860F6C83192BFCA02E9AB470 39890A878BE00E49A83E76


\(^{109}\)A. Tukker (2013); https://repository.tudelft.nl/view/tno/uuid:04bba533-fe02-45b5-8689-fb10f06cb72f
To properly deal with these issues, the PBL Netherlands Environmental Assessment Agency has proposed a R-ladder consisting of nine elements\textsuperscript{111}. Whereas most circularity frameworks, such as the 3R and 4R frameworks, focus on products, PBL’s R-ladder is based on the function of the products. This makes it possible to consider how specific functions can be provided by using distinct products. A well-known example being streaming a film rather than selling a DVD. For supply chain this means that less products are required to provide the same function. The 9R anticipates on this development by prioritizing the order in which more efficient products and services should be developed in existing and new product chains\textsuperscript{112}. Ultimately, such a view makes it possible to formulate circularity strategies in which the main function of the product is maintained. Due to its multiple comprehensive and integrated nature and strong foundation in the academic literature, the 9R’s will be used to capture the nuances of circularity.

### 7.2.2 Services

On the services side, the described transition also entails a change from manufacturing, and potentially selling a product, to the provision of a service based on the use of the same product\textsuperscript{113}. For instance, Renault offers electric cars with no battery included in the purchase price. The batteries are leased by customers, making it possible to not only replace them when needed, but also to re-engineer them or recycle them to extract more value. According to a research report presented by the EU Investment Bank (EIB), Innovfin Advisory and the EC in 2015\textsuperscript{114}, such services can produce a transition to:


\textsuperscript{112} A third party owns the product and provides related service

\textsuperscript{113} Pay-per-service unit

\textsuperscript{114} Functional result

\textsuperscript{115} Access-to-finance conditions for projects supporting circular economy: http://www.eib.org/attachments/pj/access_to_finance_study_on_circular_economy_en.pdf

\textsuperscript{116} Access-to-finance conditions for projects supporting circular economy: http://www.eib.org/attachments/pj/access_to_finance_study_on_circular_economy_en.pdf
• Offering lending, renting, take-back and sharing services as an alternative to being an owner of products;
• Services that facilitate the repair, maintenance and reuse. An example being services where individuals can drop their after-use products for re-use by others;
• Services that assist in tracing, marketing and trading secondary raw materials, such material databases that navigate the traceability of materials and communicate on the quality of these materials.
7.3 Circular Economy business models

The below sub-paragraphs describe the most common circular economy business models. The transition towards a circular economy requires companies to adopt new business models that have the ability to assess the function of a product or service from a value proposition perspective. By rethinking perceptions of value, business models can present an opportunity to deliver social and environmental benefits while also creating a competitive advantage. Creating a business model that is circular requires a systemic approach, with a significantly different financing approach, scope and purpose compared to traditional business models.

Figure 8: circular economy business models

The co-maker model

This business model focuses on sustainable use of materials in the market. The model stimulates innovative thinking, as contractors collaborate with suppliers to configure long term maintenance solutions. An example would be a modular office building, that can easily be demolished without materials losing their residual value.

Circular input model

If materials and input is renewable, biodegradable and recyclable based, the model can be considered circular. It focuses on creating resources and inputs that contribute to the circular economy. For this business model to be lucrative, renewable raw

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115 A literature and practice review to develop sustainable business model
Archetypes: https://ac.els-cdn.com/S0959652613008032/1-s2.0-S0959652613008032-main.pdf?_tid=007f8ca3-5add-4bd9-b5a5-db4e191c8f93&acdnat=1545996625_b915187eaa63c9241d9d45315ba373c5

116 Social and Economic Council (SER) and Deloitte analyses
materials should either be cheaper and/or better than traditional materials. Examples are products that are solely made of biodegradable materials.

**Lifespan model**
This model is built around lengthening the lifespan of products, which can be achieved through for example reparation, upgrading, refabricating or remarketing the same product. The business is derived from services associated with, for instance, reparation, but also from sales in residual value (second-hand). Fairphone 2 is a prime example; a phone designed to be easily repaired by its owner when broken.

**Platform model**
The main driver of this model is a shared economy. To gain utility from products, consumers can offer products currently not being used to other consumers. A product can be shared for free, but also be sub rented. The model can be services based (i.e. Airbnb) or product based (i.e. Marktplaats.nl).

**Product-as-a-service model**
Instead of selling a product, a company/person remains the owner of a product. The product is solely offered through rental payments and/or on lease terms. Some well-known examples are Philips’ lighting-as-a-service and Spotify where a fixed amount per month is payed to make use of the product.

**Waste value model**
Recycling and upcycling are key in this model. It essentially creates a market for what, in any other business model, would be perceived as waste. The model makes sure to re-use part of waste as much as possible and reduce waste to a minimum. Examples are organizations in agriculture that use manure to generate energy and mineral production.

**Facilitators and enablers**
Even though business models of facilitators and enablers are not necessarily circular, they are key in the transition towards circular economy business models. Any activity that provides knowledge, networks, engineering, data or consultancy employed to realize circular economy goals can be viewed as a facilitator or enabler. For instance; a consulting firm does not necessarily has a circular business model, but when consulted for advice regarding circularity, it is an enabler or facilitator.

**Financing circular business models**
The SER believes that employing traditional financing models for these new types of business models will be the main barrier for transition, as investors perceive additional risks associated with these investments. Some examples are increasing cost prices (more social costs discounted in cost prices), instability of government policies (subsidiaries under pressure), information asymmetry (causing investors to make wrong risk estimates), and the absence of a proven track record. The Council believes the ‘product-as-a-service model’ to generate the highest risks for investors as the bank and/or organization will need to finance the product until revenue is generated from rental payments and/or lease contracts (instead of direct revenue streams from selling the product). In addition, an organization in this model is dependent on how the customers treat the product, causing the economic value of products to quickly drop to the level of residual value. The SER does however state that the majority of circular economy business models can be financed through existing constructs. Start-ups are expected to encounter more difficulties to raise (new) capital than larger/existing companies.

According to the Dutch SER, the solution to stimulate investors to finance new circular economy business models is twofold: increase government investments (through for example credit provisions and/or investment funds), and stimulate private party investments. Stimulating the private segment to invest in these business models will require a standardization of these models as
well as a shared classification to increase transparency for investors, which emphasizes the need for a taxonomy. Furthermore, the government will need to provide financial guarantees to compensate investors for increased exposure to financial risks. Lastly, the government can incentivize investment through fiscal advantages.

A research conducted by Circle Economy, Sustainable Finance Lab and NederlandCirculair\textsuperscript{117}, enabled by the Dutch Ministry of Infrastructure and the Environment, further explored the intricacies of financing circular business models. They propose six guidelines to shift the financial sector’s perspective regarding the risk and return of circular investments. A key element is that the financial sector will need to include social and environmental capital in their decision making. Specifically for circular businesses, a more transparent financial decision-making process is needed to overcome information asymmetries. That means a shift in the system is necessary to implement these changes, rather than single player action. Developing new policy and mechanisms to promote circular business and reduce short-term pressures are therefore major enablers of that collective action.

The six guidelines for financial decision-makers the research proposes are:

1. Assess different securities: a reconceptualization of risk models concerned with financing, with a long-term focus, new future value evaluation methods and different depreciation schemes;
2. Emphasize relationship-based financing: intangible capitals, such as networks of the company, are of great value to circular businesses, but are undervalued on financial statements;
3. Value natural capital gains: natural resources are not always priced correctly and are a large part of the advantages circular businesses bring, where unsustainable use of resources are insufficiently regarded as a major future financial risk;
4. Become a knowledge partner: financiers need to further grow expertise to become strategic partners for circular businesses and it will need to improve their ability to finance them;
5. Have a long-term vision: circular businesses typically have a long-term strategy, focusing on long-lasting products. However, these are incorrectly valued on the financiers’ short-term goals;
6. Become a financial chain director: circular businesses needs multiple forms of capital, which enables the spread of its risk. Financiers can play a role as knowledge broker, to make sure these needs are being met, by the financiers as well as the businesses.

7.4 Indicator sets to classify activities as sustainable and circular

Table 2: Indicator sets to classify activities as sustainable

<table>
<thead>
<tr>
<th>Indicator set</th>
<th>Advocated by</th>
<th>Characteristics</th>
<th>Number of indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eco-efficiency Analysis</td>
<td>WBCSD</td>
<td>Micro level, links economic and environmental progress with more efficient use of resources and lower emissions</td>
<td>7</td>
</tr>
<tr>
<td>Economy-wide Material Flow</td>
<td>Eurostat</td>
<td>Macro level, shows the amounts of physical inputs into an economy, material accumulation in the economy and outputs</td>
<td>6</td>
</tr>
<tr>
<td>Environmental, Social, Governance (ESG) Risk Ratings</td>
<td>Sustainalytics</td>
<td>Micro level, provides a quantitative measure of unmanaged ESG risk</td>
<td>&gt;30</td>
</tr>
<tr>
<td>Life Cycle Impact Analysis</td>
<td>European Commission</td>
<td>Micro, meso and macro level, quantifies inputs and outputs of material flows and the impact of these flows on the environment</td>
<td>&gt;50</td>
</tr>
<tr>
<td>Non-Financial Indicator</td>
<td>ING</td>
<td>Micro level, qualitative and quantitative ESG measurement, policy and performance in relation sustainability</td>
<td>10</td>
</tr>
<tr>
<td>Performance Indicators</td>
<td>GRI</td>
<td>Micro level, corporate social responsibility, indicators such as human rights, environmental, economic and sourcing</td>
<td>&gt;100</td>
</tr>
<tr>
<td>Raw Materials Consumptions</td>
<td>European Commission</td>
<td>Macro level, material flows, reuse and recycling rates</td>
<td>24</td>
</tr>
<tr>
<td>Resource Efficiency</td>
<td>EU Resource Efficiency scorecard (EURES)</td>
<td>Macro level, resource productivity, criteria related to natural resources</td>
<td>32</td>
</tr>
<tr>
<td>Socially Responsible Investments</td>
<td>ASR Nederland</td>
<td>Micro level, ESG-criteria positive screening</td>
<td>38</td>
</tr>
<tr>
<td>Sustainability Indicator</td>
<td>ABN AMRO and Sustainalytics</td>
<td>Micro level, ESG criteria, company performance on sustainability and corporate responsibility</td>
<td>3</td>
</tr>
<tr>
<td>Sustainability Criteria</td>
<td>ASN Bank</td>
<td>Micro level, ESG data, focus on themes such as human rights, climate change and consumers</td>
<td>&gt;20</td>
</tr>
</tbody>
</table>
### Table 3: Indicator sets to classify activities as circular or contributing to the circular economy

<table>
<thead>
<tr>
<th>Indicator set</th>
<th>Advocated by</th>
<th>Characteristics</th>
<th>Number of indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese National Circular Economy Indicators</td>
<td>National Development and Reform Commission</td>
<td>Macro and meso level, 3R framework, categories such as input, consumption, balance and output</td>
<td>&gt;20</td>
</tr>
<tr>
<td>Circularity Assessment Tool</td>
<td>PGGM and Circle Economy</td>
<td>Micro level, circular opportunities focused on elements such as waste as a resource and incorporate digital technology</td>
<td>7</td>
</tr>
<tr>
<td>Circular Economy Monitoring Framework</td>
<td>European Commission</td>
<td>Macro level, life cycle analysis, monitoring key trends and patterns to set new priorities</td>
<td>10</td>
</tr>
<tr>
<td>Circular Economy Toolkit</td>
<td>Evans and Bocken</td>
<td>Micro and meso level, R framework, improvement of product circularity by assessing circular opportunities</td>
<td>7</td>
</tr>
<tr>
<td>Indicators for Eco-Design for CE in Europe</td>
<td>EEA</td>
<td>Macro, EU policy priorities, covers six environmental themes and four sectors related to EU priorities</td>
<td>37</td>
</tr>
<tr>
<td>Key Indicators for Monitoring the Circular Economy</td>
<td>French Ministry of Environment and Marine Affairs</td>
<td>Macro level, performance monitoring at every life cycle stage as well as an indicator to examine employment</td>
<td>10</td>
</tr>
<tr>
<td>Material Circularity Indicator</td>
<td>Ellen MacArthur Foundation and Granta Design</td>
<td>Micro, meso level, technical cycles and materials non-renewable sources, allows companies to estimate their advancement from linearity to circularity</td>
<td>4</td>
</tr>
<tr>
<td>Material Flow Indicators</td>
<td>Japanese Government</td>
<td>Macro level, 3R Framework, origin in waste prevention and recycling policy but scope is broadening to topic such as renewable resources</td>
<td>12</td>
</tr>
</tbody>
</table>
7.5 Selection of Dutch financial institution’s taxonomies

Figure 9: ASN Sustainability Criteria Framework\(^ {118}\)

<table>
<thead>
<tr>
<th>Sustainability policy (three pillars underpinning all sustainability issues)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate change (vision of climate change and CO₂ objectives)</td>
<td>Human rights (social and ethical criteria)</td>
</tr>
</tbody>
</table>

Other policies and membreanda (tailoring pillars to specific sectors and issues):

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Issues</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste processing</td>
<td>Banks and insurers</td>
<td></td>
</tr>
<tr>
<td>Supranational</td>
<td>Transport and mobility</td>
<td></td>
</tr>
<tr>
<td>Water boards</td>
<td>Living and working</td>
<td></td>
</tr>
<tr>
<td>Healthcare</td>
<td>Governance</td>
<td></td>
</tr>
<tr>
<td>Animal welfare</td>
<td>Supply chain policy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Microfinance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Voting policy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Risk countries</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Government bonds</td>
<td></td>
</tr>
</tbody>
</table>

Figure 10: Triodos Bank Transition Themes\(^ {119}\)

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\(^ {118}\) Guide ASN Sustainability Criteria: https://www.asnbank.nl/over-asn-bank/duurzaamheid/beleidsdocumenten.html

\(^ {119}\) Impactbeleggen via beursgenoteerde aandelen en obligaties: https://www.triodos.nl/downloads/sri-whitepaper?id=cafc884f81d4
Figure 11: SDI decision tree (PGGM and APG)\textsuperscript{120}

Figure 12: investable sub goals defined by PGGM and APG related to the 12\textsuperscript{th} SDG\textsuperscript{121}

\textsuperscript{120} Taxonomies: https://www.apg.nl/en/publication/SDI%20Taxonomies/918
\textsuperscript{121} Taxonomies: https://www.apg.nl/en/publication/SDI%20Taxonomies/918
Figure 13: Climate Bonds Taxonomy (Climate Bonds)

Figure 14: Climate Bonds Taxonomy: Transport
### 7.6 EU taxonomy concept do no harm criteria from a circular economy perspective

<table>
<thead>
<tr>
<th>NACE macro-sector</th>
<th>Activities</th>
<th>No harm criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agriculture, forestry &amp; fishing</strong></td>
<td>Afforestation</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Rehabilitation/restoration</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Reforestation</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Existing forest management</td>
<td>-</td>
</tr>
<tr>
<td><strong>Manufacturing</strong></td>
<td>Energy and resource efficiency in manufacturing</td>
<td>-</td>
</tr>
</tbody>
</table>
|                                   | Manufacture of renewable energy equipment                                  | • Adapt design solutions aimed at improving durability, reparability and recyclability of the products manufactured  
                                   |                                                                               | • Implement production line quality inspection and testing in order to minimize early stage failures of component/products in the field |
|                                   | Manufacture of low carbon transport vehicles, equipment and infrastructure | -                                                                                                                                                 |
|                                   | Manufacture of energy efficiency equipment for building                    | -                                                                                                                                                 |
|                                   | Manufacture of other low carbon technologies                             | -                                                                                                                                                 |
| **Electricity, gas, steam and air** | Energy production (geothermal)                                             | -                                                                                                                                                 |
|                                   | Energy production (hydro)                                                  | • Minimize construction-related waste and ensure appropriate recycling waste generated                                                       |
|                                   | Energy production (solar photovoltaic)                                     | • Ensure the reparable of the solar photovoltaic (PV) installation or plant thanks to accessibility and exchangeability of the components, e.g. capacitors or boards in inverters, or the bypass diodes in the module junction boxes  
                                   |                                                                               | • Implement field inspection and monitoring tools at the system level to prevent failures to occur or for early detection of faults  
                                   |                                                                               | • Select modules and inverter components that have undergone accelerated life testing to demonstrate durability |

| Energy production (wind energy) | and low degradation for their expected lifespan in the field (e.g. 15 years for inverters, 25 years for modules) |
| Energy production (ocean energy) | - |
| Energy production (concentrated solar power) | - |

### Transportation and storage

| Passenger rail transport (interurban) | • Adopt separate passenger waste collection  
• Recycle waste from maintenance and operation |
| Freight rail transport | • Recycle waste from maintenance and operation |
| Urban and suburban passenger land transportation (public transport) | • Ensure the vehicles, their parts and specifically the batteries are sent for re-use or recycling at the end of their useful life |
| Infrastructure for low carbon transport | • Maximize opportunities to re-use materials and minimize waste during construction of the transport infrastructure |
| Light passenger cars and commercial vehicles | • Ensure the vehicles, their parts and specifically the batteries are sent for re-use or recycling at the end of their useful life |
| Freight transport services by road | • Ensure the vehicles, their parts and specifically the batteries are sent for re-use or recycling at the end of their useful life |
| Interurban scheduled road transport services of passengers | • Ensure the vehicles, their parts and specifically the batteries are sent for re-use or recycling at the end of their useful life |

### Construction

#### Real Estate activities

| Construction of new buildings (residential and non-residential) | • Maximize opportunities to re-use materials and minimize waste during construction and demolition  
• Increase life span of building, adopting design solution for making easy the adaptation of the building  
• Maximize the future potential of building material reuse and recycling, adopting design solutions for ease of deconstruction |
| Renovation of existing buildings (residential and non-residential) | • Maximize opportunities to re-use materials and minimize waste during construction and demolition  
• Increase life span of building, adopting design solution for making easy the adaptation of the building  
• Maximize the future potential of building material reuse and recycling, adopting design solutions for ease of deconstruction |
### 7.7 List of Dutch financial institutions consulted

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<th>Organization</th>
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<td>8</td>
<td>Netherlands Investment Agency (Invest NL)</td>
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