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conference

**THINK
2030**

A low-carbon and circular industry for Europe



**ELLEN MACARTHUR
FOUNDATION**



**Institute for
European
Environmental
Policy**

THINK 2030

Launched by IEEP and its partners in 2018, Think2030 is an evidence-based, non-partisan platform of leading policy experts from European think tanks, civil society, the private sector, and local authorities.

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Introduction

The linear “take-make-waste” model of production and consumption is not only highly wasteful, but is also an important contributor to climate change. Up to 45% of anthropogenic greenhouse gas emissions are associated with the management of land and the production of consumer goods, food, buildings, and other products used day to day¹. The relative contribution of materials to total greenhouse gas emissions has been on the rise. Case in point, the emissions from the production of materials alone increased as a share of global greenhouse gas emissions from 15%, or 5 giga tonnes of CO2 equivalent, in 1995 to 23%, or 11.5 giga tonnes of CO2 equivalent, in 2015².

Climate change is as much an economic and social as it is an environmental crisis. Even if the global temperature rise will be contained to 1.5 degrees Celsius by 2100, the costs of climate change to the global economy are projected to amount to USD 54 trillion by the end of the century and rise steeply with every further temperature increase³. Its impacts on our society, particularly on the most vulnerable, are anticipated to be devastating.⁴ Policies aimed at climate change mitigation and adaptation are therefore essential to the future of the economy and society as much as they are to the environment.

Current climate change policies, which focus on accelerating the adoption of renewable energy and energy efficiency, **only tackle part of the picture**. Even if their uptake were optimal, renewable energy and energy efficiency would only offset up to 55% of the anthropogenic greenhouse gas emissions by 2050. Most emissions resulting from agriculture, industry, and land use, land use change and forestry (LULUCF) cannot be tackled by these means. Addressing them requires a systemic overhaul of our production and consumption. In conjunction with Material Economics, the Ellen MacArthur Foundation modelled the potential impact of a circular economy for five materials — steel, aluminium, plastics, cement and food in a 2019 study titled *Completing the Picture. How the Circular Economy Tackles Climate Change*. It found that switching to a circular economy for these commodities could offset 45% of the emissions associated with their production and consumption, or 9.3 giga tonnes of CO2 equivalent per year by 2050, while generating substantial economic benefits.

¹ Ellen MacArthur Foundation, *Completing the Picture. How the Circular Economy Tackles Climate Change* (26th September 2019) https://www.ellenmacarthurfoundation.org/assets/downloads/Completing_The_Picture_How_The_Circular_Economy_Tackles_Climate_Change_V3_26_September.pdf

² International Resource Panel, *Resource Efficiency and Climate Change*, (6th August 2020) <https://www.resourcepanel.org/reports/resource-efficiency-and-climate-change>

³ Ellen MacArthur Foundation, *Completing the Picture. How the Circular Economy Tackles Climate Change* (26th September 2019) https://www.ellenmacarthurfoundation.org/assets/downloads/Completing_The_Picture_How_The_Circular_Economy_Tackles_Climate_Change_V3_26_September.pdf

⁴ UN Department of Economics and Social Affairs. *Climate Change and Social Inequality* (October 2017) https://www.un.org/esa/desa/papers/2017/wp152_2017.pdf

The EU is a leading global emitter of greenhouse gases (GHGs). In 2017, the bloc was responsible for 9.3% of global GHG emissions — or 4.5 giga tonnes of CO₂ equivalent⁵, whereas its population represents only 5.7% of the global total. In the last three decades, the EU has reduced its GHG emissions by over 20%. But if it is to accomplish its more ambitious 2030 goal of a 55% to 60% reduction compared to 1990 levels — with a view to achieving carbon neutrality by 2050, the circular economy needs to become an essential part of climate policies and plans.

In light of the EU's decision to revise its 2030 emissions reduction target upwards, addressing emissions from materials is essential to meeting climate targets. The production of goods, including food, accounts for a fifth of the EU's territorial emissions⁶; and a mere 11.2% of materials used in EU-27 were circulated back into the economy in 2017⁷. At the moment, most of the EU's ambitions regarding the climate impact of production and consumption are reflected in its Circular Economy Action Plans published in 2015 and 2020 respectively. As the different elements of the EU Green Deal are developed, ensuring that they — for example, the upcoming EU Industrial Strategy and the EU Climate Law — tackle the emissions associated with production and consumption is an opportunity to accelerate decarbonisation across the bloc.

The global economy is undergoing a deep reset in the wake of Covid-19, partly driven by unprecedented levels of government stimulus. This represents an opportunity for the EU, its Member States, and governments around the world to foster better growth by channelling public funds into investments that will not only help boost the economy in the short term, but that will future proof it. **The circular economy offers a framework to enhance economic and environmental resilience.** Designing out waste and pollution, keeping materials in use, and regenerating natural systems will result in environmental benefits; will reduce our dependence on virgin resources and imports; boost local repair, remanufacturing, and upcycling economies; and better equip us to address climate change and exogenous shocks like Covid-19.⁸

About this paper

This paper looks at the opportunities for the circular economy to reduce the EU's GHG emissions associated with three of its most carbon-intensive sectors: the

⁵ Integrated Carbon Observation System, *Global Carbon Budget 2018* (20th July 2020) <https://www.icos-cp.eu/global-carbon-budget-2018>

⁶ Eurostat, *How are Greenhouse Gas Emissions by the EU Evolving* (15th July 2020) <https://ec.europa.eu/eurostat/cache/infographs/energy/bloc-4a.html#:~:text=In%202017%2C%20EU%20GHG%20emissions.by%202030%20compared%20with%201990.>

⁷ Eurostat. *Circular Materials Use Rate* (15th August 2020) https://ec.europa.eu/eurostat/data-browser/view/cei_srm030/default/table?lang=en

⁸ Ellen MacArthur Foundation. *Growth Within*. July 2015. https://www.ellenmacarthurfoundation.org/assets/downloads/publications/EllenMacArthurFoundation_Growth-Within_July15.pdf

built environment, mobility, and food, and makes recommendations for policies within the 2030 time horizon and beyond. Altogether, these sectors account for 75% of the EU's GHG emissions. Addressing their climate impact is therefore essential. The three sectors are currently the subject of a multitude of policies, including the Emissions Trading Scheme, the Effort Sharing Directive, the Waste Framework Directive, the End of Life Vehicles Directive, the LULUCF Regulation, and others. A significant acceleration in the transition to a circular economy that is fully embedded into an overall policy strategy towards carbon neutrality will require that the EU steps up its efforts in the critical decade from 2020 to 2030. Given the current policy focus on using the European Green Deal as a compass for the economic recovery from the Covid-19 pandemic, embedding the circular economy in upcoming policies like the EU Climate Law and Industrial Strategy and ensuring the availability of finance for circular economy projects from sources like the Next Generation EU budget are important levers that need to be activated with urgency.

The three subsequent chapters illustrate some of the opportunities related to the adoption of the circular economy in the three above-mentioned sectors. They also suggest example policy instruments to overcome the barriers in each sector. Chapter five puts forward a series of additional transversal policy considerations to embed circular economy in crucial EU policy agendas through changes to the governance of EU processes, institutions, and financial resources. This twin-track approach aims to maximise the potential of the circular economy to address climate change.

Built environment

STATUS

Construction materials account for 47% of the EU's overall consumption of materials⁹ by weight, which stood at 6.9 giga tonnes in 2019¹⁰. This amount is likely to increase as the bloc's building stock continues to slowly expand and age, requiring renovation or replacement¹¹. How buildings are designed and constructed also impacts their operational emissions, for example from space heating during their use phase. As part of its efforts to address climate change, the EU has so far legislated to promote energy efficiency in buildings through the Energy Efficiency Directive and, since 2019, through the Energy Performance of Buildings Directive. Buildings are important consumers of energy, accounting for 40% of the bloc's energy consumption and 35% of its GHG emissions¹², making these efforts necessary and timely.

The embodied emissions associated with construction materials are estimated to amount to 11% of the total emissions of C40 cities¹³. Buildings are the destination for 33% of the steel, 20% of the plastics, 25% of the aluminium, and 65% of the cement used in the EU¹⁴. Since all these materials have carbon and energy intensive processes associated with their production, the buildings made from them have high levels of embodied emissions. Embodied emissions (covering both construction and renovation) account for 15% of the total GHG emissions associated with buildings over their lifetime — and up to 50% in countries that have decarbonised their energy mixes, where buildings are predominantly powered by renewable energy during their use phase¹⁵.

Reducing the material footprint of the built environment in the EU needs to become integral to the efforts to address climate change, to reduce the bloc's de-

⁹ European Parliament, *Towards a circular approach* (15th July 2020), [https://www.europarl.europa.eu/Reg-Data/etudes/BRIE/2018/625180/EPRS_BRI\(2018\)625180_EN.pdf](https://www.europarl.europa.eu/Reg-Data/etudes/BRIE/2018/625180/EPRS_BRI(2018)625180_EN.pdf)

¹⁰ Eurostat, *Material Flow Accounts* (15th July 2020)

¹¹ Material Economics, *The Circular Economy. A Powerful Tool for Climate Mitigation* (16th July 2020), <https://materialeconomics.com/publications/the-circular-economy-a-powerful-force-for-climate-mitigation-1>

¹² European Commission, *Energy Performance of Buildings Directive* (22nd July 2020) https://ec.europa.eu/energy/topics/energy-efficiency/energy-efficient-buildings/energy-performance-buildings-directive_en#:~:text=Buildings%20are%20responsible%20for%20approximately,building%20stock%20is%20energy%20inefficient.

¹³ ARUP, University of Leeds, C40 Cities. *The Future of Urban Consumption in a 1.5C World* (20th July 2020), <https://www.arup.com/perspectives/publications/research/section/the-future-of-urban-consumption-in-a-1-5c-world>

¹⁴ Material Economics, *The Circular Economy. A Powerful Tool for Climate Mitigation* (2018)

¹⁵ Idem

pendence on raw materials imports, and the downstream impacts from construction. Despite the fact that the EU has set a seemingly high recycling target for construction and demolition waste (CDW) of 70% by 2020 in the amended Waste Framework Directive, much of it continues to be downgraded through backfilling or low-grade recovery. Furthermore, quantitative recycling targets do not reflect the carbon intensity of the different materials used in construction, therefore are not effective tools to mitigate their embodied emissions.

DRIVERS AND BARRIERS

Some of the key challenges associated with transforming the construction sector are its fragmented nature, the diversity of value chains within it, the different levels of regulations (local versus national and EU-wide), and the involvement of a multitude of stakeholders with conflicting interests at different stages in the construction process. For instance, different sub-contractors often design and develop buildings without interacting. This state of affairs results in missed opportunities stemming, for example, from designers ignoring considerations like the availability of secondary raw materials when designing buildings. Any reformation of the sector therefore requires an integrated approach that facilitates the flow of information among value chain actors.

In the absence of harmonised standards for and registries of the materials and techniques used to erect and renovate buildings, the confidence levels in recycled construction materials with regards to their durability and the health risks they pose to construction workers are low¹⁶. Despite the promising progress accomplished by initiatives like the *Buildings as Material Banks* Horizon 2020 project¹⁷, materials passports and similar solutions have yet to be adopted at scale. Enhancing the flow of information and overall transparency about the materials content in buildings is an opportunity to promote the uptake of the circular economy in the built environment.

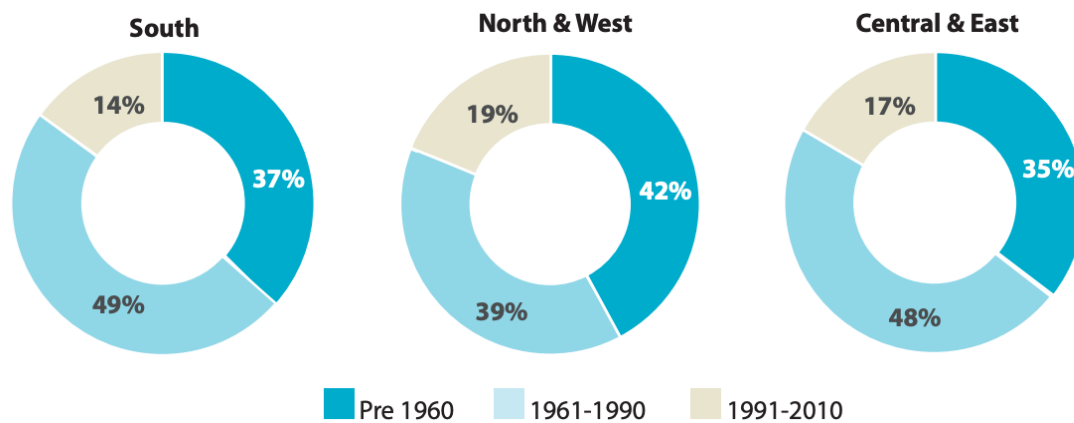
Furthermore, since the vast majority of Europe's building stock is more than three decades old (figure 1), it is challenging to bring it up to the same technical and environmental standards as new buildings. The Renovation Wave could therefore play an important role in abating the operational emissions associated with the EU's building stock, as well as extending the lifetime of buildings — and thus obviating the

¹⁶ European Commission, *EU Construction and Demolition Waste Protocol* (25th July 2020), https://ec.europa.eu/growth/content/eu-construction-and-demolition-waste-protocol-0_en

¹⁷ BAMB Project (22nd July 2020), <https://www.bamb2020.eu/>

emissions associated with the materials needed to erect new constructions, and fostering the development of the secondary raw materials market by boosting the demand for insulation and other construction materials.

Figure 1: Age categorisation of Europe's housing stock.¹⁸



SOLUTIONS

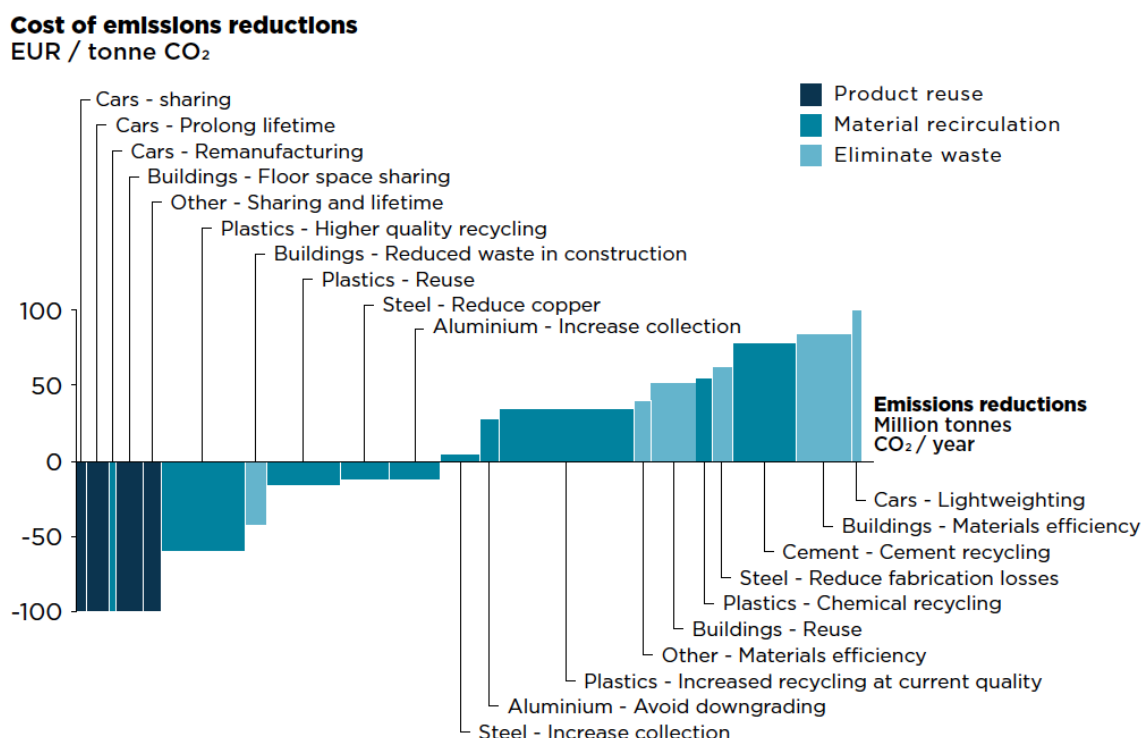
The circular economy can reduce CO₂ emissions from four major construction materials (plastics, steel, aluminium and cement) by 40% globally, and by 56% in developed economies like the EU by 2050¹⁹. Modelling indicates that by far the most cost effective strategies to mitigate embodied emissions in the built environment are increasing building utilisation (floor space sharing) and reducing waste in construction (figure 2). Costlier strategies include increasing collection rates for aluminium, reuse, reducing fabrication losses from steel making, and materials efficiency.

In part as a result of the constraints mentioned in the previous section, recycled materials account for a negligible proportion of the EU construction materials market. Promoting their uptake necessitates policy intervention in the form of (1) the creation of harmonised standards for secondary raw materials, materials registries, taxonomy, and reporting protocols; (2) market-based instruments to make recycled materials economically attractive; and (3) public procurement requirements in order to steer public and private organisations towards the incorporation of reused and recycled materials into renovation and construction projects.

¹⁸ BPIE, *Europe's buildings under the microscope* (25th July 2020), http://bpie.eu/wp-content/uploads/2015/10/HR_EU_B_under_microscope_study.pdf

¹⁹ Energy Transitions Commission, *Mission Possible* (2nd August 2020), http://www.energy-transitions.org/sites/default/files/ETC_MissionPossible_FullReport.pdf

Figure 2: Emissions reduction potential from circular economy business models.²⁰



To set the construction sector on the path towards a circular economy, policy-makers can use a combination of measures aimed at incentivising a system shift encompassing urban planning, value-enhancing business models, designing for longevity and modularity, materials substitution, and materials efficiency. These measures would motivate property owners to prioritise versatile designs that would enhance the utilisation of buildings and adapt to changing needs, to use materials with low embedded emissions wherever possible, and to use materials at their highest value.

As the EU prepares to unveil important pieces of legislation related to the Green Deal — such as the Sustainable Product Policy Framework and the Strategy for a Sustainable Built Environment — it can seize the opportunity to transform its built environment to support its climate agenda, create jobs, and reduce its dependence on materials imports. Listed below are some of the main policy interventions that could promote the most impactful measures to accelerate the transition to a circular built environment.

²⁰Adapted from Material Economics. [The Circular Economy - A Powerful Tool for Climate Mitigation](#) (2018)

Opportunity	Example of conducive policy intervention
Designing new buildings for circularity from the outset	<ul style="list-style-type: none"> • Embedding requirements for the reusability of building components; the use of prefabricated components, where appropriate, to enable modular construction; the use of materials with low embedded emissions, where appropriate (e.g.: timber); and the minimisation of waste into the Eurocodes. • Ensuring that the new Built Environment Strategy promotes circular design specifications across the bloc, particularly in the case of public buildings.
Accelerating the uptake of digital technologies, particularly digital materials registries and building information modelling (BIM)	<ul style="list-style-type: none"> • The use of BIM can significantly reduce waste and facilitate eco-design. The technology is widely used in the EU; a BIM standard²¹ could harmonise its application at scale. • Investments in R&D to solve some of the main issues with materials passports (e.g.: privacy, lack of a unified approach) in order to facilitate their market uptake. • The development of the European Dataspace for Smart Circular Applications to ensure that the digital infrastructure underpinning these developments is in place.
Increasing building utilisation	<ul style="list-style-type: none"> • Fiscal incentives for building owners who maintain consistently high occupancy levels. The measure can be implemented by Member States with support from the EU.

²¹ Poljansek, Martin, *BIM standardisation*, (2017) https://publications.jrc.ec.europa.eu/repository/bitstream/JRC109656/bim.standardization_1.pdf .

Supporting deconstruction over demolition	<ul style="list-style-type: none">• Fiscal incentives for the use of prefabricated materials, wherever possible, to facilitate disassembly and versatile design.
Creating markets for recycled construction materials	<ul style="list-style-type: none">• Devising standards for secondary raw materials used in construction, such as cement and concrete, aggregates, and steel.• Making the use of recycled CDW mandatory in newly erected public buildings.• Providing financial incentives for the use of recycled materials (e.g.: subsidies, tax breaks) in construction.

URBAN MOBILITY

STATUS

The transport sector accounted for almost a quarter of the EU's GHG emissions in 2017; road transport alone represented 20%²², making vehicles a leading source of climate impact in the EU²³. **While the bloc's public transport infrastructure is generally good, personal vehicles account for 83% of land transport²⁴. Fuel and exhaust account for the majority of the emissions from most vehicles** with the exception of battery electric vehicles powered by renewable energy, for which production and end of life account for more than 80% of emissions²⁵. While other sub-sectors, such as aviation, are important carbon emitters, this paper focuses on passenger cars because they constitute the biggest source of climate impact from mobility.

Passenger cars are the root cause of significant structural losses in our economy.

The average European car is currently parked 92% of the time. When it is used, only 1.5 of its 5 seats are occupied on average. And as much as 50% of inner-city land is devoted to parking spaces and roads, although less than 10% of this area is used at any one time, even during rush hour.²⁶ Strategies that can successfully target these structural losses must take into account the entire mobility system — tackling losses from the manufacturing and end of life of vehicles, while looking to maximise access and minimise resource and space requirements.

Mobility has been one of the worst hit sectors by the Covid-19 lockdowns.

As borders closed, air traffic dropped by almost 90% year-on-year in April 2020²⁷. Land transport companies urged governments to secure much-needed corridors for essential freight, which were created after a brief initial delay. Anticipating reservations to using public transport in favour of personal cars, cities around Europe have put in place

²² https://ec.europa.eu/eurostat/statisticsexplained/index.php/Greenhouse_gas_emission_statistics

²³ https://ec.europa.eu/clima/policies/transport/vehicles/regulation_en

²⁴ <https://materialeconomics.com/latest-updates/industrial-transformation-2050>

²⁵ <https://www.eea.europa.eu/signals/signals-2017/infographics/range-of-life-cycle-co2/view>

²⁶ https://www.ellenmacarthurfoundation.org/assets/downloads/publications/EllenMacArthurFoundation_Growth-Within_July15.pdf

²⁷ <https://www.eurocontrol.int/covid19>

limitations for cars in their centres as lockdowns began to lift, while creating additional bicycle lanes to motivate residents to switch to active mobility. With many transport workers furloughed or laid off across the bloc, companies in the sector soliciting government support to survive, and many reducing their travel due to changes in lifestyles, the economic impacts of Covid-19 on the transport sector are likely to continue to deepen in the coming months and years.

Exactly how Covid-19 will affect consumer behaviour around mobility is unclear.

Pre-Covid-19, emissions from transport were on the rise in the EU²⁸, though they plummeted temporarily in 2020 as a result of the lockdowns²⁹. Some of the measures that automakers have resorted to in order to salvage part of their revenues — like car sharing — also happen to be cost effective ways to reduce embodied emissions from vehicles, but have unclear implications for public health, prompting some governments to advise against them whenever possible³⁰.

DRIVERS AND BARRIERS

The deep economic crisis in which the transport sector finds itself is both a detractor and an opportunity, in the short and medium terms, when it comes to rethinking mobility. In the short term, manufacturing lobbies³¹ and policymakers³² alike have highlighted the need to prioritise the sector's economic recovery through recovery stimulus packages over green considerations.

²⁸ Transport & Environment. *CO2 Emissions From Cars*. (April 2018) https://www.transportenvironment.org/sites/te/files/publications/2018_04_CO2_emissions_cars_The_facts_report_final_0_0.pdf

²⁹ Le Quere, C. et al. *Temporary Reduction in Daily Global CO2 Emissions During the Covid-19 Forced Confinement* (19th May 2020) <https://www.nature.com/articles/s41558-020-0797-x>

³⁰ UK Government. *Covid-19: Safer Travel Guidance for Passengers* (21st August 2020) <https://www.gov.uk/guidance/coronavirus-covid-19-safer-travel-guidance-for-passengers>

³¹ ACEA. *Stakes Are High for European Automotive Recovery*. (30th July 2020) <https://www.acea.be/press-releases/article/covid-stakes-are-high-for-european-automotive-recovery-new-facts-and-figure>

³² Morgan, Sam. *EU Transport Chief Cautions Against Green Strings for Airline Bailouts*. (16th April 2020) <https://www.euractiv.com/section/transport/interview/eu-transport-chief-cautions-against-green-strings-for-airline-bailouts/>

Despite long-standing efforts to reduce emissions from transport, the EU is not on track to meet its existing targets.³³ The pace of change in the mobility sector has been slow enough to warrant concern about the likelihood of reaching the more ambitious 2050 targets that the EU has set in the Green Deal.

Much of the impetus for business model and technological innovation in the automotive sector comes from within the industry itself, particularly from US- and China-based automakers, original equipment manufacturers, and technology companies that have experimented and successfully launched alternative mobility platforms and access models, such as mobility as a service. The uptake of some of these solutions in the EU is on the rise, particularly in member states like Germany, France, Italy, and Scandinavian countries.

Policymakers in EU Member States have also used innovative approaches to regulating emerging forms of mobility, such as shared cars. In France, for instance, all free floating vehicles must be electric or hybrid³⁴ by law, a policy that has incentivised the uptake of such vehicles. However, other policies — such as the tax exemption of company vehicles in member states like Belgium³⁵ — have stalled the progress on shifting from vehicle ownership to access to mobility.

SOLUTIONS

Reducing lifecycle emissions from passenger cars and enhancing utilisation of mobility infrastructure are essential to the EU's Smart and Sustainable Mobility Strategy and to meeting its climate goals. Advances in technology have made it possible to build better performing cars over the years. But these advances have been outweighed by the economic inefficiencies and environmental costs resulting from the uptake in personal vehicle ownership, which is expected to double by 2050. Overhauling the current mobility system will necessitate a multi-pronged approach consisting of changing our urban design to ensure better accessibility, expanding public transport

³³ EC. *Roadmap to a Single European Transport Area* (2011) https://ec.europa.eu/transport/themes/strategies/2011_white_paper_en

³⁴ Monitor Deloitte. *Car Sharing in Europe*. (20th August 2020) <https://www2.deloitte.com/content/dam/Deloitte/de/Documents/consumer-industrial-products/CIP-Automotive-Car-Sharing-in-Europe.pdf>

³⁵ Brussels Times. *More Belgian Employees Receive a Company Car*. (8th January 2020) <https://www.brusselstimes.com/belgium/88117/more-company-cars-registered-in-belgium/>

and biking infrastructure, and switching to business models focused on access to mobility, instead of vehicle ownership.

By switching to an integrated, multimodal, on-demand mobility system, the embodied emissions in vehicles could be cut by 70% globally by 2050 compared to a baseline scenario. Particularly effective measures at offsetting such emissions are extending vehicle lifetime, car sharing, lightweighting, and reuse and remanufacturing (figure 3). More broadly, embedding passenger cars within multi-modal mobility systems, in which different modes of transport can be shared as a service and designed for durability, reuse and public health, is an opportunity to cut costs and emissions, improve accessibility and quality of life, and reduce pollution.³⁶ Such a system could cut the costs associated with mobility for European households by as much as 70% by 2050, while slashing the CO₂ emissions associated with mobility by 40% by 2040.³⁷

In the New Circular Economy Action Plan, the European Commission recognises the importance of mobility as a service, reducing virgin material consumption, optimising infrastructure and vehicle use, increasing occupancy rates and load factors, and better connecting design and end of life for vehicles. **These steps are essential to transitioning to a circular economy for mobility** and therefore it is expected that they will be a part of the EU's Smart and Sustainable Mobility Strategy. In addition, solidifying some of the measures undertaken by local governments during the lockdowns — such as promoting alternatives to passenger cars, clarifying the public health implications of shared mobility, and promoting repair and remanufacturing can contribute to a more resilient mobility sector going forward. In addition to the above-mentioned considerations, summarised below are the main opportunities to promote a circular economy for the mobility sector and the policy interventions that could facilitate their implementation.

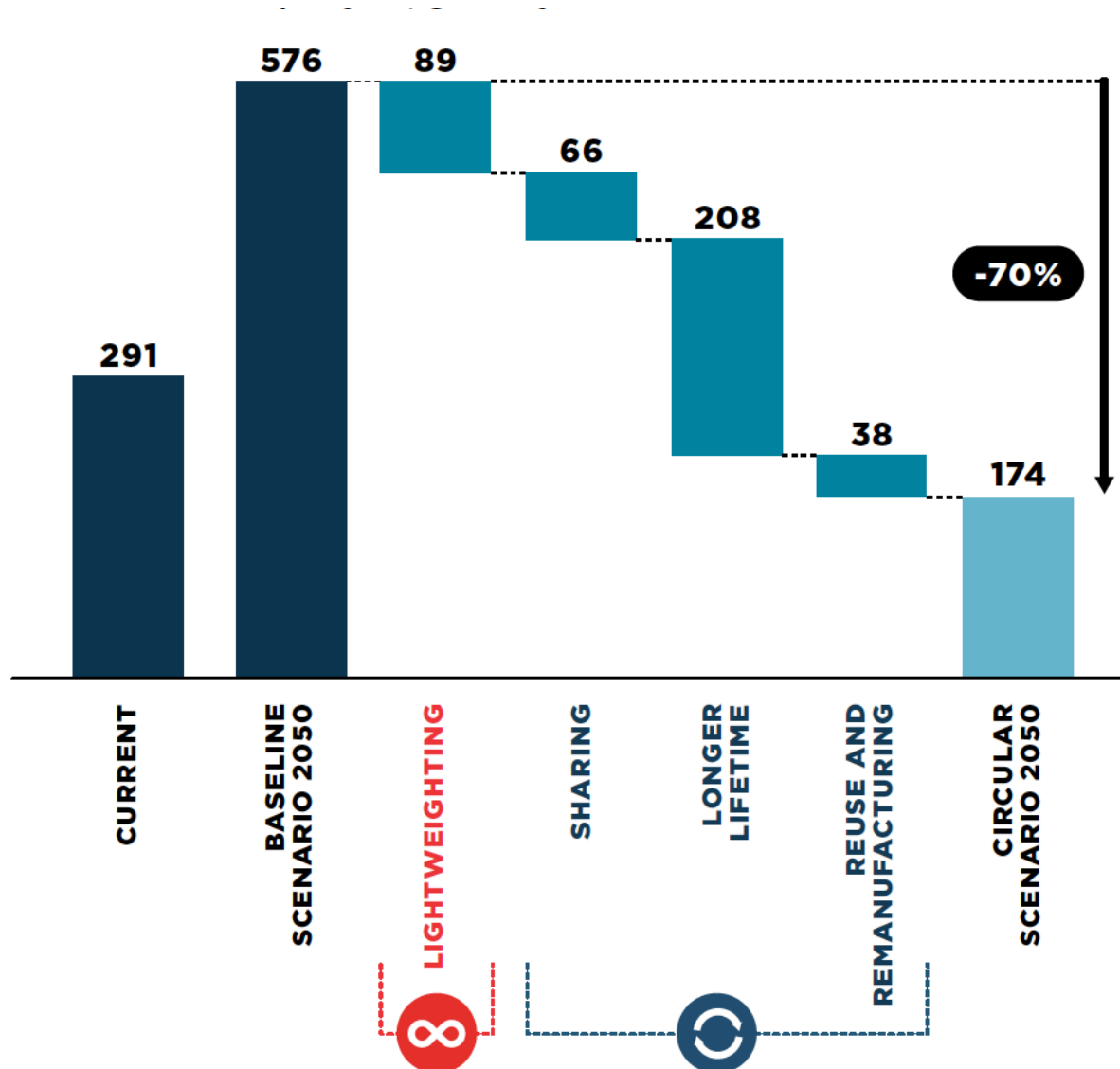
Opportunity	Conducive policy interventions
Promoting refurbishment, re-manufacturing, and recycling of vehicles and other transport	<ul style="list-style-type: none"> Some Member States, like Sweden, have already introduced bills to lower the value

³⁶ Ellen MacArthur Foundation. *Completing the Picture. How the Circular Economy Tackles Climate Change*. (26th September 2019) <https://www.ellenmacarthurfoundation.org/publications/completing-the-picture-climate-change>

³⁷ Ellen MacArthur Foundation. 10 Circular Investment Opportunities (21st August 2020) <https://www.ellenmacarthurfoundation.org/assets/downloads/Mobility.pdf>

<p>means (e.g.: bicycles, motorcycles). Extending the lifetime of vehicles through design for durability, repair, and refurbishment could result in CO2 savings to the tune of 0.2 giga tonnes CO2 equivalent/year by 2050 globally.</p>	<p>added tax for repair works. Including repair, remanufacturing, refurbishment and recycling of means of transport in Annex III of the VAT Directive among the activities eligible for reduced VAT rates could prompt a broader uptake of these activities.</p> <ul style="list-style-type: none"> • More broadly, shifting to taxing virgin material use rather than labour can incentivise repair, refurbishment and remanufacturing. The EU has a limited remit in influencing Member States' taxation policies, but can provide guidance and technical assistance.
<p>Enabling multimodal transport systems</p>	<ul style="list-style-type: none"> • Making financing available to cities working to become compliant with the Sustainable Urban Mobility Plans guidelines. • Ensuring that the European Dataspace for Smart Circular Applications covers transport and mobility. • Supporting the development of active urban mobility infrastructure (e.g.: expanded networks of bicycle lanes) through guidelines for urban planning and funding.
<p>Fostering circular design for new vehicles, including electric and hybrid ones</p>	<ul style="list-style-type: none"> • As stipulated in the New CEAP, linking design with end of life and setting minimum targets for recycled content in new vehicles. • Fostering design for durability and the shift to mobility-as-a service business models for automakers by making financing schemes available to support this transition. • Developing new legislation to regulate batteries and the use of their components (the new Batteries Directive).

Figure 3: Emissions from all materials used in passenger cars (million tonnes of CO2 equivalent/year, globally).³⁸



³⁸ Adapted from Material Economics. [The Circular Economy - A Powerful Tool for Climate Mitigation](#) (2018)

FOOD SYSTEM

STATUS

Food production occupies 40% of the EU's land surface³⁹ and the consumption of food is estimated to account for 17% of EU households' GHG emissions⁴⁰. When it comes to climate impact, food cultivation and land management differ from other economic activities due to their ability to actively capture carbon in soil and therefore to act as carbon sinks⁴¹. Agriculture is also more susceptible to the impacts of climate change compared to other economic sectors. For instance, due to climate change, maize yields in southern Europe could halve and those of wheat drop by up to 14% by 2050⁴².

According to the European Environment Agency (EEA), emissions from agriculture and LULUCF have largely plateaued in the EU in the last three decades⁴³. But this state of affairs fails to seize the full potential that these sectors can have in the fight against climate change. Having committed to ensuring a neutral or even net positive carbon impact for the food value chain in its Farm to Fork Strategy⁴⁴ and to reversing

³⁹ European Environment Agency, *Agriculture. Briefing* (18 February 2015)

<https://www.eea.europa.eu/soer/2015/europe/agriculture#:~:text=European%20agriculture%20%E2%80%94%20of%20the,dramatic%20loss%20of%20grassland%20biodiversity>

⁴⁰ Sandstorm, V. *et al*, *The role of trade in greenhouse gas footprint of EU diets*, (December 2018) <https://doi.org/10.1016/j.gfs.2018.08.007>

⁴¹ Allen, B. *et al* *Feeding Europe: Agriculture and Sustainable Food Systems* (October 2018)

<https://ieep.eu/uploads/articles/attachments/64e06bc1-6c2e-4b94-bc93-9150725093ac/Think%202030%20Feeding%20Europe.pdf?v=63710011359>

⁴² European Commission. *Analysis of Climate Change Impacts on EU Agriculture by 2050*. (20th August 2020) <https://ec.europa.eu/jrc/en/publication/analysis-climate-change-impacts-eu-agriculture-2050>

⁴³ EEA. *Total GHG Emissions Trend Projects in Europe*. (20th August 2020) <https://www.eea.europa.eu/data-and-maps/indicators/greenhouse-gas-emission-trends-6/assessment-2>

⁴⁴ European Commission. *Farm to Fork Strategy*. (20th May 2020) https://ec.europa.eu/food/sites/food/files/safety/docs/f2f_action-plan_2020_strategy-info_en.pdf

its impact on biodiversity in the Biodiversity Strategy,⁴⁵ the EU has the opportunity to substantiate its strategy with legislation and raise the level of ambition for the sector.

Together with forestry, agriculture and the food industry are the economic sectors that most closely interact with natural ecosystems, which they impact in numerous ways. A leading source of deforestation,⁴⁶ agriculture has resulted in a series of negative impacts over time. The overreliance on chemical inputs like fertilisers and pesticides has contributed to air and water pollution, soil contamination, biodiversity loss and adverse public health impacts. Intensive livestock rearing is an important source of methane, a powerful greenhouse gas, and of ammonia, a common pollutant. Excess tillage exposing soil organic matter to air releases locked-in soil carbon to the atmosphere.⁴⁷ Globally, agriculture is estimated to account for up to 80% of biodiversity loss, 80% of deforestation, and 70% of all freshwater use⁴⁸.

The main sources of emissions from the food system globally stem from livestock rearing and food cultivation, representing between 9% and 14% of total GHG emissions globally⁴⁹, followed by land use practices (5-14%), and food processing, distribution and consumption (5-10%).

More than 20% of all food or 88 million tonnes per year is wasted in the EU, while 43 million EU residents cannot afford a quality meal every second day⁵⁰. **Less than 11% of the food waste produced in the bloc is currently valorised into human and animal feed (for edible waste) or by-products like soil amendments and compost**

⁴⁵ European Commission, *EU Biodiversity Strategy for 2030* (20th May 2020) <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52020DC0380&from=EN>

⁴⁶ European Commission. *The Impact of EU Consumption on Deforestation*. (2013) <https://ec.europa.eu/environment/forests/pdf/1.%20Report%20analysis%20of%20impact.pdf>

⁴⁷ Ellen MacArthur Foundation. *Completing the Picture*. (26th September 2019) https://www.ellenmacarthurfoundation.org/assets/downloads/COMPLETING_THE_PICTURE_HOW_THE_CIRCULAR_ECONOMY_TACKLES_CLIMATE_CHANGE_V2_23_September.pdf

⁴⁸ United Nations. *The 2021 Food Systems Summit*. (20th August 2020) <https://www.un.org/sustainable-development/food-systems-summit-2021/>

⁴⁹ IPCC. *Special Report on Climate Change and Land Food Security*. (20th August 2020) <https://www.ipcc.ch/srccl/chapter/chapter-5/>

⁵⁰ European Commission. *Food Waste*. (20th August 2020) https://ec.europa.eu/food/safety/food_waste_en

(for inedible waste)⁵¹. As a result, the valuable resources used in the production of this food, like the land and the energy used to grow, harvest, transport and package it are also wasted. Compounding the problem is the methane produced in the landfilling of organic waste. All in all, food waste has been found to account for approximately 8% of anthropogenic GHG emissions, making it a sizable source of climate impact⁵².

DRIVERS AND BARRIERS

Overhauling the EU's food system will require a concerted effort of unprecedented magnitude. Doing so will call for balancing a number of sometimes conflicting pressures on the system, including providing nutrition for the EU's 446 million residents⁵³, a livelihood for the over 10 million families in the EU who depend on farming⁵⁴, continued employment for the over 4.5 million who work in the food industry⁵⁵, environmental protection, climate change mitigation and adaptation, and income generation for the private companies active in the sector.

The EU is in the process of addressing important aspects of the materials flows in the food value chain by, for instance, making the separate collection of bio-waste mandatory in all member states starting in 2024, capping emissions from land use through the LULUCF Regulation, reforming the Common Agricultural Policy (CAP), and

⁵¹ EUPFWL. *Recommendations for Action in Food Waste Prevention*. (20th August 2020) https://ec.europa.eu/food/sites/food/files/safety/docs/fs_eu-actions_action_implementation_platform_key_recommendations.pdf

⁵² Ellen MacArthur Foundation. *10 Circular Investment Opportunities*. (20th August 2020) <https://www.ellenmacarthurfoundation.org/assets/downloads/Food.pdf>

⁵³ EU. *Living in the EU*. (20th August 2020) https://europa.eu/european-union/about-eu/figures/living_en#:~:text=The%20EU%20covers%20over%204,population%20after%20China%20and%20India.

⁵⁴ Eurostat. *Agriculture Statistics - Family Farming in the EU*. (20th August 2020) https://ec.europa.eu/eurostat/statistics-explained/index.php/Agriculture_statistics_-_family_farming_in_the_EU#:~:text=There%20were%2010.5%20million%20farms,value%20of%20the%20agricultural%20output.

⁵⁵ FoodDrink Europe. *Data and Trends of the European Food and Drink Industry 2018*. (20th August 2020) <https://www.fooddrink europe.eu/publication/data-trends-of-the-european-food-and-drink-industry-2018/#:~:text=Europe's%20food%20and%20drink%20industry,the%20biggest%20employer%20within%20manufacturing>.

moving forward with the legislative initiatives laid out in the Farm to Fork and Biodiversity Strategies. The implementation of these policies will be essential to driving forward a circular economy for food.

Breaking lock-in effects in the food system requires policy incentives and funding for food growers and manufacturers and investments in processing infrastructure for bio-waste. For instance, even though crop diversification has been proven to have a host of environmental, climate, and nutritional benefits, the prevalent production methods consist of high-input, high-yield monocultures⁵⁶. Expectations of short-term revenue shortfalls make it challenging to incentivise growers to transition away from this form of farming. The Common Agricultural Policy (CAP) remains the largest item on the EU's budget⁵⁷, accounting for over 38% of its expenditure in 2018. Redirecting funds effectively in accordance with the reformed CAP could go a long way in promoting regenerative farming practices in the EU, which could turn agriculture and land use into carbon sinks.

SOLUTIONS

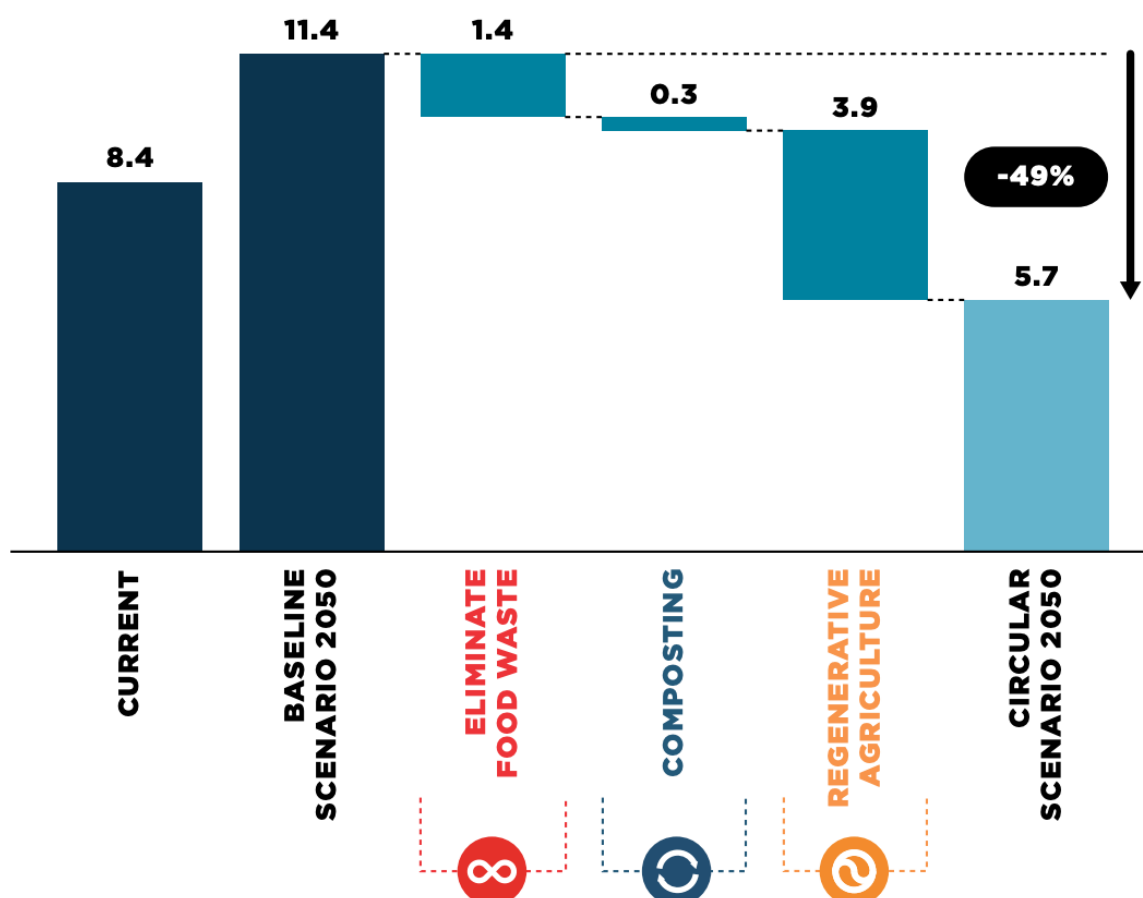
Transitioning to a circular economy for food could result in global economic benefits worth USD 2.7 trillion per year in cities alone by 2050. Regenerative agriculture, eliminating avoidable food waste, and valorising unavoidable food and bio-waste into compost and soil amendments could offset 49% of the GHG emissions associated with the food system by 2050, or 5.6 giga tonnes of CO2 equivalent per year⁵⁸ (figure 4).

⁵⁶ Magrini, M-B. et al. *Pulses for Sustainability: Breaking Agriculture and Food Sectors Out of Lock-In* (24th October 2018) <https://doi.org/10.3389/fsufs.2018.00064>

⁵⁷ European Commission. *CAP Expenditure in the Total EU Expenditure* (20th August 2020) https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/cap-expenditure-graph1_en.pdf

⁵⁸ Ellen MacArthur Foundation. *Cities and Circular Economy for Food* (January 2019) https://www.ellenmacarthurfoundation.org/assets/downloads/Cities-and-Circular-Economy-for-Food_280119.pdf

Figure 4: Opportunities to reduce emissions from the global food system (billion tonnes of CO2 equivalent/year). ⁵⁹



Promoting the adoption of regenerative agriculture

Regenerative agriculture is aimed at building healthy, biologically active ecosystems; improving, rather than degrading the environment in which food cultivation takes place. Investing in accelerating the uptake of regenerative farming can create numerous economic opportunities. USD 57 billion spent on accelerating regenerative production has been estimated to yield USD 1.9 trillion in input cost savings⁶⁰. The profitability of regenerative agriculture has been found to be higher than that of conventional food

⁵⁹ Idem

⁶⁰ Karas, Sheryl. *Can We Afford Regenerative Agriculture?* (25th August 2020) <https://www.csuchico.edu/regenerativeagriculture/blog/drawdown-post.shtml>

production systems. For example, a 2018 study on corn fields found that those managed regeneratively saw a 78% increase in profits compared to conventionally farmed fields⁶¹. Replacing monocultures with polycultures can lead to greater farmer income diversification, while improving the overall resilience of the food production system⁶². This greater resilience, in turn, can help improve food security as the system is better able to absorb external shocks created by adverse weather or climate change, while securing steadier income for farmers.

The reformed CAP is a key opportunity to promote regenerative agriculture. In particular, making direct payments under CAP contingent on the implementation of the Member States' eco-schemes will represent a strong incentive for growers to adopt regenerative farming practices. In order to avoid widely differing levels of ambition in different countries, it is recommended that the European Commission define in advance the range of practices that these could comprise and give indications as to their expected outcomes.

Ensuring the greater and successful uptake of these solutions will also require investments in training and digitalisation. Harnessing blockchain and other technologies enabling greater traceability, can create greater demand-side pull for regenerative agricultural goods by increasing consumer awareness of factors like product origin, farming techniques, nutritional content and environmental impact. Artificial intelligence can be applied to better enable farmers to make decisions aligned with regenerative land management, providing valuable insight into soil quality and crop and animal welfare, for instance. Digital farming, i.e. combining data collection, storage, analytics and decision modelling, can be leveraged by large-scale farms by utilising big data and internet-of-things solutions to enable optimal results⁶³. **Through the European Innovation Partnership for agricultural productivity and sustainability (EIP-AGRI), the EU can strengthen farmer advisory services and the integration of**

⁶¹ Canne, Claire E., Lundgren, Jonathan G. *Regenerative Agriculture: Merging Farming and Natural Resource Conservation Profitably*. (26th February 2018) [10.7717/peerj.4428](https://doi.org/10.7717/peerj.4428)

⁶² ReNature. *Long-Term Investment Unlocks Agricultural Profit* (17th November 2019) <https://www.renature.co/articles/long-term-investment-unlocks-agricultural-profit/>

⁶³ Ellen MacArthur Foundation. *Cities and Circular Economy for Food* (January 2019) https://www.ellenmacarthurfoundation.org/assets/downloads/CCEFF_Full-report-pages_May-2019_Web.pdf

farmers within Agricultural Knowledge and Innovation Systems (AKIS) in order to facilitate the flow of know-how between research and practice⁶⁴.

Reducing food waste and loss

The EU has committed to halving food waste and loss, which stood at 88 million tonnes per year in 2012 or 20% of the EU's food production, by 2030 in alignment with Sustainable Development Goal (SDG) 12.3. Doing so will result in economic savings of more than EUR 143 billion per year⁶⁵ and reduce approximately 8% of the bloc's domestic and food-related outsourced GHG emissions⁶⁶.

Setting up the EU Platform on Food Waste and Losses was a promising first step in addressing this issue. In a report published in December 2019, the platform compiled a number of cross-cutting and sector-specific recommendations to reduce food waste and loss⁶⁷. Particularly relevant for EU policymakers is **the incorporation of food waste and loss into climate action strategy, programmes, and legislation** at the EU and Member State level — such as in the National Energy and Climate Plans.

Tackling food waste and loss will require interventions across the entire value chain. However, in the EU, households account for the majority of the food waste generated, or over 50% in 2012⁶⁸. Preventing food waste at this level will single-handedly enable the bloc to reach SDG 12.3. However, consumer behavior around food waste is not understood well enough and the information-based programmes that are often carried out across the EU appear to have had limited impact⁶⁹. Investing in consumer

⁶⁴ European Commission. *Preparing for Future AKIS in Europe*. (25th August 2020) https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/report-preparing-for-future-akis-in-europe_en.pdf

⁶⁵ Fusions. *Estimates of European Food Waste Levels*. (25th August 2020). <http://www.eu-fusions.org/phocadownload/Publications/Estimates%20of%20European%20food%20waste%20levels.pdf>

⁶⁶ European Commission. *Food Waste*. (25th August 2020) https://ec.europa.eu/food/safety/food_waste_en#:~:text=In%20the%20EU%2C%20around%2088,environment%20of%20limited%20natural%20resources.

⁶⁷ EUFLFW. *Recommendations for Action in Food Waste Prevention* (25th August 2020) https://ec.europa.eu/food/sites/food/files/safety/docs/fs_eu-actions_action_implementation_platform_key_recommendations.pdf

⁶⁸ Idem reference 63

⁶⁹ Idem reference 65

research and supporting researchers studying food-related behavior will support the efforts to better understand consumer behaviour and devise strategies around addressing waste at this level going forward.

Circulating materials

Investments in food collection, redistribution and revalorisation infrastructure will be critical to unlocking a variety of environmental benefits for the food system. A meaningful step towards closing nutrient loops is the fact that the revised Waste Framework Directive obligates Member States to ensure the separate collection of bio-waste by January 2024. However, this requirement could be complemented by support and financing for those Member States that lag behind in the implementation of separate bio-waste collection and processing. To maximise the environmental gains from these practices, appropriate processing facilities need to be in place at optimal distances to the places where it originates. Furthermore, it is important that there is a local market for the by-products of composting or anaerobic digestion. Creating such a market will require technical support to Member States, training for farmers, and funding, issues with which the EU could support.

TRANSVERSAL POLICY LEVERS

Previous sections of this paper have showcased some sector-specific opportunities to utilise a circular economy approach in combating climate change. Beyond the measures already announced in the Circular Economy Action Plan⁷⁰ from March 2020, it is important to create a common direction of travel for all EU Member States. Alignment around the systemic nature of change across sectors is needed so that individual measures do not become locked within a wider linear economic system of national incentives and regulations. A significant acceleration in the transition to a circular economy that is fully embedded into an overall policy strategy towards carbon neutrality will require that the EU steps up its efforts in the critical decade from 2020 to 2030. Given the current policy focus on using the European Green Deal as a compass for the economic recovery from the Covid-19 pandemic five areas of transversal policy action have been chosen as examples of what could be done:

- Exploiting the circular economy potential in EU climate policies
- Mainstreaming a circular economy approach in the EU Industrial Strategy
- Strengthening the European Semester process
- Financing the transition through the EU budget and recovery fund
- Fostering global cooperation inter alia via EU trade policy

EU CLIMATE POLICIES

The European Commission already acknowledges in its new Circular Economy Action Plan from March 2020 that circular economy solutions can substantially reduce carbon emissions. This is also the case with the Commission's proposal for stepping up Europe's 2030 climate ambition.⁷¹ However, to exploit the full potential of the circular economy to reach the EU's climate targets for 2030 and 2050, a more operational approach with specific instruments needs to be adopted. This could include changes in the final legal framework of the proposed EU Climate Law. Moreover, the Commission could incorporate additional sector-specific policy interventions such as those highlighted in previous chapters of this paper into its proposal for the planned 'Fit for 55 package' on the EU's increased 2030 climate ambition.

⁷⁰ European Commission. *The Circular Economy Action Plan* (March 2020). https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf

⁷¹ European Commission. *Stepping Up Europe's 2030 Climate Ambition. Investing in a Climate-Neutral Future for the Benefit of Our People*. COM(2020) 562 final (2020).

An important first step would be to explicitly task EU institutions and Member States to develop guidance on how they could capture circular economy opportunities and measure their contribution to reducing GHG emissions more systematically. The Commission could support for example the development of a practical 'tool-box' with advice based on inter alia best practice in Member States. This would be an important prerequisite for governments to better include a circular economy approach as a key delivery mechanism in their National Long-term Strategies for achieving the targets of the Paris Climate Agreement, as well as in their National Energy and Climate Plans (NECPs)⁷².

Building on inter alia the work carried out in the Netherlands⁷³ and by think tanks and institutions such as UNEP's International Resource Panel⁷⁴, the EU could facilitate mutual learning in applying GHG accounting methodologies for circular economy strategies. It could also further improve its own expertise in utilising carbon footprint methodologies as a crucial part of sectoral climate strategies, going beyond the current focus of the EU Environmental Footprint pilot projects for specific products and organisations.⁷⁵

EU INDUSTRIAL STRATEGY

Increasing global competitiveness of European industries is a key objective of the new EU Industrial Strategy for a green and digital Europe⁷⁶. However, the original proposal from the European Commission mentioned only briefly the need for a circular economy approach that will ensure a cleaner and more competitive industry by reducing environmental impacts, alleviating competition for scarce resources, and reducing

⁷² The European Commission has done some work in this regard and highlighted the topic in its assessment of the draft NECPs: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019DC0285&from=EN>.

⁷³ Netherlands Organisation for Applied Scientific Research, *Effecten van het Rijksbrede Programma Circulaire Economie en de Transitieagenda's op de emissie van broeikasgassen* (2018); The Ministry of Infrastructure and the Environment and the Ministry of Economic Affairs, *A circular economy in the Netherlands by 2050* (2016)

⁷⁴ IRP. *Resource Efficiency and Climate Change* (25th August 2020) <https://www.resourcepanel.org/reports/resource-efficiency-and-climate-change>

⁷⁵ European Commission. *Results and Deliverables of the Environmental Footprint Pilot Phase*. (26th August 2020) https://ec.europa.eu/environment/eussd/smgp/PEFCR_OEFSR_en.htm

⁷⁶ European Commission, [*European industrial strategy 2020: using the green and digital transformations to empower industry and small and medium-sized enterprises \(SMEs\)*](#) (2020)

production costs. To further mainstream and substantiate this approach in the revised proposal of the EU Industrial Strategy foreseen for March 2021, further clarifications are needed on how such change can be achieved. These could include:

- Move from the “energy efficiency first” principle for EU industrial policy to a wider “resource efficiency first” principle, and develop guidelines for regulatory, technical, and financial support based on such an approach.
- Increase R&D funding for industrial circular economy solutions that contribute to reduced carbon footprints while ensuring access for small and medium-sized enterprises (SMEs).
- Strengthen present efforts to fund large-scale demonstration of such solutions through the Innovation Fund established under the EU Emission Trading System, for example by providing platforms for actors along value chains to cooperate on designing practical applications and testing them in realistic use case scenarios
- Support large-scale demonstration outside the area covered by the Innovation Fund. Technologies for better recovery of critical metals is one of many possible such examples. Member State initiatives such as the Danish eco-innovation programme MUDP⁷⁷, the German Umweltinnovationsprogramm⁷⁸, and various innovation programs in the Netherlands can provide inspiration.
- Recognise the important role of active engagement of green SMEs as front-runners, and promote the participation of SMEs in innovation programmes and large-scale demonstration.
- Revise EU State Aid Guidelines in accordance with the Commission proposals in the Sustainable Investment Plan, providing room for manoeuvre for Member States in supporting the commercialisation of innovative circular economy solutions, especially in the case of SMEs.
- Review the Industrial Emissions Directive regarding the promotion of circular economy aspects, such as reducing or improving material flows in industrial facilities.

⁷⁷ Danish Eco-Innovation Programme (26th August 2020) <https://eng.ecoinnovation.dk/the-danish-eco-innovation-program/>

⁷⁸ German Environmental Innovation Programme (26th August 2020) <https://www.umweltinnovationsprogramm.de/>

- Include competencies related to implementing a circular economy approach in the forthcoming updated Skills Agenda for Europe.
- Expand the scope of the European Industrial Strategy beyond tackling production by including services close to key industries that could help facilitate a circular economy in a more effective way e.g. through new business models on reverse logistics, reuse, and repair that are often provided by SMEs

The European Commission has also acknowledged that policymakers need to look closely at the opportunities and challenges facing industrial ecosystems. These ecosystems encompass all players operating in a value chain, each having their own specific expertise, and research and innovation skills. A good example is the European Battery Alliance, which brings together more than 120 European and non-European stakeholders representing the entire battery value chain and has led to the EU becoming an industrial frontrunner in this key technology. When implementing a circular economy approach, such alliances could be used to help steer work and help finance large-scale projects with positive spillover effects across Europe, using the knowledge of SMEs, big companies, researchers and regions. This approach helps remove barriers to innovation and improve policy coherence in particular areas, and comes with the need to address circular economy and resource efficiency aspects horizontally across industrial ecosystems to avoid sub-optimisation.

When it comes to specific resource-intensive materials with big carbon footprints, the European Commission is developing for example a Clean Steel Initiative. There are already a number of other proposals under way for supporting the transition to low-carbon production, such as innovation funding, a hydrogen alliance, and economic instruments such as Contracts for Difference (CfD). However, specific proposals promoting a circular economy approach are not yet well developed. Some inspiration might come from the recent German concept for the steel industry ("Handlungskonzept Stahl"), that covers actions for durability, repair, reuse, and recyclability, as well as better economic incentives for the use of recycled steel, and the need for product design that facilitates reuse and recycling⁷⁹. This approach could be replicated for other carbon-intensive material streams such as cement.

⁷⁹ German Federal Ministry for Economy and Energy. *National Reform Programme 2020*. https://www.bmwi.de/Redaktion/DE/Publikationen/Wirtschaft/handlungskonzept-stahl.pdf?__blob=publicationFile&v=12

EUROPEAN SEMESTER PROCESS

In parallel to the deployment of the new EU Multiannual Financial Framework for 2021-2027 (see further below), the European Semester process will be reformed in support of the goals of the European Green Deal. The Commission committed to developing guidelines that could be beneficial for better coordinating economic reforms, circular economy strategies, and climate policies at the Member State level. The Commission intends to specify these guidelines in the form of Country Specific Recommendations each year under the European Semester. In the Annual Sustainable Growth Strategy 2021, circular economy is briefly mentioned as part of the green transition. This needs to be translated into concrete recommendations to Member States.

The same process could also be used to encourage green tax reforms as a way of financing the recovery, shifting taxes from labour to resources. Oil prices are currently low. This provides an opportunity to reduce subsidies, and to promote environmental taxes as part of the European Semester when the time comes for fiscal consolidation. Higher carbon prices and other measures are politically easier to implement as part of broader policy packages, including, for example, when there is a need to generate new revenues for additional investments into social and economic resilience. However, when environmental taxes start to have the desired (environmental) impact, revenues fall (e.g. less pollution or less material use = smaller tax base). This needs to be carefully considered when regularly reviewing and adapting the specific tax scheme.

Specific fiscal support can also play a vital role in stimulating innovation and incentivising circular economy practices. Reducing taxes such as value added taxes on reuse, repair, and remanufacturing activities can incentivise circular designs and business models and support the circulation of valuable goods, materials, and nutrients. Council negotiations on the revision of the EU VAT directive are crucial in this regard. Other fiscal incentives can increase the use of secondary materials and encourage the adoption of regenerative food production practices. While instruments such as Extended Producer Responsibility (EPR) schemes are already in place, further harmonisation and improvement will be needed to help create meaningful financial incentives to accelerate the transition from a purely waste-oriented to a resource management approach in the context of a circular economy.

The EU response to the pandemic is to a large extent focused on promoting digital and green transitions. However, the policy links between these two areas could be strengthened. Digital technologies and solutions provide opportunities for a circular economy, by enabling asset tracking, on-demand services, and sharing models. Achieving better coherence between these policy areas, beyond tackling the increasing emissions from the digital sector, would be an important element in strategies that apply circular economy principles to address climate change.

EU BUDGET AND RECOVERY FUND

In May 2020, the European Commission proposed to create a new recovery instrument called Next Generation EU which is embedded within a revamped long-term EU budget. Under this proposal, Member States are required to put forward national recovery and resilience plans setting out their reform and investment agenda for the years 2021-23. In principle, the EU Member States agreed at their summit in July 2020 that these national plans will facilitate access to funding through the Next Generation EU initiative if they conform to the country-specific recommendations in the European Semester process. Part of the Commission's assessment before granting access to these funds is to evaluate how EU Member States can effectively contribute to the green and digital transition. Circular economy is briefly mentioned in the Commission guidelines⁸⁰, but there is a need for specific requirements when assessing Member State plans.

Currently, a certain share of the EU budget has been earmarked only for finance of climate action. Clearer Commission guidelines on how circular economy can help achieve EU climate targets can unlock funding for projects that will help accelerate the transition to a circular economy. As the scope and ambition of the European Green Deal goes beyond climate policies, the design of the "pre-defined benchmarks" for granting financial support from the EU budget and recovery fund will be crucial to avoiding funding of activities that undermine the transition to a circular economy. ECO-FIN deliberations on the benchmarks and recommendations will be of great importance, taking into account that the prevailing economic and financial policy frameworks are still hardwired for and by the linear economy. It is important to note that all measures targeting better access to finance must be designed to be accessible not only to multinational companies, but also to SMEs, which are often amongst the early innovators to provide circular solutions.

Governments and financial regulators can enhance transparency by providing standardised definitions and metrics for circular economy investments. A good example is the common classification system or "taxonomy" under development in the EU which is being created to encourage private investment in sustainable growth and a climate neutral economy. Providing policymakers, businesses, and investors with a common language on circular economic activities that substantially contribute to a low carbon and resilient recovery can help scale the efforts of all stakeholders involved, track progress, and eventually evaluate the economic, social, and environmental impacts achieved. This could be particularly beneficial in blended finance solutions where

⁸⁰ European Commission. *Commission staff working document. Guidance to member states recovery and resilience plans*. SWD(2030) 205 final.

public and private capital come together to help fund circular economy infrastructure and innovation. And it would also be a useful tool in the implementation of the EU Just Transition Mechanism.

The revision of the current EU guidelines on public procurement is an important opportunity to make consideration of circular economy aspects mandatory. Given governments' large purchasing powers, embedding requirements to use, for example, recycled materials that are compatible with a circular economy can create demand and accelerate the transition. More broadly, such measures can make circular designs and business models the default options in public procurement, strengthening the demand for circular economy products and services, as well as for more flexible buildings and infrastructure designs. It is important that SMEs have good access to public procurement, and that the most ambitious in their ranks can help create a 'race to the top'.

EU TRADE POLICY

Circular economy value chains are often global. Cross-border transactions will continue and integrating circular economy practices into trade policies is a key area for future engagement. Transitioning to a more circular economy will inevitably have implications on a global scale. However, to ensure circular economy practices are integrated into trade policies, improved policy coherence will be needed.⁸¹ This could include: the better harmonisation of recovery programmes; standardising definitions and standards; reviewing regulatory systems; improving the integration of circular economy into EU trade policy and free trade agreements; championing trade incentives for circular economy goods, by supporting an international agreement on removing trade barriers to environmental goods (EG); and increasing cooperation between countries.⁸²

Strengthened green diplomacy including the circular economy can play an important role in facilitating global environmental cooperation. For example, the European Union, Japan, and South Korea have similar objectives when it comes to the circular economy and to de-carbonisation. Together, these countries could bundle their efforts in funding innovation in the pre-commercial phase or through joint large-scale demonstration projects.

⁸¹ Institute for European Environmental Policy, *EU circular economy and trade: Improving policy coherence for sustainable development* (2019) [https://ieep.eu/uploads/articles/attachments/f560794d-c411-4895-8ae9-910c65548f33/EU%20trade,%20CE%20and%20sustainable%20development%20\(IEEP%202019\)%20FINAL.pdf?v=63741577228](https://ieep.eu/uploads/articles/attachments/f560794d-c411-4895-8ae9-910c65548f33/EU%20trade,%20CE%20and%20sustainable%20development%20(IEEP%202019)%20FINAL.pdf?v=63741577228)

⁸² Idem

The future design of EU Free Trade Agreements (FTAs) could include more effective enforcement measures in cases where climate-related, environmental, and social commitments are violated by one of the parties. While the European Green Deal will facilitate the economic transition towards a low carbon and circular industry, it is important to ensure a level playing field with competitors outside the EU and to avoid outsourcing of environmental damages to other geographies. For example, the June 2019 proposal for a EU trade deal with MERCOSUR (Brazil, Argentina, Uruguay and Paraguay) raised substantial political concerns about driving further deforestation and adverse climate impacts in the region. Making better use of the impact assessments underpinning the EU trade agreements and key improvements in the agreements' sustainability related provisions by including their more assertive implementation is a first step in the right direction.⁸³

In addition, the European Commission will propose a Carbon Border Adjustment Mechanism (CBAM). A well-designed instrument could be combined with other measures to reduce the risk of "carbon leakage" and simultaneously encourage circular material use with attendant reductions in carbon emissions. For example, a minimum taxation rate on the use of virgin carbon-intensive materials could be applied to both EU and foreign producers in order to increase the efficiency and global acceptability of the CBAM.

⁸³ Kettunen et al. (2020) *An EU Green Deal for trade policy and the environment: Aligning trade with climate and sustainable development objectives*. IEEP Brussels / London.

MAIN CONCLUSIONS

The EU can play a crucial role in shaping Member States' policies and strategies concerning the transition to a low carbon and circular industry, while setting the tone and putting in place the incentives for more international collaboration. The Circular Economy Action Plan from March 2020 is an ambitious step in the right direction. Its impact could be magnified not only by seizing sector-specific opportunities, such as those in the built environment, mobility, and food, highlighted in this paper, but also by leveraging transversal EU processes and policies.

Mainstreaming a circular economy approach in the EU's broader policy frameworks on climate, industry, finance, and trade is essential to enabling a successful transition away from a linear take-make-waste production and consumption model. Doing so will make circular economy solutions more attractive financially, will preempt some of the difficulties companies encounter in shifting to new business models, and will open up new markets for circular innovations. As demonstrated above, doing so is also essential to meeting the EU's 2030 and 2050 climate targets.