



THINK 2030

Paper summary

A low-carbon and circular industry for Europe

The linear “take-make-waste” model of production and consumption is both highly wasteful and an important contributor to climate change via greenhouse gas (GHG) emissions associated with land management and the production of consumer goods, food, buildings, and other products¹.

Climate change is as much an economic and social crisis as an environmental one; even if global temperatures rise by no more than 1.5 degrees Celsius by 2100, the global economic costs of climate change are projected to reach USD 54 trillion by the end of the century² and to have devastating societal impacts.³ Climate change mitigation and adaptation policies

Lead authors:

Carmen Valache-Altinél
and Carsten Wachholz
(Ellen MacArthur
Foundation)

Co-author:

Mats Engström (IEEP
Associate)

Policy expert:

Emma Watkins (IEEP)

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 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

³ 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



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are therefore essential to the future of the economy and society as well as the environment.

Current climate change policies, which focus on accelerating the adoption of renewable energy and energy efficiency, cannot effectively tackle most of the emissions resulting from industry and land use, land use change and forestry (LULUCF).

Although the EU has reduced its GHG emissions by over 20% in the last three decades, it remains a leading emitter (accounting for 9.3% of global GHG emissions in 2017). To achieve its 2030 goal of a 55% reduction in GHGs compared to 1990 levels, the circular economy needs to become an essential part of EU climate policies and plans. A systemic overhaul of our production and consumption is necessary.

The implementation of the EU Green Deal – including, for example, the upcoming EU Industrial Strategy and the EU Climate Law — provides an important lever to accelerate decarbonisation. The reset of the global economy in the wake of Covid-19 is 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 future proof it. The circular economy offers a framework to enhance economic and environmental resilience, by designing out waste and pollution, keeping materials in use, and regenerating natural systems.⁴

The Think 2030 paper “A Low-Carbon and Circular Industry for Europe” looks at the opportunities for the circular economy to reduce the EU’s GHG emissions associated with three key

Key policy recommendations:

- To explore the potential of the circular economy in EU climate policies such as the “Fit for 55 package” scheduled for spring 2021;
- To mainstream a circular economy approach in the EU Industrial Strategy;
- To strengthen the European Semester process;
- To finance the transition through the EU budget and recovery fund; and
- To foster global cooperation, inter alia via EU trade policy.

THE BUILT ENVIRONMENT

The challenge

Construction materials account for 47% of EU material consumption by weight, which was 6.9 giga tonnes in 2019. Buildings account for 40% of the EU’s energy consumption and 35% of its GHG emissions¹¹. Recycled materials currently account for a negligible proportion of the EU construction materials market.

The solution

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 2050¹².

⁴ Ellen MacArthur Foundation. *Growth Within*. (July 2015). [https://www.ellenmacarthurfoundation.org/assets/downloads/publications/EllenMacArthurFoundation Growth-Within July15.pdf](https://www.ellenmacarthurfoundation.org/assets/downloads/publications/EllenMacArthurFoundation%20Growth-Within%20July15.pdf)

carbon-intensive sectors – the built environment, mobility, and food – which together account for 75% of the EU's GHG emissions. It discusses some of the opportunities related to the adoption of the circular economy in these sectors, suggests policy instruments to overcome related barriers, and provides a series of additional policy considerations to embed circular economy in crucial EU policy agendas.

Key findings

- Up to 45% of anthropogenic GHG emissions are associated with land management and the production of consumer goods, buildings, and other products⁵.
- Even if current renewable energy and energy efficiency policies are optimised, they would only offset up to 55% of the anthropogenic GHG emissions by 2050.
- Switching to a circular economy for five key commodities (steel, aluminium, plastics, cement, and food) 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.
- Emissions from the production of materials increased as a share of global GHG emissions from 15%, or 5 giga tonnes of CO₂ equivalent, in 1995 to 23%, or 11.5 giga tonnes of CO₂ equivalent, in 2015⁶.
- Even if global temperature rise is contained to 1.5 degrees Celsius by 2100,

⁵ 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

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

URBAN MOBILITY

The challenge

The transport sector accounted for almost a quarter of the EU's GHG emissions in 2017; road transport alone represented 20%¹³.

The solution

Extending the lifetime of vehicles through design for durability, repair, and refurbishment could result in a saving of 0.2 giga tonnes CO₂ equivalent/year by 2050 globally. An integrated, multi-modal, on-demand mobility system could cut the embodied emissions in vehicles by 70% globally by 2050 and cut CO₂ emissions associated with mobility by 40% by 2040¹⁴.

FOOD SYSTEMS

The challenge

Food production occupies 40% of EU land¹⁵ and food consumption is estimated to account for 17% of EU households' GHG emissions¹⁶. Over 20% of all food (88 million tonnes per year) is wasted in the EU, with less than 11% of food waste currently valorised into human or animal feed, or by-products like soil amendments and compost¹⁷.

The solution

Transitioning to a circular economy for food could produce 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 could offset 49% of food system GHG emissions by 2050 (5.6 giga tonnes of CO₂ equivalent per year)¹⁸.

the costs of climate change to the global economy are projected to reach USD 54 trillion by the end of the century and rise steeply with every further temperature increase⁷.

- In 2017, the EU was responsible for 9.3% of global GHG emissions — or 4.5 giga tonnes of CO₂ equivalent⁸, but 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%.
- The production of goods, including food, accounts for a fifth of EU territorial emissions⁹.
- Less than 12% of the materials used in the EU-27 were circulated back into the economy in 2019¹⁰.

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⁷ 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](https://www.ellenmacarthurfoundation.org/assets/downloads/Completing%20The%20Picture%20How%20The%20Circular%20Economy%20Tackles%20Climate%20Change%20V3%2026%20September.pdf)

⁸ Integrated Carbon Observation System, *Global Carbon Budget 2018* (20th July 2020) <https://www.icos-cp.eu/global-carbon-budget-2018>

⁹ 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.>

¹⁰ Eurostat, *Circular Materials Use Rate* (15th August 2020) https://ec.europa.eu/eurostat/data-browser/view/cei_srm030/default/table?lang=en

¹¹ 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.

¹² Energy Transitions Commission, *Mission Possible* (2nd August 2020), http://www.energy-transitions.org/sites/default/files/ETC_MissionPossible_FullReport.pdf

¹³ European Commission, *Greenhouse gas emission statistics* (15th July 2020). https://ec.europa.eu/eurostat/statisticsexplained/index.php/Greenhouse_gas_emission_statistics

¹⁴ Ellen MacArthur Foundation, *10 Circular Investment Opportunities* (21st August 2020) <https://www.ellenmacarthurfoundation.org/assets/downloads/Mobility.pdf>

¹⁵ European Environment Agency, *Agriculture. Briefing* (18 February 2015) <https://www.eea.europa.eu/soer/2015/europe/agriculture#:~:text=European%20agriculture%20E%2080%94%2040%25%20of%20the,dramatic%20loss%20of%20grassland%20biodiversity>

¹⁶ 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>

¹⁷ 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

¹⁸ 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

