

Factsheet No. 4

Bio-based Products and Services in the Circular Economy

What is the circular economy?

Although still loosely defined, according to the EU the “circular economy (is the economic space) where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimised”. It, therefore, **aims to keep products, components, and materials at their highest utility and value at all times, making use of waste prevention, recycling, up-grading and cascading uses.**

Throughout its evolution and diversification, our industrial economy has hardly moved beyond one fundamental characteristic established in the early days of industrialisation: a linear model of resource consumption that follows a ‘take-make-dispose’ pattern. Companies harvest and extract materials, use them to manufacture a product, and sell the product to a consumer – who then discards it when it no longer serves its purpose.

A circular economy is an industrial system that is restorative or regenerative by intention and design. It replaces the ‘end-of-life’ concept with consecutive cascade usage aiming at restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair re-use, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models. Since waste will still occur for a long time, an increasing implementation of the waste hierarchy, with a strong focus on recycling, is a crucial aspect of the Circular Economy, too.

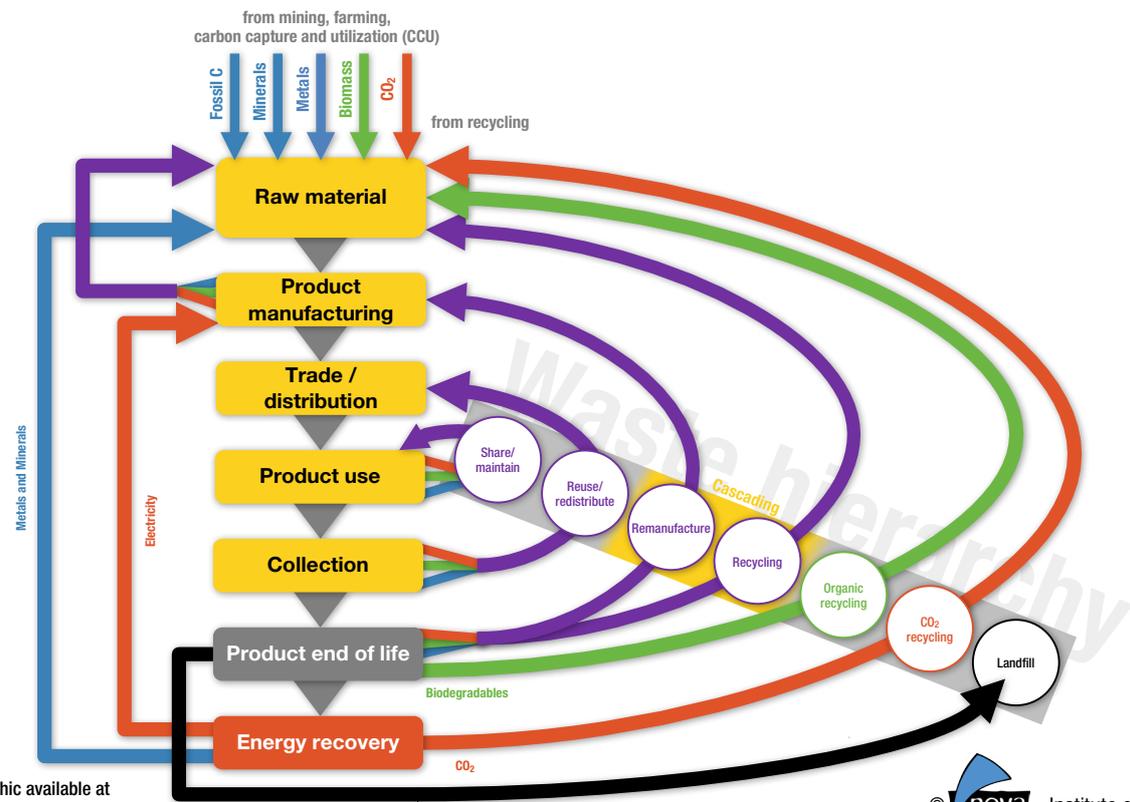
By focusing on a more circular economic system, the EU aims at boosting its competitiveness and creating new business opportunities. A new approach to resource utilisation may encourage the development of new business models for a more sustainable growth, e.g. sharing or leasing models instead of product ownership, which will contribute to retaining raw materials in the value chain and facilitate achieving closed resource loops. This will also encourage the transition from a resource-intensive to a labour-intensive economy. Circularity will also increase new skills focused on services, such as repairing and leasing/renting.

Due to the fact that all resources can be broken down to essential materials, to make an economy truly circular all products need to be divided according to their waste streams, under a waste hierarchy. This can be easily understood in the picture below. The hierarchy of material use should be prioritised from the centre of the picture to the exterior, being landfill a process to be completely banned.

McKinsey estimates shifting towards circularity could add \$1 trillion to the global economy by 2025 and create 100,000 new jobs within the next five years. McKinsey and Ellen MacArthur foundation, 2015.

“90% of the raw materials used in manufacturing become waste before the product leaves the factory while 80% of products made get thrown away within the first six months of their life.” (Girling 2005)

Comprehensive Concept of Circular Economy



Circular Economy, Circular Procurement and other Bio-based Public Procurement schemes

What is Circular Procurement?

- Circular procurement is a different way of acquiring goods and services that promotes consideration of the whole lifetime of the products throughout their supply chain and focuses on the use of the products and associated services rather than their ownership (ICLEI – Local Governments for Sustainability).

Procurement as an enabler of circular economy:

- Public authorities spend approximately 1.8 trillion euro annually, representing around 14% of the EU's gross domestic product. By purchasing products that can contribute to closing resource loops, public procurers could play a significant role in the transition towards a circular economy. The different national and EU procurement policies should aim to shift the traditional procurement practices to support the circular transition.

- Examples:
 - Circular Procurement of furniture – City of Venlo, The Netherlands
 - Creating a circular approach to fashion in Europe, ECAP – European Clothing Action Plan

Green Public Procurement:

- In recent years several voluntary GPP criteria for different products and service categories have been developed in the EU. These criteria aim to facilitate the inclusion of green requirements into tender documents. The European Commission seeks to make sure that more attention is placed on the aspects of products that are relevant to the circular economy. Durability and reparability of products and other circular economy aspects will be given more emphasis when developing and/or revising future EU GPP criteria.

Possible creation of local jobs

- The circular economy focuses on keeping resources in the economy, rather than extracting more from the environment. This demands a high level of remanufacture,

reuse and servitization, to keep resources in use for as long as possible products need to be taken apart and refurbished. One of the results of encouraging the circular economy is that it increases economic activity as a result of increasing labour intensity. This is significant to local communities as product refurbishing is typically done as locally as possible.

Circular Economy and bio-based products and services

It is widely accepted that biomass flows and the cascading principle are part of the circular economy. However, the concept of bioeconomy and the bio-based economy go far beyond the circular economy (see figure below). The main differences are caused by the resource basis and end of life options.

While the circular economy should be based on renewable and sustainable resources, the bioeconomy's raw resources are sustainable and renewable by nature (literally!), in so long as they are properly managed.

As products reach their end of life, assumptions are usually made on the capacity of bio-based materials to be circular. Although commonly made believe that they are circular by nature, not all bio-based products, for a variety of reasons, are circular. However, the bioeconomy can provide products that contribute to the enhanced circularity of our economic model:

- Use of by-products and waste
- Biodegradable solutions being returned to the circle
- Successful recycling of wood and paper
- Innovative additives from oleo-chemicals enhancing recyclability of other materials
- After threshold volume reached: Recycling of bioplastics

Bio-based plastics and recycling

Plastics are composed of a variety of components, some of which can be bio-based. Some of the bio-based components, such as PE and PET, are chemically identical to currently used petroleum plastics and can, therefore, be recycled through already existing recycling systems.

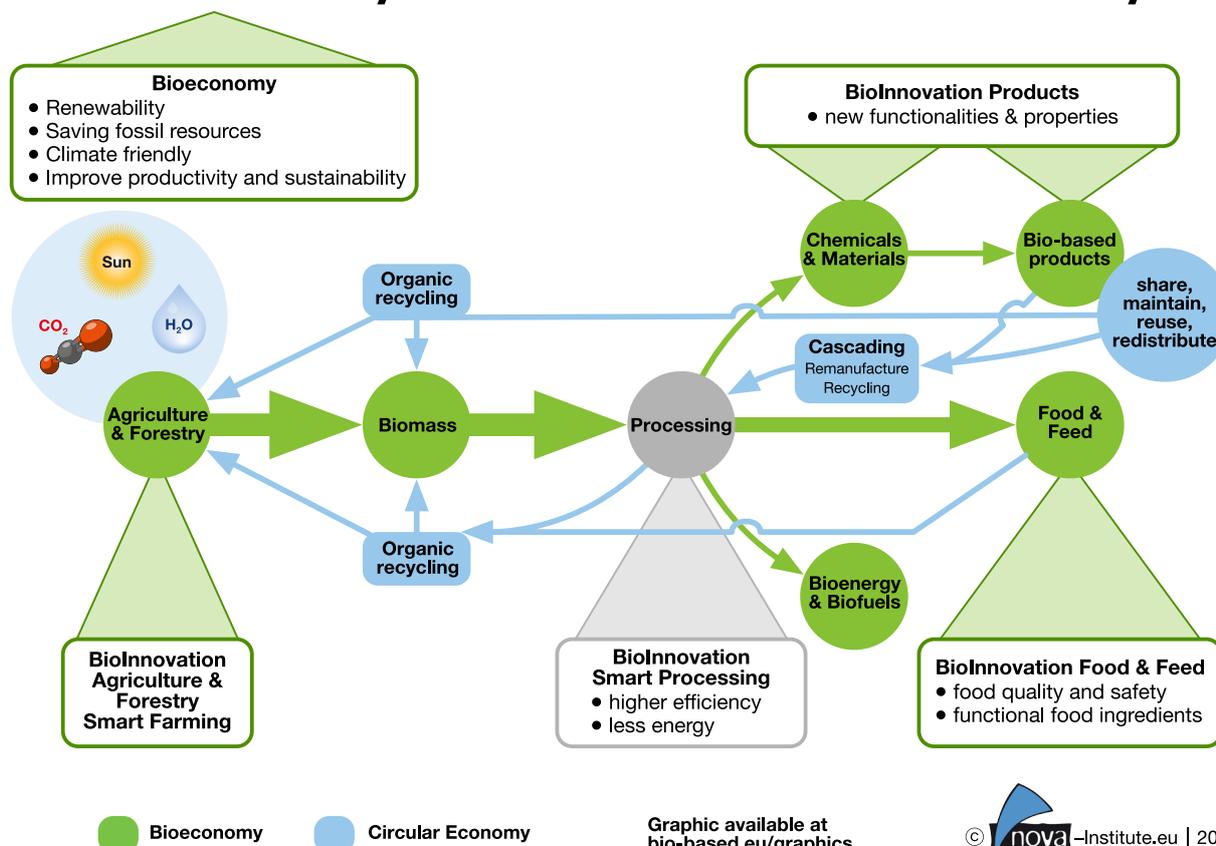
However, in order for recycling to be economically viable, a volume threshold needs to be surpassed for each 'plastic family'. Unfortunately, this results in several plastics (both petro- and bio-based) not being economically attractive for recycling, even if they are technically recyclable. Already now, of the dozens of plastics available on the market, only a small number of fossil plastics are recycled in the existing systems (PE/PET, PP, PVC and PS), with most others ending in landfill or incineration as their volumes are too low to justify their collection and separation.

Recent research (www.open-bio.eu) has shown that bio-based plastics, when they enter existing recycling streams, do not contaminate these streams any more than any of the other existing petro-based plastics do. In consequence, this means that bio-based plastics have the exact same impacts in terms of circularity as any plastic which is not recycled for the economic reasons explained above. It should be noted that thermal recycling (incineration) has been accepted by EU authorities as a valuable disposal route for a circular economy as well.



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Bioeconomy: More than Circular Economy



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InnProBio seeks to build a community of public procurement practitioners interested in the procurement of bio-based products and their associated services. This factsheet series aims to provide concise information on topics of relevance to public procurement of bio-based products and services.

Partners:



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