



05.10.2021 Statement

Circular Economy: Leveraging a Sustainable Transformation



Executive Summary

The ambitious targets in place for sustainable development – national, European and global alike – underscore just how time-critical the transformation towards a circular economy is. A circular economy focuses on the value chain process in its entirety with the aim of closing resource loops insofar as possible, and the policy shift from a linear economy to such a circular economy is of crucial importance in achieving a whole range of sustainability targets. Here, it is imperative to make use of synergies with other major transformations, first and foremost climate neutrality and biodiversity preservation, both in terms of content and timing. The circular economy will fundamentally change the way we produce and consume today. That's why embedding the associated processes of structural change in society in an appropriate way must also become a greater focus as a matter of urgency. Despite its already established high leverage effect and the fact that some progress¹ has already been made here, the circular economy has yet to take the spotlight in the political sphere. A strategic approach to circularity is urgently needed and should be developed, managed and implemented in a cross-ministerial capacity in line with efforts at EU level and together with international partner nations.

Against this backdrop of such diversified, transformational needs, the German Council for Sustainable Development recommends organising the transition to circularity via a new, cross-ministerial governance mechanism coordinated by the German Federal Chancellery.²

The German Council for Sustainable Development (RNE) recommends:

- Adjusting objectives to strive for an absolute reduction in primary raw material consumption,
- Establishing a policy mix of incentives, support measures and regulation to achieve a steering effect,
- Anticipating processes of structural change and further developing social safeguarding instruments,
- Setting out standards and norms and avoiding distortion of competition,
- Promoting transparency with coherent sustainability reporting and strengthening the circular economy in international trade,

¹ Cf. Appendix: **Examples of current political initiatives.**

² German Council for Sustainable Development (2021): Recommendations for the Reform of Government Work: Better Governance for Sustainable Development. Available at: https://www.nachhaltigkeitsrat.de/wp-content/uploads/2021/10/20211004_RNE-Stellungnahme_Reform-der-Regierungsarbeit-Bessere-Governance-fuer-die-Nachhaltige-Entwicklung.pdf.



- Realizing economic opportunities and supporting sound circular economy business models,
- Mainstreaming recyclability throughout the whole product lifecycle, starting with product design,
- Reinforcing producer responsibility across the board,
- Avoiding pollutant inputs in ecosystems,
- Empowering consumers to exercise their freedom of choice and implementing measures to increase acceptance,
- Expanding education and research around the circular economy,
- Solidifying circularity as the foundation of a sustainable European economy and
- Strengthening international partnerships and technology transfer.



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Introduction and Objective

1. Challenges for a circular economy

Across the globe, more than 100 billion tonnes of primary raw materials³ are consumed each year⁴ – more than three times the amount consumed in 1970.⁵ In 2020, however, only around 9% of these primary raw materials were recycled or reused in a circular way.⁶ If resource consumption fails to change and with the global population continuing to grow, by 2050 it would take “three Earths” to meet the demand for raw materials.⁷ It follows that a profound transformation of production and consumption must take place to secure a sustainable society congruent with the 2030 Agenda for Sustainable Development and the global Sustainable Development Goals (SDGs). The German Council for Sustainable Development (RNE) has recently taken a stance⁸ on the issue of climate neutrality and has already developed a series of specific considerations on the circular economy.⁹ Both areas of transformation require considerable and, in parts, directly connected investments (e.g. climate-neutral energy supply and raw-material and basic-commodity production) as well as a structural paradigm shift. As such, the two must be considered, and tackled, holistically, nationally, at European level and on a global scale.

³ Primary raw material: “Raw material that is obtained by extraction from nature.”; Renewable primary raw material (including biotic raw materials): “Raw material obtained by extraction from nature that has the potential to renew itself over a certain period of time. This includes biogenic raw materials but also air and (non-fossilised) water. There is no uniform consensus on the time period over which a raw material is no longer considered renewable.”; Non-renewable primary raw material (including abiotic raw materials): “Raw material obtained by extraction from nature that does not have the potential to renew itself over a certain period of time. This includes mineral and fossil raw materials. There is no uniform consensus on the time period over which a raw material is no longer considered renewable. The boundary between “renewable” and “non-renewable” usually falls between 100 and 1000 years.” (German Environment Agency (2012; p. 17f.): *Glossar zum Ressourcenschutz [Glossary on Resource Protection]*. Available at: [umweltbundesamt.de/sites/default/files/medien/publikation/long/4242.pdf](https://www.umweltbundesamt.de/sites/default/files/medien/publikation/long/4242.pdf).)

⁴ Cf. Circle Economy (2020; p. 12): *The Circularity Gap Report 2020*. Available at: https://assets.website-files.com/5e185aa4d27bcf348400ed82/5e26ead616b6d1d157ff4293_20200120%20-%20CGR%20Global%20-%20Report%20web%20single%20page%20-%2020210x297mm%20-%20compressed.pdf.

⁵ Cf. Circle Economy (2020; p. 15): *The Circularity Gap Report 2020*. Available at: https://assets.website-files.com/5e185aa4d27bcf348400ed82/5e26ead616b6d1d157ff4293_20200120%20-%20CGR%20Global%20-%20Report%20web%20single%20page%20-%2020210x297mm%20-%20compressed.pdf.

⁶ Cf. Circle Economy (2021; p. 8): *The Circularity Gap Report 2021*. Available at: drive.google.com/file/d/1MP7EhRU-N8n1S3zpzqlshNWxqFR2hznd/edit.

⁷ Cf. WWF (2016): Earth Overshoot Day: The World is Not Enough. Available at: [wwf.de/themen-projekte/biologische-vielfalt/welterschoepfungstag-die-welt-ist-nicht-genug/](https://www.wwf.de/themen-projekte/biologische-vielfalt/welterschoepfungstag-die-welt-ist-nicht-genug/).

⁸ Cf. German Council for Sustainable Development and German National Academy of Sciences Leopoldina (2021): *Climate neutrality: Options for setting the right course and ambitious delivery*. Available at: [nachhaltigkeitsrat.de/wp-content/uploads/2021/06/RNE_Leopoldina_Positionspapier_Klimaneutralitaet.pdf](https://www.nachhaltigkeitsrat.de/wp-content/uploads/2021/06/RNE_Leopoldina_Positionspapier_Klimaneutralitaet.pdf).

⁹ Cf. German Council for Sustainable Development (2017): *Chancen der Kreislaufwirtschaft für Deutschland – Analyse von Potenzialen und Ansatzpunkten für die IKT-, Automobil- und Baustoffindustrie [Opportunities of the Circular Economy for Germany – an Analysis of Areas of Potential and Starting Points for the ICT, automotive and building materials industries]*. Available at: [nachhaltigkeitsrat.de/wp-content/uploads/migration/documents/RNE-Accenture_Studie_Chancen_der_Kreislaufwirtschaft_04-07-2017.pdf](https://www.nachhaltigkeitsrat.de/wp-content/uploads/migration/documents/RNE-Accenture_Studie_Chancen_der_Kreislaufwirtschaft_04-07-2017.pdf); cf. German Council for Sustainable Development (2021): *Aufbruch in ein Jahrzehnt der Nachhaltigkeit [Moving into a Decade of Sustainability]*. Available at: [nachhaltigkeitsrat.de/aktuelles/aufbruch-in-ein-jahrzehnt-der-nachhaltigkeit/](https://www.nachhaltigkeitsrat.de/aktuelles/aufbruch-in-ein-jahrzehnt-der-nachhaltigkeit/).



The circular economy aims to close material loops insofar as possible, reduce resource consumption in absolute terms and generally play a central role in contributing to sustainable development, in particular to climate neutrality, biodiversity protection and, more broadly, the preservation of the very natural foundations of life.¹⁰ In addition, the circular economy plays a role in reducing dependence on imported raw materials, thus decoupling resource consumption from economic growth and sustainably securing material production bases. The overall concept of the circular economy extends far further than its current conceptualisation as a “closed loop” economy, which has thus far primarily focused on the recycling of “waste”.¹¹

The circular economy is essentially a clever combination of the following three principles: a reduction in absolute resource use (Reduce), an extension of product lifecycles (Reuse and Repair) and the continued use of materials at the end of a cycle (Recycle). The fact that the 30 raw materials classified as critical in Europe are of vital importance for many key future industries, including in the manufacture of e-vehicles, solar panels, smartphones, steel and wind turbines, reveals the challenge at play.¹² The size of the material loops is relevant here: the goal should be smaller and, if possible, regional material loops, especially in the case of renewable raw materials, as opposed to a circular economy in which materials are transported over long distances. The basis for this is a holistic view of the value chain from raw material extraction and intelligent product design to recycling, all while taking into account the respective lifecycle assessments.

¹⁰ Adapted from the definition given by the EU Parliament. Cf. European Parliament (2021): Circular economy: definition, importance and benefits. Available at: <https://www.europarl.europa.eu/news/en/headlines/economy/20151201STO05603/circular-economy-definition-importance-and-benefits>.

¹¹ Cf. Circular Economy Initiative Germany (2021; p. 22): *Circular Economy Roadmap for Germany*. Available at: acatech.de/publikation/circular-economy-roadmap-fuer-deutschland/.

¹² Cf. Communication from the Commission: Critical Raw Materials Resilience. COM (2020)474. Available at: eur-lex.europa.eu/legal-content/DE/TXT/?uri=CELEX:52020DC0474.



2. The systemic integration of the circular economy

The transformation towards a circular economy is running in parallel with other major challenges and transformations, such as climate change and digitalisation. These major change processes are closely interlinked, and yet are systemically and systematically neither conceptualised nor designed holistically at present. There is an urgent need to create a coherent connection between these different aspects of the transformation.

As a systemic solution, the circular economy is able to address the interdependent crises of **climate change** and **resource scarcity**.¹³ It follows that alongside the shift to circularity and improved energy efficiency, this is also a matter of moving towards a climate-neutral energy supply.¹⁴ To avoid unnecessarily duplicating efforts, upcoming investment cycles which aim to protect the climate must therefore also take into account the objective of circularity in parallel. This applies in industry, in particular, but also in trade, the skilled trades and the service sector.

On the other hand, as the supply and use of raw materials are responsible for over 90% of biodiversity loss today, it also holds true that a circular economy plays a central role in species conservation and thus the protection of livelihoods. From the extraction of raw materials through to processing and the end of an intensive use phase, it is vital to ensure that this in no way poses a threat to ecosystems. The same applies to the treatment and storage of residual materials for possible future use.

Another cornerstone of the circular economy with an important role to play is the **bio-economy**. Properties such as the degree to which a product is biobased or biodegradable are growing in importance but are not in themselves a guarantee of high recycling rates. As with mineral raw materials, product design and value chain organisation must be geared towards cascading and recycling.

The transformation towards a circular economy will only be possible if it is systemically connected to **digitalisation**. Here, digitally connected value chain networks and digital product management can increase material productivity, while digital product passports should boost transparency regarding the materials used and their respective locations, thus also helping to build trust.

¹³ The extraction and processing of natural resources, from exploration to material conversion and production processes, require considerable amounts of energy. With the use of conventional energy sources, this currently accounts for around 50% of global greenhouse gas emissions. Cf. International Resource Panel (2019; p. 8): *Global Resources Outlook 2019: Natural Resources for the Future We Want*. Available at: <http://www.resourcepanel.org/reports/global-resources-outlook>.

¹⁴ Cf. Circular Economy Initiative Germany (2021; p. 51): *Circular Economy Roadmap for Germany*. Available at: acatech.de/publikation/circular-economy-roadmap-fuer-deutschland/. Take the example of plastic packaging in Germany: strategies to avoid its use and efficient resource management not only save raw materials, such as crude oil, but also significantly reduce CO₂. According to the Circular Economy Initiative Germany, for instance, simply increasing the proportion of recycled and reused packaging alone could save around 4 million tonnes of CO₂ equivalents per year by 2050.



Equally, digital solutions are a central success factor for circular business models. Indeed, the potential this area has to offer is far from exhausted.¹⁵ In setting up the necessary IT systems, attention must be paid from the outset to circularity, lower energy consumption and environmental protection.¹⁶

¹⁵ For the section in full: Circular Economy Roadmap.

¹⁶ Cf. German Council for Sustainable Development (2018): sustainable_AND_digital: Sustainable development as the framework for digital transformation. Available at: https://www.nachhaltigkeitsrat.de/wp-content/uploads/2019/01/20181219_RNE_Empfehlung_Digitalisierung.pdf.



Recommendations for a Sustainable Circular Economy

The German Council for Sustainable Development recommends addressing the following 13 action points into order to achieve a transformation towards a circular economy:

1. Adjust the objective – strive for absolute reduction of primary raw material consumption

One of the core objectives of German environmental and sustainability policy is to achieve a significant increase in overall raw material productivity by using raw materials more efficiently. However, in view of the array of challenges we face, not least raw material scarcity, climate neutrality and the protection of biodiversity, this objective fails to go far enough. Instead, the primary objective of the circular economy must be a reduction of primary raw material consumption in absolute terms. Accordingly, the German government should set out specific reduction targets for 2030 and 2050 respectively, anchor said targets in the German sustainability strategy and measure compliance using the Total Material Consumption¹⁷ per capita indicator. For example, the German government could turn to the new Dutch targets¹⁸. By 2050, the use of abiotic primary raw materials should be reduced to a maximum of 6 tonnes per person¹⁹ per year. A possible interim target could be a reduction amounting to at least 50 percent by 2030. The use of biotic primary raw materials should be reduced to a maximum of 2 tonnes per person per year by 2050. Here, increased efficiency, systemic innovation and a sufficiency strategy can all play a role in meeting these new targets.

Such steps should be supplemented with a set of appropriate further targets and indicators, including output-focused caps on sector-specific waste production, for example in the steel, chemicals, information and communications technology or construction sectors. These sector targets should be developed in dialogue with business, academia and civil society, should be set in a calculable and reliable manner and become more ambitious over time. A further objective should be the increased use of sustainable raw materials.

¹⁷ Total Material Consumption (TMC) is "a material flow indicator: quantity of all consumption-related materials to enter a reference system directly and indirectly, including hidden material flows in mass flow units (t/a)."; cf. German Environment Agency (2012): *Glossar zum Ressourcenschutz [Glossary on Resource Protection]*. Available at: [Glossar zum Ressourcenschutz \(umweltbundesamt.de\)](https://www.umweltbundesamt.de/en/resources/glossar).

¹⁸ Cf. Ressourcenwende-Netzwerk (ed.) (2021; p. 4f.): *Policy Brief: Ressourcenschutzziele zur absoluten Reduktion des Ressourcenverbrauchs [Policy Brief: Resource Conservation Targets for the Absolute Reduction of Resource Consumption]*. Available at: https://ressourcenwende.net/wp-content/uploads/2021/06/Policy-Brief_Ressourcenschutzziele_Juli2021.pdf.

¹⁹ The resource consumption target of 6 t/capita/year is derived from the global extraction of the year 2000 with the assumption that this figure will need to be at least halved in 2050. It also assumes an equitable distribution among all people. In 2000, the TMC value for global resource extraction (~6.12 billion people) was ~17–19 t/capita/year (TMC_{abiot}) and ~3.5 t/capita/year (TMC_{biot}).



2. Establish a policy mix of incentives, support measures and regulations for management

Only through a combination of public and private investments will it be possible to meet the sustainability and, in particular, resource targets in place. The preferable course of action to mobilise these investments involves the swift utilisation of market-based steering instruments to promote the development of circular product and service alternatives to the extent that is necessary. Conceivable incentives include improving access to favourable and also innovative financing options for circular business models and creating tangible demand, for instance through public sector tenders. In addition, circular economy activities, based on appropriate, sector-specific indicators, should be granted adequate importance within the frameworks of the EU taxonomy and sustainable finance agenda. The effects of the rise in CO₂ prices in the context of emissions trading will also have an indirect impact on consumption, especially for resources with energy-intensive production processes. It is also worth examining whether a reduction in VAT rates for products and services that are particularly mindful of resource conservation, both at European and national level, or modified depreciation periods could prove effective.

Alongside incentives, however, clear regulatory requirements are also needed, including in product design, for instance. Given the urgency of the transformation, it seems reasonable to set out quotas for the use of secondary raw materials, for example in the buildings and construction sector or in the production of basic commodities.²⁰ Such quotas could also aid in countering the hitherto frequent discrepancy between the supply and the demand for secondary raw materials. In setting out use quotas, it is vital to ensure that the secondary raw materials in question are available in high quality and sufficient quantities. Environmentally harmful subsidies must be systematically dismantled.

3. Anticipate structural change processes and further develop social safeguarding instruments

Transitioning from a linear to a circular economy will go hand in hand with comprehensive structural change. In Germany, the overall extent of the change processes is comparative to the German energy transition (*Energiewende*). Conversely, the case at hand will see a significantly higher number of regions and sectors affected.²¹ Here, best practice from other processes of structural change are of great value and must be adapted accordingly to the conditions of the

²⁰ Announced by the EU Commission, the Strategy for a Sustainable Built Environment may already include requirements for the recycled content of building materials. Cf. European Union (2020; p. 14): *Circular Economy Action Plan. For a cleaner and more competitive Europe*. Available at: [new_circular_economy_action_plan.pdf](https://ec.europa.eu/eip/circular/eip_action_plan_en) (europa.eu).

²¹ Cf. Friedrich Ebert Stiftung (2021; p. 14): *Zirkuläre Wirtschaft. Aufbruch in die Kreislaufwirtschaft [Circular Economy. Moving into a Closed Loop Economy]*. Available at: [Zirkuläre Wertschöpfung - Aufbruch in die Kreislaufwirtschaft](https://www.fes.de/de/aktuelle-aktivitaeten/2021-03-10-zirkulaere-wirtschaft-aufbruch-in-die-kreislaufwirtschaft) (fes.de).



circular economy. This may entail infrastructure investments or support for new business models and economic diversification. Synergies with existing projects, for instance within the framework of the Structural Development Act (Strukturstärkungsgesetz), should be exploited. Social welfare systems must be prepared to anticipate long-term structural change processes. In this context, unemployment benefits, for instance, should be further developed into a system of benefits for workers²², geared towards securing long-term employability. The goal here is to protect against threats to income in transitional phases throughout a person's entire working life and to view continuing professional development and retraining as well as reorientation as a core component of changing employment conditions.

4. Set standards and norms, avoid distortion of competition

For Germany to build trust in the development of a circular economy among companies and consumers alike and to avoid distortion of competition, it must decide to dedicate all its economic and academic expertise to the introduction of new standards, norms and suitable measurement methods at both European and global level. This holds true for new technologies and processes in need of development as well as for secondary raw materials or products in a circular economy.

Commonly agreed measurement methods and underlying data will allow for the targeted monitoring and management of the requisite development for the successful attainment of a circular economy. Nonetheless, the lack of incentives (remuneration) in place to secure the professional commitment of experts from academia and industry has resulted in the German perspective being entirely, or at least partially, missing from circular economy standardisation processes (at present, for example, for rare-earth elements, lithium or gold). Actors such as China or South Korea have set up standardisation committees in this area and are currently positioning themselves as forerunners. The task at hand is to identify key areas of standardisation in the implementation of a circular economy and to play a central role in shaping them. The German Institute for Standardization (DIN) and other key players such as the Physikalisch-Technische Bundesanstalt (PTB), Germany's national metrology institute, and the Federal Office for Materials Research and Testing (BAM) are currently engaged in developing the content of a standardisation strategy. It is up to the German government to provide significant support for this process of development and implementation.

²² "The proposal [of a system of benefits for workers] aims to protect against threats to income in case of unemployment, but also in risky transitions at points in working life as well as to secure and improve employment opportunities throughout working life.", cf. Hans et al. (2017): Umsetzung, Kosten und Wirkung einer Arbeitsversicherung [Implementation, Costs and Impact of Benefits for Workers]. Available at: <https://library.fes.de/pdf-files/wiso/13628.pdf>, p. 11.



The “Made in Germany” hallmark still enjoys a high level of trust around the globe thanks to its strong reputation for engineering. To date, the work behind this label has not gone without economic success. Setting standards, standardisation and core measurement methods geared towards using resources in full loops, or at least as full as possible, all have a role to play in opening the door to the implementation of the circular economy.

5. Promote transparency through coherent sustainability reporting and strengthen the circular economy in international trade

Mandatory sustainability reporting with a focus on environmental and social aspects along the value chain as a whole can improve circular business model risk assessments. Accordingly, circular business models with a clear sustainability strategy will have better access to financial markets, for instance. The EU Commission has laid solid foundations for improving reporting, including the proposed new Corporate Sustainability Reporting Directive (CSRD) and the inclusion of the circular economy in the EU Taxonomy. The German government should support the adoption of the proposed directive and play an active role in shaping the reporting standards currently under development as part of it. In parallel with European efforts, standard-setters across the globe are developing relevant reporting requirements. Here, too, the German government should strive to create coherent requirements, thus avoiding unnecessary bureaucracy and broadening acceptance regarding such transparency requirements. In addition, this should avoid distortions of competition insofar as possible.

Similarly, the activities and conversations underway at G7, G20, OECD and UN level need to be intensified, and the objectives of the circular economy should also be established in global trade. At European level, the German government must advocate for the rapid development and adoption of an ambitious Act on Corporate Due Diligence in Supply Chains as well as for the inclusion of circular economy objectives in all bilateral trade agreements.

6. Utilise economic opportunities, support sound business models for a circular economy

Without developing resource-saving innovations at all levels of the value chain process and in all sectors, without supporting the rapid transfer of practical knowledge, it will not be possible to implement a circular economy. In essence, this entails new opportunities in basic commodity and materials management, process and processing technologies for production, new design approaches, improved reuse/remanufacturing approaches and more comprehensive recycling across all sectors. Digital technologies, too, can increase efficiency or establish wholly new, less resource-intensive business models, such as new mobility concepts for urban and rural areas capable of achieving a significant drop in the use of resource-intensive motorised individual transport.



New business models in the maintenance and repair sector also offer opportunities for value creation and jobs in the skilled trades and services sector. A “right to repair” that is independent from the manufacturer and a fundamental focus on durability and reusability are key to extending product lifecycles. Promoting these principles will kickstart the development and expansion of repair or modification shops. There is also an urgent need to expand “everything-as-a-service” offerings²³ on a broad scale. In the case of rental or leasing offerings, the success of a business is not primarily achieved through sales, but rather through promoting a long use phase for goods above all²⁴. Transparent cost structures are a must to ensure the success and widespread acceptance of new rental and leasing models. It is also up to the German government, with an appropriate legal framework and targeted support, to create an environment in which to test such offerings and strengthen consumer dialogue on the issue of acceptance.

The diverse offerings at hand in a sharing economy also lay the groundwork for innovative business models. To date, a large number of sharing services have remained a niche market, as the shared use of private property (such as cars, bicycles or tools) is still uncommon in individualistic societies and the lack of a legal framework creates uncertainty. Accordingly, the German government must create legal certainty surrounding shared property, thus facilitating the far more widespread transformation of sharing approaches into worthwhile business models in a circular economy. In this context, it is important that the framework for the use of services does not cancel out the savings effect (for example, the resources required for the sharing infrastructure).²⁵

Financing models also need to be rethought. Broadly speaking, circular business models entail a higher degree of inter-company collaboration. As such, implementation requires holistic financing approaches that extend across the entire network of value creation, that is to say that do not relate solely to individual companies. Financial service providers also need to develop new products that reduce the increased risk profile of the “first movers” in the circular economy.

Alongside seizing such economic opportunities, it is also important to optimise the use of products, above all at local and regional level. In addition to

²³ “Everything-as-a-service is the provision and consumption of services related to infrastructure, hardware and software right through to the use of human intelligence as a service.”; cf. Fraunhofer IPA (2021) Available at: [Everything-as-a-Service \(XaaS\) - Fraunhofer IPA](#).

²⁴ Cf. Coalition Circular Accounting (2020): The Circular Facade. Available at: [5f587b00b19689334986c5ca_20200908 - CCA - FaaS - report EN.pdf \(website-files.com\)](#); cf. Coalition Circular Accounting (2020): Pursuing Financial Reality of the Circular Road. Available at: [5e1de1e4a12b0a3cfa8999d4_Road-as-a-Service-Coalition-Circular-accounting-2020.pdf \(website-files.com\)](#).

²⁵ Cf. Heinrich Böll Stiftung (2012): *Nutzen statt Besitzen. Auf dem Weg zu einer ressourcenschonenden Konsumkultur [Use don't Own. Towards a Consumer Culture that Conserves Resources]*. Available at: [NutzenStattBesitzen_Umschlag_web01.pdf \(boell.de\)](#).



technological innovations, social, cultural and institutional systemic approaches and innovations should therefore also be considered.²⁶ In a similar vein, there is an urgent need to start a debate on the entire system of innovation. Discussions on social and cultural values such as “participation and sharing instead of ownership” should be promoted, while it is also essential to create and run places and structures that allow for experiments with and experiences of the circular economy. Funding could be directed towards the development of open repair workshops, for example, as these opportunities for participation and exchange bring important social added value. Here, the partial disappearance of brick-and-mortar retail opens a unique window of opportunity, providing a visible space in city/town centres for such offerings.

7. Keep recyclability in mind throughout the whole product lifecycle, starting with product design

Recycling is a central pillar of the circular economy. To a significant degree, the principle of recyclability is dependent on product design. Germany, for example, has thus far failed to achieve a sufficient level of material recycling for plastic waste, coming in at 46% in 2019. In some recycling processes, the high energy input and the limits of material recycling prevent better results. The diverse composition of mixed plastic waste and its partial contamination by pollutants and impurities pose particular challenges to recycling processes. Moving forward, more ambitious recycling quotas should be set throughout Europe, including in Germany. Alongside the further development of material-group-specific recycling processes, it is important to meet and track these quotas transparently, while creating as little bureaucracy as possible.

Today, composite materials often pose a challenge when it comes to recycling. That said, they often have major advantages in terms of function or energy use compared to conventional single-component materials. It follows that research and development processes must target material and product development from the outset to ensure the best possible recyclability, even where different components are used. It is important for industrial consumers to disclose useful properties and expectations and, should a conflict of objectives arise, discuss and decide on the former in an appropriate and transparent manner. Simultaneously, disassembly and recycling technologies must also be further developed (mechanical and chemical recycling). Experiments have proven that even many complex composite materials can be recycled with the innovative use of established mechanical processes.²⁷ It may therefore be necessary to scientifically

²⁶ Cf. Hightech Forum (2021): Eine offene Innovationskultur für eine nachhaltige Zukunftsvorsorge [An Open Culture of Innovation for Sustainable Future Provision]. Available at: <https://www.hightech-forum.de/publication/ideenpapier-innovationskultur/>.

²⁷ Cf. BASF (2021): Institut cyclos-HTP zertifiziert die Recyclingfähigkeit von Mehrschichtfolien mit Polyamid 6 [Institut cyclos-HTP certifies the recyclability of multilayer films with polyamide 6]. Available at: [basf.com/at/de/media/news-releases/20201/06/p-21-237.html](https://www.basf.com/at/de/media/news-releases/20201/06/p-21-237.html).



re-evaluate beliefs and previous assessments regarding the compatibility of materials and recycling processes in order to avoid wasting opportunities.

For recycling processes that are particularly emission- or energy-intensive, it is worth examining whether substituting or avoiding certain materials or processes could have a positive impact on the overall balance. Alongside recycling goods that currently no longer have a role to play in the economic process, there is also the option of utilising anthropogenic deposits, for instance landfills or dumps (“urban mining”). In the building materials sector in particular, this shows considerable potential. However, leveraging this potential would require a significant improvement in knowledge regarding materials and material contamination in order to make the material stocks in cities usable as secondary raw materials.

8. Reinforce producer responsibility across the board

Companies have a central role to play in implementing the circular economy, meaning producer and, in particular, product responsibility must be extensively solidified. Specifically, it is key to guarantee the trajectory of products and their components along the value and supply chain as well as in the lifecycle – all the way from design to recycling. Digital product passports as well as business models and solutions will be central factors in this area. The increased transparency this will bring is an important prerequisite for remanufacturing, repairing or reusing individual product modules after their initial use. Digital data processing and management systems, such as blockchain, can be used for this purpose. Across Europe, there is a need to develop and support cross-company solutions, such as in the area of reusable logistics. The primary objective here should be the standardisation of packaging and the reduction of packaging waste, for example through reusable containers or pallets for internal and external transport as well as in storage and order picking. Here, pooling service providers or deposit systems in the business-to-business sector can support circularity. Notwithstanding the above, the German Council for Sustainable Development advocates the creation of a legal framework with regard to the responsibility on the part of industry to develop solutions of this kind that function across companies throughout Europe. According to the Circular Economy Roadmap, requirements could, for instance, be formulated for policymakers within the framework of industry alliances in order to break down barriers to circular business models and promote approaches that support full producer responsibility throughout the product lifecycle, including “end of life” (such as sharing or pay-per-performance models).

The digital revolution around Industry 4.0 is opening a great number of doors. These should not be used only in the development of new business models but also for the implementation of producer and product responsibility. It follows that the German government’s “Implementation Strategy for Digitalisation”



from 2018 should be expanded accordingly to contribute to better resource conservation and efficiency.

9. Avoid pollutant inputs in ecosystems

In principle, a circular economy strategy should ensure that the input of potentially critical substances into ecosystems is reduced at the sources of development and use and should be avoided wherever possible. Nowhere is this more relevant than where eco- or human-toxicological, persistent or mobile critical modes of action are known or expected. Even after several lifecycles, materials should not cause damage to ecosystems and care must be taken to eliminate pollutants as broadly as possible, particularly in the separation of composite materials. Simultaneously, however, it is also vital to promote the recycling of secondary raw materials insofar as possible. The same rules must apply to secondary raw materials and primary materials.

The polluter-pays principle as well as prevention and reduction at source must be supported and anchored as the basis for orientation across all areas of the law. Legally reliable long-term targets and framework regulations, transformational support from research and development, public demand for pollutant-free products and good information solutions should support success and development dynamics. The findings of the “Commission on the Future of Agriculture” underscore this approach for the agricultural and food sectors. Avoiding pollutants at the level of materials and products further facilitates recycling. Accordingly, avoiding hazardous substances in products plays an important factor in maintaining working cycles.

It must, however, also be ensured that secondary and primary raw materials are subject to comparable requirements in terms of limits to protect the merchantability of secondary raw materials. The example of gypsum recycling highlights that the lack of limit values makes it impossible at present to recycle removed gypsum plasterboard with legal certainty, meaning secondary gypsum cannot be produced in sufficient quantities, even though the technical processes for this already exist.

10. Give consumers more freedom of choice and implement measures to increase acceptance

Generally, consumers lack sufficient information to make purchasing decisions based on the resources used in everyday goods. In a recent representative survey commissioned by the DBU Center for Environmental Communication, only 2% of respondents said they felt very well informed about the use of resources in



everyday goods.²⁸ Information on repair options for devices such as smartphones, televisions or tools is also not easily accessible insofar as needed, which is resulting in products being bought new instead of repaired.²⁹

There is a clear need for action to increase the information available to consumers regarding the resources used in and the reparability of products. One method to achieve this is via digital product passports³⁰, which could hold the key to widespread recycling by transparently providing all relevant data on the materials used. At EU level, approaches are already being discussed as part of a “sustainable product policy framework”, a possible source of all-important momentum in this direction. For this to succeed, information must be presented simply and coherently through certification and in such a way that it is possible to make the requisite purchasing decisions towards sustainability on the basis of comprehensible, reliable and verifiable statements. An information campaign is also needed to make traditional trades such as tailoring and shoemaking more attractive again and adapt them to today’s needs. When it comes to the real-life implementation of transformation infrastructure (such as recycling or wind power plants), a strong culture of information and participation is central to the development of a circular economy. For such projects to succeed, the education and participation of relevant stakeholder groups must be guaranteed. Indeed, a large number of stakeholders have underscored the importance of broad citizen participation in gaining acceptance.³¹ Targeted public communications as well as the creation of diverse and objective-focused participation formats can help to improve trust in and acceptance of circular economy products. The project “Gemeinschaftswerk Nachhaltigkeit” (Joint Action for Sustainable Development in Germany) initiated by Federal Chancellor Merkel together with Prime Ministers of the Länder can also offer effective support in raising consumer acceptance.

11. Expand education and research around the circular economy

Education and research lay the essential groundwork for the transformation towards a circular economy. Together, they form the basis for the development from a linear to a circular way of thinking and acting as well as the corresponding models. A transformation of this kind requires sustainable structural change in the education and research system. This change presupposes cross-ministerial

²⁸ Cf. Forsa (2021; p. 6): *Repräsentative Bevölkerungsbefragung zum Thema „Circular Economy“* [Representative Population Survey on the Topic of the Circular Economy]. Available at: dbu.de/media/270621100108orea.pdf.

²⁹ Cf. *ibid.* (p. 11).

³⁰ A digital product passport is a standardised way of providing environmentally relevant data (on materials and chemical substances but also on reparability, spare parts or proper disposal) for a product. This makes it easier for value chain stakeholders to work towards a circular economy and for consumers to make sustainable consumption decisions.

³¹ Cf. ASA *et al.* (ed.) (2020; p. 162–165): *Statusbericht der deutschen Kreislaufwirtschaft 2020* [Status Report on the German Circular Economy]. Available at: statusbericht-kreislaufwirtschaft.de/wp-content/uploads/2020/11/Statusbericht_2020.pdf.



cooperation within the Federal Government and the transfer of findings from existing research into real-world applications.

A call for a circular economy should be made as part of the funding opportunities offered by the “Important Projects of Common European Interest (IPCEI)”, a joint investment effort on the part of European companies working in cooperation and flanked by government funding. The German Council for Sustainable Development also advocates the further development of research into transformative research. Comprehensive material- and product-related research needs to be launched in order to develop circular systems across all industries.

In addition, it is important to specifically promote flagship research projects, for example carbon concrete in the construction sector, so as to specifically advance alternatives to traditional materials, such as the areas of wood or lightweight construction. Calls for proposals and support programmes should include clear incentives to actively include researchers in standardisation processes.

The international transfer of environmental technology and expertise also needs to be promoted to establish global environmental standards, and the transformation towards a circular economy needs highly qualified specialists. In turn, this requires a public education campaign in schools, vocational schools and universities which should, for instance, promote future educational measures to understand circular economy structures and lifecycles. These measures still need to be further developed. In this regard, there is a particular need to consider and, if necessary, swiftly reform dual training-study courses. For companies currently undergoing the transition, and especially SMEs, a cost-effective and easily accessible network of advice and information platforms should also be established, based on the energy transition consulting experience.



12. Make circularity the foundation of a sustainable European economy

The EU has a central role to play in the success of the global transformation towards a circular economy and should position itself as a pioneer of sustainable business, and the EU Action Plan currently provides vital and ambitious direction. Nevertheless, it is crucial that circular economy approaches, instruments and frameworks are both systemically and systematically anchored within the EU but also in economic relations across its external borders. Both in terms of content and timing, this applies above all to securing a coherent, interlocking design for climate protection and the circular economy.

European economic activity should be guided by the principle of circular and low-emissions economic activity that is evaluated by lifecycle assessments. In specific areas such as agriculture and food, where possible, this should also be designed in regional loops. This approach should be integrated into the broader EU policy framework for climate, industry, finance and trade.

In the spirit of levelling the playing field, equal competitive conditions should be ensured in the EU for circular economy production processes and business models as well as for primary and secondary raw materials. This includes implementing financial incentives to promote a genuine European single market and developing adequate standardisation (such as for cross-manufacturer component exchange in ICT products³²). To promote a move towards more resilient loops, the implementation of COVID-19 recovery plans must take into account the core principles of the circular economy.

The COVID-19 pandemic only highlighted Europe's dependency on external resources as well as just how quickly entire supply chains can collapse. Accordingly, Europe needs a sustainable and secure common resource strategy. EU supply chains also need to establish a level playing field in terms of competition and trade agreements need to include (WTO-compliant) criteria to strengthen the circular economy. Equally, the implementation of COVID-19 recovery plans must take the core principles of the circular economy into account to promote movement towards resilient cycles.

³² Cf. BT-Drs. 19/20375, p. 53.



13. Strengthen international partnerships and the transfer of technology

At international level, the existing trade-offs involved in the necessary transition towards a circular economy become even more apparent: for exporters of raw materials, decoupling economic growth and resource consumption can have a negative impact on growth and existing business models, especially in countries in the Global South. The example of electronic waste demonstrates that the burden of the negative impacts of resource management along the value chain are far too often shifted from the Global North to the Global South. The reuse, for instance, of 82.6% (44.3 million tonnes) of e-waste generated in 2019 is neither documented nor tracked, and a large amount of e-waste is exported illegally or simply under the guise of reuse. Of the total e-waste generated, the volume of Waste from Electrical and Electronic Equipment (WEEE) that is transported across borders is estimated to be between 7% and 20%.³³ In countries in the Global South, recycling is often taken over by the informal economy, where the lack of (safety) structures can lead to significant damage to the environment and human health. Conversely, this informal economy is the sole livelihood of many of the people working there.

In terms of global responsibility, the transformation to a circular economy will only take place with targeted cooperation models and trade agreements aimed at finding a fair balance. Existing regulatory measures (Regulation (EC) Number 1418/2007, Bamako Convention) need to be strengthened to prevent the illegal export of waste. Of particular significance here, not least for systematic international monitoring, is the Basel Convention, which has been in place since 1992 and aims to comprehensively regulate the cross-border trade of WEEE. In future, all e-waste should be subject to mandatory notification³⁴. In addition, the focus of existing multi-actor partnerships on strengthening cooperation between politics, business and civil society (such as Partnership for Action on Computing Equipment – PACE) should be expanded from individual electrical and electronic appliances to all relevant appliances in the sector. Last but not least, greater responsibility should be placed on companies to initiate the necessary return of products.

The German government should advocate for a UN convention for sustainable chemicals, waste and materials flow management and should promote this at international level in line with EU regulation. In addition, a “Berlin Raw Materials Convention” is needed to complement the Paris Climate Accords. This Convention should aim to put an end to the threat that hazardous substances pose to people and the environment. Chemical and resource consumption must

³³ Cf. Forti, V. et al. (2020; p. 14): *The Global E-waste Monitor 2020: Quantities, flows and the circular economy potential*, Bonn: United Nations University. Available at: ewastemonitor.info/wp-content/uploads/2020/12/GEM_2020_def_dec_2020-1.pdf.

³⁴ The PIC (Prior Informed Consent) procedure requires the consent of the exporting country, all countries of transit and the importing country.



be drastically reduced, something which requires targeted chemicals management and an absolute, and binding, global resource protection target for the reduction of resource consumption. International agreements on product and material quality standards, including with regard to the trade in secondary raw materials, or the mutual recognition of equivalent systems should be promoted.

Furthermore, support, both financial (such as blended finance³⁵) and technical, must be given to stakeholders at the end of the value chain, in particular small and medium-sized enterprises. Projects such as “RETech Germany”³⁶ have already demonstrated the importance of promoting new business models and jobs in the Global South through the transfer of innovative technologies and expertise, simultaneously raising international standards, for instance in waste management.³⁷ At the same time, this can also promote the diversification of economic structures in the Global South.

New business models and relationships, which should be supported by the transfer of technology and international network platforms, can also promote the diversification of exports, which thus far have been strongly focused on raw materials.³⁸ It is important to increase the promotion of local value creation processes, such as the establishment of production facilities with modern technologies in the Global South (for instance, the “Waste-2-Chemicals” project in Lagos³⁹). This is true for the creation of new jobs, among other things, and must be oriented towards sustainability criteria. In line with the priority ProgRes III measure, development banks must also take circular economy criteria (such as the conservation of natural resources) into greater account in the allocation of funds.⁴⁰

The informal economy, which accounts for more than half of the world’s workforce⁴¹, plays a major role in the overall economy, especially in the Global South. Specific inclusive projects such as the integration of the informal sector

³⁵ Blended finance: The strategic use of development finance from public and philanthropic sources to leverage additional private sector investment.

³⁶ Cf. website of German RETech Partnership, Recycling & Waste Management (2021). Available at: [Startseite | RETech Germany \(retech-germany.net\)](#).

³⁷ In Kenya, for instance, the waste collection company Ekotech, which collects various types of waste and uses it to produce sustainable laminated boards, is the contracted waste recycler for Tetra Pak cartons in the East Africa region. Cf. Rademaekers, K. *et al.* (2020): *Circular Economy in Africa-EU cooperation: Continental report*. Available at: [Continental-report-published.pdf \(trinomics.eu\)](#).

³⁸ Cf. Rademaekers, K. *et al.* (2020): *Circular Economy in Africa-EU cooperation: Continental report*. Available at: [Continental-report-published.pdf \(trinomics.eu\)](#).

³⁹ The project collects mixed plastic waste, which is then thermochemically converted into pyrolysis oil, a high-value raw material, before being further used in local value chains. By the end of 2025, more than 50,000 tonnes of plastic waste per year will be recycled in this way.

⁴⁰ Cf. BT-Drs. 19/20375, p. 44.

⁴¹ Cf. Friedrich Ebert Stiftung (2020): *Covid-19 and the informal economy*. Available at: [Covid-19 and the informal economy \(fes.de\)](#).



into circular (community) waste management⁴² must be promoted to create long-term income opportunities and strengthen self-organisation in trade unions or cooperatives as well as training opportunities. This includes supporting the transition of existing industrial parks into circular sustainable eco-industrial parks.⁴³ Ultimately, the objective is for countries in the Global South to achieve their own climate targets, which in turn has a positive global impact. Given its size and heavy dependence on crude oil thus far, Nigeria could become a key example of a transition to a more circular economy. It is up to the EU to support the African Circular Economy Action Plan, which is currently under development, and address common objectives in both action plans.⁴⁴

⁴² Cf. German RETech Partnership (2021): *Structural Integration of the Informal Sector in Solid Waste Management*. Available at: [Informeller Sektor | RETech Germany \(retech-germany.net\)](https://www.retech-germany.net/).

⁴³ Cf. Rademaekers, K. *et al.* (2020): *Circular Economy in Africa-EU cooperation: Continental report*. Available at: [Continental-report-published.pdf \(trinomics.eu\)](https://trinomics.eu/wp-content/uploads/2021/03/Continental-report-published.pdf).

⁴⁴ Cf. Rademaekers, K. *et al.* (2020; p. 10): *Circular Economy in Africa-EU cooperation: Continental report*. Available at [http://trinomics.eu/wp-content/uploads/2021/03/Continental-report-published.pdf](https://trinomics.eu/wp-content/uploads/2021/03/Continental-report-published.pdf).



Appendix

Examples of current political initiatives

Recent years have seen numerous activities, initiatives and changes in regulatory frameworks to increase the circularity of the economy at all levels. The activities chosen and highlighted below at the global, European and national level all support this statement.

International level		
Global Alliance on Circular Economy and Resource Efficiency (GACERE)	2021	An EU initiative, GACERE, together with UNEP and UNIDO, promotes global measures for the transition to a circular economy, resource efficiency and sustainable consumption and production. In particular, the initiative aims to assist African countries to introduce the circular economy step by step in key sectors.
PREVENT Waste Alliance	2019	The multi-actor platform promotes dialogue and international cooperation on circular economies.
Platform for Accelerating the Circular Economy (PACE)	2018	Launched by the World Economic Forum, PACE is a multi-stakeholder platform designed to help accelerate the global transition to a circular economy (e.g. the Circular Economy Action Agenda sets out the design of a circular economy across plastics, textiles, electronics, food and capital goods).
G20 Resource Efficiency Dialogue	2017	The G20 countries are aiming to promote a resource-efficient sustainable global economy as well as sustainable production and consumption.
G7 Alliance on Resource Efficiency	2015	The G7 Alliance on Resource Efficiency is a permanent, voluntary platform for G7 partners and stakeholders from business, research and civil society to share best practices.
International Resource Panel (IRP)	2007	The goal of the IRP is to conduct independent, politically relevant academic assessments for the sustainable use of natural resources and, in particular, their environmental impact over the entire lifecycle. The IRP is supported by the German government.
European level		
Strategy for a Sustainable Built Environment	2021/ 2022	The EU Commission has announced the Strategy for a Sustainable Built Environment for the construction sector. The Strategy should contain proposals on, among other things, public procurement, waste generation from insulation materials, avoidance of impervious surfaces, resource logs in the building sector and possibly



		requirements for the recycled content of building materials.
Circular Economy Action Plan	2015/2020	Building on the Circular Economy measures implemented since 2015, the EU Commission's new Plan (2020) aims to accelerate the profound change called for in the European Green Deal.
New European Bauhaus	2020	Launched in 2020, the New European Bauhaus initiative is a platform for the innovative design of future living spaces.
European Ecodesign Directive (Directive 2009/125/EC)	2009	The Directive sets out an initial framework for mitigating the environmental impact of energy-related products, taking into account their lifecycle as a whole.
<u>National level</u>		
German Sustainable Development Strategy	2021	A closed loop economy was included in Germany's national Sustainable Development Strategy as one of a total of six transformation areas.
Substitute Building Materials and Soil Protection Umbrella Ordinance	2021	The Substitute Building Materials and Soil Protection Umbrella Ordinance aims to nationally regulate the recycling of mineral waste on a uniform basis.
Circular Economy Initiative Germany	2021	The Circular Economy Roadmap for Germany focuses on shaping a uniform common target for a circular economy in 2030 and formulating specific recommendations for action.
German Resource Efficiency Programme (ProgRes) III	2020	The German Resource Efficiency Programme (currently ProgRes III) offers numerous options for circular economy action. The programme is largely based on voluntary measures and incentives.
Amended Circular Economy Act (KrGW)	2020	The objectives of the amendment to the KrGW are the more efficient use of resources and the avoidance of waste.

About the German Council for Sustainable Development

The German Council for Sustainable Development (RNE) advises the Federal Government on issues of sustainability policy. It acts in this capacity as an independent entity, and since 2001 its members have been appointed every three years by the Federal Government. The Council consists of 15 public figures, comprising individuals from civil society, the business sector, the scientific community and the political arena. It has been chaired since 2020 by Dr Werner Schnappauf and his deputy, Prof. Dr Imme Scholz. The Council also carries out its own projects aimed at advancing the topic of sustainability in practical terms. In addition, it helps shape topically focused momentum within policy and societal dialogue. The Council is supported in its activities by an administrative office based in Berlin.

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