

Turning waste into a resource Moving towards a 'circular economy'

SUMMARY

In a circular economy, unlike in a linear economy based on a 'take-make-consume-throw away' pattern, the materials contained within products are reused, turning waste into a valuable resource. Although businesses have started to use this model on specific products in various sectors, it has not yet been implemented on a large scale.

In its communication on a circular economy presented in July 2014, the European Commission proposes to double the rate of increase in resource productivity by 2030. To achieve this, the European Commission considers a broad range of measures related to design and innovation, financing for resource efficiency, and awareness of businesses and consumers.

A transition towards a more circular economy could have a number of benefits: enhancing the security of supply for raw materials; stimulating GDP growth; strengthening the competitiveness of businesses in the EU; and helping to protect the environment. However, there are also a number of barriers and challenges: moving towards circularity is a major change at a time of economic crisis; key enablers for the transition are still missing; significant discrepancies currently exist between Member States; and such a transition is a major multi-level governance challenge.

The European Parliament has repeatedly stressed the need for a shift towards resource efficiency and eco-innovation. Many Member States have been critical of the Commission proposal even though some have already started moving towards a circular economy. For their part, stakeholders have expressed diverging views.



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Glossary

Domestic material consumption (DMC): total amount of materials, including energy sources, consumed domestically by residents; commonly expressed in tonnes.

Raw material consumption (RMC): total estimated amount of raw materials, including energy sources, needed to produce goods consumed domestically by residents; commonly expressed in tonnes (figure currently only available at EU level).

Resource productivity: ratio of gross domestic product (GDP) over raw material consumption (or domestic material consumption); commonly expressed in euro per kilogramme of material.

Background

A 'circular economy' is generally described as one in which products and the materials they contain are valued highly, unlike in the traditional, linear economic model, based on a 'take-make-consume-throw away' pattern.

In a circular model,¹ waste is reduced to a minimum. When a product reaches the end of its life, its materials are kept within the economy wherever possible. These can be productively used again and again, thereby creating further value. Measures leading towards a circular economy include re-using, repairing, refurbishing and recycling existing materials and products. What used to be considered as 'waste' can be turned into a valuable resource, through trying to mimic the natural cycles of ecosystems.

The production and consumption model is based on two [complementary loops](#): one for so-called 'biological' materials (which can be decomposed by living organisms) and one for so-called 'technical' materials (which cannot be decomposed by living organisms). In both cases, the aim is to limit the leakage of resources as much as possible.

Currently, the circular economy is little more than a concept, albeit a potentially powerful one. It has yet to be applied on a large scale, although the boom in commodities prices in the 2000s contributed to putting the circular economy higher on the agenda. Companies have started implementing it on specific products in various sectors, as shown in the [list of Cradle to Cradle certified products](#) or in [case studies by the Ellen MacArthur foundation](#), a private trust which has also published a [series of reports](#) drafted with McKinsey, an international consulting firm.

Commission communication on circular economy

On 2 July 2014, the European Commission adopted a communication '[Towards a circular economy: a zero waste programme for Europe](#)', together with a review of the targets in six waste management directives. According to the Commission, the communication and the accompanying [legislative proposal](#) fit into the [Roadmap to a resource efficient Europe](#) and more broadly into the Europe 2020 Strategy for smart, sustainable and inclusive growth. However, in his mission letter Environment, Maritime Affairs and Fisheries Commissioner Karmenu Vella was asked by Commission President Jean-Claude Juncker to check 'whether and how [the circular economy package] is consistent with our jobs and growth agenda and our broader environmental objectives.' This request has led to much speculation among stakeholders that the Commission intends to withdraw the proposal.

Measuring resource productivity

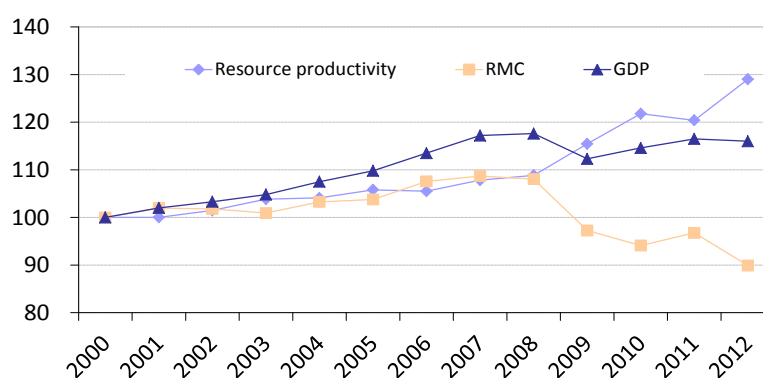
Ahead of the mid-term review of the Europe 2020 Strategy launched in 2014, the high-level [European Resource Efficiency Platform](#)² recommended setting up indicators and

targets as guiding tools for policy-making.³ The Commission subsequently proposed to use a 'resource productivity' indicator, measured as gross domestic product (GDP) over raw material consumption (RMC) – rather than the more commonly used GDP over domestic material consumption (DMC) – so as to take into account the actual resources originating outside Europe needed to produce goods consumed in the EU.⁴

However, grounding a resource productivity indicator on material consumption (whether raw or domestic) has limitations: it does not differentiate between more valuable and less valuable materials since RMC and DMC are purely based on weight; it focuses on the quantity of materials rather than on their efficient use at all stages of the value chain; and it does not take into account some important resources, such as land and water.

As shown in figure 1, material consumption is already part decoupled from economic growth: raw material consumption has tended to increase during periods of economic growth, but at a slower pace than GDP. The significant drop in raw material consumption since 2008, partly due to the economic crisis, has pushed the increase in resource productivity to 1.9% per year on average since 2000.

Figure 1 – Resource productivity in comparison to gross domestic product (GDP) and raw material consumption (RMC) in EU27
(Index: 2000 = 100)



Data source: Eurostat ([nama_gdp_k](#), [env_ac_rme](#)), 2000-12.

Forecasts by the European Commission suggest that resource productivity will continue to increase under a business as usual scenario, but at a slower pace than up to now (0.9% per year or 15% by 2030).⁵ In its communication, the Commission proposes to set as a target a 30% increase in resource productivity by 2030.

Waste as a resource

The resource productivity target is complemented by a [review of waste management targets set in six EU directives](#). This review is mostly due to legal obligations, contained within the Directives to be revised, to propose new targets by 2014. The aim is also to turn waste from a burden into a useful resource.

In order to drive the shift towards a circular economy, the European Commission proposes the following targets: 70% recycling of municipal waste by 2030; 80% recycling of packaging waste by 2030, with material-specific targets (90% recycling for paper by 2025, and 60% for plastics, 80% for wood, 90% for ferrous metal, aluminium and glass by 2030); phasing out landfilling of recyclable waste by 2025; and a 30% reduction in food waste by 2025.

Proposed policy framework

The measures envisaged combine smart regulation, market-based instruments, research and innovation, incentives, information exchange and support for voluntary approaches. They can be grouped into three broad areas:

Design and innovation

Waste is 'designed out' and innovation is included throughout the value chain. Examples include using fewer materials and less of them to perform a given function; increasing

the durability of products; fostering eco-design; creating markets for secondary raw materials; reducing the use of materials which are difficult to recycle; fostering industrial clusters to exchange by-products; and encouraging renting, lending, leasing and sharing instead of ownership of products. Although current policies already include some tools and incentives ([waste hierarchy](#), phasing out of very hazardous chemicals, and durability requirements included in eco-design measures, among others), the European Commission proposes to support research and innovation and to facilitate the development of more circular economic models.

Financing

In order to mobilise more private financing for resource efficiency, innovative financial instruments (such as the [natural capital financing facility](#) or public-private partnerships) are to be developed. In addition, investment in resource efficiency is to be encouraged by scrapping environmentally harmful subsidies and switching taxation away from labour towards pollution and resources.

Consumer and business awareness

Businesses and consumers are key actors in the transition towards a circular economy, with opportunities identified in the production, distribution and consumption phases. The European Commission highlights the need to inform consumers about the environmental impact and the resources used in products and services so as to incentivise them to reduce and sort waste; and for large-scale training of the labour force in order to ensure an effective and job-rich transition.

Benefits and barriers

Potential benefits of a circular economy

A circular economy could considerably enhance security of supply, both for the EU as whole and for specific companies. The European Union is not self-sufficient as regards the supply of often critical raw materials.⁶ It imports, in raw material equivalents, about half the resources it consumes. Several risks are associated with the supply of raw materials: availability-related (some resources, like phosphorus, are hardly available in Europe); technological (because of limited recycling options, as in the case of rare earths, or unavailability of substitutes); or economic (e.g. high market concentration for iron ore, certain minerals and some critical metals, and high import dependency for some industrial minerals and many rare metals). A more circular economy would mitigate these risks, as well as the general risk related to price volatility of raw materials.

A circular economy could have a positive impact on GDP growth. According to Commission estimates, the resource productivity target set out in its communication (i.e. a 30% increase in resource productivity by 2030) would induce an increase in GDP of 0.8% by 2030 and the creation of 2 million new jobs. Analysis carried out on behalf of the European Commission indicates that the EU target for manufacturing to reach a 20% share of EU GDP is compatible with the resource productivity target.

A circular economy could also strengthen the competitiveness of EU companies thanks to cost savings on materials. After almost a century of decline, real prices of natural resources have increased by 150% since the turn of the century. Resources (not including energy) can make up a significant part of the cost structure in some sectors. The Ellen MacArthur Foundation estimates that circularity could bring EU companies annual net material cost savings ranging from €250 billion to €465 billion, or from 12%

to 23% of their material costs, depending on the magnitude of the shift. The Commission estimates that it could also reduce total annual greenhouse gas emissions by 2% to 4%. More generally, businesses would also benefit from organisational and product innovation. The business case has convinced companies in various sectors (including car manufacturing, clothing, telecommunications and electronics) to take measures towards more circular models, as shown by the partnership between the Foundation and many global companies.⁷

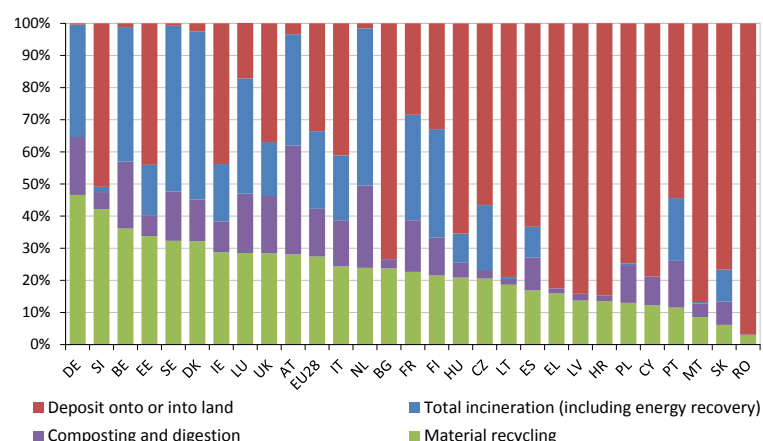
Last but not least, a circular economy would have a beneficial impact on the environment. According to Commission estimates, full implementation of the proposed waste management targets could deliver a 27% reduction in marine litter by 2030, with positive effects on ecosystems, the life of animals and human health. A drop in mining activity due to large-scale reuse of raw materials would substantially reduce landscape and habitat disruption, would help to limit biodiversity loss and would reduce overall energy consumption.

Barriers and challenges

Moving towards a circular economy would be a major change at a time of economic crisis. It would require a change in mind-set from consumers, with implications on everyday behaviour, in terms of waste sorting and food waste for instance. Acceptance of new business models (e.g. leasing rather than owning) remains low among consumers and companies. Sustainable (green) public procurement remains limited in most public entities across the EU. This major change could have negative impacts on developing countries from which many raw materials come, as well as on the 350 000 jobs in the European mining industry. Key enablers for a change towards a circular economy are still missing in the EU, among others: resource prices encouraging efficient resource reuse; sufficient skills and investment in circular product design and production; finance tools for mass market development of radical innovations; sufficient internalisation of externalities⁸ by policy; and incentives for producers and recyclers to work together in order to improve performance within and across specific value chains.

Significant discrepancies exist between Member States in terms of waste management, as shown in figure 2. The latest available figures on the treatment of municipal waste show that the highest proportion of municipal waste being recycled is 46% in Germany and the lowest 3% in Romania, while the EU average is 27%. With respect to landfilling, six countries send less than 3% of their municipal waste to landfills, while nine countries landfill more than 75% of their municipal waste. Furthermore, waste prevention and reuse (e.g. through mandatory deposit refund systems for glass and plastic bottles) can also play an important role in the transition towards a more circular economy. However, they are not taken into account in the waste-treatment statistics

Figure 2 – Municipal waste treatment in EU28 (2012)



Data source: [Eurostat](#), 2012.

and in the waste-recycling targets proposed by the Commission. This does not encourage such schemes and puts countries where they are widespread at a disadvantage.

The transition towards a circular economy is a major multi-level governance challenge. Actions would need to be taken at many levels (e.g. European, national, local, business, individual) and in many policy areas (e.g. waste management, professional training, packages and product design, research and development, and finance) including taxation, which requires unanimity in the Council. Moreover, existing policies such as the internal market would have to be taken into account. Keeping the transition policy consistent across all levels and policy areas could prove difficult.

European Parliament

In its [resolution of 24 May 2012](#) on a 'resource efficient Europe', Parliament highlighted that decoupling economic growth from resource consumption is essential for improving Europe's competitiveness and reducing its resource dependency. It also underlined the need to support innovation and investment in new techniques and business models, such as a leasing society.

In its [resolution of 12 December 2013](#) on 'eco-innovation – Jobs and Growth through environmental policy', Parliament called for an ambitious sustainable industrial policy with emphasis on resource efficiency, and highlighted the dual environmental and economic benefits of transition to a green sustainable economy.

In its [resolution of 14 January 2014](#) on a 'European strategy on plastic waste in the environment', Parliament called on the Commission to make proposals by 2014 to phase out the landfilling of recyclable and recoverable waste by 2020. It also highlighted that appropriate levels of training and skills were needed for eco-innovations to flourish and recommended that Member States integrate the circular economy model into their professional training schemes.

On 26 September 2014, EP President Martin Schulz urged Jean-Claude Juncker to include sustainable development in the competences of Jyrki Katainen, Commission Vice-President for Jobs, Growth, Investment and Competitiveness. Although this request was not followed up directly, the Commission's First Vice-President Frans Timmermans was subsequently tasked with taking on additional responsibility for sustainable development.

Member States

At a Council meeting of environment ministers on 28 October 2014, the proposed level of waste recycling targets put forward together with the communication on circular economy was criticised for being too far from current reality, in particular by central European countries. A number of Member States⁹ also said the proposal was too focused on waste management rather than preventing its generation and called for better product policy (eco-design). Some Member States called for reuse to be taken into account and suggested a combined target for reuse and recycling.

Though most Member States are still far from the current targets in terms of recycling, a number of them have initiated the transition towards a circular economy. Germany has underlined the need to decouple economic growth from material consumption since 2002. A [Circular Economy Act](#) implementing the EU Waste Framework Directive came

into force in 2012 with a view to promote ecologically sound waste management and a circular economy protecting natural resources.

The United Kingdom developed WRAP, an initiative on circular economy, estimating that a circular economy could generate 50 000 new jobs and €12 billion of investment, boosting GDP by €3.6 billion. In July 2014, the House of Commons Environmental Audit Committee published a [report](#) taking stock of measures and proposing recommendations for a circular economy. In its answer to the Commission consultation on the review of European waste management targets, the UK government highlighted its support for reducing waste and improving resource efficiency but insisted on the need to implement existing targets before setting new ones.

In 2013, France developed a strategy with long-term measurable objectives and a roadmap for the transition to a circular economy. The [French Institute for Circular Economy](#) promotes exchange of best practices, awareness-raising, and research and development of concrete examples. The outcome of consultations now underway will be summarised in a white paper, with a view to adopting legislation on the circular economy by 2017.

Stakeholders' views and public opinion

[BusinessEurope](#), representing business federations, criticises the resource efficiency target-based approach as 'far too simplistic' and wrongly focused on quantity rather than on efficiency of resource use, although it supports the broader objective of resource efficiency.

[ETUC](#), the European trade union confederation, welcomes the proposal as forward-thinking, but stresses the need to pay attention to jobs lost as well as created.

[Europen](#), an association representing organisations and businesses in the packaging value chain, advocates better defining the responsibilities of producers; clarifying the impacts of the proposed calculation method on existing recycling rates before setting new targets; and not setting mandatory national packaging design requirements which could undermine the internal market.

[FEAD](#), the federation of the European private waste management industry, supports the proposal to ban landfilling of recyclable waste from 2025 and the aspiration to reduce landfilling further after that. It advocates better enforcement of the current EU legislation in order to close the gap between the best and worst performing Member States.

[Municipal Waste Europe](#), an organisation representing the public waste management sector, calls for a gradual implementation of the targets proposed by the European Commission accompanied by implementation tools and EU oversight of funding given to Member States; it also stresses the importance of extended producer responsibility.

[European Environmental Bureau](#), an environmental NGO, generally supports the targets proposed by the Commission as a step towards a circular economy, and calls for the proposal to be strengthened with waste-reduction provisions.

[Friends of the Earth Europe](#), an environmental NGO, regrets that the proposal does not ban the incineration of recyclable materials and fails to take into account additional resources embedded in products, like land and water. On the whole, it deems the proposal insufficient given the scale of Europe's resource wastage and its impacts on the rest of the world.

According to a [Eurobarometer survey](#) published in June 2014, EU citizens appear to back the rationale behind resource efficiency. A substantial majority of people think that more efficient resource use would have a positive effect on the quality of life in their country (86%), on economic growth (80%), as well as on employment opportunities (78%). However, only a smaller proportion have tried alternatives to buying new products: buying a remanufactured product (35%), using sharing schemes (27%) or leasing/renting a product instead of buying it (21%).

Main references

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Implementation Appraisal briefing on [Resource efficiency and waste](#) / European Parliamentary Research Service, October 2014.

Initial appraisal of a European Commission Impact Assessment: [Review of EU waste management targets](#) / European Parliamentary Research Service, September 2014.

[Study on modelling of the economic and environmental impacts of raw material consumption](#) / Cambridge Econometrics and bio Intelligence Service, March 2014, 60 p.

[Towards the circular economy: accelerating the scale-up across global supply chains](#) / Ellen MacArthur Foundation, 2014, 80 p.

Endnotes

- ¹ The concept of circular economy is associated with concepts such as 'industrial ecology' and 'cradle to cradle', respectively popularised in 1989 and 2002. These models share an inspiration from biological cycles.
- ² The Platform's [members](#) include several European Commissioners, Members of the European Parliament, ministers, business CEOs, academics and representatives of NGOs and civil society.
- ³ European Resource Efficiency Platform, [Manifesto and policy recommendations](#), March 2014.
- ⁴ Although DMC takes into account imports and exports of materials, it is measured in weight of goods, regardless of how much they have been processed. RMC uses [raw material equivalents](#) (usually several times greater than the weight of the goods themselves).
- ⁵ GDP is forecast to increase by around 30% between 2014 and 2030. RMC is forecast to increase by around 15% by 2030. As a result, resource productivity would improve by around 15% by 2030 (and by 7% by 2020) at a trend rate of 0.9% per year.
- ⁶ The European Commission estimates that at least 30 million jobs depend on access to raw materials in the EU.
- ⁷ See [Circular Economy 100](#) for more details.
- ⁸ Changing a company's costs (or benefits) so that they reflect the costs (or benefits) for society and environment.
- ⁹ Including Belgium, Bulgaria, France, Greece, Hungary, Lithuania, the Netherlands, Slovakia, and the UK.

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