



ABSTRACT

This paper aims to highlight the influence of circular economy (CE) to promote a faster transition toward sustainable development. A circular economy is a systems-level approach to economic development designed to benefit businesses, society, and the environment. Considering that the fundamental principles of CE are the elimination of waste and pollution by design, regenerate natural systems and keep products and materials in use, this economic system reduces resource dependence, protects the environment from overexploitation, pollution and contributes to reducing greenhouse gas emission. Furthermore, CE is in harmony with the inherent interests of the corporations, as it is aligned with the competitive and strategic frameworks. Additionally, CE principles present distinctive chances to help tackle the climate crisis by reducing GHG emissions along supply chains; preserving the embodied energy of products and materials; and increasing carbon sequestration through the regeneration of natural systems. Some reports have shown that the implementation of CE in sectors such as the built environment, mobility, food and, electronics over Europe, China, and India could reduce an average of 22% to 44% the GHG emissions in 2050 when compared to current development scenarios. Therefore, CE represents a shortcut and a viable alternative to achieve sustainable development targets. For example, by contributing to responsible consumption and production (SDG12), CE, a circular economy contributes to at least 12 of the 17 SDG goals outlined in the UN's 2030 Agenda for Sustainable Development.

Keywords: sustainable development; circular economy; environmental protection, sustainable economy

INTRODUCTION

By the end of the twentieth century, it had become clear that the issues of environment and development could not be separated, which influenced the promotion of the concept of sustainable development that focused on environmental, social, and economic. According to the Brundland Report(1987) "Sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Although this concept suggests a symbiotic relationship between environment and economical growth, the economic system prevailing until today is based on the linear system which is characterized by over exploration and inefficient use of resources, large amounts of waste, and missed opportunities to retain the value of materials and products (Prieto-Sandoval, Jaca, & Ormazabal, 2018). Over 30 years, the number of natural resources extracted has doubled since 1980, reaching close to 72 gigatonnes (Gt) in 2010, and is expected to reach 100 Gt by 2030 (Schöder & Anggraeni, 2018, as cited in OECD, 2015). The circular economy (CE) by contrast, extends the lifecycle with methods like reuse, remanufacturing, or recycling of products. Due to its systemic level approach that addresses solutions for an economy in which waste and pollution do not exist by design, where products and materials are constantly used, and natural systems are regenerated (Birat, 2015; Ghisellini, Cialani, & Ulgiati, 2016), this economic model was designed to preserve and increase the value of resources used during production and manufacturing of goods at the same time reducing environmental impacts in the whole life cycle of that activity (Marković, Krstić, & Radenović, 2020). A shift to a CE requires eco-innovations to close the loop of the product's lifecycle, get valuable products from waste and solve the needs of environmental resilience in accordance with economic growth (Prieto-Sandoval, Jaca, & Ormazabal, 2018). Therefore, the transition to a circular economy can make a significant contribution to achieving a more sustainable economy and the Sustainable Development goal set by the UN.

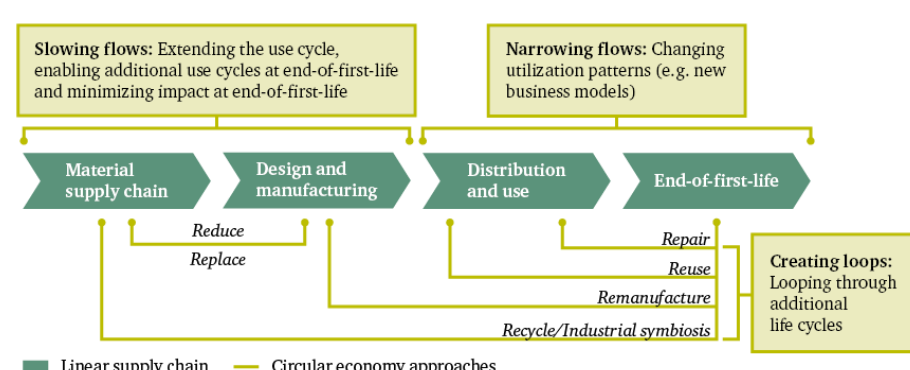


Figure 1: Circular economy approaches . Source: Preston, Lehne and Wellesley (2019), An Inclusive Circular Economy: Priorities for Developing Countries

Table 1:Sustainable Goals, adapted from UN(2015)

SDG 1 – No poverty
SDG 2 – Zero hunger
SDG 3 – Good health and well-being
SDG 4 – Quality education
SDG 5 – Gender equality
SDG 6 – Clean water and sanitation
SDG 7 – Affordable and clean energy
SDG 8 – Decent work and economic growth
SDG 9 – Industry, innovation and infrastructure
SDG 10 – Reduced inequalities
SDG 11 – Sustainable cities and communities
SDG 12 – Responsible consumption and production
SDG 13 – Climate action
SDG 14 – Life Below water
SDG 15 – Life on land
SDG 16 – Peace, justice and strong institutions
SDG 17 – Partnerships for the goals

CE model is essential for reaching several of the economic and environmental goals of the 2030 Agenda for Sustainable Development, in particular Sustainable Development Goal (SDG) 6 (Clean Water and Sanitation), SDG 8 (Decent Work and Economic Growth), SDG 11 (Sustainable Cities and Communities), SDG 12 (Sustainable Consumption and Production), SDG 13 (Climate Change), SDG 14 (Life below Water) and Goal 15 (Life on Land) (Schroeder, P., Anggraeni, K. and Weber, U. , 2018),

OBJECTIVES

The objective of this research is to highlight the main benefits of implementing CE practices and to demonstrate that its implementation is in accordance with the sustainable development goals which contributes to achieve a sustainable economy.

METHOD

The elaboration of this paper was done through a qualitative research based on data collection from environmental and sustainability reports, and case of study of companies that had implemented CE practice throughout its supply chain, matching these actions with the corresponding SDG based on the results obtained .

RESULTS

Some reports have shown that the implementation of CE in sectors such as the built environment, mobility, food and, electronics over Europe, China, and India could reduce an average of 22% to 44% the GHG emissions in 2050 (Ellen MacArthur Foundation, 2019), when compared to current development scenarios. The table below summarizes some of the practices that have been adopted in different sectors of the economy and the SDG achieved by these practices. By tracking these parameters it is possible to evaluate the connection of such actions to reach a more sustainable economy and study strategies to assist other companies to implement such practices in their business model

Table 2: relation of SDG and CE practices in different sectors of the economy

CE practices	SDG	DESCRIPTION	SECTOR	OUTCOMES
Design out of waste / keep products and materials in use	7	Affordable and Clean Energy	industries	Energy and resource efficiency
Design out of waste / keep products and materials in use (reuse, remanufacturing, recycling)	13	Climate Action	industries	Reduce GHG emission - This would bridge half of the existing emissions gap to reach the 1.5°C target as outlined under the Paris Agreement.
Nutrient recovery in agriculture	13		agriculture	
Material substitution	13		Construction sector	
Shared ownership	13		Transport system	
recycling of municipal and packaging waste	13		waste	GHG emission - 424 to 617 million tonnes (MT) of CO2 eq. over 2015–2035
resource efficiency	13		industries, hospitality	GHG emission - reduction of CO2-eq. emissions by around 100 to 200 Mt
reuse	12.5	Responsible consumption and production		reduce of waste, resource efficiency , reduces air, water, and soil pollution along the life cycle
	15.2 / 15.5	Life on land	agricultural	reduce land use for livestock production, halt deforestation and the loss of biodiversity
Reuse and recycling of food waste	7.3/ 7.2	Affordable and Clean Energy	energy	increase the share of renewable energy in the global energy mix / Double the improvement in energy efficiency
Reuse , recycling	7		energy	Expanding energy services for developing countries
regeneration of natural system	13	Climate Action	Built environment, mobility, food, electronics, textile	increase carbon sequestration; lower air pollution
recycling, remanufacturing	8 (8.5)	Decent Work and Economic Growth	industries	New jobs opportunities - European CE employment opportunities ranging from 634,769 (modest scenario) to 747,829 (ambitious scenario) by 2025.
recycling and reuse of water	6	Clean Water and Sanitation / Sustainable cities and communities	sanitation	reduce water pollution, minimizing hazardous chemicals
Refurbishment practices	11		construction sectors	reduce the adverse per capita environmental impact of cities

The circular economy offers an opportunity to tackle emissions and accelerate the transition towards a net-zero carbon economy. According to different scenarios perspectives, it has demonstrated that CE approach could reduce global CO₂ emissions from key industry materials by 40% or 3.7 billion tonnes in 2050 (Ellen MacArthur Foundation, 2019)

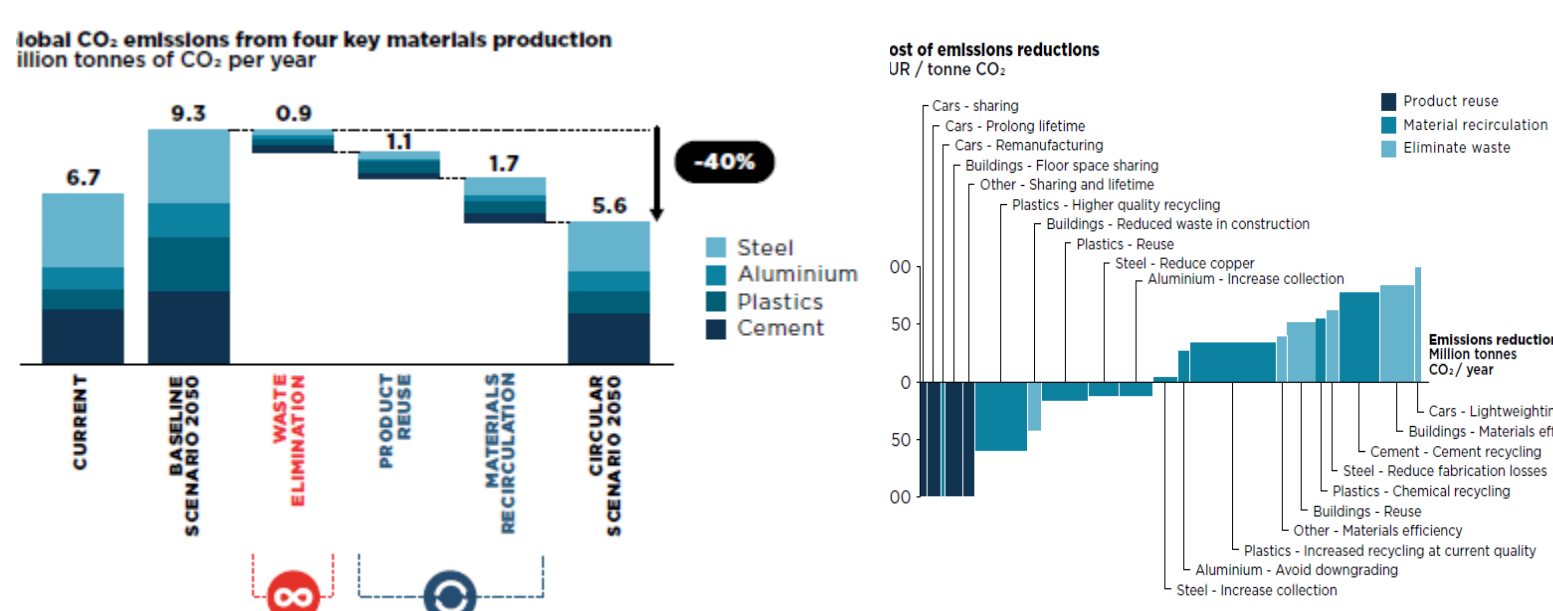


Figure 2: Reduction of CO₂ for circular scenario in different industries Source: (Ellen MacArthur Foundation, 2019)

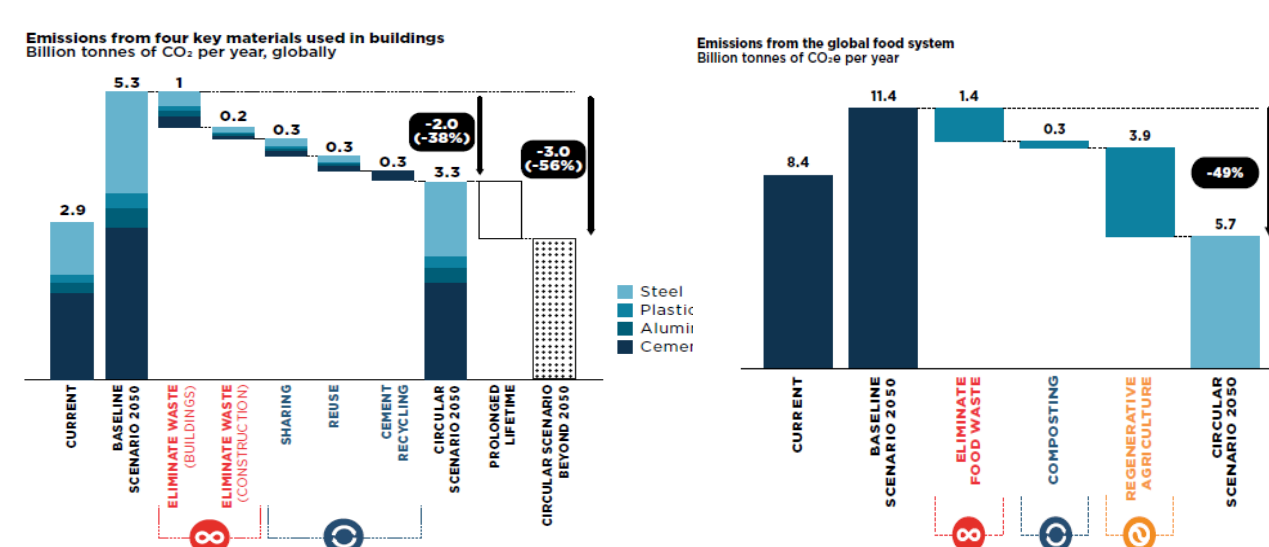


Figure 3: A circular scenario for the built environment (left) and for food sector Source: (Ellen MacArthur Foundation, 2019)

A circular scenario for the built environment could reduce global CO₂ emissions from building materials by 38% or 2.0 billion tonnes CO₂ in 2050, due to reduced demand for steel, aluminium, cement, and plastic, plus CE also reduces the demand for raw material while for the food industry, CE could reduce emissions by 49% or 5.6 billion tonnes CO₂e by adopting regenerative agriculture practices. Furthermore, regenerative agriculture can save money through reduced requirements for agricultural input by recycling organic inputs.

CONCLUSIONS

By analyzing environmental reports of companies that had already implemented CE practices in their business model and comparing the result obtained from such practices, it is possible to state that CE is a tool to manage the transition toward a sustainable economy. Implementing circular strategies in key sectors such as the built environment to the reuse of materials like steel, cement, plastics, and aluminum, could decrease global GHG emissions by 40 percent until 2050, and reduce the dependence on raw material. Furthermore, the implementation of CE practices such as design out of waste, keep products and materials in use through recycling could also boost economic growth by creating new job opportunities. Thus, by applying CE practices such as design out of waste, keep products in use through reuse, remanufacturing and recycling, and regenerative natural system it is possible to boost the transition towards a sustainable economy as it will have positive effects on social, economic, and environmental levels

SUMMARY

- Application of CE practices will benefit the most the following economic systems: food and agriculture, cities, energy and materials, and health and well-being.
- Main Sustainable Development Goal(SDG) accomplished through CE model are in particular SDG 6 (Clean Water and Sanitation), SDG 7 (Affordable and Clean Energy) , SDG 8 (Decent Work and Economic Growth), SDG 11 (Sustainable Cities and Communities), SDG 12 (Sustainable Consumption and Production), SDG 13 (Climate Change), SDG 14 (Life below Water) and Goal 15 (Life on Land)
- CE practices bring benefits to all pillars of sustainable development: social, economic and environment

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