Measuring and monitoring the circular economy in Europe

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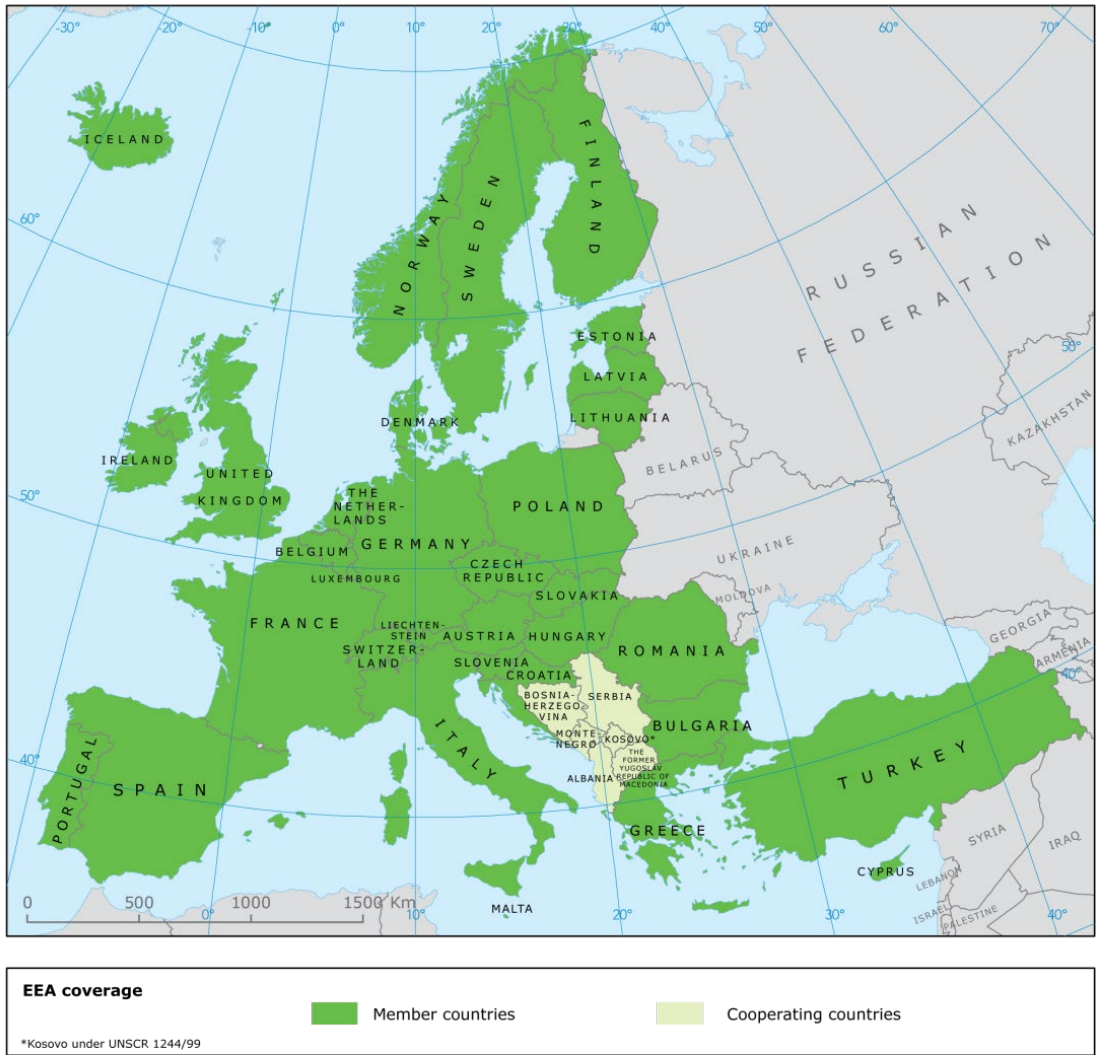
The EEA: a network organisation with direct links to policy

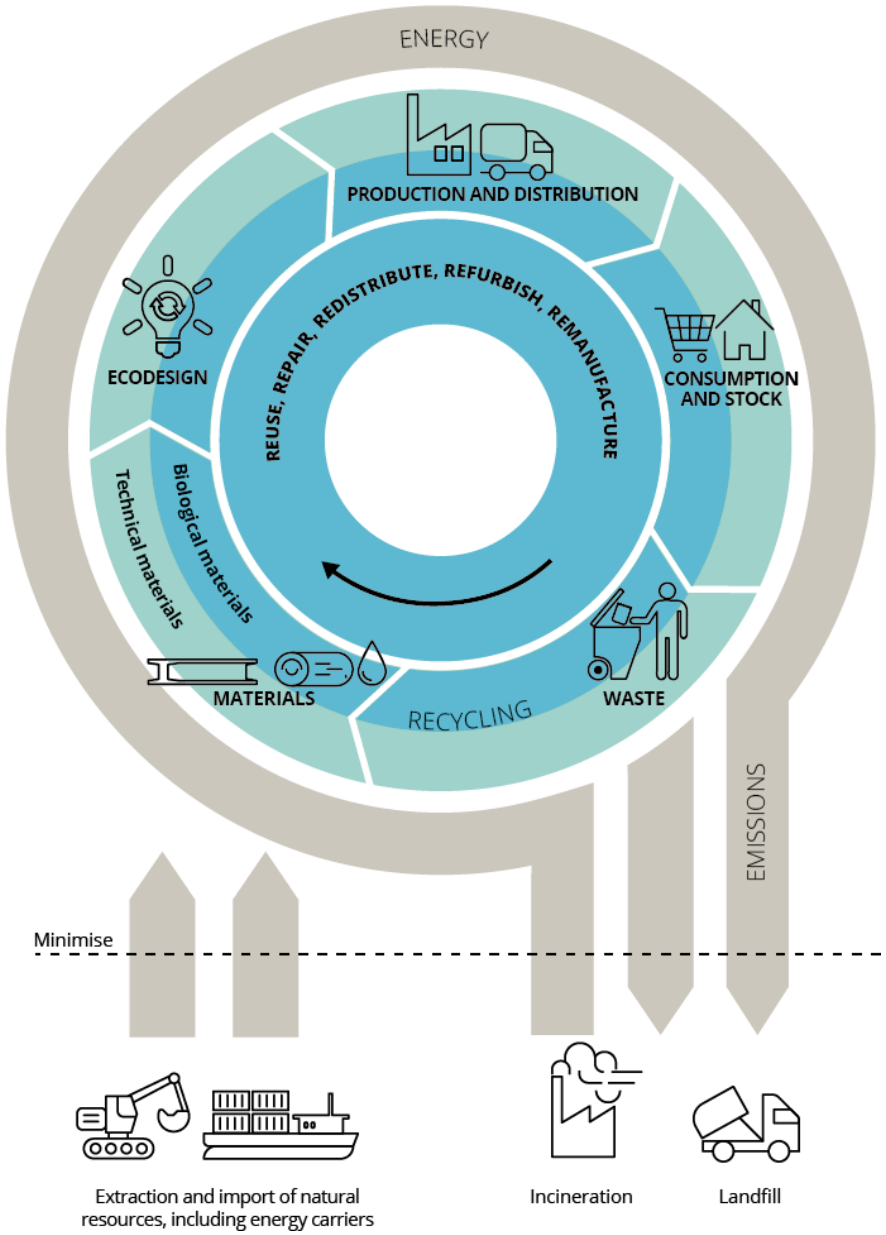
The European Environment Agency is an EU body that operates at the **interface of science and policy**.

The EEA has c. 200 staff, while its **network** ‘Eionet’ comprises more than 1000 experts and 350 institutions in 39 European countries.

The EEA gathers data and information from across Europe and **translates** them into assessments and knowledge to inform **policy and decision-making**.

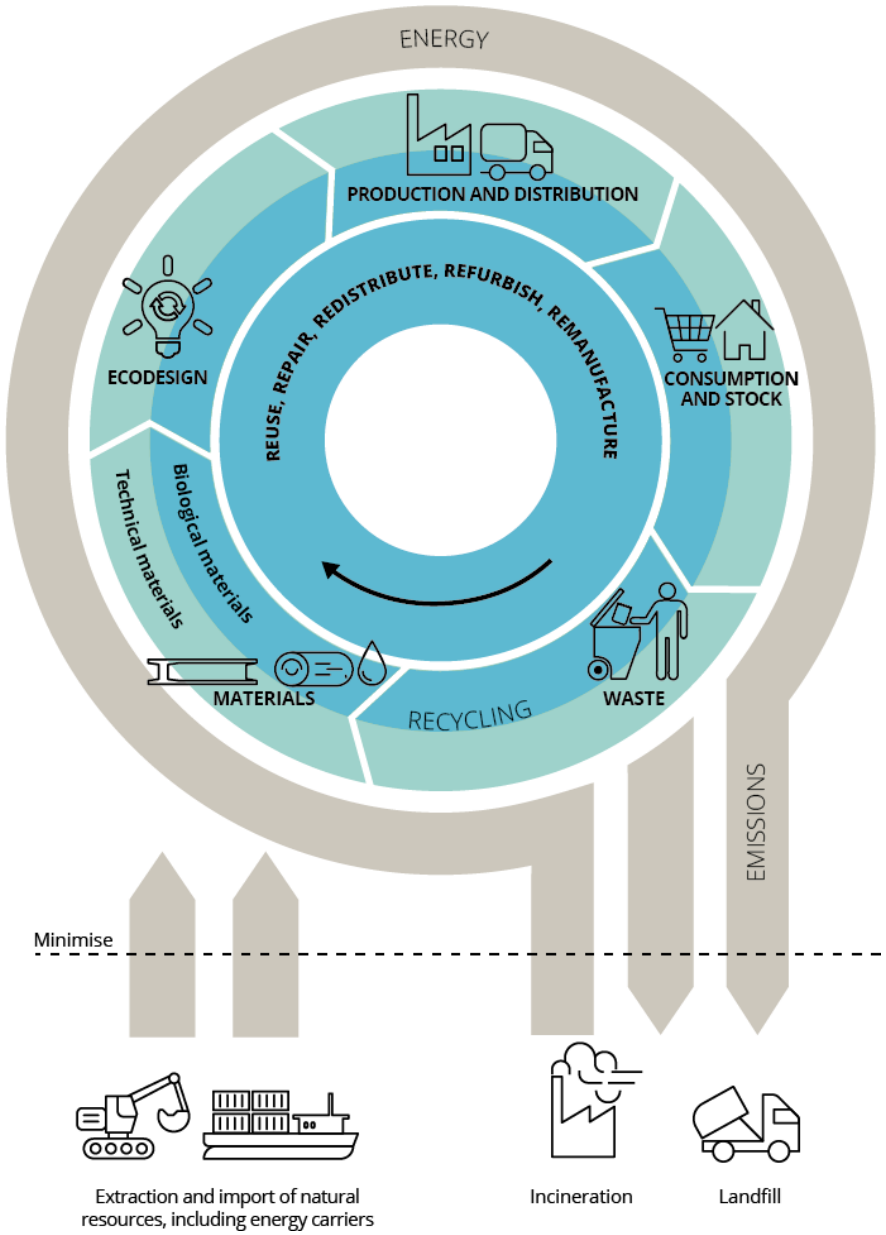


Defining the circular economy concept



- A fundamental alternative to the linear take-make-consume-dispose model
- Reduces resource use by recycling materials and reusing products, extending their lifespan and maintaining their economic value
- Minimises the need for new inputs of materials and energy while reducing environmental pressures related to resource extraction, emissions and waste
- Provides opportunities to create prosperity and jobs

Defining the circular economy concept



- **Outer circle** represents overall **energy** flows – total energy efficiency and share of renewables should increase and emissions decrease compared with a linear economy
- **Middle circle** represents **material** flows – recycling should increase and waste generation decrease compared with a linear economy
- **Inner circle** represents **reuse**, **repair**, **remanufacture** and **refurbishment** – these retain the value of products, components and materials at the highest level and should increase compared with a linear economy

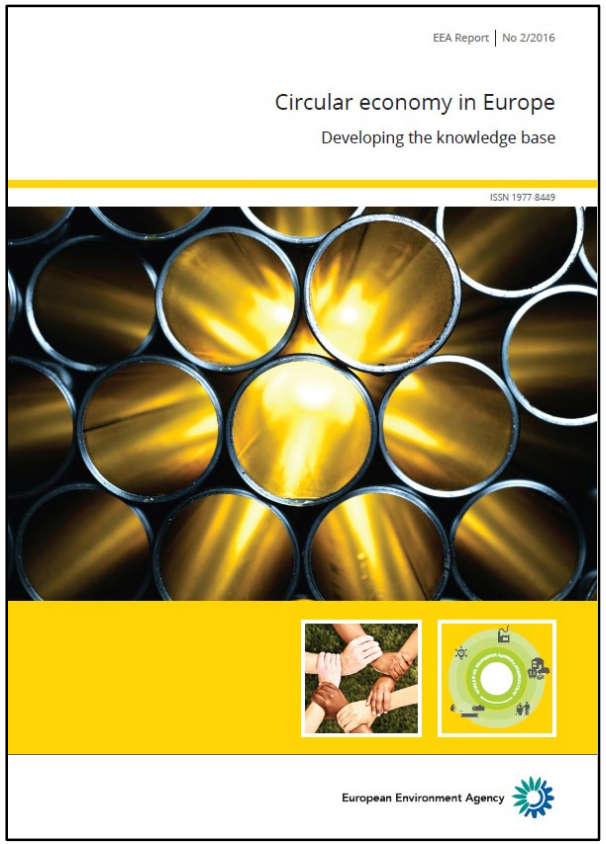
Key characteristics

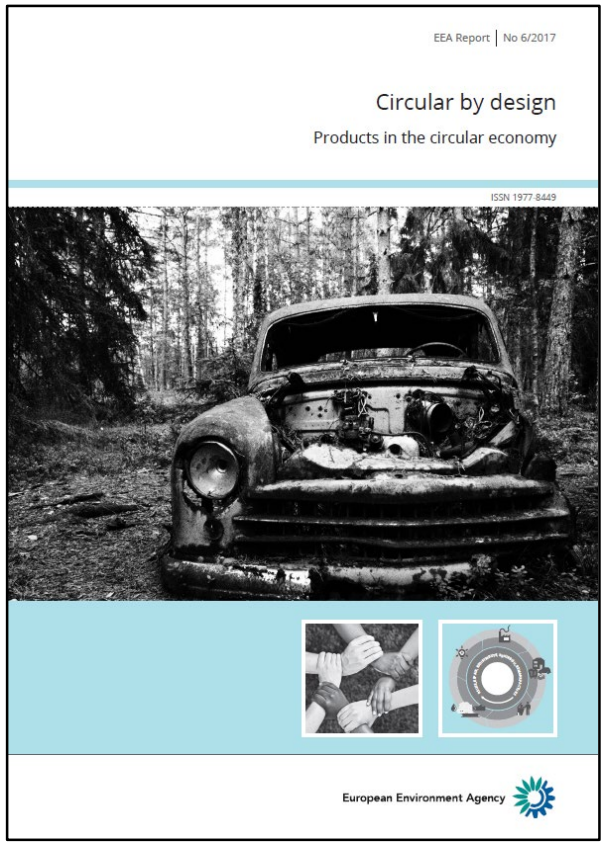
Characteristic	Examples
Less input and use of natural resources	Reduced import dependence Minimised overall energy and water use
Increased share of renewable and recyclable resources and energy	Non renewable resources replaced with renewable ones within sustainable levels of supply
Reduced emissions	Less pollution through clean material cycles
Fewer material losses and residuals	Incineration and landfill limited to a minimum Dissipative losses of valuable resources minimised
Keeping the value of products, components and materials in the economy	Extended product lifetimes Reuse of components High quality recycling

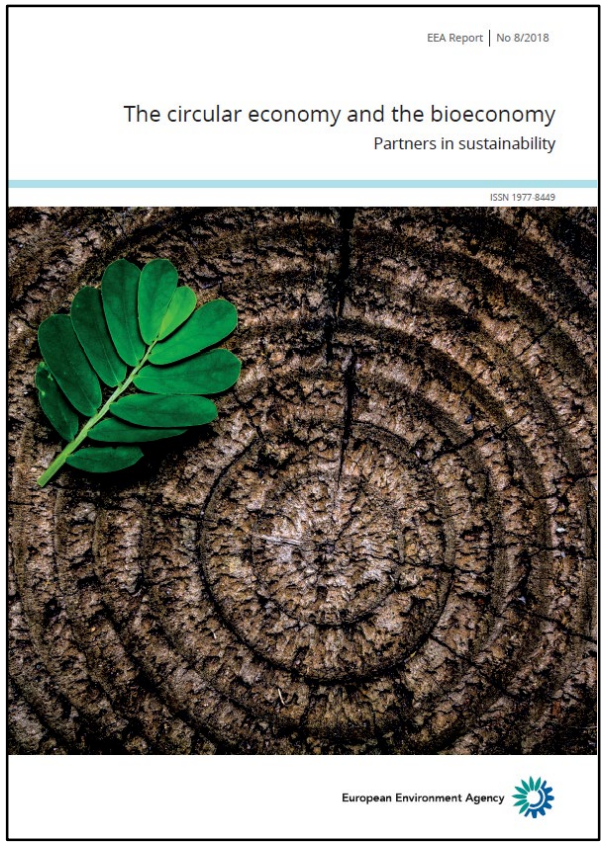
Enabling factors

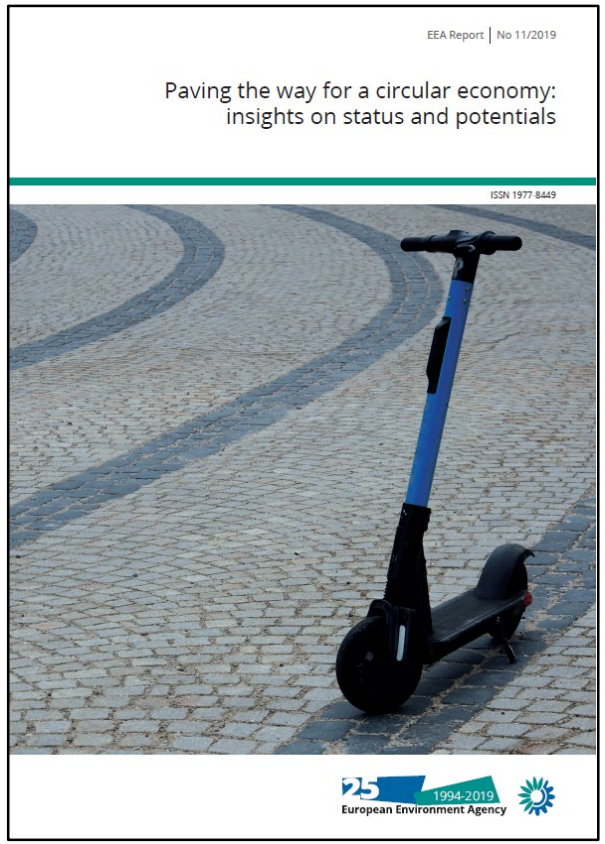
Enabling factors	Examples
Eco-design	Substitution of hazardous substances Design for disassembly
Repair, refurbishment and remanufacture	Repair, refurbishment and remanufacture given priority enabling reuse of products and components
Recycling	Avoidance of down-cycling Well functioning markets for secondary materials
Economic incentives and finance	Extended producer responsibility Deposit systems
Business models	Service and function based Industrial symbiosis
Eco-innovation	Technological, social and organisational innovation
Governance, skills and knowledge	Education Data, monitoring and indicator development

Policy relevant assessments – circular economy

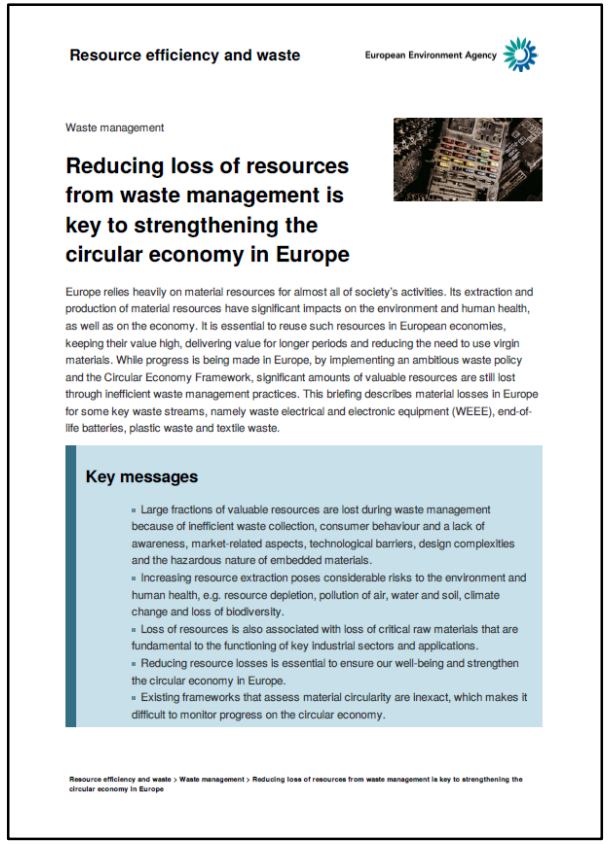








Policy relevant assessments – specific waste/material streams



Resource efficiency and waste

European Environment Agency

Waste management

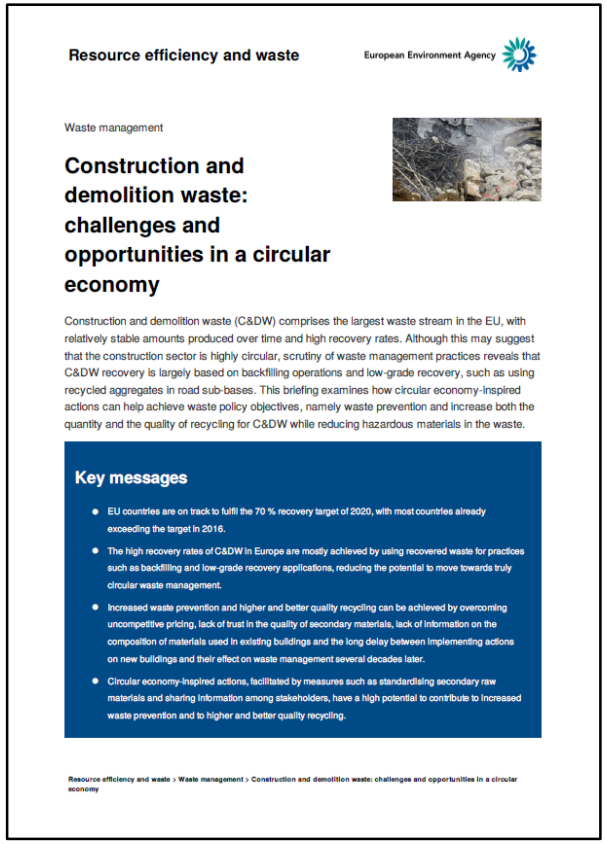
Reducing loss of resources from waste management is key to strengthening the circular economy in Europe

Europe relies heavily on material resources for almost all of society's activities. Its extraction and production of material resources have significant impacts on the environment and human health, as well as on the economy. It is essential to reuse such resources in European economies, keeping their value high, delivering value for longer periods and reducing the need to use virgin materials. While progress is being made in Europe, by implementing an ambitious waste policy and the Circular Economy Framework, significant amounts of valuable resources are still lost through inefficient waste management practices. This briefing describes material losses in Europe for some key waste streams, namely waste electrical and electronic equipment (WEEE), end-of-life batteries, plastic waste and textile waste.

Key messages

- Large fractions of valuable resources are lost during waste management because of inefficient waste collection, consumer behaviour and a lack of awareness, market-related aspects, technological barriers, design complexities and the hazardous nature of embedded materials.
- Increasing resource extraction poses considerable risks to the environment and human health, e.g. resource depletion, pollution of air, water and soil, climate change and loss of biodiversity.
- Loss of resources is also associated with loss of critical raw materials that are fundamental to the functioning of key industrial sectors and applications.
- Reducing resource losses is essential to ensure our well-being and strengthen the circular economy in Europe.
- Existing frameworks that assess material circularity are inexact, which makes it difficult to monitor progress on the circular economy.

Resource efficiency and waste > Waste management > Reducing loss of resources from waste management is key to strengthening the circular economy in Europe



Resource efficiency and waste

European Environment Agency

Waste management

Construction and demolition waste: challenges and opportunities in a circular economy

Construction and demolition waste (C&DW) comprises the largest waste stream in the EU, with relatively stable amounts produced over time and high recovery rates. Although this may suggest that the construction sector is highly circular, scrutiny of waste management practices reveals that C&DW recovery is largely based on backfilling operations and low-grade recovery, such as using recycled aggregates in road sub-bases. This briefing examines how circular economy-inspired actions can help achieve waste policy objectives, namely waste prevention and increase both the quantity and the quality of recycling for C&DW while reducing hazardous materials in the waste.

Key messages

- EU countries are on track to fulfil the 70 % recovery target of 2020, with most countries already exceeding the target in 2016.
- The high recovery rates of C&DW in Europe are mostly achieved by using recovered waste for practices such as backfilling and low-grade recovery applications, reducing the potential to move towards truly circular waste management.
- Increased waste prevention and higher and better quality recycling can be achieved by overcoming uncompetitive pricing, lack of trust in the quality of secondary materials, lack of information on the composition of materials used in existing buildings and the long delay between implementing actions on new buildings and their effect on waste management several decades later.
- Circular economy-inspired actions, facilitated by measures such as standardising secondary raw materials and sharing information among stakeholders, have a high potential to contribute to increased waste prevention and to higher and better quality recycling.

Resource efficiency and waste > Waste management > Construction and demolition waste: challenges and opportunities in a circular economy

Resource efficiency and waste

European Environment Agency

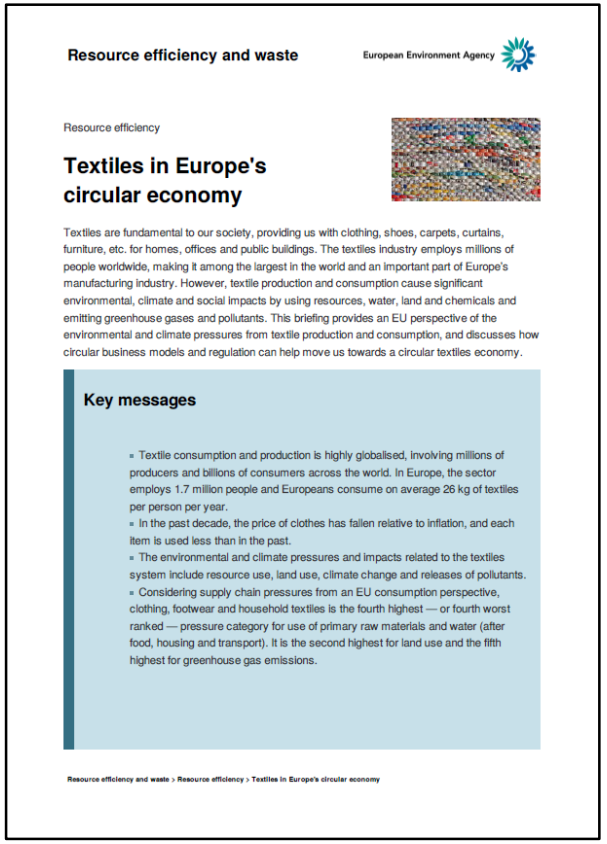
Resource efficiency

The plastic waste trade in the circular economy

Europe is at crossroads regarding its management of plastic, plastic waste and the plastic waste trade. Rapidly growing amounts of plastic have negative environmental and climate impacts. Plastic and plastic waste are traded worldwide. Exporting plastic waste from the EU to Asia is a means of dealing with insufficient recycling capacities in the EU. Waste import restrictions in China have shifted exports to other countries. Because some types of plastic waste have been added to the United Nations Basel Convention, the option of exporting plastic waste is becoming increasingly difficult. This requires policymakers, business and other actors to build a more robust and circular economy for plastic in Europe.

- Annual global plastic production has increased from 2 to 380 million tonnes since 1950 and is projected to double by 2035 and almost quadruple by 2050. European countries lack the capacity to manage growing amounts of plastic waste in circular and sustainable ways.
- In early 2019, the EU exported around 150 000 tonnes of plastic waste per month. This figure was about twice as high in 2015 and 2016 - up to 300.000 tons monthly - when exports went to China and Hong Kong primarily. Import restrictions are the reason for the decrease and shift in exports of plastic waste to other countries in Asia.
- Poor management of plastic waste has negative environmental and climate effects, such as deposits of plastic and microplastics appearing on land and in rivers and oceans worldwide. Plastic contributes to climate change through greenhouse gas emissions from production and from waste management, and to harmful effects from chemicals and water use. There is little knowledge or transparency about how plastic waste imported from the EU is managed in other countries.
- Recent restrictions on imports of plastic waste in China, combined with some types of plastic being added to the Basel Convention, is likely to further decrease EU exports. This poses the risk of increased incineration and landfilling of plastic waste in Europe. The EU must find circular and climate-friendly ways of managing its plastic waste e.g. by increasing reuse and recycling.

Resource efficiency and waste > Resource efficiency > The plastic waste trade in the circular economy



Resource efficiency and waste

European Environment Agency

Resource efficiency

Textiles in Europe's circular economy

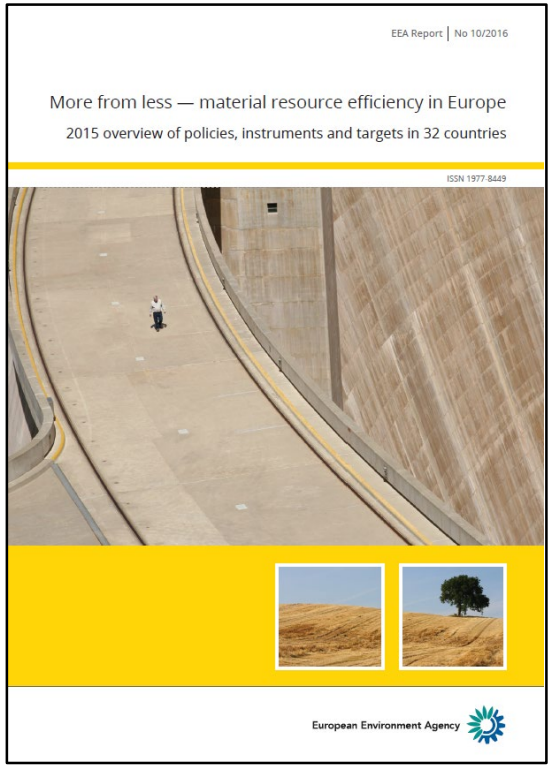
Textiles are fundamental to our society, providing us with clothing, shoes, carpets, curtains, furniture, etc. for homes, offices and public buildings. The textiles industry employs millions of people worldwide, making it among the largest in the world and an important part of Europe's manufacturing industry. However, textile production and consumption cause significant environmental, climate and social impacts by using resources, water, land and chemicals and emitting greenhouse gases and pollutants. This briefing provides an EU perspective of the environmental and climate pressures from textile production and consumption, and discusses how circular business models and regulation can help move us towards a circular textiles economy.

Key messages

- Textile consumption and production is highly globalised, involving millions of producers and billions of consumers across the world. In Europe, the sector employs 1.7 million people and Europeans consume on average 26 kg of textiles per person per year.
- In the past decade, the price of clothes has fallen relative to inflation, and each item is used less than in the past.
- The environmental and climate pressures and impacts related to the textiles system include resource use, land use, climate change and releases of pollutants.
- Considering supply chain pressures from an EU consumption perspective, clothing, footwear and household textiles is the fourth highest — or fourth worst ranked — pressure category for use of primary raw materials and water (after food, housing and transport). It is the second highest for land use and the fifth highest for greenhouse gas emissions.

Resource efficiency and waste > Resource efficiency > Textiles in Europe's circular economy

Policy relevant assessments – country level analysis



- Economic interests, such as competitiveness, jobs and security of supply are driving forces of circular economy policies. Environment-related policies focus more on end-of-life phases (recycling, energy and waste)

- Market based instruments are the most frequently used policy type. Eco-design, consumption and reuse are typically targeted with softer policy instruments such as awareness raising

- There are widely differing approaches and degrees of development regarding indicator frameworks. This can be partly explained by the absence of a broadly accepted framework for monitoring circularity

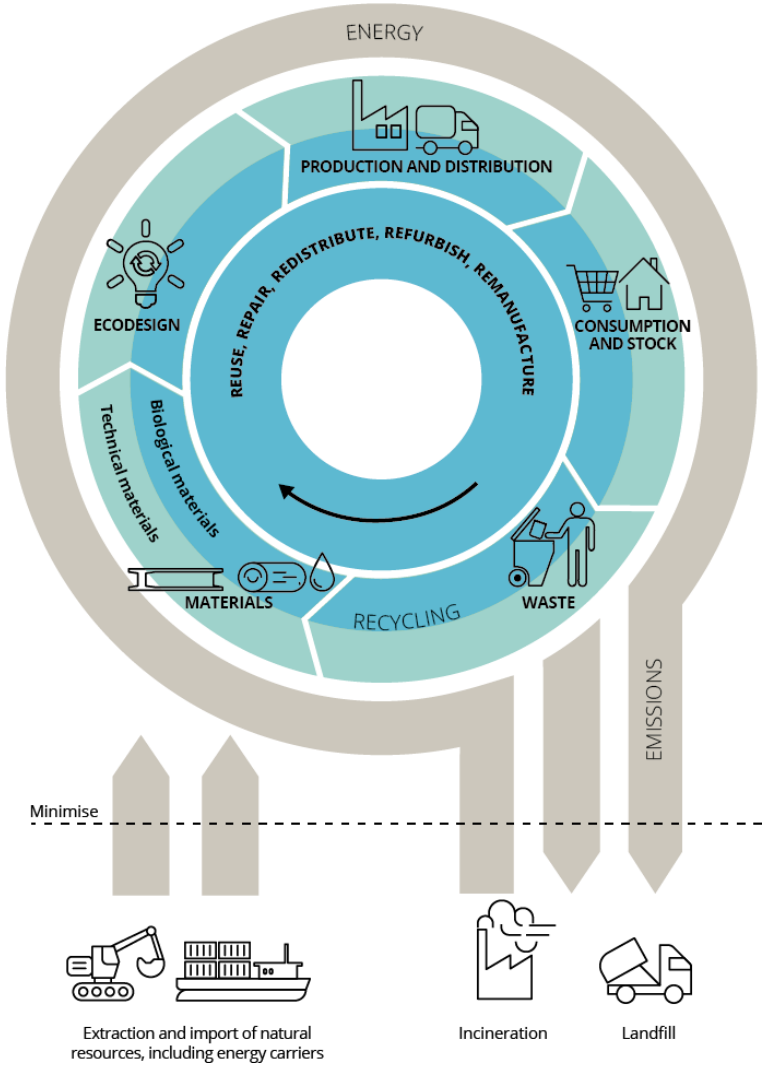
Policy relevant assessments – integrated - SOER 2020

- **Assessing progress using available quantitative information:** circular material use rate; DMC and RMC; resource productivity; available waste generation, collection, reuse and recycling rates for different waste streams

- **Assessing progress on the basis of policy analysis:** clear need for improved coherence between waste, products and chemicals policies

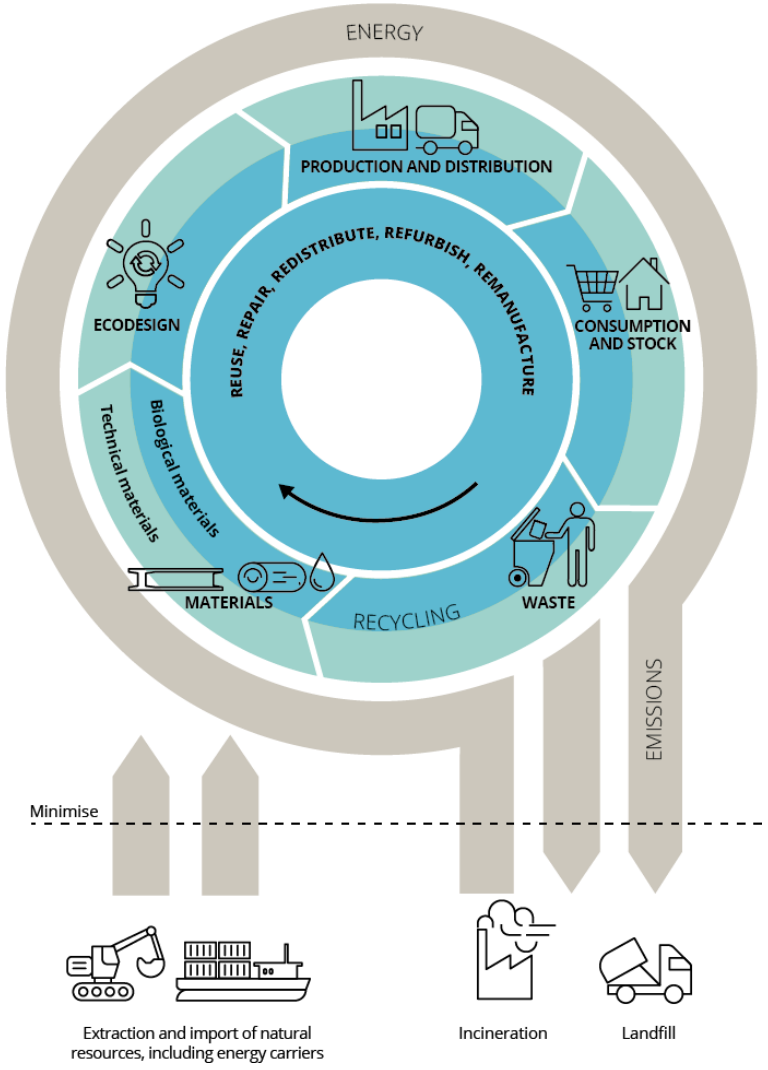
- **Assessing interlinkages:** highlighted the relationship between the circular economy, bioeconomy and climate-neutral economy and potential synergies and trade-offs

Knowledge developments and needs



- Current knowledge of circularity largely concerns trends in energy, material flows and waste – the outer and middle circles
- Waste and materials statistics collected to support policy implementation are largely volume based rather than value based – need to look at waste and material recovery from the angle of value retention
- Waste statistics address the quantity of waste materials collected and entering the recycling process – need to look at the quality of recycling

Knowledge developments and needs



- Lack of information on the quantity and quality of recycled materials produced – market price is currently used as a proxy
- Existing indicators focus primarily on physical parameters – indicators for aspects as collection systems are less well defined and developed
- Very few existing indicators capture the effect of actions that relate to smarter product use and manufacturing or extending the lifespan of products – the inner circle – and standardisation is required

Looking ahead – Measuring progress of the CE transition

- Need to complement established energy, waste and materials indicators with product focused indicators and those that address enabling factors
- Measurement and monitoring of the environmental, social and economic outcomes along the value chain requires clear improvement
- Interlinkages are important – SEEA has a role in economy-environment interactions
- Need to take a broader perspective than just implementation of current policy objectives
- Indicators and statistics will always need to be complemented by qualitative information and policy analysis to provide a fuller picture of developments