ELLEN MACARTHUR FOUNDATION

MATERIAL ECONOMICS

COMPLETING THE PICTURE

How the circular economy tackles climate change

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Executive summary

The current response to the global climate crisis represents an incomplete picture. This paper argues that putting in place a circular economy is a fundamental step towards achieving climate targets.

Such a shift moves us beyond efforts to minimise emissions in our extractive linear system. It offers a systematic response to the crisis by both reducing emissions and increasing resilience to its effects. The benefits encompass meeting other goals such as creating more liveable cities, distributing value more widely in the economy, and spurring innovation. These attributes make the circular economy a potent contributor to achieving zero-carbon prosperity.

The world has woken up to the climate crisis, the effects of which are already being felt. The greenhouse gas emissions causing climate change are a product of our 'take-make-waste' extractive economy, which relies on fossil fuels and does not manage resources for the long-term. A step-change is needed to put the world on track to achieve net-zero emissions by 2050 to meet the 1.5˚C target set out in the Paris Agreement. Even if this target is met, costs to the global economy relating to climate change are projected to reach USD 54 trillion by 2100 and rise steeply with every further temperature increase. The incentive to meet the challenge is unquestionable.

To date, efforts to tackle the crisis have focused on a transition to renewable energy, complemented by energy efficiency. Though crucial and wholly consistent with a circular economy, these measures can only address 55% of emissions. The remaining 45% comes from producing the cars, clothes, food, and other products we use every day. These cannot be overlooked. The circular economy can contribute to completing the picture of emissions reduction by transforming the way we make and use products.

To illustrate this potential, this paper demonstrates how applying circular economy strategies in just five key areas (cement, aluminium, steel, plastics, and food) can eliminate almost half of the remaining emissions from the production of goods – 9.3 billion tonnes of CO_2e in 2050 – equivalent to cutting current emissions from all transport to zero.

In industry, this transformation can be achieved by substantially increasing the use rates of assets, such as buildings and vehicles, and recycling the materials used to make them. This reduces the demand for virgin steel, aluminium, cement, and plastics, and the emissions associated with their production. In the food system, using regenerative production and designing out waste along the whole value chain serve to sequester carbon in the soil and avoid emissions related to uneaten food and unused by-products.

This paper further finds that the circular economy has the potential to increase resilience to the physical effects of climate change. For example, in keeping materials in use, businesses can decouple economic activity from the consumption of raw materials vulnerable to climate risks, and therefore build greater flexibility. In the food system, regenerative production improves the health of soil leading, for instance, to its greater capacity to absorb and retain water, increasing resilience against both intense rainfall and drought. More research on the size and nature of the opportunities in this area could reveal even greater potential.

As well as tackling both the causes and effects of climate change, the circular economy can help meet other UN Sustainable Development Goals, chief among them SDG12 (responsible consumption and production). It has been shown that the circular economy framework can improve air quality, reduce water contamination, and protect biodiversity. Its principles offer businesses a raft of innovation opportunities that reduce materials costs, increase asset utilisation, and respond to changing customer demands.

Together, these attributes make a compelling case for seeing the circular economy not just as one option to consider in the quest to meet climate targets, but as a powerful solutions framework for a prosperous future.

Achieving the transformation will require concerted effort: no organisation can do it alone. International institutions can put the circular economy squarely on the climate agenda and give it the prominence afforded other important emission reduction activities such as energy efficiency and reforestation. Governments and cities can weave circular economy principles into their climate strategies. Businesses can scale opportunities that simultaneously create value in new ways and respond to climate change. Investors can mobilise capital towards businesses that actively reduce climate risk in their portfolios.

A complete picture of a thriving, net-zero-emissions economy is coming into focus: the mission now is to make it a reality.

Key findings

Today's efforts to combat climate change have focused mainly on the critical role of renewable energy and energy-efficiency measures. However, meeting climate targets will also require tackling the remaining 45% of emissions associated with making products. A circular economy offers a systemic and cost effective approach to tackling this challenge. This paper shows that when applied to four key industrial materials (cement, steel, plastic and aluminium) circular economy strategies could help reduce emissions by 40% in 2050. When applied to the food system the reduction could amount to 49% in the same year. Overall such reductions could bring emissions from these areas 45% closer to their net-zero emission targets.

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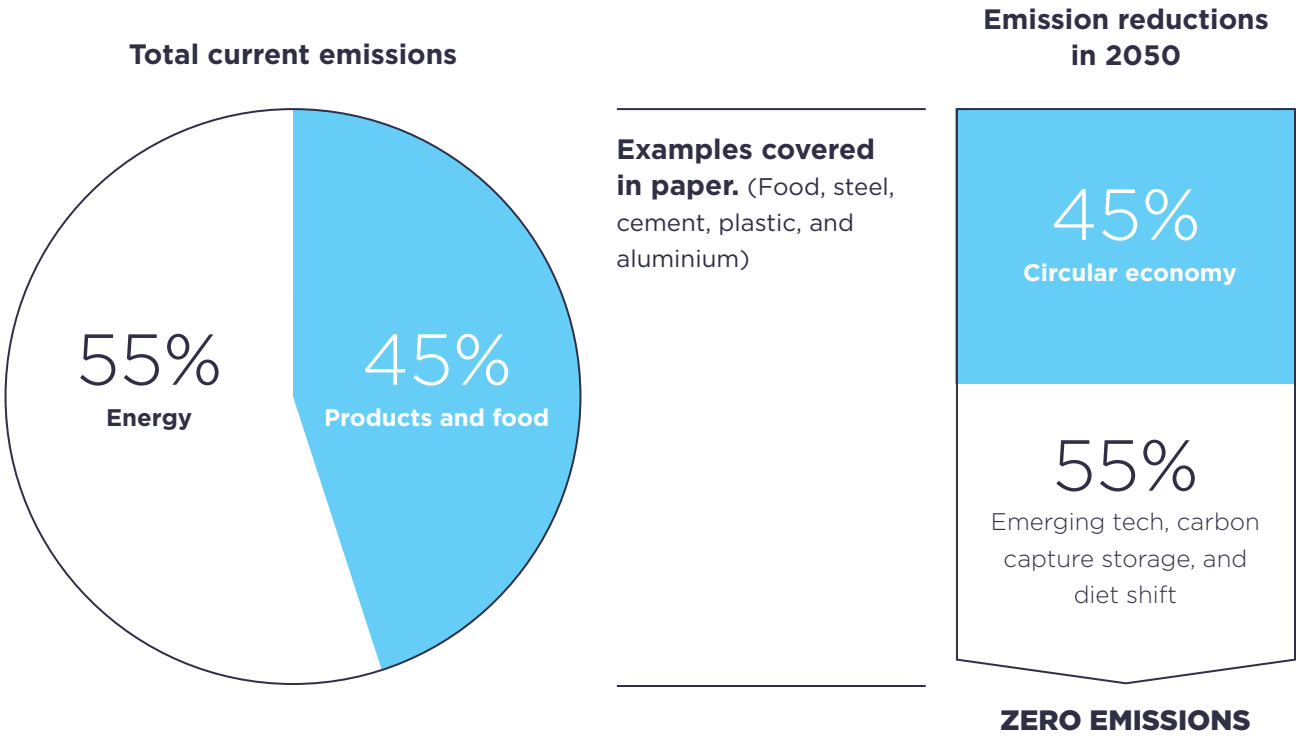
Completing the picture: tackling the overlooked emissions



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