PACKALL

PackAlliance:
European alliance for innovation training
& collaboration towards future packaging

Linking Academy to Industry.

Training program: modules

- **Eco-design & novel manufacturing processing**
  - New materials and biomaterials
  - Citizen and Consumer Engagement
  - Residue management and valorisation

Co-funded by the
Erasmus+ Programme
of the European Union

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Recycling: one route toward the circular economy

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Linear economy vs circular economy

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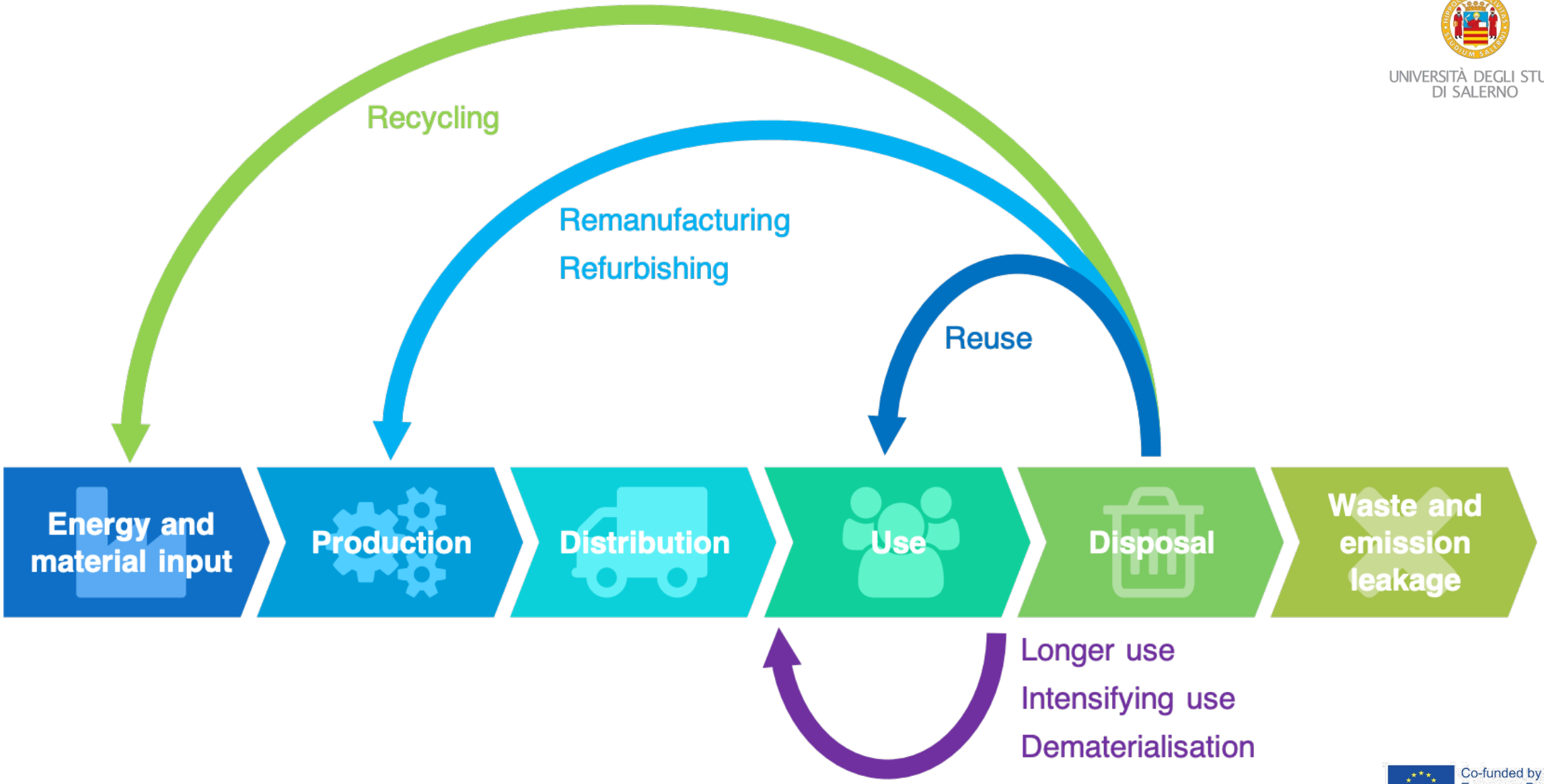
Toward the circularity of the plastic industry



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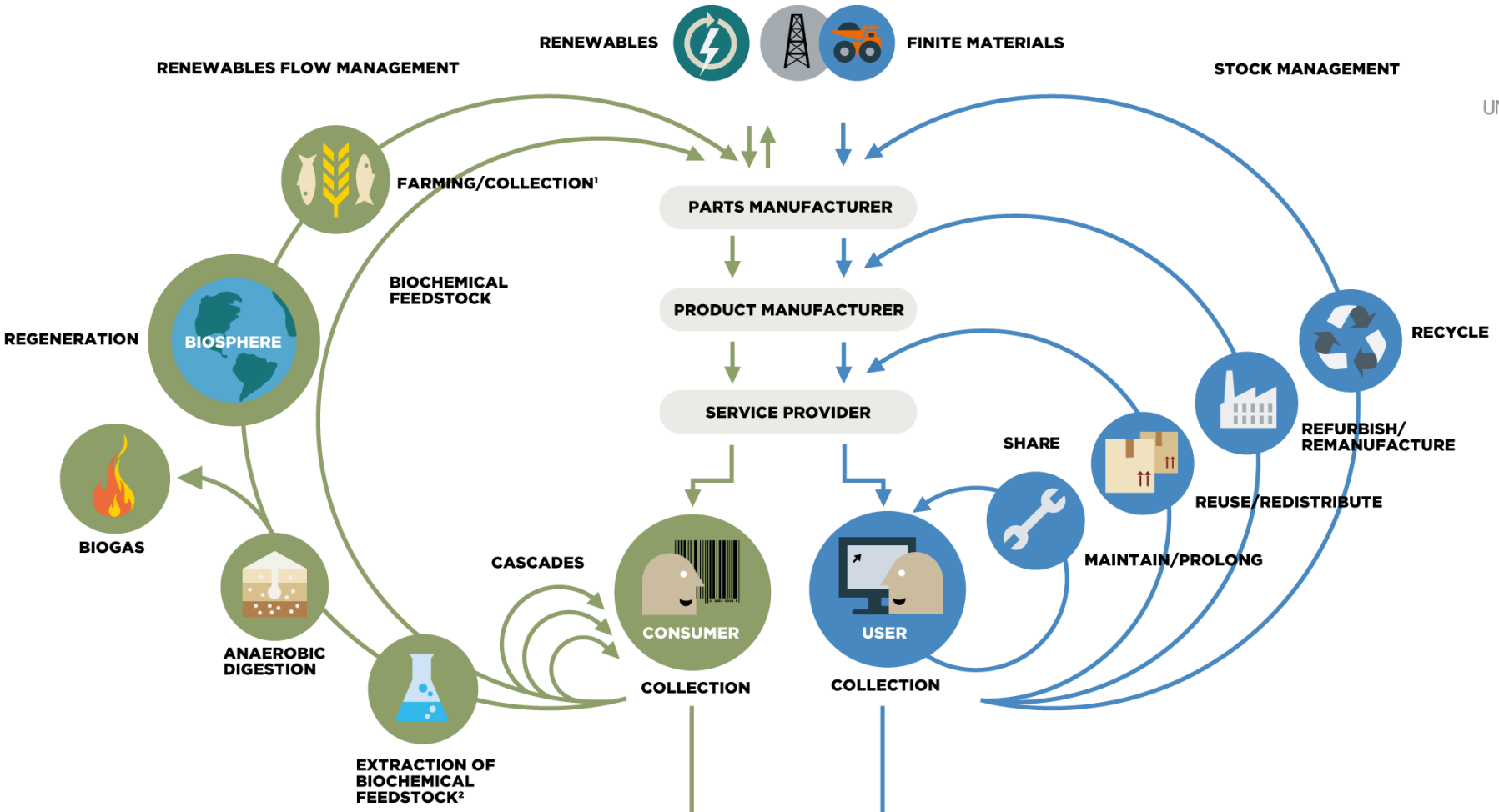
Toward the circularity of the plastic industry



1 Hunting and fishing
2 Can take both post-harvest and post-consumer waste as an input

SOURCE
Ellen MacArthur Foundation
Circular economy systems diagram (February 2019)
www.ellenmacarthurfoundation.org
Drawing based on Braungart & McDonough, Cradle to Cradle (C2C)

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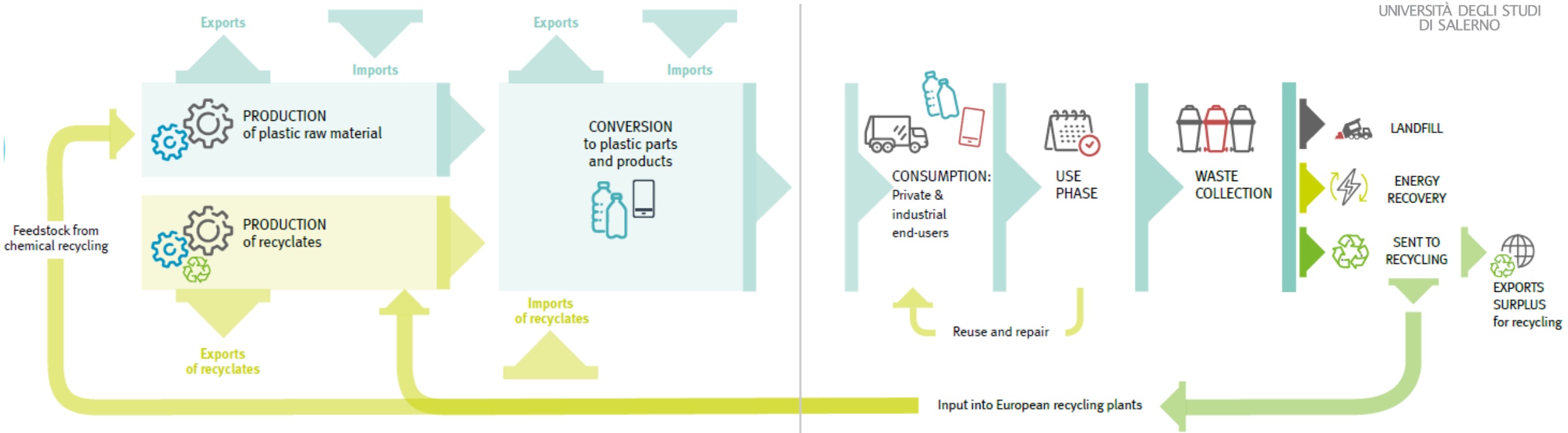
Toward the circularity of the plastic industry



Today, 60% of plastic products and parts have a use phase between 1 and 50 years, or even more.
This lapse of time determines when they will potentially become waste.
This is why, in a single year, the quantity of collected plastic waste does not match the quantity of production or consumption.

Source: PlasticsEurope

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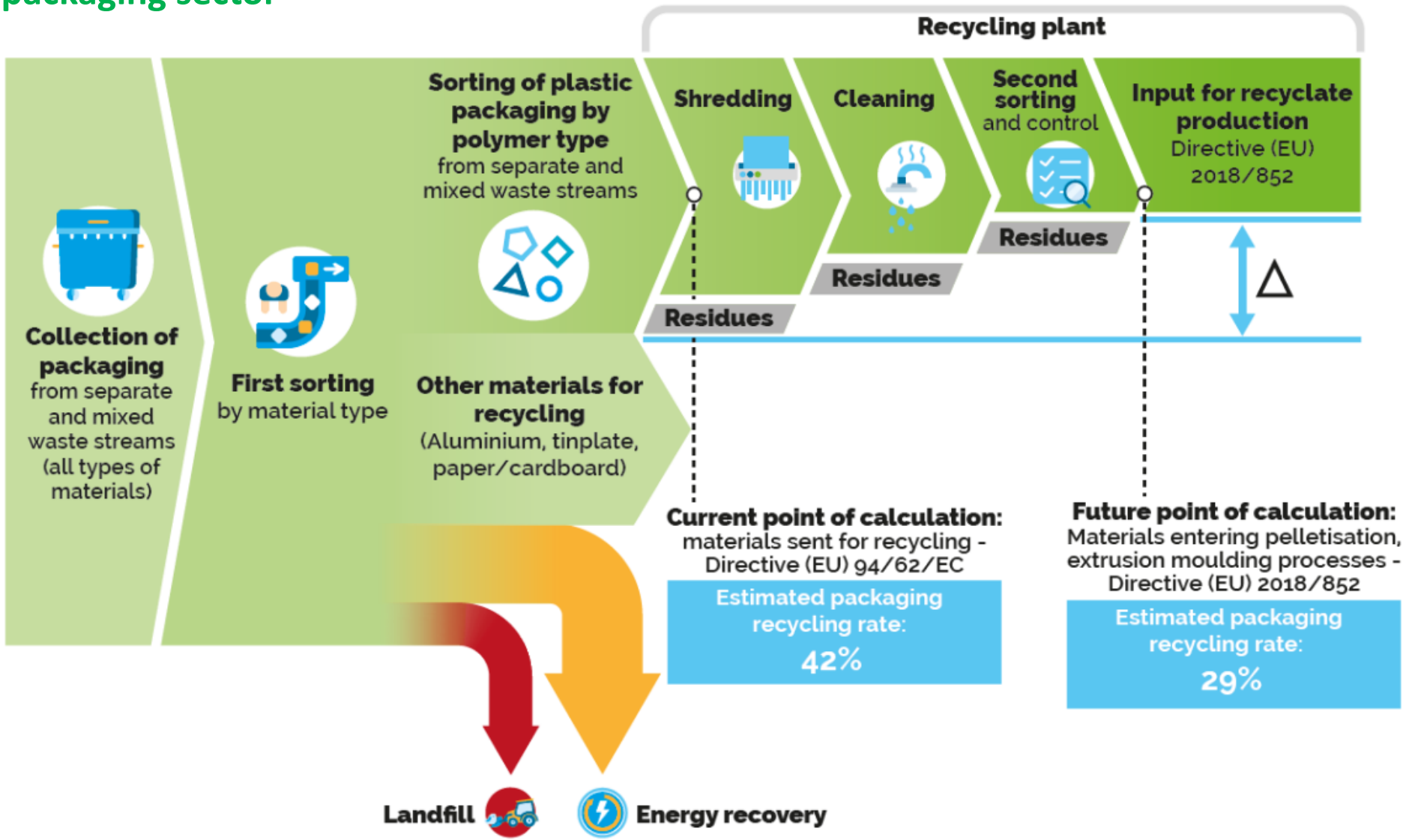
Toward the circularity of the plastic industry

Plastic packaging sector



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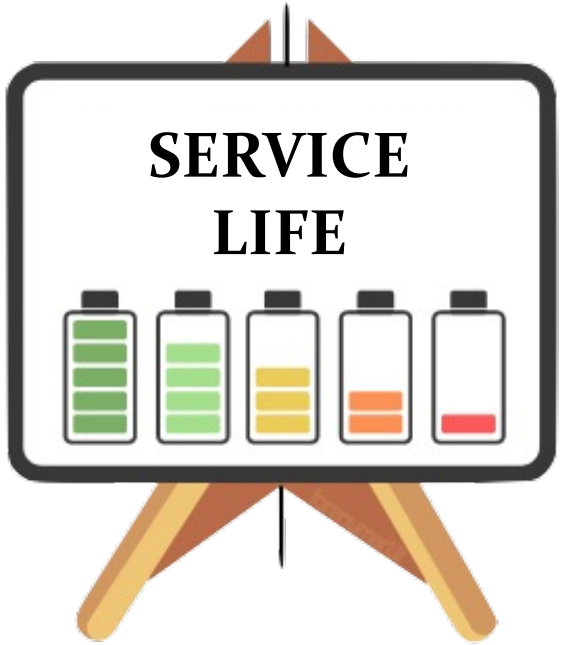
What is the service life of a product?



Service life is "a product's total life in use from the point of sale to the point of discard“.

Service life is strictly related to the type of product and can be strongly different: packaging as a very short service life, durable items (e.g. a PVC window or a car component)

The shorter the service life, the higher the environmental impact of the end-of-life management.

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Plastics Recyclability

In order to help the policy makers in defining laws and rules to foster the circular economy, in 2018, two international organizations, the European **Plastics Recyclers Europe** (PRE) and the American **Association of Plastic Recyclers,** has worked together to a definition of "**Plastics Recyclability**", that is what is to be considered recyclable.

Previously, the term «*recyclable*» was used generically, without a clear and univoque definition.

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Plastics Recyclability

According to this definition, **in order to be considered recyclable**, a plastic item must meet **four conditions**:

Plastics must meet four conditions for a product to be considered recyclable:

1. The product must be made with a plastic that is **collected for recycling**, has **market value** and/or is **supported by a legislatively mandated program**.
2. The product **must be sorted and aggregated into defined streams** for recycling processes.
3. The product can be **processed and reclaimed/recycled with commercial recycling processes**.
4. The recycled plastic becomes a raw material that is **used in the production of new products**.

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Plastics Recyclability

This definition **does not intend to restrict innovation**.
For innovative materials to be recyclable, **it shall be demonstrated that they can be collected and sorted** in sufficient quantities and are **compatible with existing industrial recycling processes** or have **sufficient material quantities to justify operating new recycling** processes.

Nonetheless, **fulfilling these four categories does not automatically designate a product recyclable**. Recycled material is available in many different quality grades which depend among others on the quality of the input material to the process. **Recyclability will however depend on the specific design of each packaging that will have to be evaluated** by the recycling protocols.

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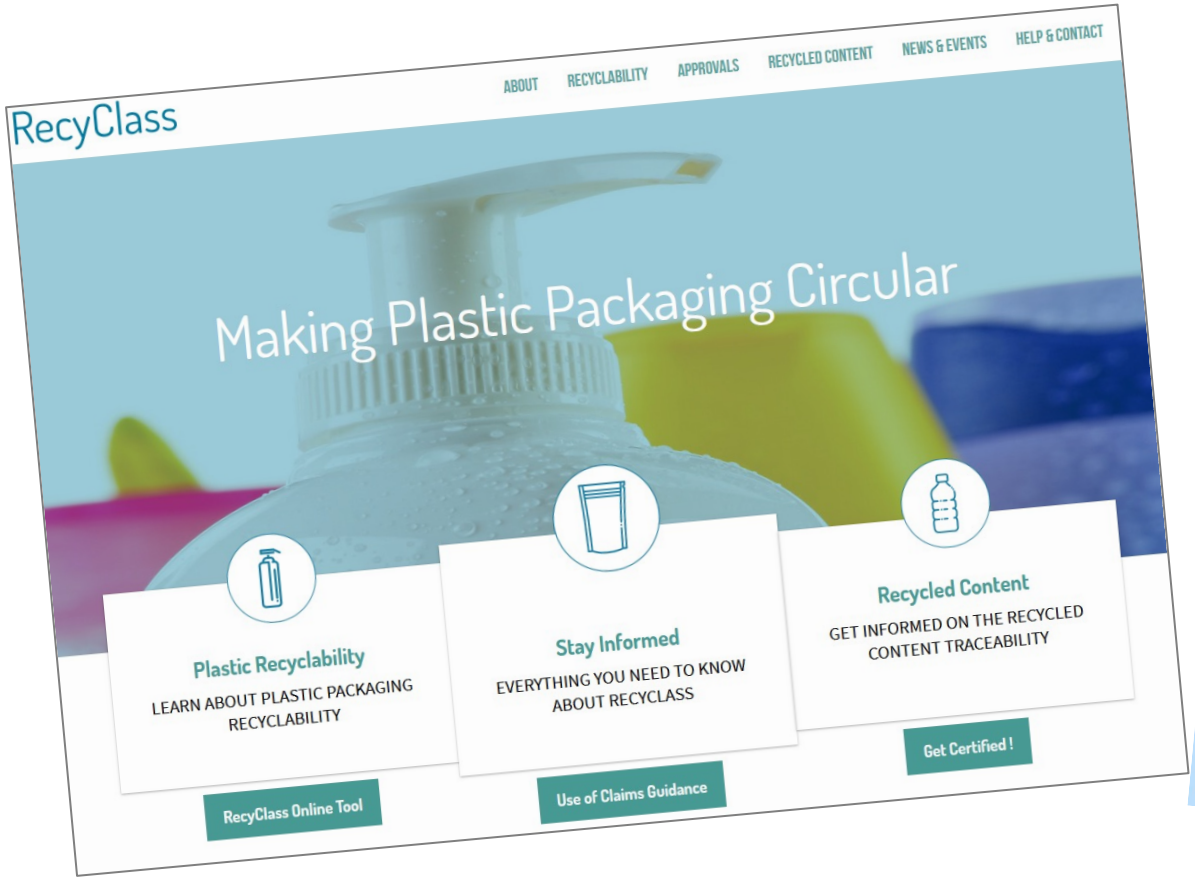
Recyclability protocols



https://recyclass.eu/

https://plasticsrecycling.org/apr-design-guide

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Post-industrial and post-consumer waste

Post-consumer fraction

It is based on the products that has been used and completed their service life.

As for packaging they are typically collected by the municipalities.

Other sectors have their own collection systems (ELV, WEEE,…)

→ Eterogenous mixture of may different materials: it must be sorted!

Post-industrial scraps

It is based on post-industrial scraps and products that do not comply with the specifications (off-specs)

→ Easier recycling process (in some cases it can be milled and reuse immediately)

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