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A long-term strategy for a European circular economy – setting the course for success

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EXECUTIVE SUMMARY

The transition towards a circular economy offers an opportunity to reduce Europe's ecological footprint by lowering raw material consumption and minimising waste generation. It means, keeping the value of resources for as long as possible and rethinking production, consumption and end of life management processes. It is necessary to develop a long-term vision for the circular economy to set a clear direction of travel and determine which actions are necessary to turn this vision into reality.

In 2050, economic trends favour product and material longevity. Information on the material composition of products is accessible by all actors throughout the value chain who cooperate more closely. As landfilling is phased-out, recycling becomes the last resort with secondary materials of good quality flowing across the EU single market. Beyond material flows, innovative business models thrive and contribute to reducing the need for new products and raw materials as well as the optimal use of assets. Global value chains also become more resource efficient. Finally circular economy strategies are designed according to the societal needs they intend to meet and play a key role in the achievement of climate and social objectives.

A series of barriers currently prevent this paradigm shift from happening. These barriers can be market related and regulatory or companies can be unable to switch to circular business models because of limited financial and technical capacities. The potential for a rebound effect, where circular economy products would be produced in addition to linear products rather than substituting them is an often-overlooked barrier. Moreover, trade-offs and inconsistencies between the circular economy and climate and social issues need to be addressed.

The concept of circular economy is gaining traction, which has led to various policy actions throughout the life cycle of a product ranging from measures on eco-design to recycling targets. Despite the progressive incorporation of the circular economy in industrial and innovation policies, the EU and Member States policies have a strong focus on increasing recycling rates, reducing landfilling and creating markets for secondary raw materials. On their own these measures are insufficient to result in a paradigm shift in resource use and current targets inadequate to provide a clear direction of travel.

Policy recommendations

In order to turn the long term vision for a circular economy into reality and establish a credible policy framework, the EU should undertake the following actions:

- Develop clear targets to reduce the EU's ecological footprint with respect to material consumption, and overall waste arisings as well as quantitative targets on waste prevention.
- Use environmental fiscal reform as a key instrument in the circular economy transition. The tax burden should be shifted away from labour and onto resource depletion to support a double dividend. Low hanging fruit includes using the VAT directive and the European semester process to give favourable rates to repair activities, which support circularity. Urgently needed reforms should also

cover the removal of environmentally harmful subsidies – such as those on fossil fuels, which are by definition linear and Member States have already committed to removing.

- Accelerate the extension of the scope of eco-design criteria, beyond energy use, to incorporate considerations for material use, multiple product life cycles, repair and the circular economy more widely.
- The transition towards a decarbonised and circular economy must be part of the same systemic shift. The circular economy should be incorporated in countries' long-term decarbonisation plans including the EU's long term strategy for greenhouse gas emissions reduction.
- The circular economy should be integrated in the EU's external policies including trade. The EU should include the circular economy in the Sustainable Development Chapters of all its trade agreements and push for global standards related to the durability, reusability and recyclability of products.
- Ensure that benefits are shared along value chains and that transparency helps to not only close material loops but also reinforce partnerships between producers, consumers and end of life management operators.
- Increasingly link the circular economy with the social agenda and the just transition in order to ensure that inequalities are limited and individuals whose livelihoods might be jeopardised have access to training and retraining opportunities that would enable them to prosper.
- European and Member States legislators should communicate on resource and circular economy issues to make them relevant to all citizens, and thus establish democratic support for the environment and circular economy as a crucial issue for the future of Europe.

1 An urgent response to unsustainable material resource use with multiple benefits

Our current linear economic model based on a ‘take, make, dispose’ approach is putting unsustainable pressure on earth’s natural resources. 92.8 billion tonnes of resources entered the global economy in 2015¹. The trend is accelerating as material resource use could double between 2015 and 2050, reaching 186 billion tonnes per year by 2050.² The transition towards a circular economy, where materials and products are reused and recycled and the generation of waste is minimised, is necessary to effectively tackle this global challenge. From a sustainability perspective, the circular economy offers the opportunity to reduce the economy’s ecological footprint by lowering raw material consumption and minimising the production of waste, as well as keeping the value of resources for as long as possible and rethinking processes throughout the value chain.

The transition comes with important economic and societal benefits. According to the United Nations Environment Programme³, increasing resource efficiency combined with ambitious climate policies could lead to annual economic benefits of more than \$2 trillion globally in 2050 and addressing resource scarcity would improve the competitiveness of businesses. An often quoted estimate suggests that improving resource productivity by a factor 5 (or 80%) would allow for a doubling of wealth while halving resource consumption.⁴ As for Europe, the REBus (Resource Efficient BUSiness Models) project⁵, showed that the large scale adoption of Resource Efficient Business Models could ‘create 1.2 million to 3 million jobs in Europe, reduce equilibrium unemployment by around 250,000 to 520,000, generate €114 billion to €324 billion in additional Gross Value Added, reduce raw material demand (excluding fossil fuels and energy carriers) by 70Mt to 184Mt, and greenhouse gas emissions by 80Mt CO₂eq to 154Mt CO₂eq.’

The circular economy could indeed also play a significant role in achieving the Paris Climate Agreement’s objective to maintain global temperatures to well below 2 degrees Celsius above pre-industrial levels as half of the world greenhouse gas emissions could be linked to the extraction,

¹ (excluding water). Circle Economy (2018). ‘The circularity gap report: our world is only 9% circular’. https://www.circle-economy.com/case/the-circularity-gap-report-our-world-is-only-9-circular/#.W5u3k6YzblU*

² United Nations Environment Programme (UNEP) and International Resource Panel (IRP) (March 2017). ‘International Resource Panel Report – Resource efficiency: potential and economic implications’. http://www.resourcepanel.org/sites/default/files/documents/document/media/resource_efficiency_report_march_2017_web_res.pdf

³ UNEP and IRP, March 2017, *ibid*.

⁴ Ernst-Ulrich von Weizsäcker et al (2010): Faktor fünf. Die Formel für nachhaltiges Wachstum, Droemer.

⁵ WRAP (November 9th 2016). ‘Extrapolating resource efficient business models across Europe’. Prepared by James, K.; Mitchell, P. and Mueller, D., p. 5. <http://www.rebus.eu.com/wp-content/uploads/2017/07/Extrapolating-resource-efficient-business-models-across-Europe.pdf>

processing, use and disposal of materials⁶, and given estimates that a more circular economy could cut emissions from heavy industry by 56% by 2050.⁷

The circular economy is an essential building block not only for the implementation of Sustainable Development Goal (SDG) 12 to ‘ensure sustainable consumption and production patterns’ but also various other SDGs. This is echoed in the European Commission’s Communication on ‘Next steps for a sustainable European future’⁸ – which draws links between the circular economy and goals 6, 8, 9, 11, 12, 13, 14 and 15.⁹

⁶ Materials management represent 54 to 64% of total GHG emissions, based on case studies in Australia, Mexico, Slovenia and Germany. OECD (March 2012). ‘Greenhouse gas emissions and the potential for mitigation from materials management within OECD countries’. <https://www.oecd.org/env/waste/50034735.pdf>

⁷ Material Economics (2018). ‘The circular economy - a powerful force for climate mitigation: Transformative innovation for prosperous and low-carbon industry - executive summary’. Material Economics Sverige AB, Stockholm. <https://europeanclimate.org/wp-content/uploads/2018/06/FINAL-MATERIAL-ECONOMICS-CIRCULAR-ECONOMY-SUMMARY.pdf>

⁸ European Commission (November 22nd, 2016). ‘Next steps for a sustainable European future – European action for sustainability’. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions COM(2016) 739 final, Strasbourg. https://ec.europa.eu/europeaid/sites/devco/files/communication-next-steps-sustainable-europe-20161122_en.pdf

⁹ SDG 6: ‘Clean water and sanitation’, SDG 8: ‘Decent work and economic growth’, SDG 9: ‘Industry, innovation and infrastructure’, SDG 11 ‘Sustainable cities’, SDG 13 ‘climate action’, SDG 14 ‘Life below water’, SDG 15 ‘Life on land’.

2 A glimpse into the future – The circular economy in 2050

The circular economy is still at an early stage of implementation and yet to become a reality across the board which makes it difficult to clearly paint a vision of the future. Yet, having a long term vision for the circular economy is essential to set a clear course for action. Circular economy principles and the mainstreaming of best practices could take us in the following direction:

Closing material loops and actions throughout a product's life cycle:

Out of the 92.8 billion tonnes of materials entering the economy, 56.8 billion tonnes are used to make short lasting products that reach their end use within a year.¹⁰ In the future, the trend is reversed and an emphasis is placed on **product longevity** including to prevent recycled materials from re-entering the production cycle too soon. Legislators and designers alike collectively reject planned obsolescence in favour of planned durability and product life extension. Under new economic models short lived products and waste of materials will represent a cost to producers rather than a viable business opportunity. Companies fully integrate reparability, disassembly of components and reuse right from the design stage. Technological innovation leads to the development of predictive maintenance solutions which enable companies to monitor the state of materials with sensors and repair components before they break down. These techniques are already used by businesses in the transport and manufacturing sectors.

Information on the material composition of products, including raw materials, is **accessible by all actors throughout the value chain who cooperate more closely**. Producers recognise the benefits of disclosing information about their products to support repair activities, secondary uses for materials and the cycling back of materials in the same products. Information related to the material composition of a product including the presence of recycled or reused components, its durability, reparability, the ability to reuse its components is available to consumers, thereby increasing demand for products that are durable, reusable, recyclable and repairable.¹¹

As landfilling is phased out, **recycling becomes the last resort with secondary materials of good quality flowing across the EU single market** and hazardous substances being eliminated from material flows. Upcycling opportunities, where the reuse of materials leads to the creation of a product of higher quality or value than the original, are mainstreamed throughout the economy.

Rethinking processes and value creation:

Beyond closing material loops, the transition also involves rethinking processes.

The circular economy is fully embedded in the industrial strategies at European, national and regional level. Industrial symbiosis models where an industry's by-product becomes another industry's raw material are implemented across European regions. European cities have embraced circular economy principles providing an enabling framework of cooperation between producers, consumers and waste management operators and showed the way by integrating these principles in their **Green**

¹⁰ De Wit, M.; Hoogzaad, J.; Ramkumar, S.; Friedl, H.; Douma, A. (January 2018). 'The circularity gap report – an analysis of the circular state of the global economy' Circle Economy. https://docs.wixstatic.com/ugd/ad6e59_c497492e589c4307987017f04d7af864.pdf

¹¹ For more information on sustainable consumption: please see the Think 2030 paper on 'Sustainable consumption – policy approaches for systems change'.

Public Procurement (GPP) practices. In addition to public authorities, sustainable procurement at the corporate level is also a new normal.

While production, use, reuse and recycling processes become more localised in order to close material cycles, **global value chains become more resource efficient** and leakages at global level, in which materials are lost, are reduced. The multilateral trading system and **trade rules** create an enabling environment for closing material loops and disseminating circular economy services worldwide in a way that also benefits the poorest communities. The EU has become a frontrunner by pushing for the adoption of global standards related to product durability, reparability and recyclability and by including the circular economy in the Sustainable Development Chapters of its Free Trade Agreements.

The transition towards a circular economy goes beyond the responsible management of natural resources and making linear processes more circular. Achieving a circular economy at scale requires a major rethinking of our current economic models including how to create value.

As consumers increasingly favour access over ownership, companies develop **innovative business models** enabling them to sell services rather than products. **Collaborative and sharing economy models** contribute to the reduction of the consumption of new products and, by extension, raw materials as well as the optimal use of assets. For example, online platforms provide new channels to match the demand for secondary products, underused assets and services. Companies engaged in sharing economy models offer benefits and protections to their workers which are consistent with national labour right provisions and protection schemes.

A recent report by Circle Economy¹² argues that **circular economy strategies** should be **designed according to the societal needs they intend to meet** such as housing, mobility and nutrition. The report links these needs with their corresponding global material footprint thereby illustrating how many resources are used to satisfy them. Housing and infrastructure is the need representing the largest resource footprint with 42.4 billion tonnes annually followed by nutrition (21.8 billion tonnes), mobility (12 billion tonnes), consumables like mobile phones, refrigerators, clothing (9.1 billion tonnes), services (94.4 billion tonnes), healthcare (2.3 billion tonnes) and communication (1.7 billion tonnes).

Playing a key role in addressing other Sustainable Development Goals :

In 2050, the circular economy played a key role in keeping the increase in global average temperature to well below 2°C above pre-industrial levels by reducing raw materials consumption. Best practices already show that circular economy solutions can yield important climate benefits. Extending the lifespan of a tablet and a laptop can reduce the CO₂ emissions of these products by 21% and 19% respectively.¹³ Moreover, the production of secondary or recycled materials demands less energy than for primary materials with estimated energy savings of between 40 and 80%, and up to 95% for aluminum.¹⁴ **Making production processes more energy efficient also leads to a decrease in emissions.** In the city of Ghent, the residual heat of the Stora Enso paper company provides the nearby site of Volvo plant with hot water it can use in the production process, allowing the plant to cut its annual CO₂ emissions by about 15,000 tonnes. The Ellen MacArthur Foundation found that “CO₂

¹² Circle Economy, 2018, *op.cit.*

¹³ Benton, D.; Hazell, J.; Coats, E. (February 19th, 2015). ‘A circular economy for smart devices’, Green Alliance. ISBN: 978-1-909980-36-5. https://www.green-alliance.org.uk/a_circular_economy_for_smart_devices.php

¹⁴ Blok, K.; Hoogzaad, J.; Ramkumar, S.; Ridley, A.; Srivastav, P.; Tan, I.; Terlouw, W.; de Wit, M. (2016). ‘Implementing the circular economy globally makes Paris targets achievable’. Circle Economy and Ecofys. <https://www.ecofys.com/files/files/circle-economy-ecofys-2016-circular-economy-white-paper.pdf>

emissions from the mobility, food and built environment can decrease with 48% by 2030 and with 83% by 2050 compared to 2012 levels if these sectors become more circular.’¹⁵

The transition towards a circular economy has been increasingly linked with the social agenda. The transition has created jobs across the entire lifecycle of a product, from design to end of life management, as well as in services. It has been harnessed in order to provide new employment opportunities for workers employed in sectors or companies that are no longer competitive or locked in linear practices.

As illustrated by the impacts of climate change or the management of e-waste, some communities bear the burden of a linear economy more than others. While circular economy has not been presented as a model for social change, if well implemented it will reduce the drivers of social injustice which invariably result from resource insecurity and environmental degradation. In order to function sustainably, **the circular economy in 2050 would hold issues of social and environmental justice at its core.**

Circular economy strategies designed in the future could also seek to find a way to **combine private needs with the delivery of public goods.** For example, the company DYCLE¹⁶ produces compostable diapers which can be used by families in small communities to grow fruit trees. Scaling up such projects would lead to the delivery of ecosystem services such as better air quality regulation as well as food production.

¹⁵ Ellen MacArthur Foundation and McKinsey Centre for Business and Environment (July 2015). ‘Growth within: a circular economy vision for a competitive Europe’. https://www.mckinsey.com/~media/mckinsey/business%20functions/sustainability%20and%20resource%20productivity/our%20insights/europes%20circular%20economy%20opportunity/growth_within.ashx

¹⁶ Dycle (2018). ‘Diapers Cycle’. <https://dycle.org/en>.

3 The challenges in turning the vision into reality

While the rationale for transitioning towards a more resource efficient European economy and the benefits associated to this systemic shift are clear and acknowledged by stakeholders across the board including policy makers, business and civil society, more action is required as our world economy is only 9.1% circular, leaving a massive ‘Circularity Gap’.¹⁷

The transition is currently hampered by several factors.

Firstly, barriers can be **behavioural or related to limited financial and technical capacity**. While awareness is growing in the business sector, some companies remain unaware of the value of transitioning to more circular or innovative business models or are locked-in a linear system through their infrastructure. An increasing number of big companies are adopting circular economy practices, yet SMEs may lack the financial and technical capacity to transition to more circular and innovative business models. Limited investment capacity can also prevent companies from switching from ‘linear assets’ to ‘circular assets’. Moreover, even if companies choose to adopt circular practices, this will have limited effects if their supply chain does not. For their part, consumers tend to prefer new products, repeatedly buying the same 150 items that fulfil 85% of their household needs¹⁸.

Barriers can be **market related**. Low prices for virgin materials make it more expensive to use recycled materials and /or to opt for more durable design. Recycling rates can be also hampered by the absence of a functioning market for secondary raw materials in the EU. The current lack of availability of good quality secondary raw materials resulting partly from the lack of standards requiring resource efficient product design is also an issue. Moreover, many recycling processes are still not optimal leading to a loss in material quality and quantity. With regard to durability, the lack of recognition and commercial interest can also limit initiatives to make products more durable.

Barriers can also be **regulatory**, such as the lack of a harmonised definition of end of waste at global level¹⁹, which makes it difficult to determine precisely when waste ceases to be waste to become a resource. This constitutes an obstacle for trading secondary materials outside of the EU. Other trade barriers include trade bans, such as China’s decision to ban imports of waste and countries in East Africa banning imports of used textiles, or export restrictions on metal waste and scrap. In addition, fossil fuel subsidies serve as a deterrent to effectively reduce resource consumption as subsidies hide the inefficiency of wasting energy and materials, as well as further externalising the costs of pollution – in the EU fossil fuel subsidies are estimated to be around EUR 112 billion annually.²⁰

A number of obstacles prevent from reaping the full benefits of digital technologies for the transition towards a circular economy. Access to data and its free flow across borders is hampered by insufficient

¹⁷ De Wit et al, January 2018, *op.cit.*

¹⁸ Schneider, J. and Hall, J. (April 2011). ‘Why most product launches fail’. Harvard Business Review, Magazine Issue from April 2011, Harvard Business Publishing, Watertown. <https://hbr.org/2011/04/why-most-product-launches-fail>.

¹⁹ European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL) (November 13th, 2017). ‘A survey on practitioners’ views about the implementation challenges with EU environmental legislation, their underlying reasons and ways to improvement: 2017’. Report number: 2017/27. <https://www.impel.eu/wp-content/uploads/2018/04/FR-2017-27-Implementation-Challenge-follow-up.pdf>

²⁰ Gençsü, I; McLynn, M.; Runkel, M.; Trilling, M.; van der Burg, L.; Worrall, L.; Whitley, S.; and Zerkaw, F. (September 2017). ‘Phase-out 2020 - Monitoring Europe’s fossil fuel subsidies’, ODI & CAN Europe. <https://www.odi.org/sites/odi.org.uk/files/resource-documents/11762.pdf>

digital infrastructure, inadequate interoperability between systems, geo-blocking and a reluctance from companies and individuals to share their data.

Another and often overlooked, barrier to policies on circular economy delivering meaningful changes to resource use, is the potential for a **rebound effect**²¹. The environmental benefits from circular economy transition will only be realised if they result in a net reduction in the total consumption of resources from economic activities as well as the pressures this places on the biosphere. From the perspective of global and European sustainability goals, this means an absolute decoupling of resource use from economic development, and within established ecological limits or thresholds (i.e. planetary boundaries).²² Circular products will therefore only be truly effective if they displace or substitute wasteful linear products rather than being produced in addition to them. Likewise, good practice at the firm or local level must be up-scaled to deliver economy wide savings – outlining the need for systemic rather than incremental changes to our economic model.

Trade offs and inconsistencies between the circular economy and other sustainability issues should also be addressed. While biomass is considered as a source of renewable energy in some energy policies, the circular economy prioritises the material use of biomass over energy use. Furthermore, the growth of sharing economy models has led to concerns regarding their potential social impacts. These models may reduce jobs in sectors such as tourism and transport. Workers engaged in sharing and collaborative economy models can have lower rights and benefits than their counterparts employed full time in traditional sectors and earn on average 25% less in hourly wage²³. This is partly due to the fact that workers in a full time job are paid on the basis of an agreed number of working hours while those engaged in these models are paid on a task by task basis. Moreover, while digitalisation is a crucial enabler for the transition towards a circular economy, risks of job losses resulting from dematerialisation need to be addressed.

Lastly, at the EU level a clear political barrier to action is **bi-partisan opposition and Euroscepticism relating to environmental policy**. This has been seen in national media campaigns which have miscommunicated on policies such as the eco-design directive. In this sense, a key challenge for the European and Member States legislators will be to communicate on resource issues to make them relevant to all citizens, and thus establish democratic support for the environment and circular economy as one of Europe's *big issues*.

²¹ Zink, T. and Geyer, R. (February 5th, 2017). 'Circular Economy Rebound'. *Journal of Industrial Ecology*, 5th of February 2017, vol. 21, Iss. 3, pp. 593-602. DOI: <https://doi.org/10.1111/jiec.12545>. <https://onlinelibrary.wiley.com/doi/abs/10.1111/jiec.12545>

²² Zink and Geyer, 2017, *ibid*.

²³ Hill, S. (October 20th, 2015). 'Welcome To The Share The Crumbs Economy'. Fast Company. <https://www.fastcompany.com/3052461/welcome-to-the-share-the-crumbs-economy>

4 Current policy agenda and targets

Despite the challenges outlined in the previous section, the concept of circular economy is gaining traction. This has translated into a range of policy actions.

The Circular Economy Action Plan (CEAP)²⁴, was adopted by the Commission on December 2nd 2015, and provides the core of EU's circular economy agenda. It outlines a series of measures and actions which aim to “stimulate Europe's transition towards a circular economy which will boost global competitiveness, foster sustainable economic growth and generate new jobs”. The Action Plan includes broad instruments touching on a range of sectors and policy areas, but notably resource efficiency, waste management and innovation. The EU's Seventh Environment Action Programme (7th EAP) already called for Europe to become more resource-efficient. It acknowledges that reusing products and recycling materials plays an important role in reducing resource use and ensuring that Europe stays within planetary limits.

The development of measures associated with the Action Plan, have included the development of new policies, such as the Circular Economy Monitoring Framework²⁵ and activities involving the revision of existing legislation. A clear example of this are the recently accepted amendments to four waste Directives²⁶. The 2018 Circular Economy Package²⁷ notably included the publication of the EU Strategy for Plastics – the first EU policy to address a specific material and a Communication with options to address the interface between chemical, product and waste legislation.^{28,29} Actions related to the beginning of a product's lifecycle constitute an important progress especially given estimates that 80% of a product's environmental impact is determined during the design stage. The Ecodesign Working

²⁴ European Commission (December 2nd, 2015). ‘Closing the loop – an EU action plan for the Circular Economy’. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions COM(2015) 614 final, Brussels. https://eur-lex.europa.eu/resource.html?uri=cellar:8a8ef5e8-99a0-11e5-b3b7-01aa75ed71a1.0012.02/DOC_1&format=PDF

²⁵ European Commission (January 16th, 2018). ‘Communication on a monitoring framework for the circular economy’. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions COM(2018) 29 final, Strasbourg. <http://ec.europa.eu/environment/circular-economy/pdf/monitoring-framework.pdf>

²⁶ European Council, Council of the European Union (February 23rd, 2018). ‘EU ambassadors approve new rules on waste management and recycling’, press release. <https://www.consilium.europa.eu/en/press/press-releases/2018/02/23/eu-ambassadors-approve-new-rules-on-waste-management-and-recycling/>

²⁷ European Commission (January 16th, 2018). ‘Plastic Waste: a European strategy to protect the planet, defend our citizens and empower our industries’, press release. http://europa.eu/rapid/press-release_IP-18-5_en.htm. For more information on Plastics please see the Think 2030 paper on ‘Moving towards sustainable plastics use in the EU by 2030’.

²⁸ European Commission (January 16th, 2018). ‘A European Strategy for Plastics in a Circular Economy’. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions COM(2018) 28 final, Brussels. https://eur-lex.europa.eu/resource.html?uri=cellar:2df5d1d2-fac7-11e7-b8f5-01aa75ed71a1.0001.02/DOC_1&format=PDF

²⁹ European Commission (January 16th, 2018). ‘Communication on the implementation of the circular economy package: options to address the interface between chemical, product and waste legislation’. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions COM(2018) 32 final, Strasbourg. <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1516265440535&uri=COM:2018:32:FIN>

Plan 2016-2019³⁰ aims to develop provisions to extend the lifetime of a product, reuse components or recycle materials.

The EU has made several financing instruments available to stimulate investments in circular economy projects. The European Investment Bank (EIB) can provide loans for projects that contribute to the circular economy. In order to be financed, the project must fall into 'Circularity categories' including Circular design and production (application of reduce/recycle strategies in design/production phases), Circular use and life extension (application of reuse/repair/repurpose/refurbish/remanufacture strategies in use phase), Circular value recovery (application of recycle/recover strategies in after-use phase) and Circular support (Support and facilitation of all circular strategies in all lifecycle phases).³¹ Other financing instruments include the European Fund for Strategic Investments (EFSI)³², InnovFin³³ for research and innovation projects, Cohesion policy funds, Horizon 2020, and LIFE.

The circular economy is also mentioned alongside innovation and industrialisation in various EU texts. The Communication 'A renewed EU Industrial Policy Strategy'³⁴ states that one of the objectives of the strategy is to build on Europe's leadership in a low-carbon and circular economy and to support companies to innovate and adapt to the transition. The 'Cluster 'Digital and Industry' of the new research framework and innovation programme Horizon Europe aims to reinforce capacities and secure Europe's leadership in circular industry³⁵.

The international dimension of the transition is also reflected in EU legislation particularly including in the area of trade. The EU Strategy for Plastics outlines several international actions such as the promotion of a circular plastics economy in non EU countries through policy dialogues on trade and the development of international industry standards on sorted plastic waste and recycled plastics as well as certification schemes for recycling plants in third countries. The EU also signed a Memorandum of Understanding on the Circular Economy with China on 16 July 2018³⁶ and organises Circular Economy Missions, with political and business meetings, in countries like Japan, India and Indonesia.³⁷

³⁰ European Commission (November 30th, 2016). 'Ecodesign Working Plan 2016-2019'. Communication from the Commission COM(2016) 773 final, Brussels. https://ec.europa.eu/energy/sites/ener/files/documents/com_2016_773_en.pdf

³¹ European Investment Bank (October 2018), 'The EIB Circular Economy Guide - Supporting the circular transition', Luxemburg.

http://www.eib.org/attachments/thematic/circular_economy_guide_en.pdf

³² More information available at : http://ec.europa.eu/growth/industry/innovation/funding/efsi_en

³³ More information available at: <http://www.eib.org/en/products/blending/innovfin/index.htm>

³⁴ European Commission (September 13th, 2017). 'Investing in a smart, innovative and sustainable industry – a renewed EU Industrial Policy Strategy'. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank COM(2017) 579 final, Brussels. https://eur-lex.europa.eu/resource.html?uri=cellar:c8b9aac5-9861-11e7-b92d-01aa75ed71a1.0001.02/DOC_1&format=PDF

³⁵ European Commission (June 7th, 2018). 'Proposal for a decision of the European Parliament and of the Council on 'on establishing the specific programme implementing Horizon Europe – the Framework Programme for Research and Innovation'. <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1540387739796&uri=CELEX%3A52018PC0436>

³⁶ European Commission (July 16th, 2018). 'Memorandum of understanding on Circular Economy between the European Commission and the National Development and Reform Commission of the People's Republic of China', signed at Beijing. http://ec.europa.eu/environment/circular-economy/pdf/circular_economy_MoU_EN.pdf

³⁷ European Commission (2018). 'Circular Economy Missions to Third Countries'. http://ec.europa.eu/environment/international_issues/missions_en.htm

³⁸ The review of the EU Waste Shipment Regulation³⁹ scheduled for the end of 2020 will look at how to make this regulation more consistent with the circular economy agenda, including by contributing to the establishment of a single market for waste treatment services and recovered materials within Europe.

Collectively, the EU legislation developed under the circular economy strategy has resulted in the adoption of a number of targets which will likely determine the direction and shape the transition will take. This includes recycling 65% of municipal waste by 2035, 70% of packaging waste by 2030 and limiting landfilling to 10% by 2035 – other targets are identified in Table 1. It should be noted that some targets, such as those given in the recent proposal on single use plastics⁴⁰, are under development and have yet been adopted – illustrating that the circular economy agenda is an ongoing process. A report on progress towards the implementation of the Circular Economy Action Plan was published in 2017⁴¹, the report notes the areas where actions had been made namely: food waste, eco-design, organic fertilisers, guarantees for consumer goods, and innovation and investments, as well as the integration of the circular economy concept into other policy areas. The report highlights the delivery of policies so far and future policy objectives up until 2018. Very little information is given on progress towards the circular economy in real terms, or the effectiveness of measures. In some areas such as eco-design and food waste progress has in reality been notably slow⁴². Additionally, the extent to which the circular economy agenda will continue to be developed and prioritised in future political cycles is not clear.

³⁸ European Commission, 2018, *ibid*.

³⁹ European Commission (2018). 'Evaluation of the Waste Shipment Regulation'. http://ec.europa.eu/environment/waste/shipments/evaluation_of_the_wsr.htm

⁴⁰ European Commission (May 28th, 2018). Proposal for a directive of the European Parliament and of the Council on the reduction of the impact of certain plastic products on the environment, COM(2018) 340 final, 2018/0172 (COD), Brussels. http://ec.europa.eu/environment/circular-economy/pdf/single-use_plastics_proposal.pdf

⁴¹ European Commission (January 26th, 2017). Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the implementation of the Circular Economy Action Plan, COM(2017) 33 final, Brussels. http://ec.europa.eu/environment/circular-economy/implementation_report.pdf

⁴² No eco-design measures have been developed since 2017 and there have been no policy proposals on food waste beyond methodologies.

Table 1 – Screening of targets relevant to the EU Circular Economy Monitoring Framework⁴³

Focus	Indicator	Is there a relevant EU target or action?	
Production and consumption	1. EU self-sufficiency for raw materials (%)	The Commission's 2008 Raw Materials Initiative ⁴⁴ outlines relevant broad objectives. There are no explicit targets for this indicator.	
	2. Green public procurement (tbc.)	This is a new indicator with no existing data, there are no explicit EU targets on GPP. A mandatory GPP question will be included in procurement procedures.	
	3. Waste generation	3a. Generation of municipal waste per capita (kg per capita)	The Waste Framework Directive includes a definition of municipal waste, but no targets for reducing waste per capita.
		3b. Generation of waste excluding major mineral wastes per GDP unit	There are no explicit policy targets or objectives for eco-efficiency.
		3c. Generation of waste excluding mineral wastes per DMC (%)	There are no explicit policy targets or objectives for material efficiency.
4. Food waste (million tonnes)	This is a new indicator, there is no agreed EU definition of food waste. The EU has committed to SDG 12.3 to half per capita food waste by 2030. ⁴⁵		
Waste management	5. Overall recycling rates	5a. Recycling rate municipal waste (%)	This indicator supports monitoring progress towards municipal waste recycling rates, 55% by 2025, 60% by 2030, and 65% by 2035. ⁴⁶
		5b. Recycling rate excluding mineral waste (%)	There are no explicit targets for increasing the recycling rates for mineral waste. Although MS are encouraged to apply the waste hierarchy in the WFD.
	6. Recycling rates for specific waste streams	6a. Overall packaging (%)	This indicators supports monitoring the revised waste package targets for packaging: 65% by 2025 and 70% by 2030.
		6b. Plastic packaging (%)	This indicators supports monitoring the revised waste package targets for plastics: 50% by 2025 and 55% by 2030.
		6c. Wooden packaging (%)	This indicators supports monitoring the revised waste package targets for wood based packaging 25% by 2025 and 30% by 2030.
		6d. E-waste (%)	This indicator is based on the WEEE Directive (2012/19/EU) - <i>see Annex V</i> .
		6e. Bio-waste (%)	Under new waste package MS should ensure biowaste is separated and recycled at source or separately collected by end of 2023 – no explicit targets have been established – although it could be interpreted as a 100% recycling rate.
6f. Construction and demolition waste (%)	This indicator supports the objectives of the WFD target – by 2020 a minimum of 70% (by weight) of construction and demolition waste shall be prepared for re-use, recycling or recovery.		
Secondary raw materials	7. Contribution of recycled materials to raw materials demand	7a. End of life recycling input rates (EOL-RIR) (%)	There is no explicit target for increasing the share of secondary materials in total material demand.
		7b. Circular material use rate (%)	There is no explicit target for increasing the CMU for the EU.
	8. Trade in recyclable raw materials	Imports from non-EU countries (tonnes)	There are no explicit targets for the trans-border movements of waste both extra EU and intra-EU.
		Exports to non-EU countries (tonnes)	
		Imports from EU countries (tonnes)	
Exports to EU countries (tonnes)			

⁴³ European Commission (January 16th, 2018). 'Measuring progress towards circular economy in the European Union – Key indicators for a monitoring framework' and communication on a monitoring framework for the circular economy. Communication From The Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, SWD(2018) 17 final, Strasbourg. http://ec.europa.eu/environment/circular-economy/pdf/monitoring-framework_staff-working-document.pdf

⁴⁴ European Commission (November 4th, 2008). 'The raw materials initiative — meeting our critical needs for growth and jobs in Europe'. Communication from the Commission to the European Parliament and the Council, COM(2008) 699 final, Brussels. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52008DC0699&from=EN>

⁴⁵ European Parliament (2016). 'Reduction of Food Waste', legislative train schedule. <http://www.europarl.europa.eu/legislative-train/theme-new-boost-for-jobs-growth-and-investment/file-reduction-of-food-waste>

⁴⁶ European Council, Council of the European Union (May 22nd, 2018). 'Waste management and recycling: Council adopts new rules', press release. <https://www.consilium.europa.eu/en/press/press-releases/2018/05/22/waste-management-and-recycling-council-adopts-new-rules/>

A long-term strategy for a European circular economy – setting the course for success

Competitiveness and innovation	9. Private investments jobs and gross value added	9a. Gross investment in tangible goods (% GDP)	There are no explicit targets to increase the investment and employment in circular economy sectors. The EU has established a number of funding instruments and initiatives to support the development of these sectors and innovation.
		9b. Persons employed	
		9c. Value added at factor cost (% of GDP)	
	10. Patents	Number of patents related to recycling and secondary raw materials	

Key Indicator supported by a target



Indicator supported by measures but no explicit target



There are no explicit targets for the indicator.



Circular Economy Monitoring Framework

The Circular Economy Monitoring Framework was introduced by the European Commission on the 16th January 2018⁴⁷. The joint initiative, from DG Environment, Eurostat and DG Grow, aims to monitor progress towards the circular economy at the EU level and across the 28-Member States. It provides data at the Member State level, allowing for comparison between countries. The framework is structured around ten indicators across four dimensions: ‘production and consumption’, ‘waste management’, ‘secondary raw materials’ and ‘competitiveness and innovation’.⁴⁸

In general, the monitoring framework aims to build on existing data in order to minimise the administrative burden on national statistical bodies. Two new indicators are Green Public Procurement and food waste.⁴⁹

The EU Monitoring Framework, borrows some data from and complements existing Eurostat tools including the EU Resource Efficiency Scoreboard (RES) and the Raw Materials Scoreboards (RMS). These two tools include several more indicators, and cover issues such as environmental impacts and specific economic sectors in detail. Data provided by the framework illustrates that while progress has been made in some areas, such as reducing landfilling, overall municipal waste generation levels have remained relatively stable since 1996, likewise the circular material use remains low at around 11%.⁵⁰

While some of the indicators applied in the circular economy monitoring framework are relevant to EU level policy objectives and targets, such as recycling rates for specific waste streams, they are not explicitly linked as such. Furthermore, for many of the indicators there are no established legislative targets against which to track progress. Although, it could be argued that many of the indicators are indirectly linked to wider objectives.

The indicators selected by the Inter Agency Expert Group working on Sustainable Development Goal Indicators to monitor progress towards sustainable development goals 8.4 and 12.2⁵¹, as well as those recently applied by the International Resource Panel (Domestic Material Consumption; Material Footprint; Material Intensity), are not included in the framework.

Monitoring progress on the SDGs

The 2017 Eurostat monitoring report on the SDGs, Sustainable development in the European Union⁵², suggests the EU is progressing well towards SDG12. The report is based on assessing SDG12 under

⁴⁷ European Commission (January 16th, 2018). ‘Documents on the strategy for plastics in a circular economy’. https://ec.europa.eu/commission/publications/documents-strategy-plastics-circular-economy_en

⁴⁸ Eurostat (2018). ‘Circular economy monitoring framework’. <https://ec.europa.eu/eurostat/web/circular-economy/indicators/monitoring-framework>

⁴⁹ European Commission (April 20th, 2018). ‘Manfred Rosenstock explains the structure and the role of the EU Circular Economy Monitoring Framework’. http://ec.europa.eu/newsroom/ENV/item-detail.cfm?item_id=624120&newsletter_id=300&utm_source=env_newsletter&utm_medium=email&utm_campaign=Beyond%20GDP&utm_content=Manfred%20Rosenstock%20explains%20the%20structure%20and%20the%20role%20of%20the%20EU%20Circular%20E&lang=en

⁵⁰ Eurostat, 2018, *ibid*.

⁵¹ Material footprint, material footprint per capita, and material footprint per GDP (8.4.1, 12.2.1); Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP (8.4.2, 12.2.2).

⁵² Eurostat (2017). ‘Sustainable development in the European Union - Monitoring report on progress towards the SDGs in an EU context’, 2017 edition, Luxembourg. <https://ec.europa.eu/eurostat/documents/3217494/8461633/KS-04-17-780-EN-N.pdf/f7694981-6190-46fb-99d6-d092ce04083f>

three sub-themes: decoupling environmental impact from economic growth, energy consumption, and waste generation and management.

Positive progress on sustainable consumption is reported based on a number of indicators. Notably, resource productivity is applied as one measure of decoupling environmental impacts from economic growth. Resource productivity was 2.07 EUR per kg in 2016, an improvement of 17.3% since 2011. However the report notes the weakness of this improvement, as it has been effected by the financial crisis, and the resource intensity of imports are poorly reflected. 2018 reporting at the UN level⁵³, notes a large gap between two indicators: domestic material consumption and material footprint in both developing and developed countries but in opposite directions, illustrating that materials extracted from developing countries are being used to satisfy the consumption habits of developed countries.

At the global level, the UN Sustainable Development Goals Report 2017 notes that the global material footprint is growing and that Europe has one of the highest per capita material footprints - 20.2 tonnes per capita in 2010 compared to 2.5 tonnes per capital in Sub-Saharan Africa.

The EU SDG Indicator Set 2018 published by Eurostat in April 2017 states that material footprint and material footprint per capita will be considered as indicators once Member States data is available.⁵⁴

Member State Initiatives on the Circular Economy

A number of Member States have started to develop circular economy initiatives, and in some cases national strategies and monitoring frameworks. Some of these strategies include the development of legislation, and specific targets towards circular economy goals, national strategies, monitoring indicators as well as sub-national level initiatives. Examples of Member State activity in this area are shown in Table 2 and Table 3.

Table 2 – Overview of circular economy initiatives from Member States

Types of legislation	Member State examples
National circular economy strategies with targets	Netherlands , France , Denmark , Scotland , Germany
National circular economy strategies with qualitative objectives only	Finland , Luxembourg , Italy , Slovenia
National circular economy assessments	Greece , Spain
National indicator frameworks	France , Netherlands
Municipal or regional circular economy initiatives	Flanders , Catalonia , London , Brussels

⁵³ United Nations (2018). 'The Sustainable Development Goals Report 2018'. United Nations, New York, p. 27. <https://unstats.un.org/sdgs/files/report/2018/TheSustainableDevelopmentGoalsReport2018.pdf>

⁵⁴ European Commission, Eurostat (April 3rd, 2018). 'EU SDG Indicator set 2018 – result of the review in preparation of the 2018 edition of the EU SDG monitoring report'. <https://ec.europa.eu/eurostat/documents/276524/7736915/EU+SDG+indicator+set+2018+-+public+web+version+with+cover+note/c86cd681-a537-4f0c-9680-197f04888f12>

Table 3 – Member State circular economy strategies with targets

MS	Initiative	Description	Key objectives and targets
Denmark	Advisory Board for the Circular Economy – Recommendations for the Danish Government (2017)	National recommendations from the Ministry of Environment and Food	By 2030: boost resource productivity by 40% by materials, and 15% by value, overall recycling to 80%, and reduce overall waste production by 15%. Increase population active in sharing economy to 50%. Quadruple the turnover of eco-labelled products and services.
France	50 measures for a 100% circular economy (2018)	Joint initiative from the Ministry for Ecological Transition and the Ministry for Economy and Finances	Increase resource consumption relative to GDP by 30% (2030 compared to 2010); reduce residual waste by 50% (2025 compared to 2010), move towards 100% recyclable plastics by 2025, reduce carbon emissions by 8 million tonnes per year, create 300,000 jobs.
Germany	Resource Efficiency Programme (ProgRes II) (2016)	National programme led by the Ministry for the Environment, Nature Conservation, Building and Nuclear Safety	Uses “total raw material productivity” as headline indicator. Targets to 2020: double raw material productivity, sustain trend on total raw material productivity, municipal recycling over 65% (see document for full list of targets)
Netherlands	A Circular Economy in the Netherlands by 2050 (2016)	Government wide programme for circular economy transition	Target a 50% reduction in the use of primary raw materials (minerals, fossil and metals) by 2030
Scotland	Making Things Last - A Circular Economy Strategy (2016)	Scottish Government led Circular Economy strategy to build a strong economy, protect resources and support the environment	By 2025: household waste 70% recycling/composting and preparing for re-use; Reduce waste arising by 15% against the 2011 baseline of 13.2 million tonnes; No more than 5% of all waste to go to landfill.
Slovenia	Roadmap towards the circular economy in Slovenia (2018)	National Strategy contracted by the Ministry of Environment and Spatial Planning	No quantitative targets. Priority areas: food, manufacturing and mobility. Targets taken from Slovenian Development Strategy 2030: Material productivity 3.5 PPP/kg, share of renewable energy 27%, GDP per GHG emissions to meet EU average.

Further actions have been developed by wider stakeholders including business and civil society.

5 Setting the right targets to drive change

A scoping of the EU and Member States policies and initiatives on the circular economy reveals a growing and diverse mix of actions explicitly in support of a transition to a circular economy.

This represents a success in terms of policy support for an economy which is more productive with resources and places less stress on the environment. However, the shape and strength of measures and their potential to deliver measurable changes to resource use in Europe remains undetermined.

The EU policies on circular economy have a strong focus on increasing recycling rates, reducing landfill and creating markets for secondary materials. This is echoed in existing Member States policies. Furthermore, Member States will have to adopt binding recycling targets established in the revised waste legislation. These measures represent an important driver for change, and reflect the potential for European leadership on waste management globally. On their own, however, these measures are potentially insufficient to result in a paradigm shift in resource use – or indeed prevent a rebound effect where net productivity gains are lost in growing consumption overall.

Key observations include:

- **The EU and most Member States do not have clear objectives or targets to reduce overall resource consumption in the economy.** The Netherlands is the only Member State with the objective to reduce the overall use of raw materials in the economy (by 50%). France, Denmark and Germany have targets to increase resource productivity by 2030.
- **The EU and most Member States do not have clear objectives or targets to reduce the overall levels of waste arisings in the economy.** Denmark aims to reduce waste production by 15% by 2030, France aims to reduce per capita household waste by 10% (2010 compared to 2020)⁵⁵, and Scotland aims to reduce waste arising by 15% against the 2011 baseline of 13.2 million tonnes by 2017.
- Many policy objectives established by the EU and Member States are not measurable, or there is a lack of coherence between indicator sets and policy objectives. **Most of the indicators in the EU monitoring framework lack corresponding objectives and targets.** Additionally, EU level reporting on SDG12 published in 2017 is not easy to compare against the UN targets.
- **Many targets, including those for recycling, are relative (e.g. to GDP) and as such do not necessarily ensure overall reductions in resource consumption or waste production,** e.g. in a growing economy the rate of recycling may increase, but pollution levels or the actual volume of waste sent to landfill may be the same or increase.
- **The widespread use of Domestic Material Consumption (DMC) as a measure of national material use poorly reflects the material intensity of the economy, as resource uses hidden in imports are ignored.** A comparison of DMC with material footprint reveals a large EU dependency on materials from outside of Europe. The SDG Progress report of the Secretary General of the UN Economic and Social Council, notes that in absolute terms DMC has grown

⁵⁵ France, Law relating to energy transition for green growth (August 17th, 2015), n° 2015-992. <https://www.legifrance.gouv.fr/affichTexteArticle.do?idArticle=JORFARTI000031044647&cidTexte=LEGITEXT00031047847&categorieLien=id>

globally from 1.29 to 1.41 kg per USD – indicating in a growth in resource use per unit of economic output.

- **At the EU level clear funding instruments have been established to support circular economy initiatives. This is less evident at the member state level** where commitments to invest directly are much more limited in policy documents supporting circular economy measures. Scotland has committed to investing 70 million EUR in initiatives.
- The narrative making the link between decarbonisation and dematerialisation is underdeveloped and in some areas non-existent. **Identifying and quantifying opportunities for emissions reductions from material savings are increasingly found in third party grey literature but are rarely part of national policies to address climate change.**
- **Equity and environmental justice are recognised objectives at the EU and Member State levels, but neither issues are well integrated into the circular economy narrative.** Research on environmental inequality, such as carbon inequality⁵⁶, demonstrate that Europeans as individuals rather than as a population consume an uneven share of resources globally. Establishing per capita measures and targets for resource use can help to demonstrate eco-efficiency as well as resource efficiency.
- Resource productivity, as well as other measures, are given relative to economic performance and growth in broad terms. While economic growth using GDP can be a useful measure of the state of an economy, such measures preclude the sustainability and the wellbeing of populations and individuals. **Establishing more progressive measures of socio-economic performance**, such as those being identified in the Beyond GDP initiative, could play a key role in severing the link between development and unsustainable resource use, as well as providing a driver for economic transition.

In the same way that the overall objective of global agenda on climate change is not to increase the share of renewable energy, but to reduce the level of GHG emissions, from an environmental perspective the overall objective and the central appeal of the circular economy is not to increase recycling rates – but to reduce the consumption of resources and the production of waste in absolute terms. At the moment objectives and targets to do this are missing from the circular economy agenda in Europe.

Best practice in terms of policy making on circular economy policies from the EU Member States include some which either aim to reduce resource use or waste production. Only the Netherlands has a target to reduce resource use in absolute terms (50% primary raw materials by 2050).

In order to achieve its ambitions and generate a transformative agenda on the circular economy, the EU should adopt stronger targets on resource use and waste production as part of its circular economy

⁵⁶ Chancel, L. and Piketty, T. (November 3rd, 2015). 'Carbon and inequality: from Kyoto to Paris - Trends in the global inequality of carbon emissions (1998-2013) & prospects for an equitable adaptation fund'. Paris School of Economics, Paris. <http://piketty.pse.ens.fr/files/ChancelPiketty2015.pdf>.

transition. Some of the indicators identified in the EU Monitoring Framework already start to do this, but are not always supported by policy.

More comprehensive measures of resource use such as material footprint (and material footprint per capita), have already been identified by Eurostat⁵⁷, and would provide a basis for strong policies and eventually targets in the future.

It should be acknowledged that existing methodologies of material flow accounting focus on mass of materials (in tonnes), without giving attention to the potential qualitative differences between the a given mass of the same material. A recent assessment of Switzerland’s Ecological Footprint presents an alternative methodology for assessing consumption based on “eco-points”.⁵⁸

Careful consideration would have to be given to how developing such measures would translate into actions at different governance levels or for different sectors⁵⁹ – this would likely be a complex task, and it should be acknowledged that targets alone will not be sufficient to delivering on the transition. Furthermore, statistical coverage of material footprint is currently limited, and current estimates⁶⁰ include a number of limitations. Nevertheless developing such a measure would provide the right policy signal to different stakeholders and at the same time ensure the direction of travel in reducing resource use is attained.

⁵⁷ Eurostat (September 2018). ‘Material flow accounts statistics - material footprints’. http://ec.europa.eu/eurostat/statistics-explained/index.php/Material_flow_accounts_statistics_-_material_footprints

⁵⁸ Confederation Suisse, Federal Statistic Office: <https://www.bfs.admin.ch/bfs/en/home/statistics/sustainable-development/ecological-footprint.html>

⁵⁹ European Commission (July 2nd, 2014). ‘Analysis of an EU target for Resource Productivity’, Commission staff working document, and ‘Towards a circular economy: a zero waste programme for Europe’, communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, SWD(2014) 211 final, Brussels. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014SC0211&from=GA>

⁶⁰ Eurostat (September 14th, 2018). ‘Material flow accounts in raw material equivalents by final uses of products - modelling estimates’. http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_ac_rmefd&lang=en

6 Roadmap for action

If the European Union is convinced of the need to transition to a circular economy it is evident that the next Commission (and subsequent ones) should **take forward the European agenda** on circular economy, and continue to build on existing support and actions.

In order to capitalise on the opportunities identified and establish a credible policy framework, the EU should:

Targets and measuring progress

Develop clear targets and timelines to reduce the material consumption in the European Union's economy. The EU should follow the Dutch lead and work towards a 50% reduction in primary raw material consumption by 2050. Studies suggest to go even further and aim for 80% reduction in per capita material footprint by 2050.⁶¹ **The environmental benefits of the circular economy will not be realised without absolute reductions in material consumption.** The waste hierarchy provides Europe with a logic for reducing consumption and waste production. Suitable indicators for measuring re-use should also be considered.

For the same reasons, **complimentary targets on reducing overall waste arisings should be established.** These should cover both municipal and industrial waste streams. Such targets would ensure that successful circular economy measures (including increasing recycling rates) are not offset by a rebound of growing consumption. As a reference, France has legally binding targets to reduce both household waste and waste from economic activities by 7% and 10% respectively by 2020 compared to 2010 levels.

Under the revised Waste Framework Directive, by the end of 2024 **the European Commission must consider establishing quantitative targets on waste prevention** (including re-use) – providing a mandate to act on this issue.⁶²

In order to support both of these targets, **Europe should build on its existing work to strengthen national statistical capacity on material flow accounting and assessment of the ecological footprints.** This work should be done in cooperation with the EIP on Raw Materials and wider international efforts

⁶¹ Material footprint is a consumption-based indicator of resource-use which measures the use of renewable and non-renewable material resources (excluding water and air) plus the erosion caused by agriculture and forestry. It describes the resource use associated with the whole life-cycle of products, services and activities. Literature from Groezinger (2009) and SPREAD Consortium (2012) indicate an average per capita material footprint of Europeans between 27 and 40 tonnes per year. A reduction of 80% in per capita material footprint is estimated from the upper bound level (40 tonnes) to reach the sustainable level of 8 tonnes per capita in 2050. This level of material footprint of household consumption is based on existing literature from Schmidt-Bleek (1993), Bringezu (2009), Kotakorpi et al (2008) and Lattenmeier et al (2012).

In order to live within planetary boundaries, Schmidt-Bleek (1993) estimated that global resource consumption had to be halved by 2050. Bringezu (2009) used data on use of abiotic and biotic resources and erosion from 2000 and, assuming an expected population of 9 billion in 2050, led to an estimated sustainable material resource use of 10 tonnes per capita per year. Under the assumption that 80% of the sustainable level of material resource use should be allocated to household consumption and the remaining 20% to public expenditure, the sustainable material footprint of household consumption is estimated at 8 tonnes per capita. Taking the 40 tonnes level of per capita material footprint as the baseline, the average European has to reduce his/her material footprint by 32 tonnes in 32 years. Based on current resource intensities of materials and assuming no change, this means a reduction in per capita material footprint by 1 tonne each year. While the target level is set at 8 tonnes, different individual preferences and needs imply that trade-offs among different categories of consumption can be made (nutrition, housing, mobility and leisure).

⁶² European Parliament, European Council (April 27th, 2018). 'Directive of the European Parliament and of the Council amending Directive 2008/98/EC on waste', PE-CONS 11/18, p. 61. <http://data.consilium.europa.eu/doc/document/PE-11-2018-INIT/en/pdf>

such as the UN Environment International Resource Panel. Care should be taken to establish the right targets, ensure accuracy, facilitate comparability, and avoid unnecessary trade-offs. Other relevant indicator areas to statistical reporting on the circular economy include food waste and green public procurement where there are currently no indicators in place.

Greater coherence should also be made between reporting on SDG12 and the circular economy, as these two policy agendas are closely linked and can be complimentary.

Taxation

Environmental fiscal reform should be used as a key instrument in circular economy transition – the tax burden should be shifted away from labour and onto resource depletion in order to support a double dividend. Using the VAT directive and the European semester process, the EU has the power to encourage flexible rates on services, such as repair, which support circularity. Urgently needed reforms should also cover the removal of environmentally harmful subsidies – such as those on fossil fuels, which are by definition linear and Member States have already committed to removing.⁶³ The tax system should encourage frontrunners and disruptors breaking the linear economy status quo. Gathering more data on the results of shifts in taxation at national level would help to assess the effectiveness of taxes and identify the tax instruments that would contribute the most to enhanced circularity.

Ecodesign

Ecodesign represents one of the EU's most successful measures in addressing energy efficiency, however existing requirements remain focused on energy use related to products. **Ongoing work to extend the scope of eco-design criteria, beyond energy use, to incorporate considerations for material use, multiple life cycles, repair and the circular economy more widely should be accelerated.** This is particularly true for product groups such as smart phones which are not yet covered by legislation.

Circular economy and climate

Better align the objectives of the Paris Agreement with circular economy policies. Opportunities such as introducing resource considerations as well as energy efficiency into eco-design standards have been identified but yet to be capitalised upon. In other areas opportunities are less well explored such as climate benefits linked to reuse and recycling and, more broadly, the reduction of raw material consumption. Issues of incoherence should be identified, for example where waste to energy disincentivises material recovery. **The transition towards a decarbonised and circular economy must be part of the same systemic shift. The circular economy must be part of countries' long-term decarbonisation plans including the EU's long term strategy for greenhouse gas emissions reduction.** Overall more needs to be done to link the narratives on climate and material efficiency.⁶⁴

The international dimension

While the close localisation of production, use and reuse/recycling can facilitate closing material loops, the European economy operates in an international environment. In 2016, Europe accounted for

⁶³ For more information please refer to ongoing research by IEEP with SITRA, Green Budget Europe and Ex-Tax.

⁶⁴ United Nations Environment Programme (UNEP) and International Resource Panel (IRP) (August 27th, 2018). 'Links between resource efficiency and climate change examined in Panel thinkpiece'. Key messages presented at G20 dialogue in Iguazu, 27th of August 2018. <http://www.resourcepanel.org/news-events/links-between-resource-efficiency-and-climate-change-examined-panel-thinkpiece>

17.9 % of world exports for goods and services and 16.2 % of world imports.⁶⁵ **The circular economy should be integrated in the EU's external policies.** A dialogue should be established between circular economy and trade experts to ensure that the circular economy is mainstreamed across the EU's trade policies. Trade should be used as an instrument to promote circular economy practices in third countries including to ensure that goods entering the EU market are consistent with circular economy principles and objectives. The EU should include the circular economy in the Sustainable Development Chapters of all its trade agreements and push for global standards related to the durability, reusability and recyclability of products. More research is needed on the potential implications of the transition to a circular economy in Europe on international trade flows.

The EU should use its diplomatic and international development instruments to encourage the development of the circular economy in third countries. Furthermore, policy makers should also encourage businesses to make their global value chains more resource efficient. **Circular economy should be promoted both within and outside the EU in a manner which is pro-poor.**

Sharing benefits and reinforcing cooperation

The circular economy agenda should be an agenda for all and not for the few. It is paramount to avoid 'winner takes all' situations where a restricted group of companies reap all the benefits by ensuring that SMEs have the financial and technical capacity to adopt innovative business models and circular economy practices. Benefits should also be shared along value chains.

Transparency and sharing information on the composition of materials throughout the value chain is crucial to facilitate reverse loops, reuse and recycling. This transparency should help to reinforce partnerships between producers, consumers and end of life management operators.

The EU should develop a **certification system for sharing and collaborative economy platforms** to clearly evaluate their potential in terms of resource efficiency gains. This certification system should also include references to labour rights and standards.

The social agenda

Europe's circular economy transition should be a social agenda - integrating ambitions for green jobs, carbon and material equality, as well as the objectives of the European Pillar of Social Rights. Comparative indicators on per capita consumption at the regional level can be a useful tool for assessing inequality, but evidence should be supported with qualitative assessments. Opportunities for social enterprise which expand re-use activities, second hand markets and the sharing economy should be supported recognising their economic potential. Efforts should be made to incorporate circular economy into other complimentary narratives on economic transition including the Beyond GDP debate, post-growth, and eco-sufficiency.

The transition towards a circular economy must be linked with the just transition and harnessed in order to ensure that inequalities are limited and individuals whose livelihoods might be jeopardised have access to training and retraining opportunities that would enable them to prosper.

⁶⁵ Eurostat (September 7th, 2018). 'World trade in goods and services - an overview'. https://ec.europa.eu/eurostat/statistics-explained/index.php/World_trade_in_goods_and_services_-_an_overview

Gathering support by citizens

European and Member States legislators should communicate on resource and circular economy issues to make them relevant to all citizens, and thus establish democratic support for the environment and circular economy as a crucial issue for the future of Europe.

7 References

Benton, D.; Hazell, J.; Coats, E. (February 19th, 2015). 'A circular economy for smart devices', Green Alliance, 41 pages. ISBN: 978-1-909980-36-5. https://www.green-alliance.org.uk/a_circular_economy_for_smart_devices.php

Blok, K.; Hoogzaad, J.; Ramkumar, S.; Ridley, A.; Srivastav, P.; Tan, I.; Terlouw, W.; de Wit, M. (2016). 'Implementing the circular economy globally makes Paris targets achievable'. Circle Economy and Ecofys, 18 pages. <https://www.ecofys.com/files/files/circle-economy-ecofys-2016-circular-economy-white-paper.pdf>

Chancel, L. and Piketty, T. (November 3rd, 2015). 'Carbon and inequality: from Kyoto to Paris - Trends in the global inequality of carbon emissions (1998-2013) & prospects for an equitable adaptation fund'. Paris School of Economics, Paris, 48 pages. <http://piketty.pse.ens.fr/files/ChancelPiketty2015.pdf>

Circle Economy (2018). 'The circularity gap report: our world is only 9% circular'. https://www.circle-economy.com/case/the-circularity-gap-report-our-world-is-only-9-circular/#.W5u3k6YzbIU*

De Wit, M.; Hoogzaad, J.; Ramkumar, S.; Friedl, H.; Douma, A. (January 2018). 'The circularity gap report – an analysis of the circular state of the global economy' Circle Economy, 35 pages. https://docs.wixstatic.com/ugd/ad6e59_c497492e589c4307987017f04d7af864.pdf

Dycle (2018). 'Diapers Cycle'. <https://dycle.org/en>

Ellen MacArthur Foundation and McKinsey Centre for Business and Environment (July 2015). 'Growth within: a circular economy vision for a competitive Europe', 97 pages. https://www.mckinsey.com/~media/mckinsey/business%20functions/sustainability%20and%20resource%20productivity/our%20insights/europes%20circular%20economy%20opportunity/growth_wi thin.ashx

European Commission (November 4th, 2008). 'The raw materials initiative — meeting our critical needs for growth and jobs in Europe'. Communication from the Commission to the European Parliament and the Council, COM(2008) 699 final, Brussels, 14 pages. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52008DC0699&from=EN>

European Commission (July 2nd, 2014). 'Analysis of an EU target for Resource Productivity', Commission staff working document, and 'Towards a circular economy: a zero waste programme for Europe', communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, SWD(2014) 211 final, Brussels, 30 pages. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014SC0211&from=GA>

European Commission (December 2nd, 2015). 'Closing the loop – an EU action plan for the Circular Economy'. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions COM(2015) 614 final, Brussels, 21 pages. https://eur-lex.europa.eu/resource.html?uri=cellar:8a8ef5e8-99a0-11e5-b3b7-01aa75ed71a1.0012.02/DOC_1&format=PDF

European Commission (November 22nd, 2016). 'Next steps for a sustainable European future – European action for sustainability'. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions COM(2016) 739 final, Strasbourg, 19 pages. https://ec.europa.eu/europeaid/sites/devco/files/communication-next-steps-sustainable-europe-20161122_en.pdf

European Commission (November 30th, 2016). ‘Ecodesign Working Plan 2016-2019’. Communication from the Commission COM(2016) 773 final, Brussels, 10 pages. https://ec.europa.eu/energy/sites/ener/files/documents/com_2016_773.en.pdf

European Commission (January 26th, 2017). Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the implementation of the Circular Economy Action Plan, COM(2017) 33 final, Brussels, 14 pages. http://ec.europa.eu/environment/circular-economy/implementation_report.pdf

European Commission (September 13th, 2017). ‘Investing in a smart, innovative and sustainable industry – a renewed EU Industrial Policy Strategy’. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank COM(2017) 579 final, Brussels, 18 pages. https://eur-lex.europa.eu/resource.html?uri=cellar:c8b9aac5-9861-11e7-b92d-01aa75ed71a1.0001.02/DOC_1&format=PDF

European Commission (2018). ‘Circular Economy Missions to Third Countries’. http://ec.europa.eu/environment/international_issues/missions_en.htm

European Commission (2018). ‘Evaluation of the Waste Shipment Regulation’. http://ec.europa.eu/environment/waste/shipments/evaluation_of_the_wsr.htm

European Commission (January 16th, 2018). ‘Documents on the strategy for plastics in a circular economy’. https://ec.europa.eu/commission/publications/documents-strategy-plastics-circular-economy_en

European Commission (January 16th, 2018). ‘Communication on the implementation of the circular economy package: options to address the interface between chemical, product and waste legislation’. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions COM(2018) 32 final, Strasbourg, 7 pages. <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1516265440535&uri=COM:2018:32:FIN>

European Commission (January 16th, 2018). ‘Plastic Waste: a European strategy to protect the planet, defend our citizens and empower our industries’, press release. http://europa.eu/rapid/press-release_IP-18-5_en.htm

European Commission (January 16th, 2018). ‘A European Strategy for Plastics in a Circular Economy’. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions COM(2018) 28 final, Brussels, 17 pages. https://eur-lex.europa.eu/resource.html?uri=cellar:2df5d1d2-fac7-11e7-b8f5-01aa75ed71a1.0001.02/DOC_1&format=PDF

European Commission (January 16th, 2018). ‘Communication on a monitoring framework for the circular economy’. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions COM(2018) 29 final, Strasbourg, 10 pages. <http://ec.europa.eu/environment/circular-economy/pdf/monitoring-framework.pdf>

European Commission (January 16th, 2018). ‘Measuring progress towards circular economy in the European Union – Key indicators for a monitoring framework’ and communication on a monitoring framework for the circular economy. Communication From The Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, SWD(2018) 17 final, Strasbourg, 60 pages. http://ec.europa.eu/environment/circular-economy/pdf/monitoring-framework_staff-working-document.pdf

European Commission, Eurostat (April 3rd, 2018). 'EU SDG Indicator set 2018 – result of the review in preparation of the 2018 edition of the EU SDG monitoring report'. 33 pages. <https://ec.europa.eu/eurostat/documents/276524/7736915/EU+SDG+indicator+set+2018+-+public+web+version+with+cover+note/c86cd681-a537-4f0c-9680-197f04888f12>

European Commission (April 20th, 2018). 'Manfred Rosenstock explains the structure and the role of the EU Circular Economy Monitoring Framework'. http://ec.europa.eu/newsroom/ENV/item-detail.cfm?item_id=624120&newsletter_id=300&utm_source=env_newsletter&utm_medium=email&utm_campaign=Beyond%20GDP&utm_content=Manfred%20Rosenstock%20explains%20the%20structure%20and%20the%20role%20of%20the%20EU%20Circular%20E&lang=en

European Commission (May 28th, 2018). Proposal for a directive of the European Parliament and of the Council on the reduction of the impact of certain plastic products on the environment, COM(2018) 340 final, 2018/0172 (COD), Brussels, 33 pages. http://ec.europa.eu/environment/circular-economy/pdf/single-use_plastics_proposal.pdf

European Commission (July 16th, 2018). 'Memorandum of understanding on Circular Economy between the European Commission and the National Development and Reform Commission of the People's Republic of China', signed at Beijing, 3 pages. http://ec.europa.eu/environment/circular-economy/pdf/circular_economy_MoU_EN.pdf

European Council, Council of the European Union (February 23rd, 2018). 'EU ambassadors approve new rules on waste management and recycling', press release. <https://www.consilium.europa.eu/en/press/press-releases/2018/02/23/eu-ambassadors-approve-new-rules-on-waste-management-and-recycling/>

European Council, Council of the European Union (May 22nd, 2018). 'Waste management and recycling: Council adopts new rules', press release. <https://www.consilium.europa.eu/en/press/press-releases/2018/05/22/waste-management-and-recycling-council-adopts-new-rules/>

European Parliament (2016). 'Reduction of Food Waste', legislative train schedule. <http://www.europarl.europa.eu/legislative-train/theme-new-boost-for-jobs-growth-and-investment/file-reduction-of-food-waste>

European Parliament, European Council (April 27th, 2018). 'Directive of the European Parliament and of the Council amending Directive 2008/98/EC on waste', PE-CONS 11/18, 99 pages. <http://data.consilium.europa.eu/doc/document/PE-11-2018-INIT/en/pdf>

European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL) (November 13th, 2017). 'A survey on practitioners' views about the implementation challenges with EU environmental legislation, their underlying reasons and ways to improvement: 2017'. Report number: 2017/27. 100 pages. <https://www.impel.eu/wp-content/uploads/2018/04/FR-2017-27-Implementation-Challenge-follow-up.pdf>

Eurostat (2017). 'Sustainable development in the European Union - Monitoring report on progress towards the SDGs in an EU context', 2017 edition, Luxembourg, 370 pages. <https://ec.europa.eu/eurostat/documents/3217494/8461633/KS-04-17-780-EN-N.pdf/f7694981-6190-46fb-99d6-d092ce04083f>

Eurostat (2018). 'Circular economy monitoring framework'. <https://ec.europa.eu/eurostat/web/circular-economy/indicators/monitoring-framework>

Eurostat (September 2018). 'Material flow accounts statistics - material footprints'. http://ec.europa.eu/eurostat/statistics-explained/index.php/Material_flow_accounts_statistics_-_material_footprints

Eurostat (September 7th, 2018). 'World trade in goods and services - an overview'. https://ec.europa.eu/eurostat/statistics-explained/index.php/World_trade_in_goods_and_services_-_an_overview

Eurostat (September 14th, 2018). 'Material flow accounts in raw material equivalents by final uses of products - modelling estimates'. http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_ac_rmefd&lang=en

France, Law relating to energy transition for green growth (August 17th, 2015), n° 2015-992. <https://www.legifrance.gouv.fr/affichTexteArticle.do?idArticle=JORFARTI000031044647&cidTexte=LEGITEXT000031047847&categorieLien=id>

Gençsü, I; McLynn, M.; Runkel, M.; Trilling, M.; van der Burg, L.; Worrall, L.; Whitley, S.; and Zerkaw, F. (September 2017). 'Phase-out 2020 - Monitoring Europe's fossil fuel subsidies', ODI & CAN Europe, 45 pages. <https://www.odi.org/sites/odi.org.uk/files/resource-documents/11762.pdf>

Hill, S. (October 20th, 2015). 'Welcome To The Share The Crumbs Economy'. Fast Company. <https://www.fastcompany.com/3052461/welcome-to-the-share-the-crumbs-economy>

Material Economics (2018). 'The circular economy - a powerful force for climate mitigation: Transformative innovation for prosperous and low-carbon industry - executive summary'. Material Economics Sverige AB, Stockholm, 7 pages. <https://europeanclimate.org/wp-content/uploads/2018/06/FINAL-MATERIAL-ECONOMICS-CIRCULAR-ECONOMY-SUMMARY.pdf>

OECD (March 2012). 'Greenhouse gas emissions and the potential for mitigation from materials management within OECD countries', 10 pages. <https://www.oecd.org/env/waste/50034735.pdf>

Schneider, J. and Hall, J. (April 2011). 'Why most product launches fail'. *Harvard Business Review*, Magazine Issue from April 2011, Harvard Business Publishing, Watertown, 140 pages. <https://hbr.org/2011/04/why-most-product-launches-fail>

United Nations (2018). 'The Sustainable Development Goals Report 2018'. United Nations, New York, 40 pages. <https://unstats.un.org/sdgs/files/report/2018/TheSustainableDevelopmentGoalsReport2018.pdf>

United Nations Environment Programme (UNEP) and International Resource Panel (IRP) (March 2017). 'International Resource Panel Report – Resource efficiency: potential and economic implications', 330 pages. http://www.resourcepanel.org/sites/default/files/documents/document/media/resource_efficiency_report_march_2017_web_res.pdf

United Nations Environment Programme (UNEP) and International Resource Panel (IRP) (August 27th, 2018). 'Links between resource efficiency and climate change examined in Panel thinkpiece'. Key messages presented at G20 dialogue in Iguazu, 27th of August 2018. <http://www.resourcepanel.org/news-events/links-between-resource-efficiency-and-climate-change-examined-panel-thinkpiece>

WRAP (November 9th, 2016). 'Extrapolating resource efficient business models across Europe'. Prepared by James, K.; Mitchell, P. and Mueller, D., 29 pages. <http://www.rebus.eu.com/wp-content/uploads/2017/07/Extrapolating-resource-efficient-business-models-across-Europe.pdf>

Zink, T. and Geyer, R. (February 5th, 2017). 'Circular Economy Rebound'. *Journal of Industrial Ecology*, 5th of February 2017, vol. 21, Iss. 3., pp. 593-602. DOI: <https://doi.org/10.1111/jiec.12545>.
<https://onlinelibrary.wiley.com/doi/abs/10.1111/jiec.12545>