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Circular and safe?

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In 2015 The European Commission launched its action plan for a circular economy in Europe¹ targeting a strong increase in reuse and recycling of all major materials in the EU. The closure of material loops is accompanied by a potential accumulation of chemicals in the materials as they pass through multiple uses. Especially for food packaging materials, this introduces serious challenges for the management of consumer exposure to chemicals and for compliance with EU regulations and the aims of the 7th Environmental Action Programme².

Circular Economy

The European Commission's action plan¹ prepares the move towards a circular economy to reduce waste and to reuse more efficiently the value of products and resources. Increased recycling of packaging materials is part of this plan, and the Commission has set ambitious goals of recycling 75% of all packaging waste in 2030 and of 55% of plastic in packaging waste in 2025³. The goals reflect that packaging is by far the largest application of the dominating plastic types, that are found among the polyolefins (PE, PP), PS and PET as shown in Figure 1.

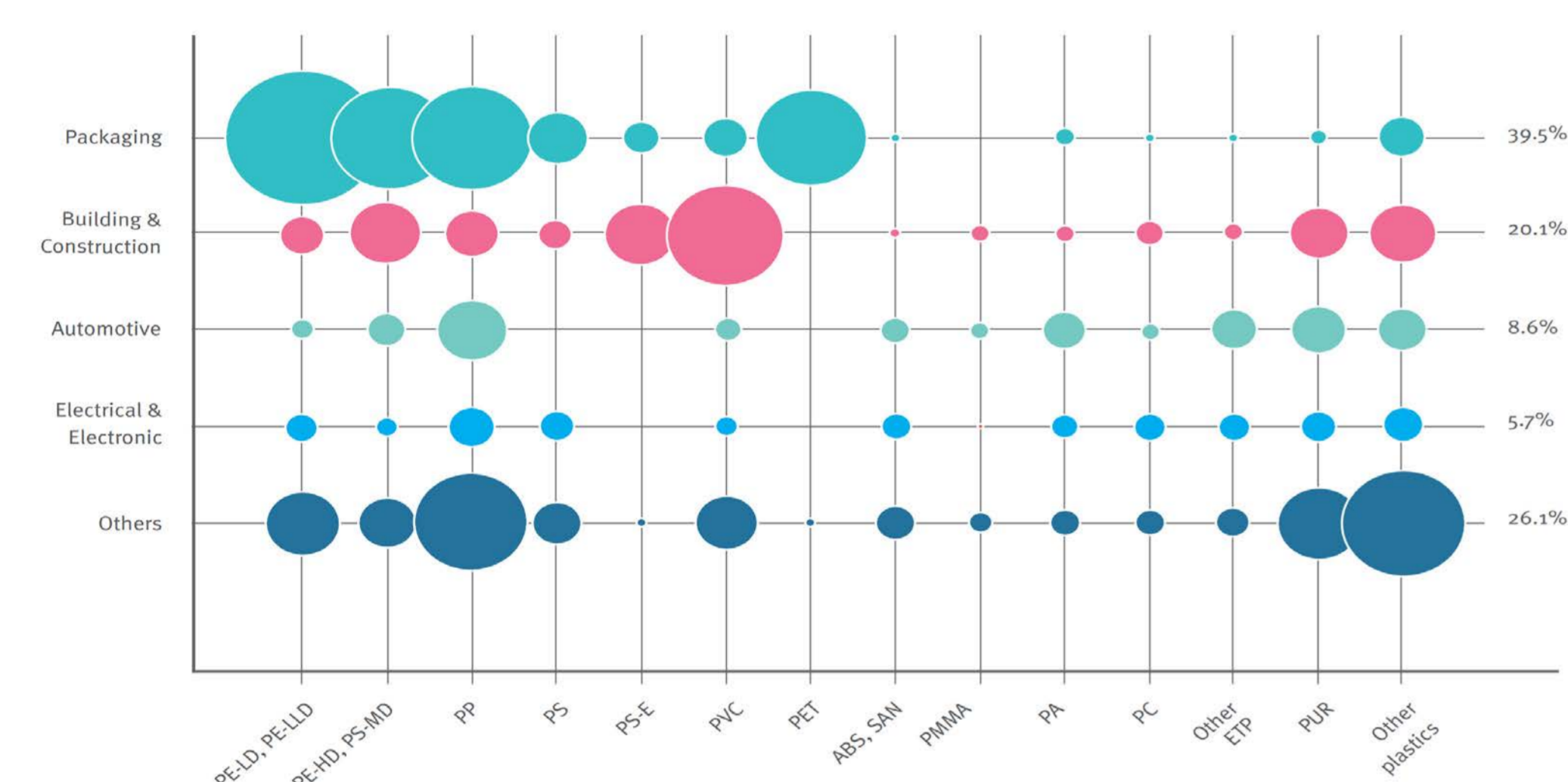
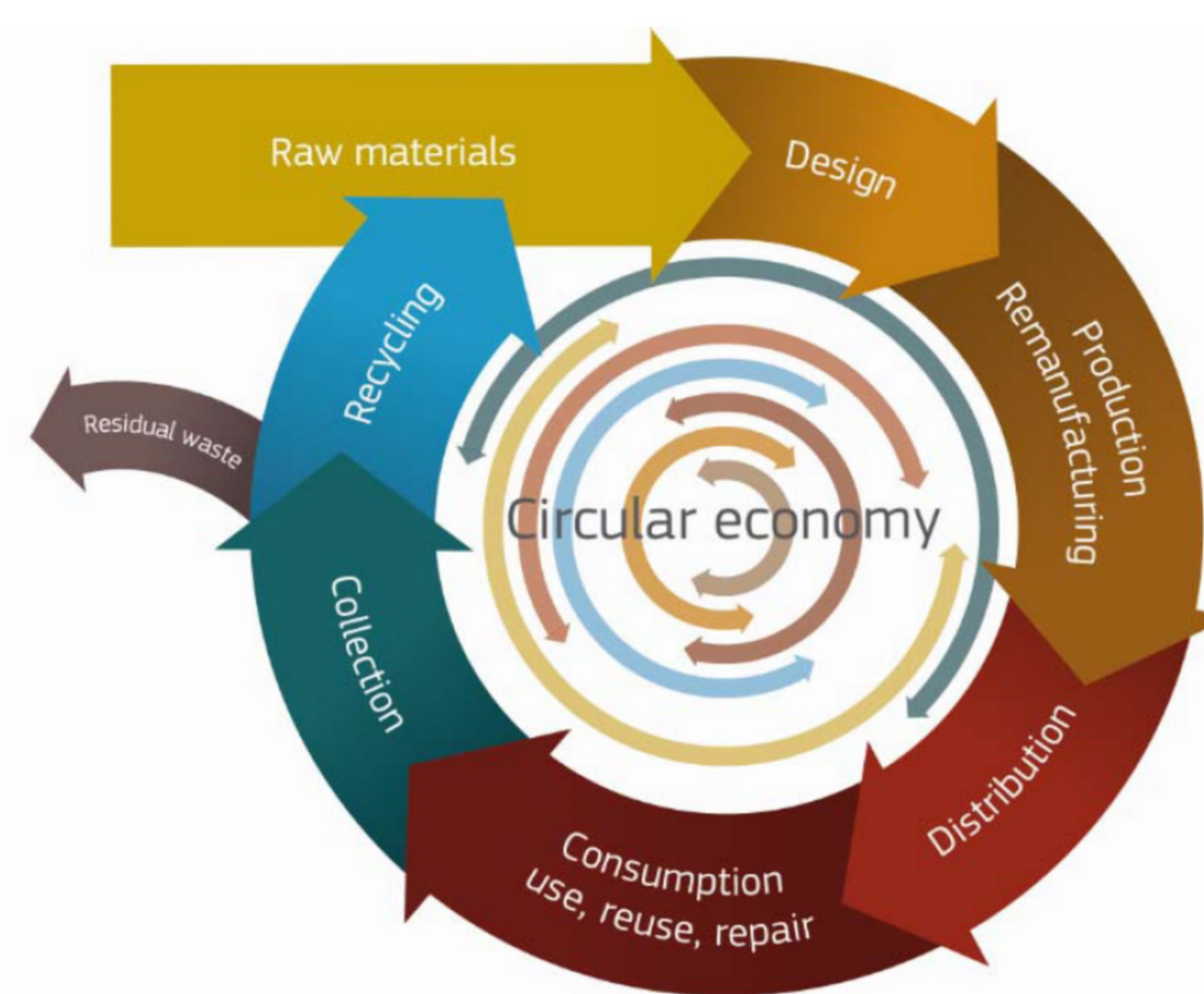


Figure 1. European plastics demand by segment and polymer type 2014⁴

Challenges

Considering the multitude of potential contaminations of plastics, compliance with regulation EU 282/2008 in a circular economy will represent a huge challenge for the monitoring, control and assessment of chemicals in plastic input and in recycled plastic food contact materials

Possible actions

- Closed loops ensuring that only evaluated materials intended for direct food contact are recycled and used
- Monitoring of chemicals in all waste plastics before decision on recycling
- Functional barriers ensuring compliance with regulation 10/2011
- Ensure that also chemicals used in non harmonised FCM (e.g. printing ink components, glues, lacquers) comply with requirements to plastic FCM since they are potential contaminants of FCMs made from recycled materials. Focus should be on substances of very high concern (SVHC) in a first phase.

Outlook

Coordination of the regulations of chemicals and food safety must be improved in EU in the light of the new potential routes for consumer exposure to support a holistic approach ensuring both sustainability and human safety in a circular economy. Agreement is needed on quality standards for primary raw materials to avoid substances of very high concern (SVHC) entering the recycling loops. Grand technical challenges remain to be solved, calling for collaboration between industry, research institutions and authorities.

Contaminants in recycled packaging materials

Recycled paper and board food contact materials, FCM, are frequently contaminated with chemicals from previous use and represent a potential significant source of human exposure to chemicals, including CRM substances such as e.g. mineral oils, phthalates, bisphenol A and recently also bisphenol S is found in waste paper of different kinds⁵. Recycled plastics has been found to be contaminated with brominated flame retardants (BFRs)^{6,7} and phthalates⁸ and recently also BFRs were reported in black FCMs^{9,10}.

Regulation of recycled plastic FCM

According to EU Commission Regulation 282/2008¹¹ Article 4, the final FCM of recycled plastics shall comply with EC 1935/2004, Article 3. The plastic input materials of recycled plastic must be in compliance with directive 2002/72/EC (replaced by Regulation EU 10/2011).

This means that

- either plastic input (from a closed and controlled chain) shall only be from materials and articles intended for food contact and *without any contamination*

or

- any contamination of the plastic input shall be reduced to a concentration that *does not pose a risk to human health*.

Consequences of these actions

- Logistic challenges to have separate loops for food packaging, combined with separate loops for individual plastic types.
- Screening for unknown chemicals in all waste plastic is a demanding task for industry
- Composite materials with a functional barrier are difficult to recycle, destructive interference between materials may occur. Barrier material must be compatible with main material, but this may fail to ensure adequate barrier properties
- Evaluation will be required for non harmonised FCMs (e.g. printing ink components, glues, lacquers), potentially accompanied by a phasing out of chemicals for use in FCMs.