# Circularity of the Belgian plastics industry

Progress report

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## Content

**The Belgian plastics industry is fully committed to this transition to a circular economy and progress is clearly being made**

## Introduction

This brochure contains an update of the **data on the circularity of the Belgian plastics industry** in 2020. The data were collected as part of a Pan-European study carried out by Conversio for Plastics Europe. They are based on publicly available information, market knowledge and insights from interviews with polymer producers, plastic converters and plastic recyclers.

The Belgian Plastics industry is **fully committed to this transition to a circular economy and progress is clearly being made**. Nevertheless the challenges are multiple: unbalanced supplies, logistic challenges, and unadapted legal framework, to name a few.

There is also a lot of eagerness to change, however: new investments to make plastics circular are announced or under preparation, new cross-sectorial collaborations are being set up, and companies are involved in innovation projects to maintain the material in the loop at the highest value, because this is what a circular economy is all about.

*May 2022*

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director, essenscia PolyMatters

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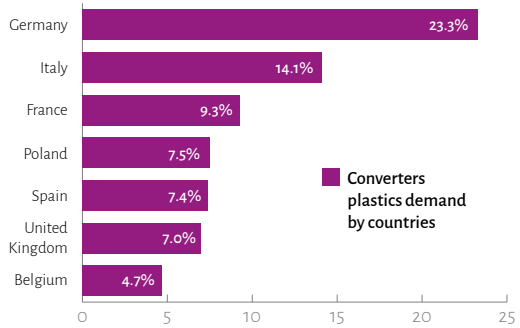
## The Belgian plastics industry in the European context

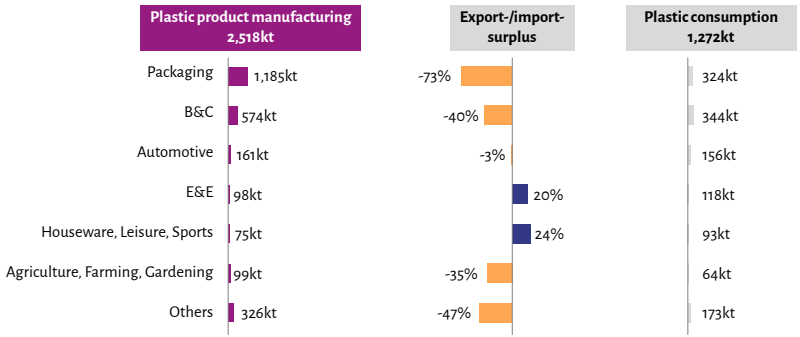
The Belgian polymer producing and plastic converting industry is **one of the key manufacturing industries in Belgium**. Our industry accounts for 4.7% of the European plastic converting industry, putting it on the **7th position right after the major European countries**.



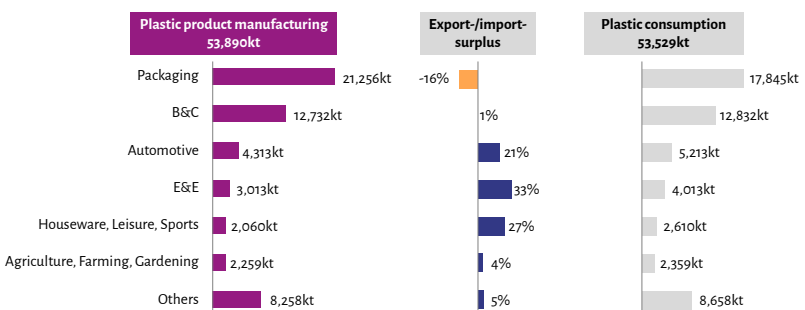

Plastics - the Facts 2021 · Plastics Europe

Whereas export and import of plastic finished products are more or less in balance on a European level, Belgium is a **net exporter of polymers as raw materials and plastic finished articles**. With a share of 44%, the plastics industry is the **second largest contributor to the Belgian trade balance**. Nearly ¾ are exported to the EU27 countries with our neighbouring countries as major trade partners.

**Plastic consumption by end-consumers in Belgium**
(including virgin material & recyclates)

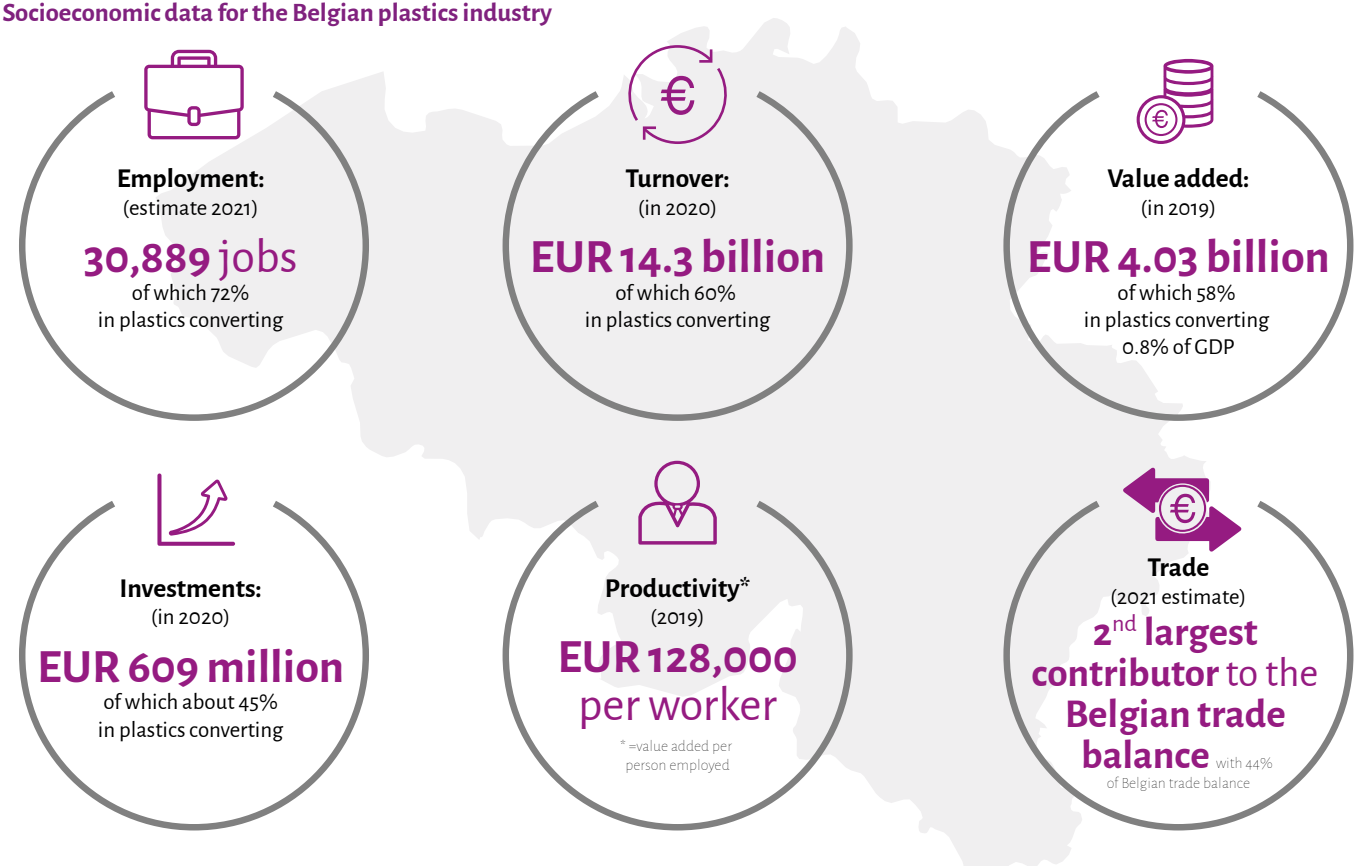



**Plastic consumption by end-consumers in EU27+3**
(including virgin material & recyclates)




## The Belgian plastics industry is one of the key manufacturing industries in Belgium

## Socioeconomic data for the Belgian plastics industry




*Sources: VAT declarations, Eurostat, BNB [National Bank of Belgium],ONSS [National Social Security Office]*



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## The Belgian plastics value chain

**Polymer production**

Belgium remains one of the major polymer producer hubs across the world, accounting for 6,820 kt of virgin plastics in 2020. Also 310 kt of recyclate were produced in Belgium in 2020.

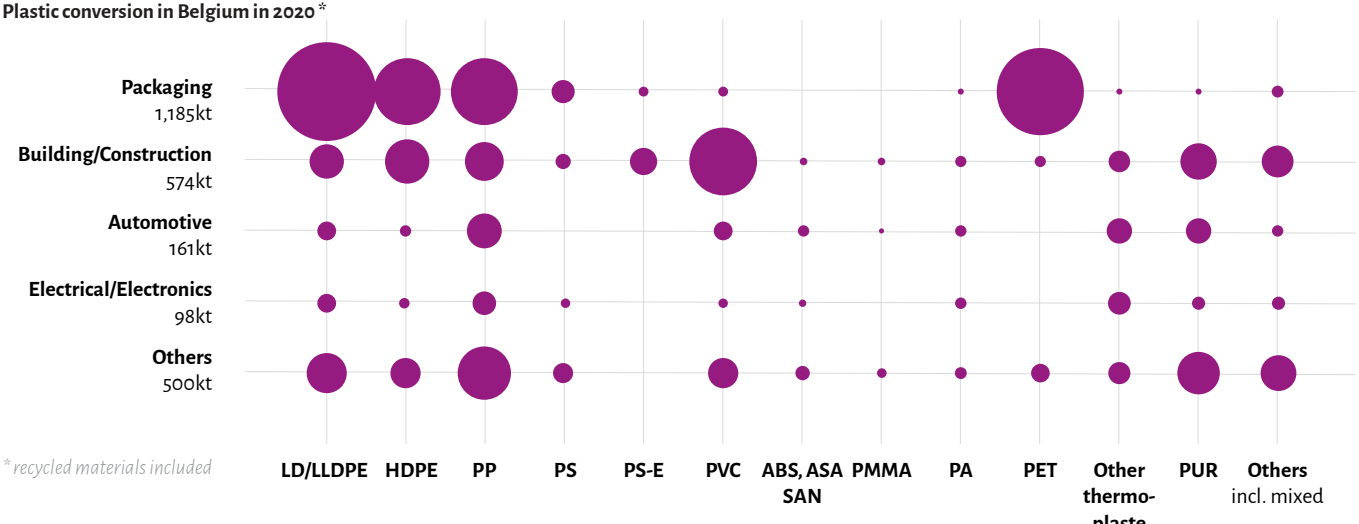
**What polymers are used and where?**

As there are many types of metals, there are also many types of plastics. Different types of polymers are used in combination with various additives depending on the technical specifications of the end products.

The Belgian plastic converters used 2,520 kt of plastics for a wide variety of applications. This includes 180 kt pre-consumer recyclate and 190 kt post-consumer recyclate. Polyolefins such as PP, HDPE, L(L)DPE are the most commonly used polymers next to PVC, PET and PS.

In 2020 the **packaging applications** accounted for **almost half of the plastic volumes converted** (47%) in Belgium, followed by **building and construction representing 23%** of the volumes.

**Plastic conversion in Belgium in 2020** *



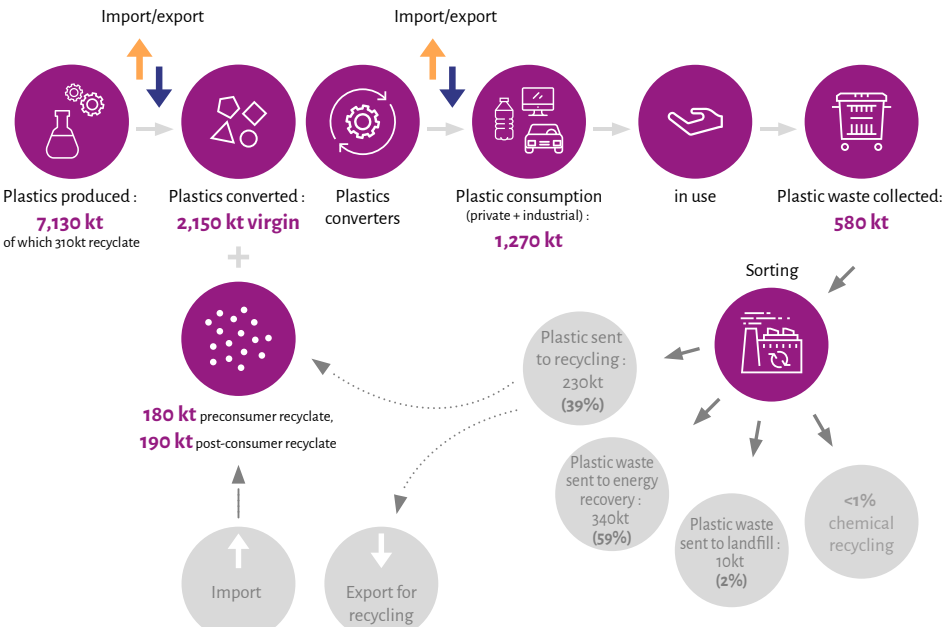

** recycled materials included*

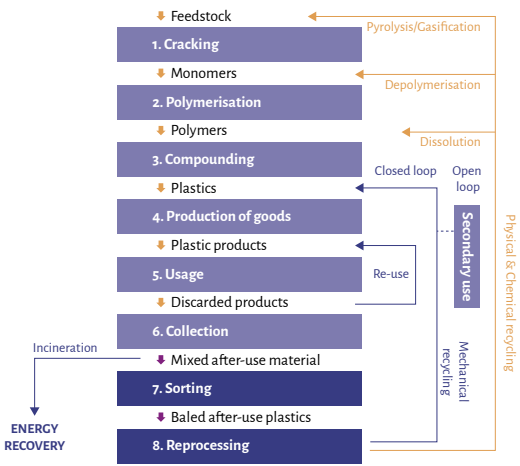
**+22%**
increased uptake of post-consumer recycled plastics

## The plastics value chain

**The uptake of post-consumer recycled plastics** by the Belgian converters **increased by 22%** from 160 kt in 2018 to 190 kt in 2020 whereas the use of pre-consumer waste (180 kt) remained at the same level. Around 370 kt of recycled plastics were converted in total, which corresponds to an average recycled content of 15% from total plastic converting in 2020. This is comparable with the European average.

For the sake of clarity and a comparison with the previous reports, this report focuses in the subsequent chapters on the use of recycled plastics coming from post-consumer waste only.






## Circular plastics

A circular economy of plastics cannot be achieved by focusing on the recycling part alone. **The focus must also be on innovation and business models that prevent waste, keep material in use and protect and restore our environment**.

One of the first principles of a circular economy is to **minimize the use of raw materials where possible**. This concept needs to top the list of concerns during the product and process design. If you can reduce your raw material loss by 10%, you can attain a 2% growth margin[1]. On average, manufacturing companies lose 18% of purchased raw materials in the production process through the generation of scrap or material that is out of specifications.

Discarded and 'end-of-life' products often still offer a lot of value. A good knowledge about how the products are discarded, by whom and why is critical, as they can perhaps be re-used, get a new life in a second-hand market after revision or remanufacturing. **Ideally the development of the end-of-life processes** like dismantling, collection, sorting, etc. **will be integrated in the product design as well** so as to make the product de facto re-usable.

This requires engagement from companies and intimate customer involvement during the life of the products, but it also comes down to making use of digitization. **A smart choice of digital technologies can accelerate the implementation of the circular economy**.

Product-as-a-service combinations are one of the new revenue models in the circular economy that have been tried and tested. **Instead of pure product sales, traditional products are reinvented as services and the customer pays based on consumption**. Customers can benefit from an increased quality and functionality of the product as the initial production costs can be divided over many uses, while companies can save up considerable amounts in logistics and drive sales through brand loyalty.

**How easily post-consumer material is recycled depends heavily on the infrastructure of collecting, sorting, pre-treatment and reprocessing technologies** that are in place in a certain area for the specific material.

1. *Whitepaper: "Circulaire economie: hoe starten als bedrijf?, Agoria-Sirris, 2020*

As the circular economy for plastics is developing, the need for novel recycling technologies is emerging.

1. **Mechanical recycling** refers to operations that aim to recover plastics via mechanical processes like grinding, washing, separating, drying, re-granulating and compounding. The highest quality (purity) recyclate streams can be used in so-called closed loop recycling trajectories. Other qualities can be recycled into lower value applications. Current mechanical recycling processes are limited by cost, degradation of mechanical properties, and inconsistent quality products. Rudimentary analysis suggests that **mechanical recycling will remain the most effective method to recycle plastics in terms of time, economic cost, carbon footprint and environmental impact**[2].

2. **Physical recycling**, also called dissolution recycling, is a process in which the polymers are selectively dissolved and seperated from undesired additives, fillers or other layers. It allows the recovery of the pure polymers as well as the other substances where desired.

3. **Chemical recycling** is the process of converting polymeric waste by changing its chemical structure and turning it back into monomers or other feedstock for the chemical industry. The chemical recycling of plastics is often complementary to traditional recycling methods as it allows the recycling of plastics which are not recyclable through mechanical recycling such as thermosets, contaminated waste or degraded plastics from products with long life times. The chemical recycling of polymers has gained popularity in recent years, as depolymerisation to form the original monomers offers the potential, if not the reality, of infinite recyclability. Non-selective chemical recycling affords raw materials that need to be captured higher up in the material value chain and will therefore also need more transformation steps and risk a bigger ecological footprint. **The adoption of chemical recycling requires further investments and a harmonized and strong policy and regulatory framework, and more public-private partnerships**[3].

2. *Mechanical Recycling of Packaging Plastics: A Review - Schyns - 2021 Macromolecular Rapid Communications - Wiley Online Library]*

3. *Chemical recycling · Plastics Europe*

**Complementary recycling technologies are developing**

In a circular economy the use of plastics is fully decoupled from the consumption of finite fossil resources. This means that next to the use of recyclates, all other virgin materials need to come from alternative, renewable resources ensuring they are responsibly managed and environmentally beneficial.

A lot of effort has already gone in the development of bio (plant)-based raw materials and their application. Several technologies are moreover under development for the capture, transport and conversion of $CO_2$ into alternative raw materials.

**Reform use of resources**

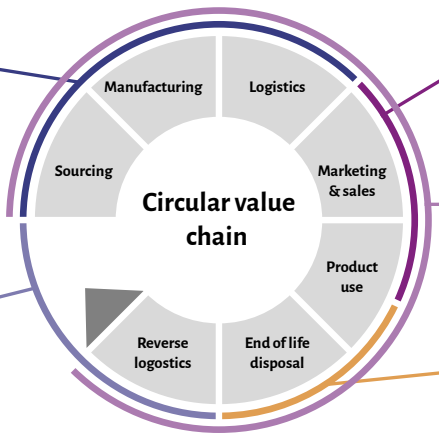
**Circular supply chain**

Use of renewable energy, bio-based or potentially completely recyclable materials

**Recover value in waste**

**Recovery & recycling**

Recovery of usable resources or energy from waste or by-products




**Optimise capacity use**

**Sharing platform**

Increased usage rates through collaborative models for usage, access, or ownership

**Offer outcome oriented solutions**

**Product as service**

Offering of products for use with retention of product ownership which incentivises increase in resource productivity along the whole life cycle

**Extend life cycles**

**Product life extension**

Extension of the life cycle through repair, maintenance, upgrading, resale and remanufacturing

## On the origin of the plastic containing waste

In Belgium, the plastic containing waste accounts for only 1.6% of the total volume of waste generated.

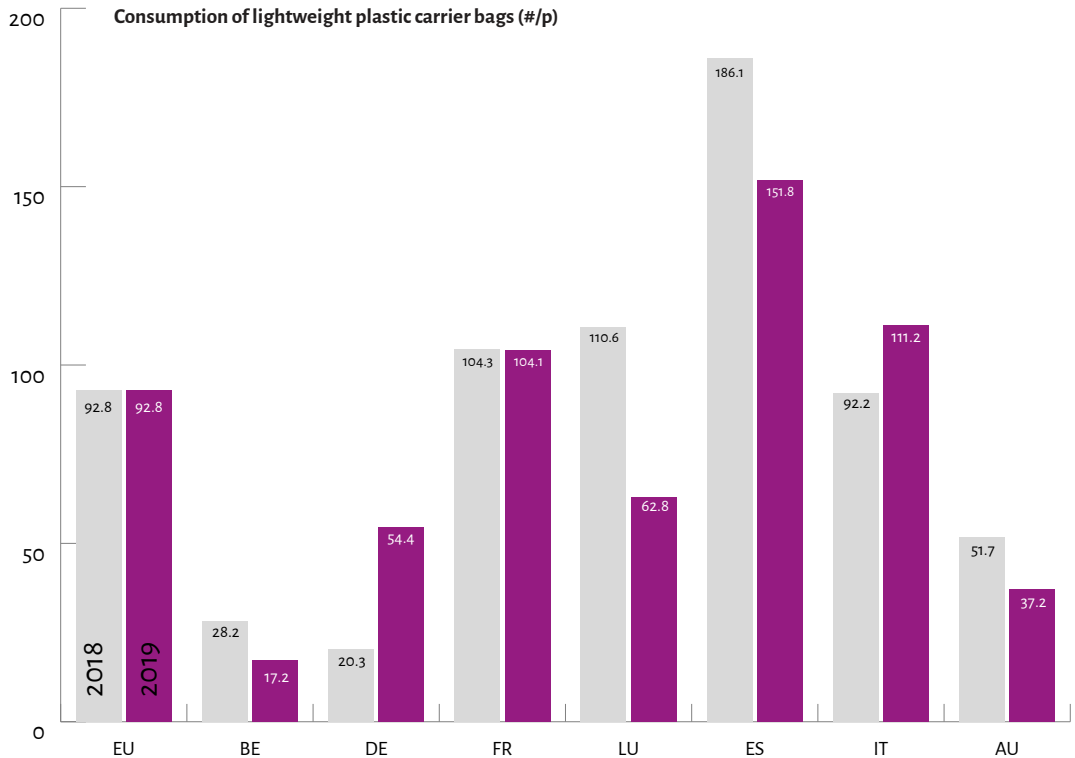
## The amount of plastic containing waste generated in 2020 has decreased by 4%

Total post-consumer waste in Belgium in 2020:
**37,250 kt**

Total plastic containing post-consumer waste in Belgium:
**580 kt = 1.6%**

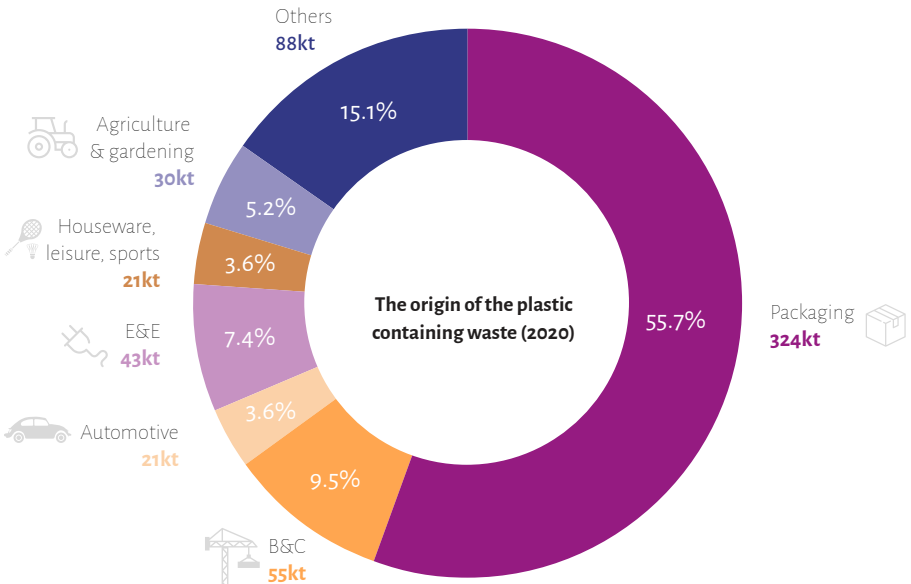
**-39%**
decrease in consumption of lightweight plastic carrier bags

Statistics | Eurostat (europa.eu)




One of the examples is the significant reduction in the use of plastic carrier bags per inhabitant in Belgium which was already well below the European average.

56% of the plastic waste generated in Belgium comes from packaging applications. However the **amounts of plastic waste generated in 2020 have decreased by 4%** compared with 2018, thanks to a decrease in plastic packaging waste. This may be attributed to a combination of the covid crisis and the various initiatives to reduce the consumption of packaging.

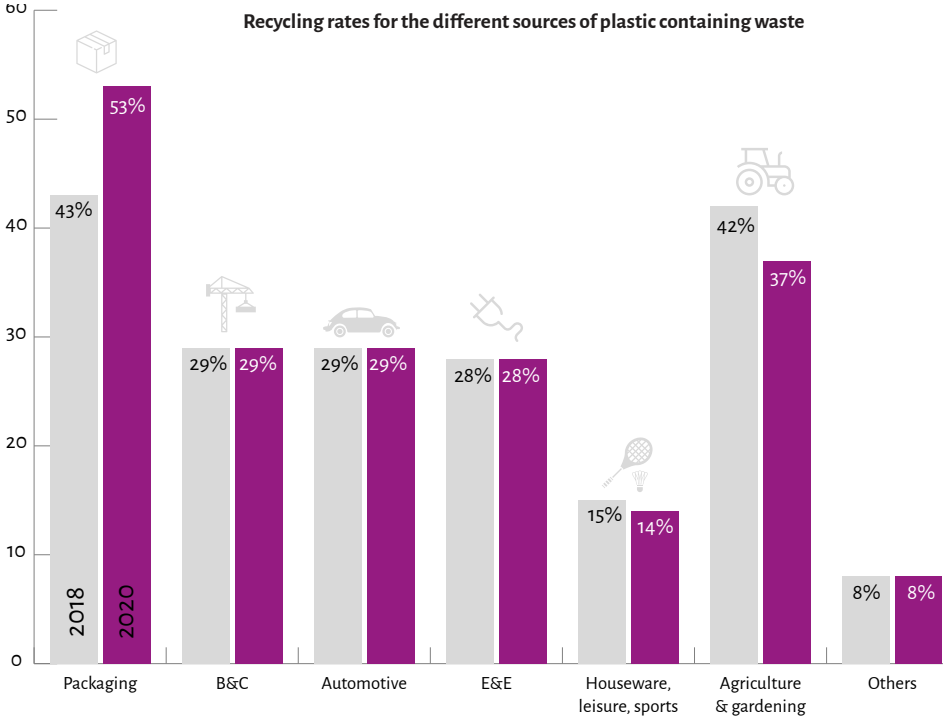



Looking at the **other market segments overall**, the amount of **plastic containing waste and the recycling rate have remained stable since 2018**. Compared to the packaging sector, plastic-containing goods in these sectors have a longer lifecycle and the emphasis in legislative pressure has been on single-use plastics. Upon closer scrutiny, only in building and construction was more plastic containing waste generated compared with 2018 (+8%).

At the same time, more of it was sent to recycling also, which leads to a break-even recycling rate of 29%. The Electrical & Electronic equipment segment produced 8% less plastic containing waste, but a similar amount compared with 2018 was sent to recycling. In Agriculture and gardening the plastics waste produced remained at the same level compared with 2018, but it was the only sector where a significant reduction in the recycling rate of -5% was observed.

**+15%**
increase in recycling rate of post-consumer plastic waste

**53%**
plastic packaging waste is recycled




The overall recycling rate for all post-consumer plastic waste increased from **34% in 2018 to 39% in 2020, well above the European average of 34%.**

Although **less plastic packaging waste was generated in 2020** compared with 2018, more was sent to recycling, **increasing the recycling rate from plastic packaging waste from 43% to 53%**.

Whereas the recycling rates from packaging waste significantly increased, it remained stable for most other applications. For plastic waste from agricultural applications a decrease was observed.

## End-of-life of plastic waste

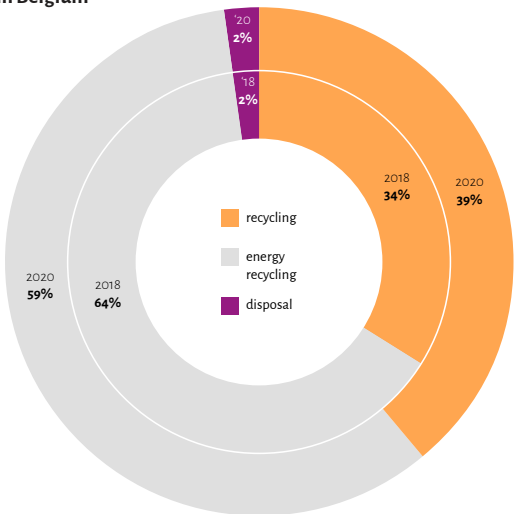
So far, we have focused on the amount of plastic containing waste that was recycled, but what happens to the remaining fraction? It is important to analyse further the part that goes to energy recovery or is disposed of in landfills.

In Belgium, the part sent to **landfill** totals 2% of the collected plastic containing waste, which is the same amount as in 2018. This amount is very small compared with the European average of 24%.

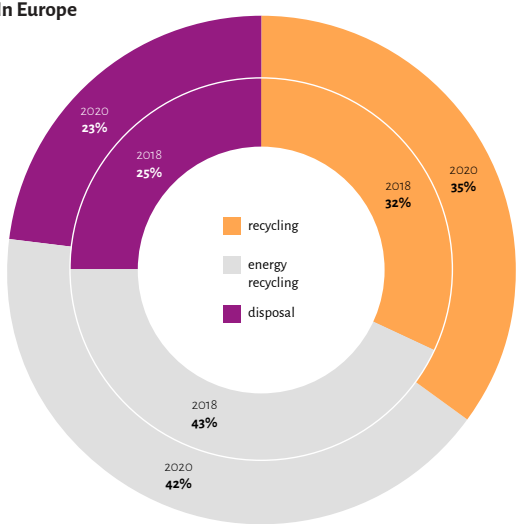
The part of the collected waste going to **energy recovery** in Belgium decreased to 59% in 2020 from 64% in 2018, which is a stronger trend than for Europe where a decrease to 42% in 2020 (-1% versus 2018) is observed. The much higher percentage in energy recovery for Belgium is where the most potential for improvement is to be found.

**39%**
of plastic waste is sent to recycling

**End-of-life fate of plastic waste in Belgium**

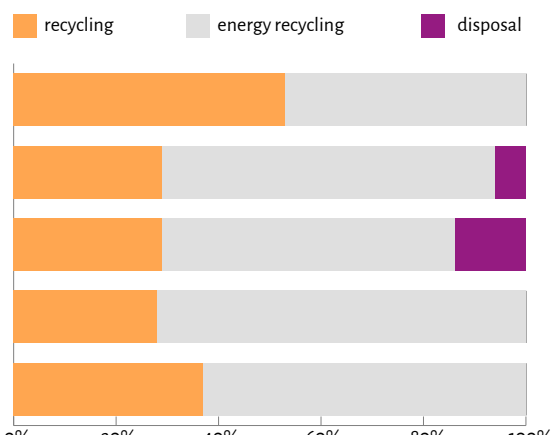



**End-of-life fate of plastic waste In Europe**



When we delve into the numbers per sector in greater depth, we also notice substantial differences in the way we handle our Belgian waste. The numbers show that none of the waste in the Packaging, electrical and electronic equipment and agriculture & gardening segments goes to disposal. Remarkably the highest percentage was noted for Automotive waste (14%), but this is still considerably lower than the 40% measured for Europe in this market segment. Further investigation is needed to explain these numbers and perhaps find other opportunities for this waste portion. **In the spirit of evolving into a true circular economy, additional efforts are required to increase the recycling rates and prevent plastic waste to be sent to incineration with energy recovery.**

**Ranking of Belgium on recycling rates from plastic waste in EU27+UK**

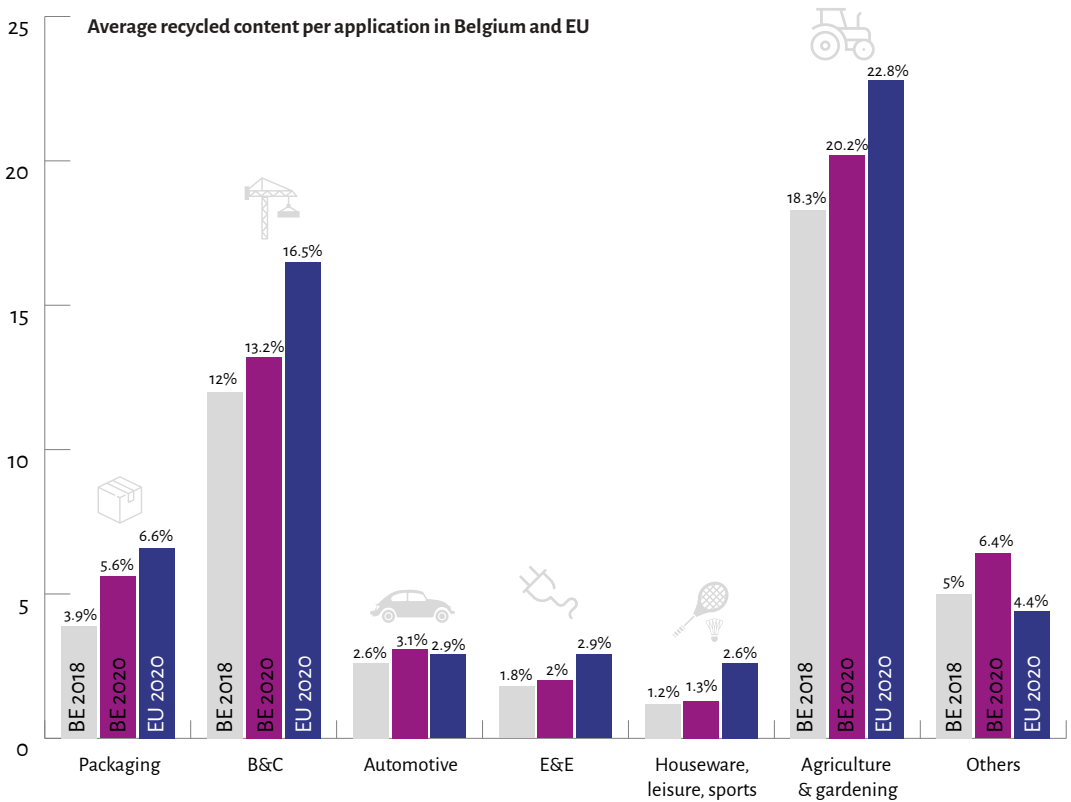


## The uptake of recycled plastics

The **uptake of recycled plastics** from post-consumer waste increased **from 6.2% in 2018 to 7.6% in 2020**. About 190 kt of recycled plastics are converted into new products. The largest increase in the **uptake of recycled plastics** are seen in **packaging applications** where the recycled content **increase with more than 40%**.

The highest recycled contents are observed in building and construction applications and agriculture and gardening applications.

However, compared with the European average, the uptake of post-consumer recycled plastics in Belgium is below average. One of the reasons is that Belgium is highly specialized in packaging for food contact applications, where the use of recycled plastic is limited due to legislative barriers.



## Outlook

### Six pathways to more circularity for the Belgian plastics value chain

In the first report **6 key areas for accelerating the circularity of plastics** were identified. Actions have been initiated in all six areas, with initiatives from various stakeholders.

1. **Adapt standards, specifications and legislations:** a prerequisite to increasing the uptake of circular material is to remove legislative and normative barriers prohibiting the use of recycled material. Technical performance and quality need to constitute the driver instead of the origin of the material. The authorities are starting to revise standard specifications to accepted recycled materials. Acceptance of chemical recycling in methodologies to calculate recycling rates from plastic-containing waste or recycled content in new products is crucial. A harmonized adaptation of legislation across Europe is needed to guarantee a single market for products, materials and materials recycled from waste.

2. **Increase selective collection:** Deviating plastic-containing waste from incineration or landfilling towards recycling will drastically increase the circularity of plastics. On a European level we call for a zero plastics to landfill strategy. On a Belgian level, the impacts of the extended blue bag only started to become apparent in 2020 but more growth is expected in the next report. In 2021 the selective collection for matrasses was initiated. And the industry works together with other sectors to identify priority streams for separate collection, for example in construction applications.

3. **Intelligent design:** designing products so that they are easy to repair or to dismantle, combining materials in a smart way or adding markers for better sorting, the role of digitisation to contribute to the circularity of plastics has only begun. For products with long lifetimes, digital material passports will allow for better information sharing on the composition of the articles.

4. **Cooperation:** improving circularity requires the complete value chain to be aware of the consequences of its decisions for the other players involved. Value chain collaboration to understand each other's needs and constraints is important if regrettable choices are to be avoided. Various collaborative projects to increase the circularity of plastics have been launched by Catalisti and Sirris.

5. **Scaling up chemical recycling:** investments into chemical recycling are needed in order to enable the Belgian plastic industry to become less dependent from fossil resources. Various Belgian players are investing or have announced investments in novel recycling technologies of polyolefins, polystyrene, etc. Decisive years lie ahead for novel recycling technologies to break through.

6. **Innovation in sorting and recycling technologies:** with the extension of the PMD collection in Belgium and the collection of the matrasses, new investments in sorting and recycling are taking place right now. As novel recycling technologies develop, new sorting lines will be required.


**Sector federations catalysing the circular economy**

Both essenscia and Agoria are actively involved in various public-private partnerships to make the circular economy happen, such as Vlaanderen Circulair, Circular Wallonia, Vlaams Uitvoeringsplan Kunststoffen.

Both sector federations are taking part in the first Action Plan for Industrial Packaging, an initiative from VBO/FEB, VOKA, UWE and BECI. Spearhead cluster Catalisti launched its Moonshot programme, including a pillar on frontrunner innovations for circular plastics.

## Conclusions

This report shows how the **Belgian plastics industry has improved its circularity. The uptake of recycled plastics is slowly but steadily increasing**. However, the results of the many initiatives started over the last years are not yet apparent in the 2020 data.

The industry is fully embarked on this journey towards a more circular economy, and is focusing beyond recycling from waste solutions. Tensions on the circular material availability and legislative barriers still need be removed. **A harmonized approach across Europe will be of a paramount importance**.

## About the methodology

- This report is based on a pan-European analysis made by Conversio GmbH on behalf of Plastics Europe
- It provides a detailed overview of the plastics flows in Belgium for 2020 and a comparison with the reference year 2018 as well as with European data.
- It provides information on the production of polymers and their transformation into plastic parts and products as well as on the collection and treatment of plastic containing waste, including recycling and the use of recycled materials.
- A comprehensive multimethodology approach was used combining publicly available data from EPR organisations, Eurostat data, environmental agencies and internal data knowledge from Conversio with a series of in-depth interviews across Europe and a validation process through Plastics Europe, EPRO, EUPC and PRE.
- To learn more about the plastics value chain Belgium, 45 in-depth interviews were conducted with producers, processors, waste management companies, sorting facilities and plastic recyclers.
- The report is limited in that it focuses mainly on the plastic recycling from post-consumer plastic waste
- The consumption figures are calculated by deduction of export/import surplus quantities from manufactured plastic products.
- Post-consumer waste includes household waste as well as commercial and industrial waste streams
- Waste management typically includes the recovery and the disposal of waste, including plastics. For recovery, a differentiation between waste sent to recycling and energy recovery was made.
- The recycling quantities for plastics in this study were calculated in total regardless of whether these quantities were recycled domestically or in another country (export for recycling). Therefore, the recycling quantities did not represent the quantities processed by recycling companies in Belgium
- The uptake of recycled plastics in new materials is an estimation based on a series of interviews and cross-checked with available information.

## Abbreviations

| | |
|---|---|
| **(L)LDPE** | (linear) Low Density Polyethylene |
| **HD/MDPE** | high density/medium density Polyethylene |
| **PP** | Polypropylene |
| **PS** | Polystyrene |
| **PS-E** | Expanded Polystyrene |
| **PVC** | Polyvinyl chloride |
| **ABS, ASA, SAN** | Acrylnitril-Butadien-Styrene, Acrylester-Styrene-Acrylnitril, Styrene-Acrylnitril |
| **PMMA** | Polymethylmethacrylate |
| **PA** | Polyamide |
| **PET** | Polyethylene Terephtalate |
| **Other thermoplastic** | e.g. POM, PC, PBT (Polyoxymthylene, Polycarbonate, Polybu tylene terephtalate), mixed |
| **PUR** | Polyurethane |
| **Others** | For example: thermoset plastics |

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