



future planet 
Smart Cities
Circular Economy



The **need for a change in the production model** is clearly understood when looking at the expected **population growth data between now and 2050, which will bring with it an increase in global demand and consumption.**

According to the United Nations in its "World Population Prospects" document published in 2019, **the world population is expected to grow to 8.5 billion people by 2030 and to 9.7 billion by 2050.** Furthermore **global GDP could double between now and 2050¹** due to growth in emerging economies and with significant increases in per capita income. Increased demand will also double the use of materials, **leading to unsustainable environmental pressures.** Without change, by 2050, **the level of global consumption would require the resources of 3 planet Earths,** according to the World Wildlife Fund (WWF).

According to the Ellen Macarthur Foundation in its paper The New Plastics Economy, **annual waste generation is projected to grow by 70% by 2050.** if no action is taken, plastics will account for 15% of the global carbon budget and 20% of oil consumption by 2050 (up from 1 and 6% in 2014).

The fight against climate change is changing the way we do things so that the **development of society is done in a way that is environmentally responsible.** The linear economy, which has been the traditional model of production, extracts raw materials, manufactures products that are to be used and discarded without taking into account the environmental footprint that this generates and the consequences in the future. Natural resources are limited and it is necessary to move to a model of regenerative, sustainable growth.

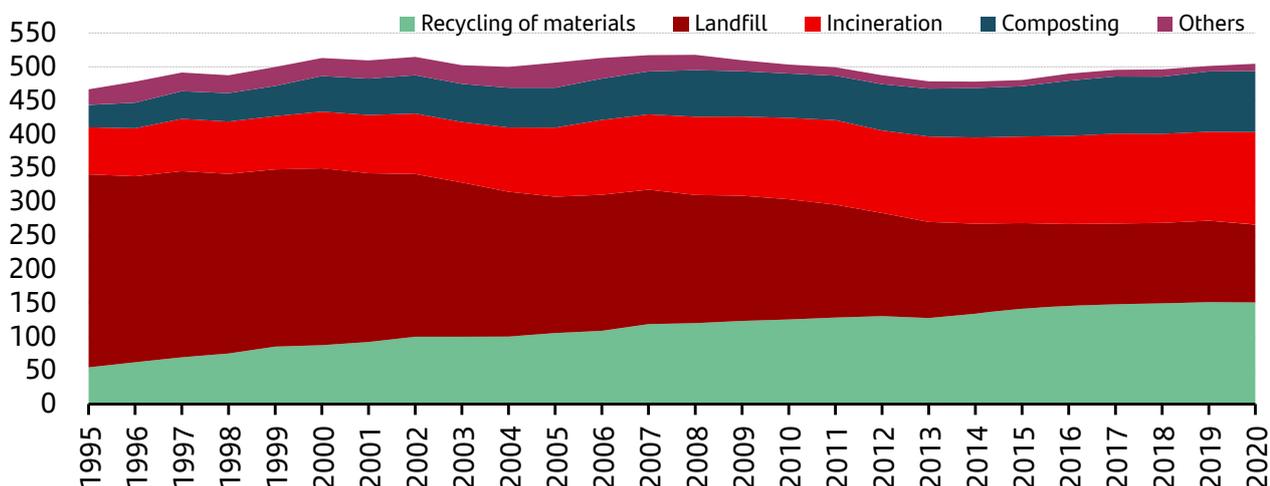
A **circular economy is an industrial system that is restorative by intention and design.** It aims to address global challenges such as climate change, biodiversity loss, waste management and pollution. In order to implement this sustainable model, the circular economy is based on three axes: **reduce, reuse and recycle.** Put another way, the circular economy has first and foremost, at its core, the objective of **"designing out" waste.** Waste does not exist, since products are designed and optimized for a cycle of disassembly and reuse. Secondly, **circularity introduces a strict differentiation between the consumable and durable components of a product.** These are designed from the outset for reuse. Thirdly, **the energy needed to feed this cycle should be renewable** in nature, again to decrease resource dependency and increase the resilience of the system (e.g. to oil or gas shocks).

The European Union in 2020 launched the **"Circular Economy Action Plan" as part of the European Green Pact.** This initiative seeks to maintain the value of resources in the economy for as long as possible while generating the least amount of waste. In addition to **promoting the manufacture of sustainable products as the norm,** among the measures it proposes is to **focus on essential value chains with high circularity potential,** such as plastics, electronics, textiles and construction. It also wants to ensure that there is less waste generation. With all of the above, it seeks to reduce environmental pressures and generate socioeconomic benefits in the area.

Municipal waste treatment, European Union, 1995-2020

(kg per capita)

Source: Eurostat



1. <https://www.pwc.com.ar/es/prensa/hacia-2050-economias-emergentes-tendran-poder-economico-del-mundo.html>



Main areas of innovation in Circular Economy

Waste management



According to Sostenibilidad.com, currently approximately 40% of the world's waste is contained in landfills, which are very harmful to the environment as they alter the ecosystem, generate emissions and can contaminate aquifers.

Waste management consists of: a) **minimizing the amount and hazardousness** of waste generated, b) **recovering raw materials and waste that can be reused** or reintroduced into the production process itself or into other processes of other industries, and c) the **ability to convert waste into real energy**. New machinery known as "digesters" can take the waste and the biogas it produces and convert it into energy that can be used on site.

Thermal conversion is another new technology that can be used to convert waste into specialty products. This process takes some cues from natural geothermal processes that use heat and pressure to convert useless materials into useful products. On the other hand, there are sensors that can alert waste management companies when containers are full and need to be screened. There are also types of **screening technology that can sort recyclable materials quickly and efficiently**, taking the work out of the hands of consumers and encouraging higher recycling rates.

Smart and sustainable packaging



Smart packaging refers to **packaging that goes beyond the simple task of packaging, as it has built-in sensors that enable better handling and monitoring of all types of products, including food or pharmaceuticals**.

They are of **special relevance for the conservation in the food chain** because at the time of production there is a control of the conditions of the installation but once the product comes out, this control is lost. Currently the most widely used is a temperature indicator, which will indicate when the product is outside the required parameters. Other examples are heatable packages that heat up without the aid of any heat source, those that cool instantly. *Smart packaging* is becoming especially relevant with the increasing concern for the environment as it is a **solution to reduce food waste and improve food safety**.

In the case of pharmaceuticals, it can be used to monitor that the temperature of a drug is optimal or to control counterfeiting with smart labels.

Collaborative economy platforms



The **collaborative economy or collaborative consumption** is an economic model in which, **fundamentally, users take advantage of new technologies to lend, buy, sell, share or rent goods and services**. It is a constantly evolving form of business, as new spaces are constantly emerging where it can be used.

Among the most prominent sectors of the collaborative economy are **accommodation**, which through websites and apps allows the exchange of homes between individuals; **transportation**, which thanks to applications that connect drivers and passengers to travel together and avoid further pollution while saving money; **second hand, where you can extend the life of any type of goods by selling them instead of discarding them**; **restoration**: apps through which **food waste is avoided** by offering packages by bars, supermarkets and food stores that have not been sold and that if not consumed have to be discarded.



Examples of relevant companies in Circular Economy

L'ORÉAL

L'Oréal SA engages in the **manufacture and sale of hair and beauty products**. It operates through the following segments: Skin Care and Sun Protection, Makeup, Hair Care, Hair Color, Hair Color, Fragrances and Other. Its **commitment to sustainability** is that by 2025 100% of **packaging will be reusable, refillable, recyclable or compostable**. By 2030 100% of **packaging will be made from recycled plastic or biodegradable sources**. The company was founded by Eugène Schueller in 1909 and is based in Clichy, France.



Veolia Environnement S.A. designs and **delivers water, waste and energy management solutions that contribute to the sustainable development of communities and industries**. Through its three complementary activities, Veolia helps to **develop access to resources, preserve available resources and replenish them**. The Veolia group supplies 95 million people with drinking water and 62 million with wastewater, produces nearly 43 million megawatt hours of energy and treats 47 million tons of waste. Veolia's home country, France, generates more than 35% of total revenues. Its origins date back to 1853.



Waste Management leads the solid waste industry in the United States. Through its subsidiaries, the company serves millions of residential, industrial, municipal and commercial customers in the United States and Canada. Waste Management **provides collection, transfer, recycling and resource recovery and disposal services**. Its sites include some 270 owned or managed landfills (the largest network in the industry) and some 350 transfer stations, as well as about 100 materials recovery facilities. Collection services account for more than 65% of sales.



Tomra Systems develops, manufactures and markets machines used to recycle beverage containers.

The company's container return machines (RVMs) are used in retail establishments to **identify returned beverage containers** (glass, plastic, aluminum or steel) and refund customer deposits. The RVMs are used to process refillable and non-refillable beverage containers: **refillables are identified by shape, sorted and packaged for transport back to the bottler; non-refillables are sorted, crushed and compacted so that they can be melted to make new containers**.



Trex Company, Inc. is a leading manufacturer **of decking, railing and other items made from recycled materials**.

It combines the durability of recycled plastic with the natural beauty of reclaimed wood in high-performance decking products.

As one of the largest plastic recyclers in the United States, **Trex prevents 400 million pounds of plastic and wood from reaching landfills each year**. An average 500-square-foot Trex composite deck contains 140,000 recycled plastic bags (company data).

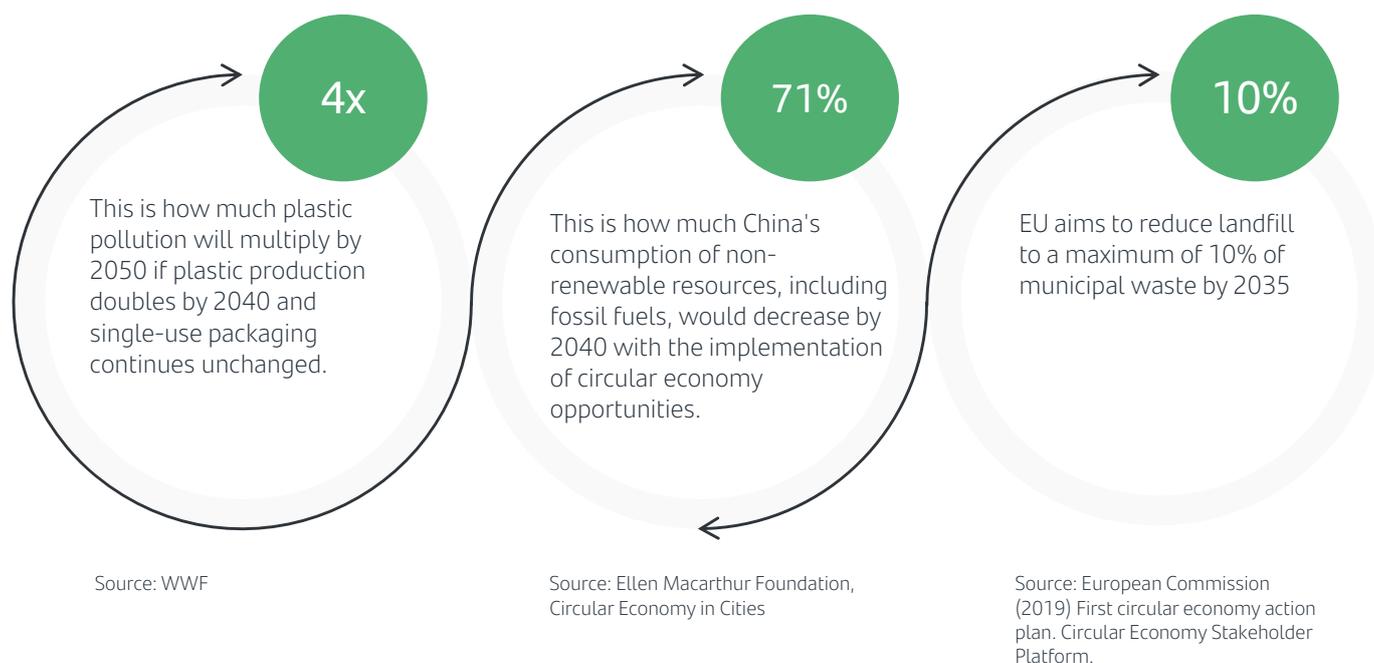


Corbion N.V., supplies **bio-based products made from renewable resources**.

The company's main products are lactic acid, lactic acid derivatives and lactides, as well as functional blends containing enzymes, emulsifiers, minerals and vitamins for global markets such as bakery, meat, pharmaceuticals and medical devices, personal and home care, packaging, automotive, coatings and resins.



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