

Fact sheet Low POP Content Threshold

For PBDE and HBCDD as proposed by the EU COM and the EU Parliament



WEEE Plastic Recycling Industry – Base Data



Waste electrical and electronic equipment (WEEE): 11 million tons in 2020 in EU

25% is plastic:

- The WEEE plastic industry started to develop only some 15 years ago – a very new specialized recycling industry
- A wide range of different polymers ABS, PS, PP, PC, PC-ABS, PA, filled PP and many others
- wide range of additives (flame retardants, fillers, plasticizers, pigments, etc.)

Recycling of these WEEE plastics could contribute to EU Pledge targets:

- 10 million tons of recycled plastics by 2025 (CPA)

This potential will not materialize, if the WEEE plastics are not delivered to EU WEEE plastics recyclers

- Until very recently the WEEE plastics were widely exported to mainly Far East countries at high prices
- Resulting in sub-standard treatment, without guarantee that POP BFRs are separated and properly treated
- As consequence of these exports there is a lack of recycling capacities for WEEE plastics

Regulatory challenges negatively impacts the WEEE plastics recycling

- New industry is facing threshold discussions for over 15 years
- One substance – one assessment is not happening (REACH, RoHS, WSR, POP regulation)
- BFR thresholds are on the recyclers' agenda since 2006
- Unstable legal environment slows down the development of new capacities
- And.....it stops innovation of recycling more plastics out of the WEEE plastics pile



Foto: © Peter Esslich

The production of virgin tech-polymers



Procurement



- ▶ Oil is extracted
- ▶ Transported to refineries
- ▶ Non-renewable resource
- ▶ EU depends on imports

Processing



- ▶ Huge refineries produce fractions
- ▶ Polymerisation plants polymers
- ▶ Huge amount of energy needed
- ▶ Some 100 Gigajoule per MT

Selling



- ▶ Virgin plastics
- ▶ Produced in large quantities
- ▶ Volatile prices
- ▶ Global market

The production of PCR tech-polymers from WEEE



Procurement



- ▶ WEEE (E-Waste) plastics
- ▶ Growing supply
- ▶ Produced by WEEE recyclers
- ▶ All from EU sources

Processing



- ▶ Mechanical 'mining' process
- ▶ Innovative technologies
- ▶ < 10% of energy
- ▶ Save about 3-4 tons CO₂/ton PCR

Selling



- ▶ 100% PCR tech-polymers
- ▶ Virgin-like quality
- ▶ Stable prices
- ▶ For "green" sustainable products

Composition of WEEE plastics



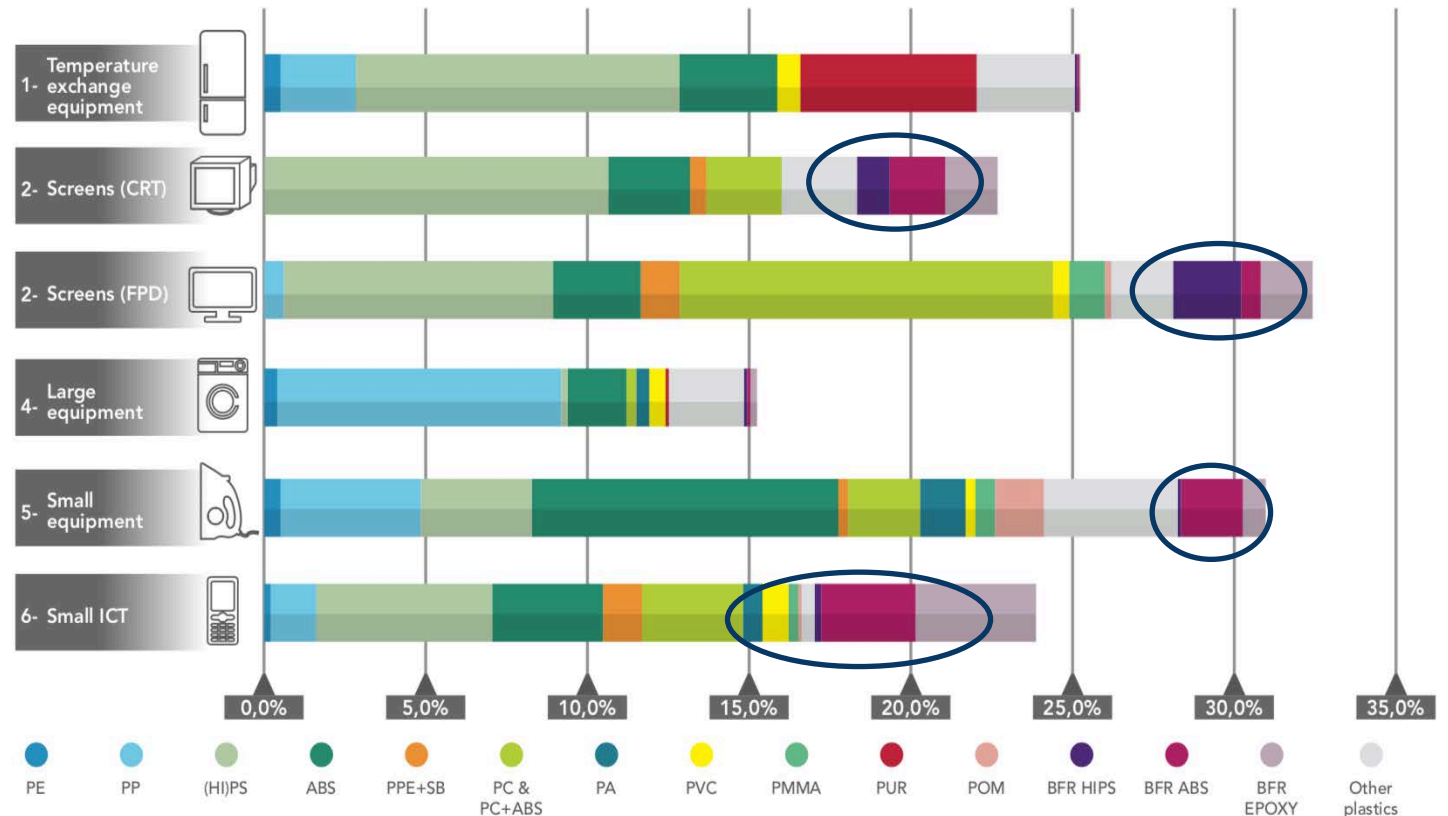
Main WEEE plastics are PP, PS, ABS and PC/PC-ABS, but also many other valuable tech-plastics

By far most of the BFRs are permitted substances, only a few are POP BFRs automatically reducing

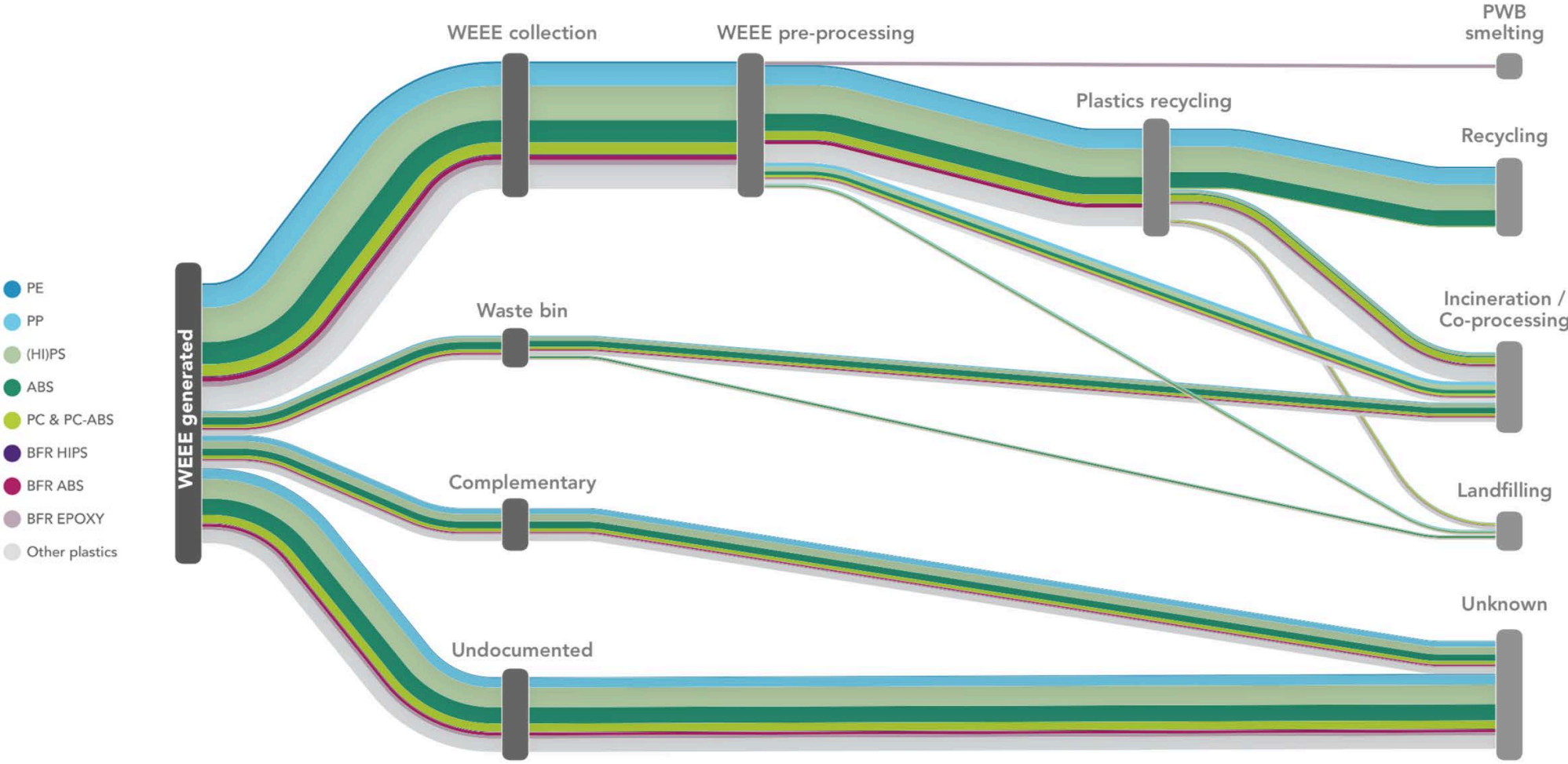
Due to the fact that the restricted BFRs have ceased to be used in EEE products since well over a decade

POP BFR-containing plastics are in different WEEE categories, with hotspots

- Displays/Screens
- Small equipment
- Small ICT



WEEE plastics mass flows

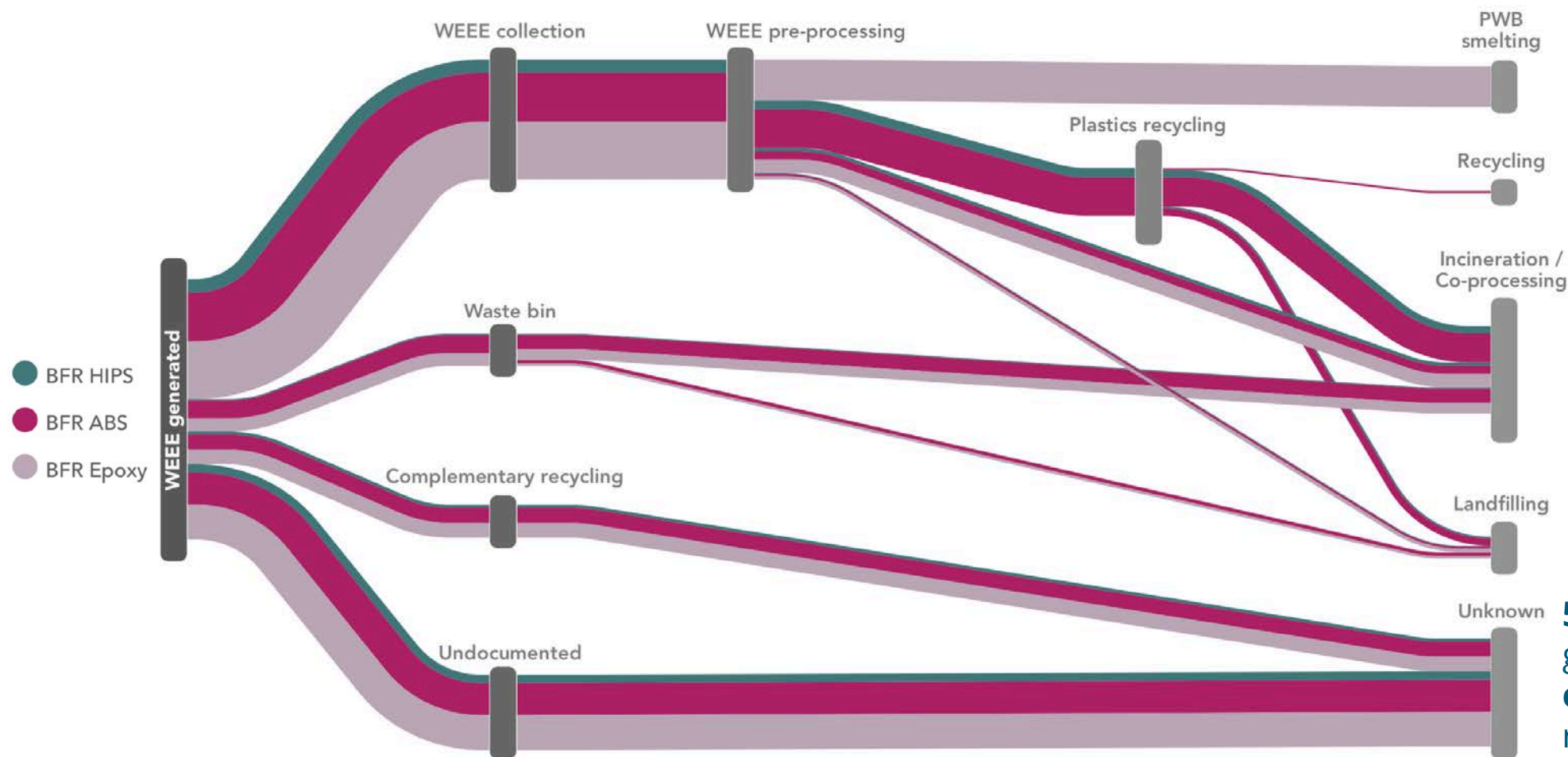


22% of all WEEE plastics

Source: [SOFIES Study](#)

- Some 2.6 million tons of WEEE plastics are generated annually in Europe, 9% of which contain BFRs
- Only half of all WEEE plastics generated enter official WEEE collection and treatment channels

BFR plastics mass flows



98% of BFR plastics entering official WEEE recycling channels are properly **disposed of**

55% of all BFR plastics generated are **not entering** official WEEE recycling channels

Source: [SOFIES Study](#)

- 220 kt of BFR containing plastics arise annually in WEEE of which only 45% enter official WEEE treatment
- WEEE plastics entering official WEEE treatment channels is the most efficient way to eliminate POP BFRs
- Building up more WEEE plastics treatment capacities therefore is of key importance to phase out POP BFRs.

POP BFR thresholds



The Low POP Content (**LPC**) refers to Waste

- And refers to how this waste can be transported to treatment facilities and
- That this waste should be managed in an environmentally sound method
- In the EU this Environmentally Sound Treatment is defined in the EN-50625 series of standards
- In the EU it does not mean that WEEE plastics with POP BFRs are automatically hazardous waste (shipments)
- This threshold has nothing to do with technology.

The Unintentional Trace Contaminant (**UTC**) threshold is referring to articles (for recycled materials)

- The current threshold values do not pose health concerns,
- Especially since recycled WEEE plastics are not intended for food-contact, medical or toy applications
- For Post Consumer Recycled Plastics from WEEE the UTC value is of critical importance.
- By the nature of the definition, the UTC threshold can be the same or lower than the LPC threshold for a substance(-group)
- For the PBDE group of substances this UTC value is already lower today than the REACH and RoHS thresholds
- This UTC threshold was already lowered with the last revision of the POP Regulation (published June 2019)
- And this threshold follows the Delegated Act legal process for review, but there is no proposal made so far

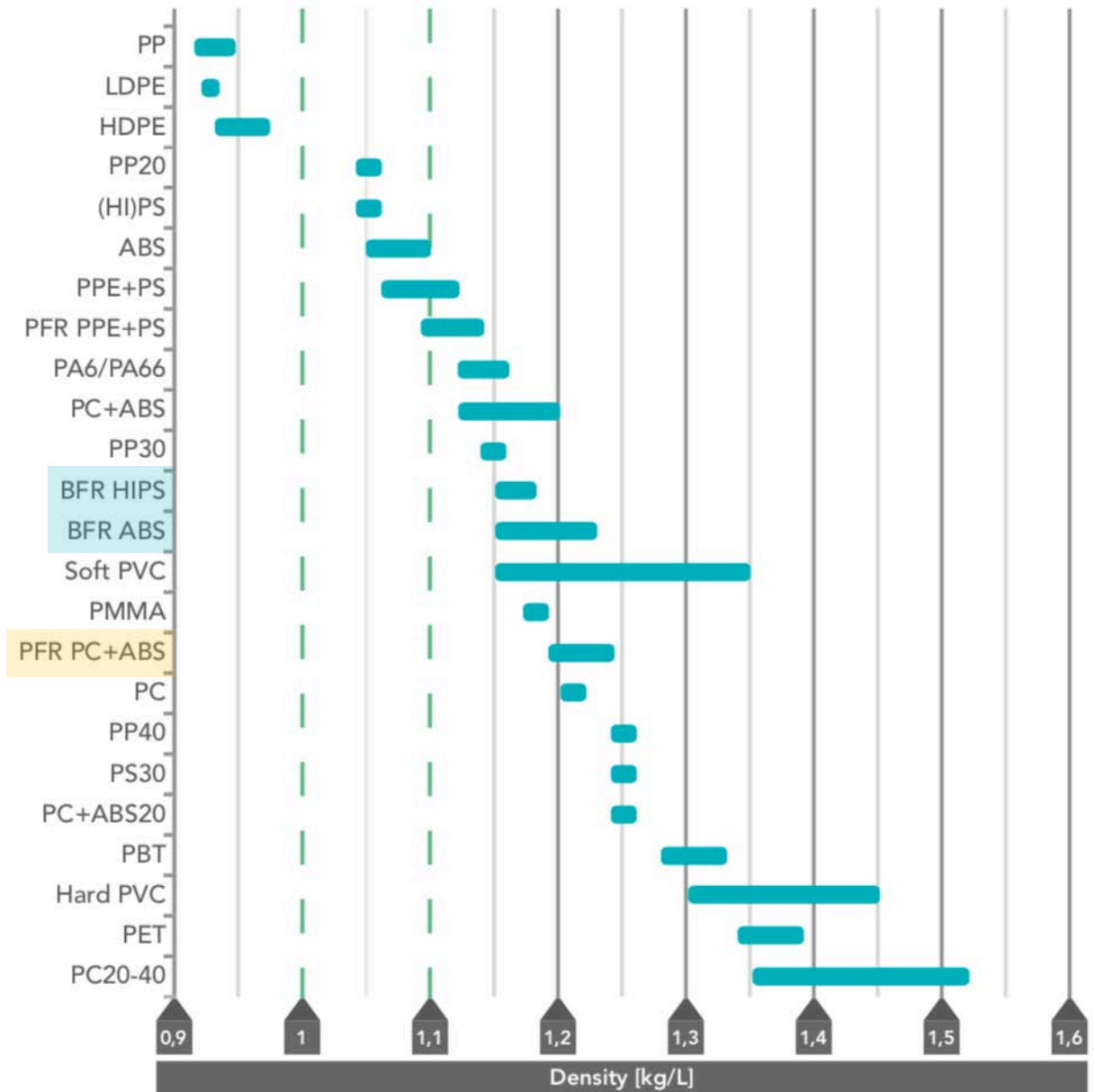
The Recycling Industry uses **XRF measurements** on Bromine as element for screening purposes.

- This XRF screening method is validated for the RoHS threshold values of 1000 ppm of Bromine as element (EN 62321-3-1:2014)
- A review date of this standard is not set yet.
- Hence a further reduction of the UTC threshold is a practical impossibility for the recycling industry
- For the PBDE group of substances this UTC value is already lower today than the REACH and RoHS thresholds
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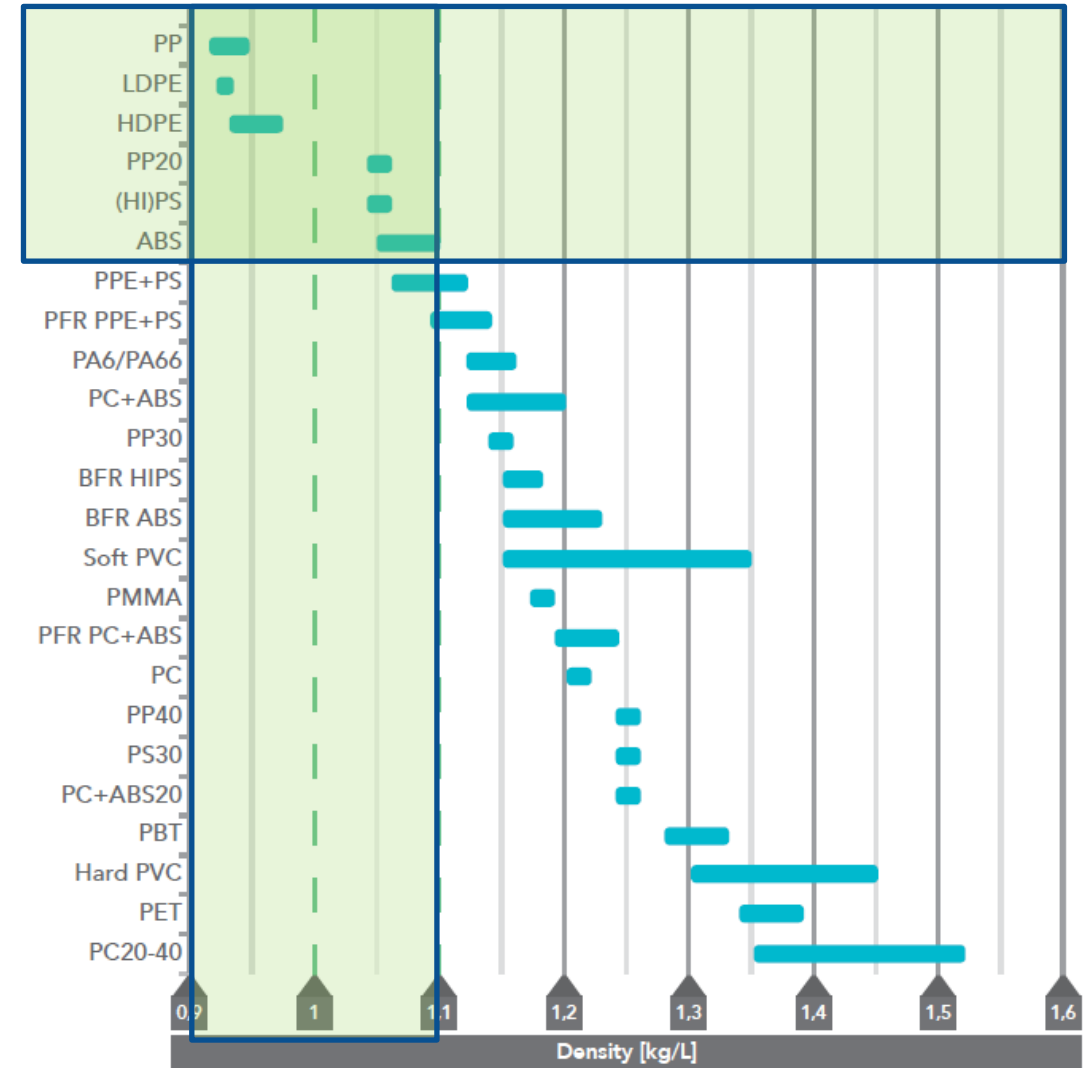
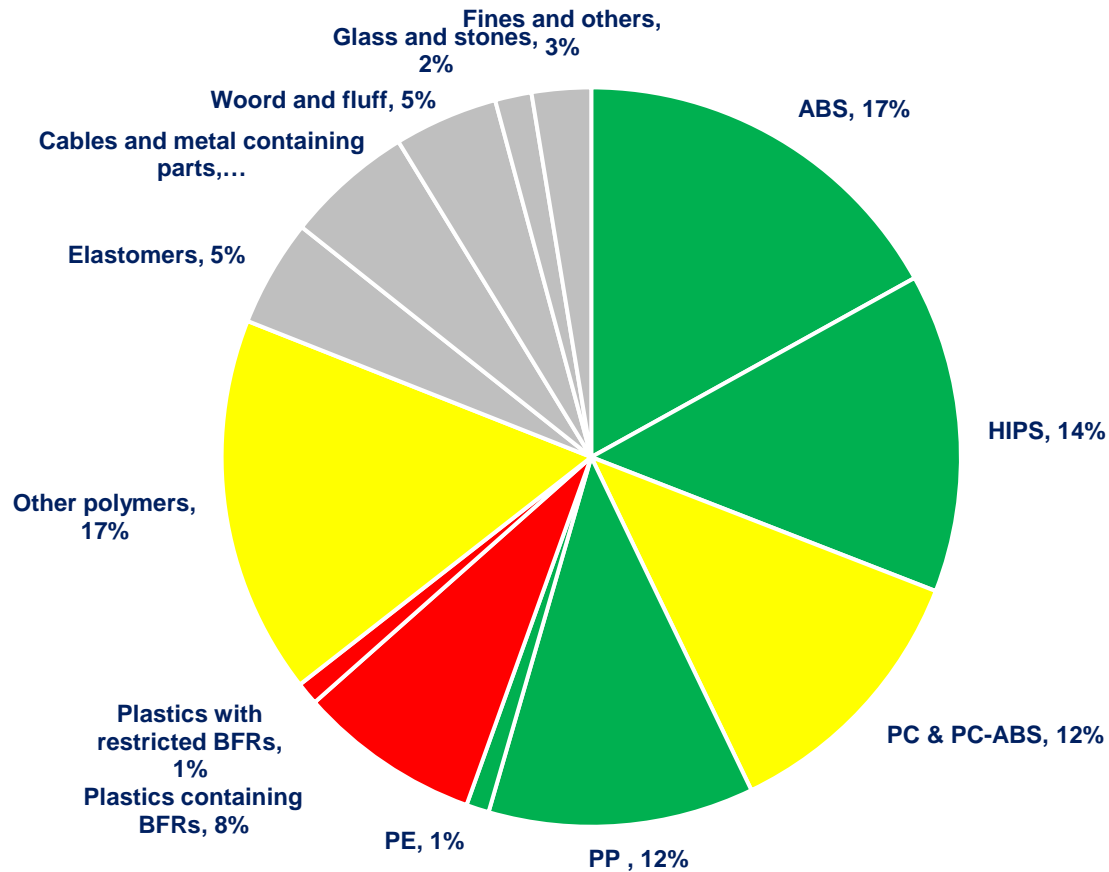
Density sorting (“Sink/Float”)



- Until recently density-based sorting processes are key to obtain homogeneous and low-BFR WEEE plastic fractions that can be turned into valuable regranulates
- Typically, two density sorting steps are applied. The low and medium density fractions can be further sorted to recover additive-poor PP, PE, ABS and HIPS.
- High-density fraction used to be referred to as the “waste fraction” to be incinerated.

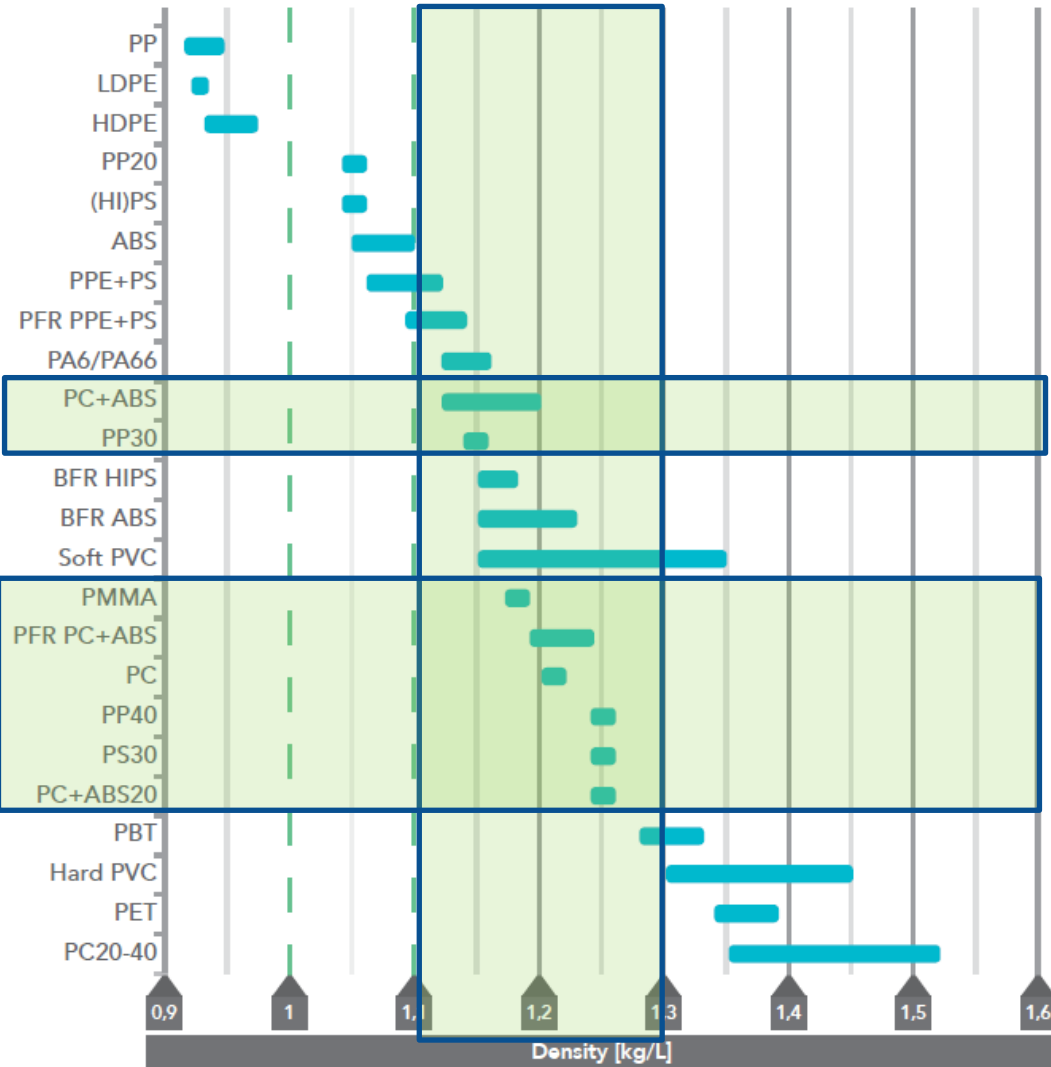
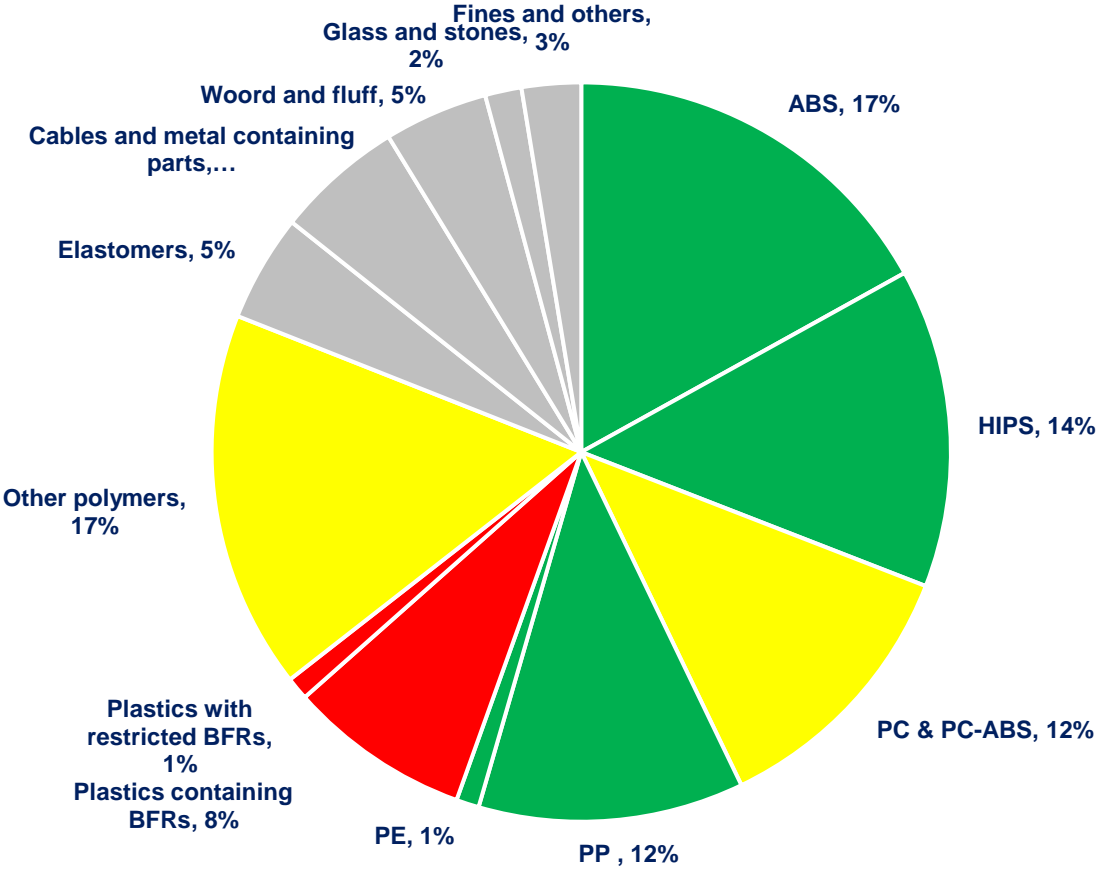


The currently recycled polymers



The “light” ranges are where the industry currently works

Innovations happen in new density ranges

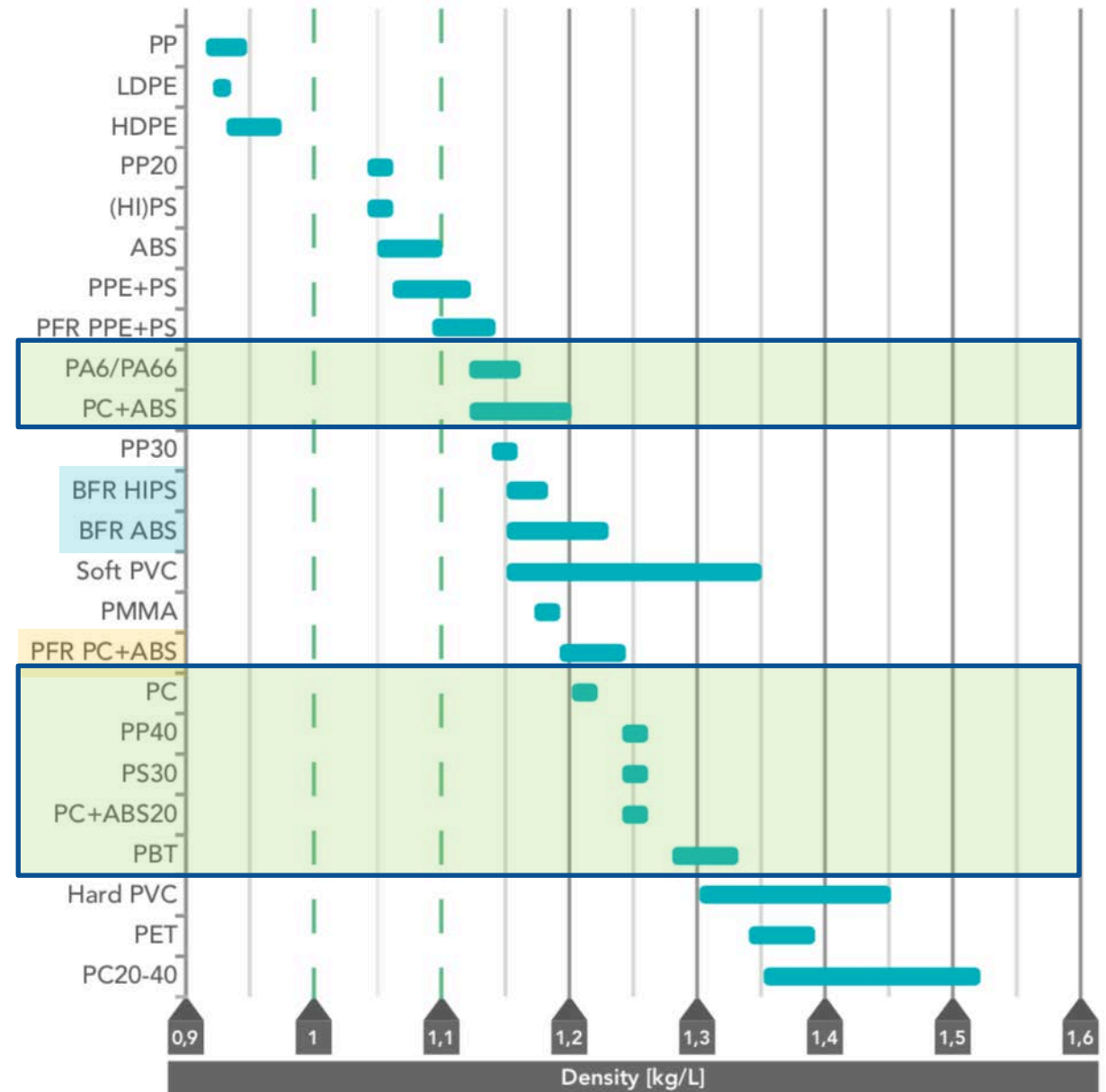


Future PCR plastic types to be developed from the “heavies”

Density sorting (“Sink/Float”)



- Today density-based sorting processes are key to obtain homogeneous and low-BFR WEEE plastic fractions that can be turned into valuable regranulates
- Typically, two density sorting steps are applied. The low and medium density fractions can be further sorted to recover additive-poor PP, PE, ABS and HIPS.
- High-density fraction used to be referred to as the “waste fraction”. This is the fraction that contains interesting and valuable plastics.
- Innovations will thus take place in the high-density fraction, to recover more plastics out of this stream of WEEE plastics and this is important for the EU Circular Economy plans
- Such innovations will stop if the POP UTC thresholds for POP BFRs are further reduced



The Plastics Recycling Award 2021



Produced with PCR PC-ABS from WEEE plastics



Deutsche Telekom
Speed Home WLAN

**Automotive, Electrical or Electronic
Product**

www.prseventeurope.com



It is possible that this product might need to be taken off the market

Key messages of lowering POP BFR thresholds



Lowering LPC values further is inconsistent with REACH and RoHS



It is inconsistent with the EU Circular Economy logic of One-Substance – One Assessment

Lowering the LPC thresholds will drive more material in the undocumented streams



Lowering the POP LPC thresholds below the UTC thresholds would imply that the UTC thresholds will have to be lowered as well



More WEEE plastics recycling capacities are needed in Europe (Circular Economy & Plastics Strategy). This will not happen if POP thresholds continue to change.



Innovations in recovering more polymers types from the WEEE plastics stream and possibly even existing capacities stop with again lowered UTC thresholds

