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CLG Europe

Policy Briefing

Materials & Products Taskforce

Circular Savings

Business perspectives on energy savings through circular practices

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CLG Europe Taskforce for Climate Neutral and Circular Materials and Products

The Taskforce for Climate Neutral and Circular Materials and Products was created by CLG Europe in September 2021, with the aim of driving forward policy action on sustainable materials by bringing together a group of progressive businesses across sectors and value chains. The group brings together companies that are actively committed to producing and using climate neutral and sustainable materials, and who want to work together to promote and support EU-wide measures to decarbonise material production and use.

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Executive summary

We have passed the one-year anniversary of Russia's invasion of Ukraine, which has had global consequences, particularly in the areas of food and energy supplies. Prices of commodities are still high but stabilising, and there are serious concerns about 'stagnation' of Western, industrialised economies – low growth and high inflation – for the foreseeable future. Food prices have fallen but remain high, while crude oil and natural gas prices have witnessed volatile trading sessions since the start of the war.

Politicians have naturally been keen to alleviate the worst effects of rising food and energy prices for people. This has led to tensions around whether long-term ambitions to shift towards a green economy should be postponed in favour of tackling shorter-term challenges.

But such a black-and-white dichotomy is false. The cost-of-living crisis has exposed Europe's need to reduce its reliance on fossil fuels, including crude oil and natural gas. Instead, it demonstrates that finding greener alternatives, such as using circular economy measures to leverage the energy savings from keeping materials and products in the economy for longer, will be key for developing long-term solutions to the EU's energy problem. The industry sector alone accounts for 26 per cent of the EU's final energy consumption. Retaining the value of materials within high-quality closed-loop value chains, such as design for repairability and longevity, and high-quality recycling or reusability, will be essential to reduce that energy consumption.

A circular economy tackles the amount of energy consumption required to make a product by reusing the resources we already have or finding ways to use fewer of them. This also means that we produce fewer greenhouse gas emissions. Furthermore, the EU's recently released Critical Raw Materials Act[1] highlights the challenge of procuring the raw materials we need to create the products necessary for the green transition in Europe. In this respect, circularity has the additional benefit of keeping materials in the system for longer, which also reduces emissions and energy costs from extraction and transport.

This paper highlights how a circular economy can lead to energy savings while reducing emissions, making it a double win for both the economy and environment. Energy, circularity and the economy go hand in hand. Furthermore, the paper demonstrates how leading progressive businesses are already benefitting from this shift to a circular economy, leading to a reduction in both emissions and energy consumption. It also highlights the current challenges that prevent greater savings through circularity. Finally, we offer six recommendations for policymakers on how to build greater circularity through existing policy measures can unlock the benefits faster, including to:

- Develop a clear vision for a new European green industrial strategy
- Create supporting links between energy efficiency and circular economy policies
- Support the development and widespread adoption of recycling technological solutions
- Enable the recirculation of materials through fiscal policies applied across all stages of the product's life cycle in alignment with existing EPR fees
- Use demand-side policies to increase the demand for circular products and services
- Improve policy coherence across Member States to facilitate the transition towards a sustainable circular economy

Introduction

Europe is in the midst of a deep transformation towards sustainable modes of production and consumption. However, we must accelerate this shift if we are to meet the European Green Deal's goal of achieving climate neutrality by 2050. Without a systemic shift, we will fall short of our climate and environmental objectives.

To reach climate neutrality, energy policies can tackle 55 per cent of emissions,[i] while circular approaches have the potential to address the remaining 45 per cent of emissions stemming from material production.[2] These also have the benefit of reducing our material demands, which in turn reduces the amount of energy we need to use for creating new products.

The Russian war in Ukraine has further exacerbated price increases. These have caused a ripple effect, triggering a major economic and political crisis. The sharp increase in energy prices has led to a surge in inflation rates, not seen in Europe for decades. This has created a cost-of-living crisis for many people, as prices for basic goods and services have skyrocketed. This also comes in the context of continued supply chain disruptions caused by the COVID-19 pandemic.

Our current situation underlines the importance of not only reducing our dependence on fossil fuels, but also of ensuring resilient materials supplies and building a circular economy. This systemic shift will result in a cleaner, greener environment where we can increase living standards while using fewer materials.

[i] Some EU policymakers, including the European Commission's Executive Vice-President Frans Timmermans, argue that the Fit for 55 package is actually tackling 57.5 per cent of greenhouse gas emissions, thanks to the agreement on land use and the inclusion of the maritime sector in the Emissions Trading System (ETS).

The policy context in the EU

In March 2020, the European Commission introduced the Circular Economy Action Plan (CEAP)[3] as a core deliverable of the European Green Deal. The CEAP aims to promote sustainable product design, reduce waste, and empower consumers to decouple economic growth from resource use.[4] By February 2021, the European Parliament had adopted a resolution[5] calling for more measures to achieve a fully circular economy by 2050. The circular economy offers a significant potential to reduce energy consumption and greenhouse gas (GHG) emissions while boosting long-term economic growth.[6] Circular economy policies are a key driver towards greater sustainability. Numerous key pieces of legislation have been introduced during this Commission's Presidency, and further action is expected in the next electoral cycle after 2024.

The EU recognises the potential of circular practices to contribute to the bloc's energy and climate goals. However, the context surrounding policies for energy saving in the circular economy is complex and dynamic, with the EU facing multiple challenges and crises, including conflict on its borders, climate change, high inflation resulting from soaring energy prices and supply chain challenges, energy security concerns and increasing fuel poverty rates. These events have highlighted the importance of urgent and ambitious climate action, with the clean energy transition being necessary for long-term economic growth.

The Stockholm Environment Institute, in one of its background papers, provides a clear definition of a circular economy as "an economic system that uses a systemic approach to maintain a circular flow of resources, by regenerating, retaining or adding to their value, while contributing to sustainable development".[7] This definition focuses on value creation, optimises resource use and emphasises the higher ladders of the Waste Hierarchy,[8] such as reduce, reuse, remanufacturing and repair over recycling and energy recovery. Circular practices can lead to significant energy savings in a number of ways, such as through reducing the energy needed to extract raw materials, lowering transportation and logistics costs, and reducing energy consumption in production processes.

The CEAP includes 35 initiatives that cover the entire life cycle of products (with a strong focus on recycling), including design, circular economy processes, sustainable consumption and waste reduction. The Commission has now put forward a number of the key CEAP policy packages, and the pace of new regulatory measures around the circular economy is likely to continue. Recent proposals include the Critical Raw Materials Act,[9] the Ecodesign for Sustainable Products Regulation[10] and the review of the Construction Products Regulation.[11]

Circular practices, such as keeping resources in use for longer and reducing waste, can help businesses save energy[12] and reduce their environmental impact. A previous analysis from CLG Europe's Materials and Products Taskforce[13] highlights the emissions reduction opportunities from the circular economy in achieving the EU's climate goals. The paper proposes recommendations for policymakers, including clarity on the definitions and metrics of the circular economy; using demand-side policy to create long-term demand for sustainable materials and products; linking stakeholder consultations and legislative outputs; and integrating financial and investment policy decisions with circularity promotion.[14]

Circular economy as a key measure for tackling the energy and climate crises

The geopolitical crisis Europe is facing has prompted a rapid roll-out of energy-related measures in the EU. These encourage savings from business and consumers in the short term[15] and diversification of energy sources and a move to renewables in the medium and long term.[16] REPowerEU, the European Commission's ambitious plan to rapidly decrease dependency on Russian fossil fuels, is set to shape the EU's short- and long-term energy policies. It will also play a key role in the Fit for 55 package – the package of legislation that will deliver at least a net 55 per cent cut in EU GHG emissions by 2030.

These measures are critical for energy security and achieving climate neutrality. Nonetheless, policy instruments with an impact on energy consumption, such as the revision of the Energy Efficiency Directive, could be more clearly aligned to the CEAP to leverage the energy savings from keeping materials and products in the economy for longer.

As highlighted by the European Commission's analysis, to reach the target of at least a net 55 per cent GHG reductions by 2030 will require a cut of at least 13 per cent of energy, translating to 750 Mtoe of final energy consumption and 980 Mtoe of primary energy consumption (compared to the 2020 Reference Scenario) by 2030.[17] However, EU policymakers reached an agreement earlier in 2023, imposing a weaker energy reduction target of 11.7 per cent for Member States, with a binding limit for final energy consumption of 763 Mtoe and an indicative limit of 993 Mtoe for primary energy consumption.[18]

The circular economy can represent a key lever for developing long-term solutions for the EU's energy problem. Measures such as reducing the extraction of virgin materials, designing long-lasting materials and products, encouraging their reuse and repair, where possible, and imposing mandatory recycling content will help reduce energy consumption. This will prove essential in reaching, and even exceeding, the energy efficiency target.

The International Energy Agency highlights that the EU is unlikely to meet its REPowerEU goals without strong policy actions that accelerate energy conservation and increase energy and material efficiency, particularly within the industry and building sectors.[19] Even if these goals are met, the energy transition will likely cause a spike in demand for raw materials and heighten Europe's import risks and dependencies on non-domestic resources.[20] Greater imports also mean increased energy costs and GHG emissions due to power demands for the transportation of these raw materials.

Failing to reduce virgin resource use also means that the production of clean energy systems (eg electric vehicles, wind turbines, photovoltaics) will continue to rely on energy-intensive extraction and production processes of critical raw materials powered by fossil fuels.[21] The European Commission's recently published Critical Raw Materials Act uses the example that global demand for lithium (used for electric vehicles and many other key products for the green transition) is expected to increase by up 89 times by 2050.[22]

It is estimated that recycling automotive lithium-ion batteries after their second life could reduce cumulative energy demand (direct and indirect energy use throughout the product life cycle) by up to 6 per cent and carbon footprint by up to 17 per cent.[23] A mix of circular economy strategies, such as making producer ownership models (eg 'Product-as-a-Service') more attractive than linear models, and mandatory secondary life requirements, could fulfil 70 per cent of today's materials demand for electric vehicle production through secondary supply in 2050, while reducing energy from production and reliance on fossil fuel-based energy.[24]

The industry sector is the third most energy intensive alongside the transport and residential buildings sectors, accounting for 26 per cent of the EU's final energy consumption, according to 2020 data.[25] The production of virgin plastics, steel, aluminium and cement alone is responsible for half of this industrial energy, emitting a total of 581 $MtCO_2$, of which 60 per cent is emitted by the construction, mobility and packaging sectors alone.[26] The EU's waste management legislation increasingly prioritises recycling of these materials. But in practice, they are often downcycled (where the recycled material is of lower quality than the original), leading to the loss of material value and limited energy savings resulting from the multiple life uses.[27] Measures that unlock materials within high-quality closed-loop value chains, such as design for repairability and longevity, and non-contamination of materials to enable high-quality recycling or reusability, will be essential to reduce industrial energy demand.

The chemicals industry could be a key player in this by designing higher-performing materials that have lower density and greater durability, and increasing the design freedom of products. Such changes could reduce energy consumption by up to 37 per cent in the downstream sectors by 2030.[28]

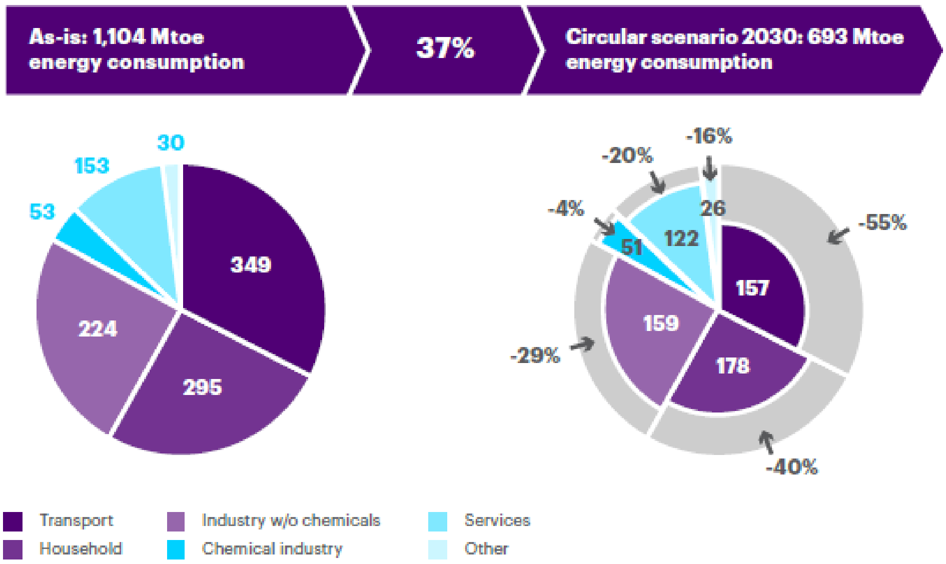


Figure 1. The impact of circular measures in the chemical industry on the energy consumption of downstream industries. Source: Accenture, *Taking the European chemical industry into the circular economy* (2017)[29]

Direct and indirect energy savings also emerge from retrofitting buildings using circular principles. The Buildings Performance Institute Europe demonstrates that improving building insulation can reduce energy demand for heating by 45 per cent, significantly cutting the EU's dependency on carbon-intensive fuels.[30] However, using certain recycled insulation materials could further reduce the energy consumption and associated carbon emissions from the production phase of the virgin material equivalents.

Opportunities emerging from circular measures

Companies are already successfully integrating circular economy principles into their business models, operations and value chains. This makes them more sustainable, resilient and competitive. Their experiences demonstrate that the adoption of a circular economy can unlock energy savings, reduce waste and emissions, and create new value streams.

ROCKWOOL's closed-loop recycling system, Rockcycle®, allows stone wool insulation materials, typically considered waste and discarded in landfills, to be recycled and used as secondary raw material for new products. This reduces the company's reliance on virgin materials and contributes to an improved energy efficiency in the manufacturing processes. The ability to recycle stone wool leads to a reduction in carbon emissions of close to 10 per cent.

On the market side, ROCKWOOL's insulation products sold in 2022 will, over the lifetime of their use, save customers around 71 million euros in energy costs by reducing the need for heating energy by 931 TWh.[31]

Signify developed the ALight initiative in collaboration with Air Liquide. The programme is aimed at helping Air Liquide reduce their building carbon emissions by 33 per cent by 2035 while achieving energy cost savings. This is a Product-as-a-Service model that replaces traditional lighting with highly efficient LED lighting. Air Liquide pays a fixed monthly price for an agreed amount of light, and benefits from regular maintenance and expertise from Signify. LED fixtures have been installed across 31 sites in Europe, Asia and the Middle East, leading to an estimated reduction of 2,840 MWh in energy consumption and 770 tons of CO_2 emissions per year.

In 2017, Saint Gobain launched the Glass Forever roadmap, which aims to increase the proportion of cullet, or recycled glass, in its glass production to 50 per cent by 2025. This approach offers numerous benefits, including reduced carbon and sulphur oxide emissions resulting from the production process. For instance, the integration of one tonne of cullet into a flat glass furnace reduces CO_2 emissions by 700 kg.

Additionally, every ton of cullet introduced into glass production saves 1.2 tons of primary raw materials. Cullet use also lowers the risk of supply chain disruptions and price volatility in raw materials markets, while meeting the growing demand for recycled products. However, the most significant benefit is that the melting process of cullet uses 30 per cent less energy than melting virgin materials.[32]

For Ball Corporation, circularity is fundamental to achieve a 55 per cent emissions reduction across Scopes 1, 2 and 3 by 2030, as reflected in the company's Climate Transition Plan. Since aluminium is infinitely recyclable and has a high residual value, increasing recycled content represents the company's biggest decarbonisation lever. This is because virgin aluminium production is energy intensive.

Depending on the electricity source used in the process, the carbon footprint of virgin aluminium varies between 5 tons CO_2e/t Al (tons CO_2-equivalent per metric ton aluminium) Cradle-to-Gate – in hydropower-based regions – to more than 20 tons CO_2e/t Al in regions that rely primarily on coal-based electricity generation.[33] By contrast, recycled aluminium uses just 5 per cent of the energy required for primary production,[34] and thus creates significantly fewer GHG emissions, around 0.5 tons CO_2e/t of recycled aluminium.

Challenges slowing down adoption of circular strategies

Progressive businesses are already drawing on this concept to reduce dependence on virgin materials and energy, and increase growth and profitability.[35] However, many internal and external challenges remain.

Incoherent and misaligned policy environment

In the EU's revision of the Energy Efficiency Directive, a key legal act on energy savings, the text mentions the complementarity to the CEAP, but does not go into further detail on how these complementarities could be achieved. Much of the political debate has been on the targets of reducing energy consumption, with far less on holistic measures to actually achieve them.

Among the proposed measures there is a focus on building renovation, energy-efficient investments, addressing energy poverty and empowering and protecting consumers. While these measures are necessary, they are insufficient to address the embodied energy consumption arising from the predicted exponential material increase required to support the green energy transition.

The current policy framing also puts the energy-saving measures more towards the consumer side, without much attention to industry. Where industry is mentioned in the text, the main focus is on reducing energy consumption through energy efficiency measures.

Integrating a more circular approach to those measures, where higher-value loops are primarily promoted in end-user products (such as redesign for longevity, reduce, reuse, repair) will be a far more effective mechanism to reduce our energy consumption and costs than adopting energy efficiency measures alone.

Where adopting higher-value loops is not feasible, recycled raw material will save the large energy costs of extraction and reduce the energy consumption from production processes. Research from the European Commission highlights that energy consumption to produce magnesium from ore is 165–230 MJ per kg of metal extracted. From scrap, this is 10 MJ per kg, meaning an energy saving of over 90 per cent. Similarly high energy savings are also seen for cobalt, platinum group metals and rare earths.[36]

Another challenge often raised by industry is the flexibility to transpose EU legislation into national legislation, which has led to different approaches in the adoption and enforcement of rules across Member States. This creates major impediments for companies operating across borders. For instance, Extended Producer Responsibility (EPR) schemes aim to eliminate waste by reusing and recycling products, and indirectly save energy from avoiding the high energy use required for the production of virgin materials. But their application often follows varying models and rules from one Member State to another,[37] as they account for different economic and cultural contexts and have evolved from different national waste legislations.

As a result, producers are subject to different EPR fee structures for the same product in different countries. Sometimes, even within the same Member State, different procedures apply to different product categories. A study of companies producing electrical and electronic equipment shows that this complex landscape makes EPR obligations confusing and highly resource-intensive to implement, leading to restricted longer-term planning and limited investment from obliged companies.[38]

The EU is currently in the process of harmonising EPR's scope, definitions and rules. For example, the EU is aligning criteria for the eco-modulation of EPR fees, which includes different fee levels being charged based on the environmental design qualities of the product, and incentivising design for recyclability. This is overdue as previous measures have predominantly focused on end-of-life recycling and waste treatment, rather than the higher-value circular strategies in the earlier stages of a product's life cycle.[39] The EU could shift away from fiscal tools that target end-of-life towards earlier stages of the product's life cycle to alter the behaviour of companies. A more upstream and harmonised regulatory framework would reduce bureaucracy, provide investment security, promote high-quality recycling and enable the growth of high-quality secondary materials markets.

Another approach could be to adopt EU-level targets on resource productivity or supply of raw materials to help limit the highly energy-intensive extraction and processing of raw materials. A recent policy analysis from the World Bank shows that few countries have targets on resource productivity and even fewer have targets related to the supply of raw materials, although concerns about reliance on resource imports and security of supply are growing.[40]

Even the evaluation of circularity at the EU level is solely based on recycling rates, giving an unrealistic view of how the value of materials is retained within the economy and where energy savings can emerge.[41] This approach is explained by the fact that waste targets are often easier to enforce than targets based on resource or raw material use. But the downside is that general waste targets integrated in policy tools and principles, such as EPR, often prioritise quantity over the quality of recycled material.[42]

Lack of adequate end-of-life provisions

Although, in a circular economy, recycling is among the least efficient ways (alongside energy recovery through incineration) to retain the value of materials,[43] this approach is essential in the short to medium term for saving materials designed for single use and short life cycles, such as the use of plastics in packaging for consumer goods. In most cases, recycling materials into new products requires lower energy consumption compared to processing their virgin input equivalent. However, the lack of adequate collection and sorting infrastructure in the EU has led to high inefficiencies, such as contamination with other polymers or waste streams, even when the waste was separately collected.

Of the 45 Mt of plastics that reached their end-of-life in 2019, 30 Mt were collected separately. From that, only one-third was sent for recycling, usually for lower-quality applications, 40 per cent of which was lost in the recycling process. The rest of the collected waste was either sent to landfill or incinerated for energy recovery.[44] Although plastics might be the most energy-efficient alternative and generate lower GHG emissions when compared to the life cycle of other materials for packaging,[45] they are highly reliant on fossil fuels to power the production processes and as a raw material input.

In 2020, plastics production accounted for 9 per cent of the EU's total final gas consumption and 8 per cent of final oil consumption.[46] Addressing the high loss of valuable plastics within the current linear system will be critical for reducing the EU's dependence on energy and feedstock from fossil fuels, plastic pollution and GHG emissions. The table below demonstrates the ultimate potential of energy savings and carbon emissions reduction for the most common types of plastics recycled today. The comparison is based on using fully recycled plastic materials in all three scenarios.

	PET recycled resin* % reduction from virgin	HDPE recycled resin* % reduction from virgin	PP recycled resin* % reduction from virgin
Total energy saved (incl. feedstock energy)	79	88	88
Carbon emissions reduction	67	71	71

* These results are based on the cut-off approach, which assumes that the impacts of production are only attributed to the first life cycle use of the material, while the impacts of material recovery, transport, separation and sorting, and reprocessing are attributed to the subsequent life cycle uses of the material.

Table 1. Energy savings and carbon emissions reduction of recycled plastics. Source: The Association of Plastic Recyclers, *Life cycle impacts for postconsumer recycled resins: PET, HDPE, and PP* (2018).[47]

Businesses often cite the higher cost of recycled compared to virgin plastics, lower quality, cost of reprocessing materials, international market developments and technological limitations as key barriers to increasing the circularity of plastics.[48,49]

More ambitious policy measures that incentivise improvements in product design (such as eco-modulation of EPR fees, and recycling infrastructure), eliminate at source hazardous chemicals hindering recycling, and introduce minimum recycled content requirements for final products, could help overcome such challenges and enable the adoption of more closed-loop materials.

The use of financial subsidies to improve end-of-life infrastructure can spur innovation and development of new technologies and solutions, while demand-side interventions, such as greater information, transparency and awareness for consumers, will send strong signals to companies.[50]

Lack of adequate technologies

Businesses of all sizes have played a pivotal role in developing innovative circular technologies across Europe. For instance, many information technologies are already rapidly emerging, such as product industrial-symbiosis platforms, blockchain platforms for product traceability or material databases. As highlighted in a previous Taskforce report, digital product passports are an important cornerstone in this area.[51] Yet, the lack of data, insufficient standardisation of information, limited interoperability between platforms and data sources, and legal and intellectual property barriers still impose significant challenges for businesses to adopt such solutions at scale.[52]

Challenges are also present in the development and adoption of recycling and production technologies for plastics, steel, aluminium, cement and concrete. For instance, in 2019, 5 Mt of aluminium reached their end-of-life in Europe, of which 3 Mt were recycled and another 2 Mt were sent to landfill, lost during the recycling processes or illegally exported.[53]

Aluminium can be infinitely recyclable due to its atomic structure which is not altered when aluminium is remelted. However, in order to obtain high recycling rates of quality material, aluminium scrap needs to be meticulously sorted. Developing technologies for shredding, identifying and sorting post-consumer aluminium scrap is critical to recycle efficiently and maintain the quality of materials. And although such technologies are currently under development, they often require high capital investments and modifications to the production processes. In the existing market environment, even if recyclers choose to invest in disruptive technologies, they have no guarantee that high-quality recycled aluminium will become the go-to market choice.

Moreover, current legislation does not distinguish between pre-consumer and post-consumer scrap. A clear distinction would incentivise recycling of the post-consumer scrap that often comes combined with other elements such as paint, oil, plastics, iron, minerals or organic compounds. Recycling of aluminium has immense potential to increase energy efficiency as recycling of aluminium consumes only around 5% of the energy required to process virgin aluminium.[54]

The transition to a circular economy cannot be achieved without a move towards technologies that disrupt the linear model of our economic system. For that to happen, new policy frameworks and financial incentives are required to support the widespread adoption of state-of-the-art technological solutions and further accelerate their improvement and development across sectors.

Examples of policy actions

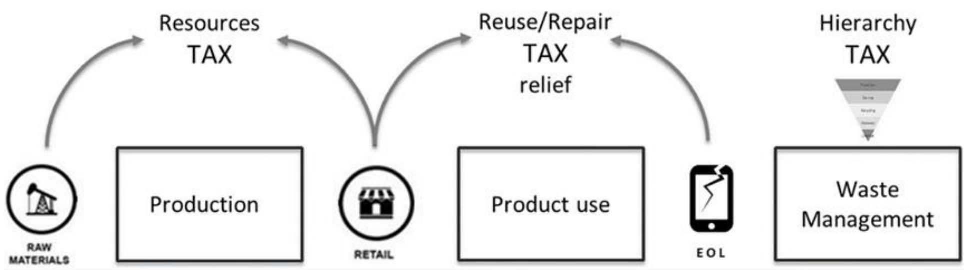
The EU is already recognised as a global front runner of the circular economy. But despite the several policies already in place, examples of pioneering policy actions from individual Member States show that more can be done to complement the existing regulatory instruments and ensure a genuine transition to a circular economy.

Targets beyond waste management

Increasing the recyclability of materials within the economy is not sufficient to decouple economic growth from virgin material use. Following this rationale, the Netherlands is among the few countries in the EU that established an absolute resource reduction target. In the ambitious strategy “A Circular Economy in the Netherlands by 2050”, the government set a system-wide vision to accelerate the circular economy transition and proposes an interim objective of a 50 per cent reduction in the use of virgin materials (including minerals, fossil-based raw materials and metals) by 2030.[55]

Fiscal policies for recirculating materials

The conventional environmental taxation models focused on end-of-life stages and sometimes low levels of taxation are not enough to alter the behaviour of business and consumers towards circular economy principles. As a recent study investigates, a more holistic fiscal policy approach (see Figure 2) applied across the entire life cycle of products could have stronger effects on purchasing decisions, enable behavioural change and incentivise a shift away from the unsustainable consumption and production of virgin materials.[56] However, such an approach should be applied in alignment with EPR fees to avoid regulatory conflicts.



* Circular Economy Taxation Framework including (1) a natural raw material resource tax, (2) reuse/repair tax relief and (3) a waste hierarchy tax at the end-of-life (EOL) of products.

Figure 2. A holistic fiscal policy approach. Source: Leonidas Milios, *Towards a Circular Economy Taxation Framework: Expectations and Challenges of Implementation* (2021).[57]

As an example, Denmark introduced a tax on domestic raw materials in 1990, such as sand, gravel, stones, peat, clay and limestone, to reduce their consumption and promote the use of recycled products. The tax helped increase recycled construction and demolition waste from 12 per cent in 1985 to 94 per cent in 2004.[58]

Since 2017, Sweden has adopted a 50 per cent tax break on labour costs for repair services conducted at home and a VAT reduction from 25 per cent to 12 per cent for repair services for products such as bikes, footwear, textiles or IT goods. The impact of such fiscal tools is still not well studied, but in some sectors, for products such as bikes and IT goods, it has led to an increased demand for repairs.[59] However, further analysis is needed to better understand the correlation of results.

Conclusion and policy recommendations

There is strong evidence of the role that a circular economy can play in tackling the energy crisis. Its adoption will be critical in making the shift to a climate-neutral economy. Currently, that shift is happening too slowly.

Furthermore, several challenges are still slowing down the adoption of circular strategies among businesses. As such, we recommend the following:

Develop a clear vision for a new European green industrial strategy, which would allow a more holistic integration of circular practices and industrial decarbonisation into a strategy. Past European industrial strategies have lacked a bold vision to drive a shift in the European economy. The Green Deal Industrial Plan presented an opportunity for bold action. Although it does deliver positive steps, it does not give the holistic approach required to shift European industry. A new European green industrial strategy encompassing circularity and decarbonisation, based upon the concept of competitive sustainability,[60] will be a powerful driver towards long-term prosperity for people and planet. This will require genuine funding to ensure a just transition, while also taking advantage of new innovations and technological change, including digitalisation. A new European industrial strategy could be a key priority for the 2024 European elections and a critical pillar of European policy for the next five years.

Create supporting links between energy efficiency and circular economy policies to reduce energy consumption of the industry sector. Currently, EU circular economy measurements are based upon recycling. Additional metrics could be added, such as the reduction of energy consumption and an absolute resource reduction target. The EU could consider also looking at how energy efficiency measures could be realised through circular economy legislation, via voluntary or mandatory targets in certain sectors. Further delegated acts through the Ecodesign for Sustainable Products Regulation could be a mechanism to introduce sector-specific legislation.

Support the development and widespread adoption of recycling technological solutions. The adoption of more efficient recycling technologies that retain the high quality of materials will be critical for enabling the growth of secondary material markets and reducing the energy consumption associated with the production of virgin materials. The EU could encourage investment in the improvement of recycling technologies by introducing ambitious mandatory recycled content requirements for wider product categories beyond just plastics.

Enable the recirculation of materials through fiscal policies applied across all stages of the product's life cycle in alignment with existing EPR fees. The EU could rethink the building blocks of the existing taxation system by introducing or increasing the taxes on raw materials, shifting taxation from labour to resources and materials or applying tougher landfill taxes. Such interventions will need to be complemented by regulatory and information-based policy instruments. The recently introduced Critical Raw Materials Act may be a good opportunity to implement such policies.

Use demand-side policies to increase the demand for circular products and services. A previous report from CISL and Agora Energiewende[61] highlights the immense potential to scale up demand for climate neutral basic materials and products. Policy interventions such as improving the availability, quality and comparability of data on embedded emissions can drive market demand for climate neutral basic materials and final products. Consumers could be incentivised through tax deductions for repairing or purchasing products made from recycled materials. Digital platforms can also provide accessible information for consumers and help shift their behaviour. For example, the My Little Plastic Footprint app provides information about plastic waste and sustainable alternatives[62] and the Repair Efficiency Wales platform connects consumers to repair service providers.[63] The introduction of a Digital Product Passport through the Ecodesign for Sustainable Products Regulation will increase transparency on how products are made. Another possibility would be to track energy consumption across the supply chain, which will give consumers greater transparency on whether they are purchasing higher or lower energy-intensive products.

Improve policy coherence across Member States to facilitate the transition towards a sustainable circular economy by avoiding unnecessary policy fragmentation. This could be achieved, for example, through a more centralised co-ordination of Extended Producer Responsibility (EPR), setting clear standards for fee modulation and design for recyclability, as outlined in the latest Packaging and Packaging Waste Directive amendment proposal. Greater circularity will lead to energy consumption savings across Member States.

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