



Towards a sustainable future with the circular economy
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The challenges of converting the supply chain into a supply cycle for WEEE plastics



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What are the challenges.....

- ▶ **The WEEE Plastics Technology Challenge**
- ▶ **The Circular Economy Canyon Challenge**
- ▶ **The Waste Ever Given Challenge**
- ▶ **The BFR and POP Challenge**
- ▶ **The Sheer Lack of Harmonization Challenge**



Compliant recyclers solve environmental problems and reduce risks

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Separation of plastic is difficult compared to metals



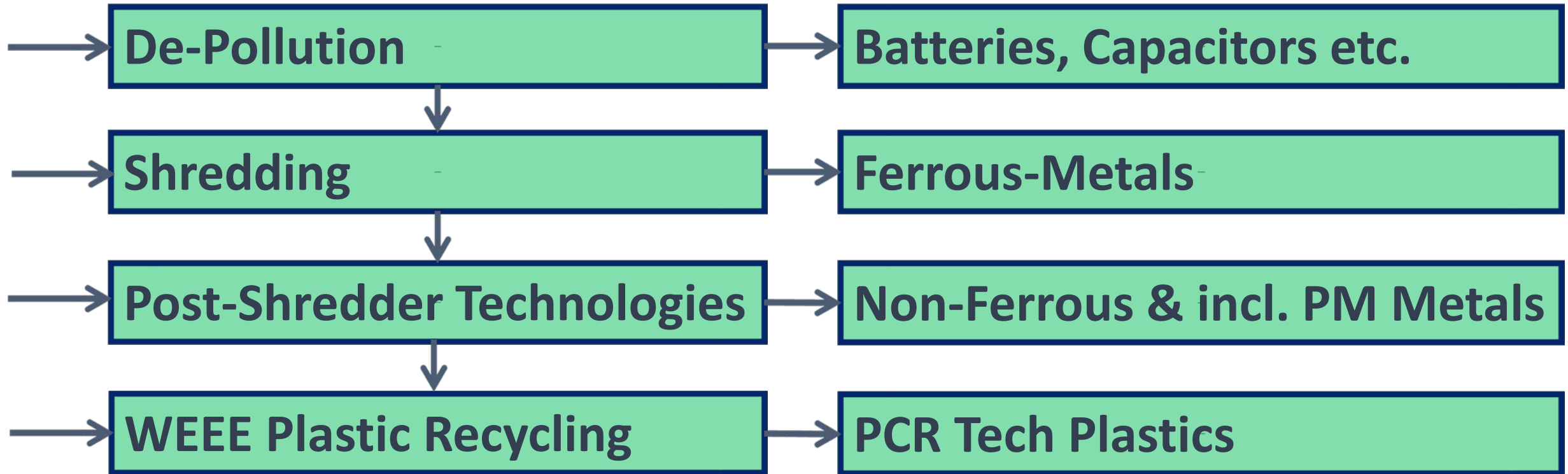
WEEE Plastics



9
8
7
6
5
4
3
2
1

PPPE PS ABS PPO f-PP nylon PET POM
SAN PC/ABS PU PPSPEI PVC
PSU

Plastic Recycling from WEEE



WEEE Plastics are the last remaining fraction to be treated

The concept of WEEE Plastics Recycling

Waste

Goods-In and Pre-processing

- Each receipt is sampled and analyzed
- Material cleaned from non-plastics

High-tech plastic separation

- Cleaning and separations
- PP, HIPS, ABS and PC-ABS



Product

Blending, Extrusion and Compounding

Lab Analyses Physical, Chemical (REACH/RoHS/POP) & Rheologic


Output Material are PCR polymers, used as drop-in replacement for virgin

Producing sustainable PCR WEEE plastics




Procurement



- ▶ Growing supply
 - ▶ Incinerated
- 
- ▶ Self-replenishing
 - ▶ Sustainable

Processing



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

Selling



- ▶ "Green" products
 - ▶ Virgin-like quality possible
- 
- ▶ More sustainable business
 - ▶ PCR plastics

Innovations are happening in a quick pace.....

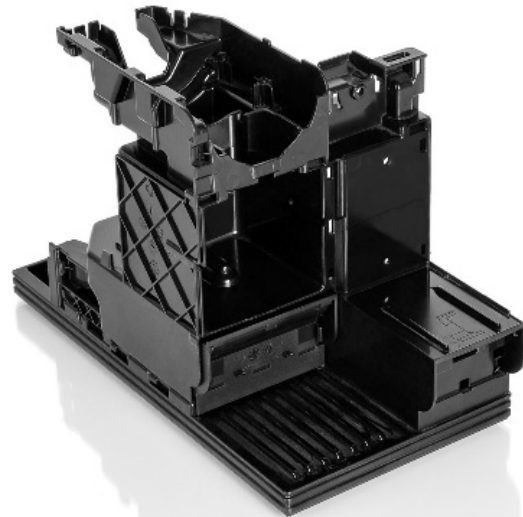
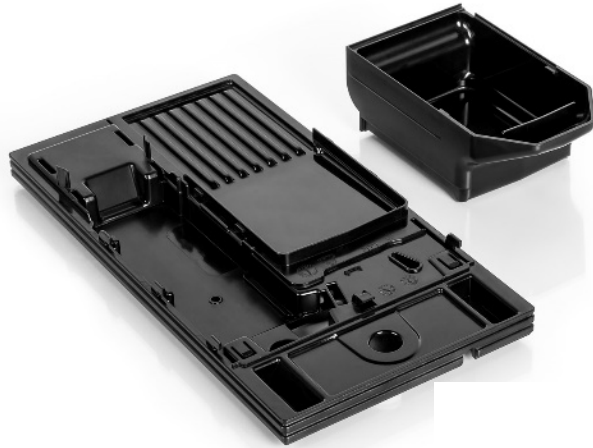


Winner of the European Plastics Recycling Award 2020

Some other examples of products with 100% PCR Plastics



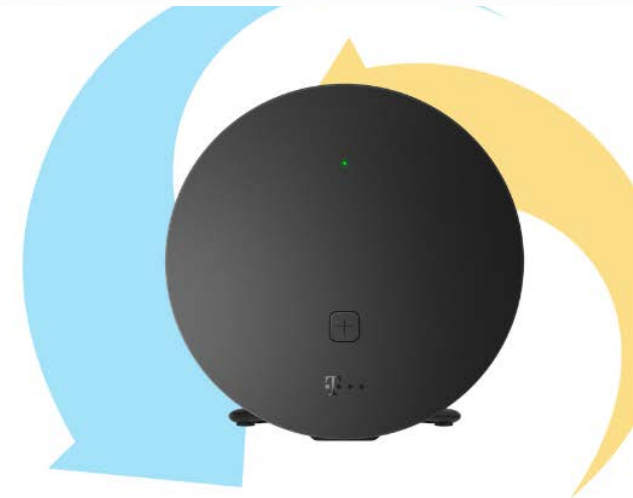
With innovations such as the introduction of PCR PC-ABS



Deutsche Telekom
Speed Home WLAN

Automotive, Electrical or Electronic
Product

www.prseventeurope.com



Winner European Plastics Recycling Award 2021 with PC-ABS

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A recyclers' view on policy development.....



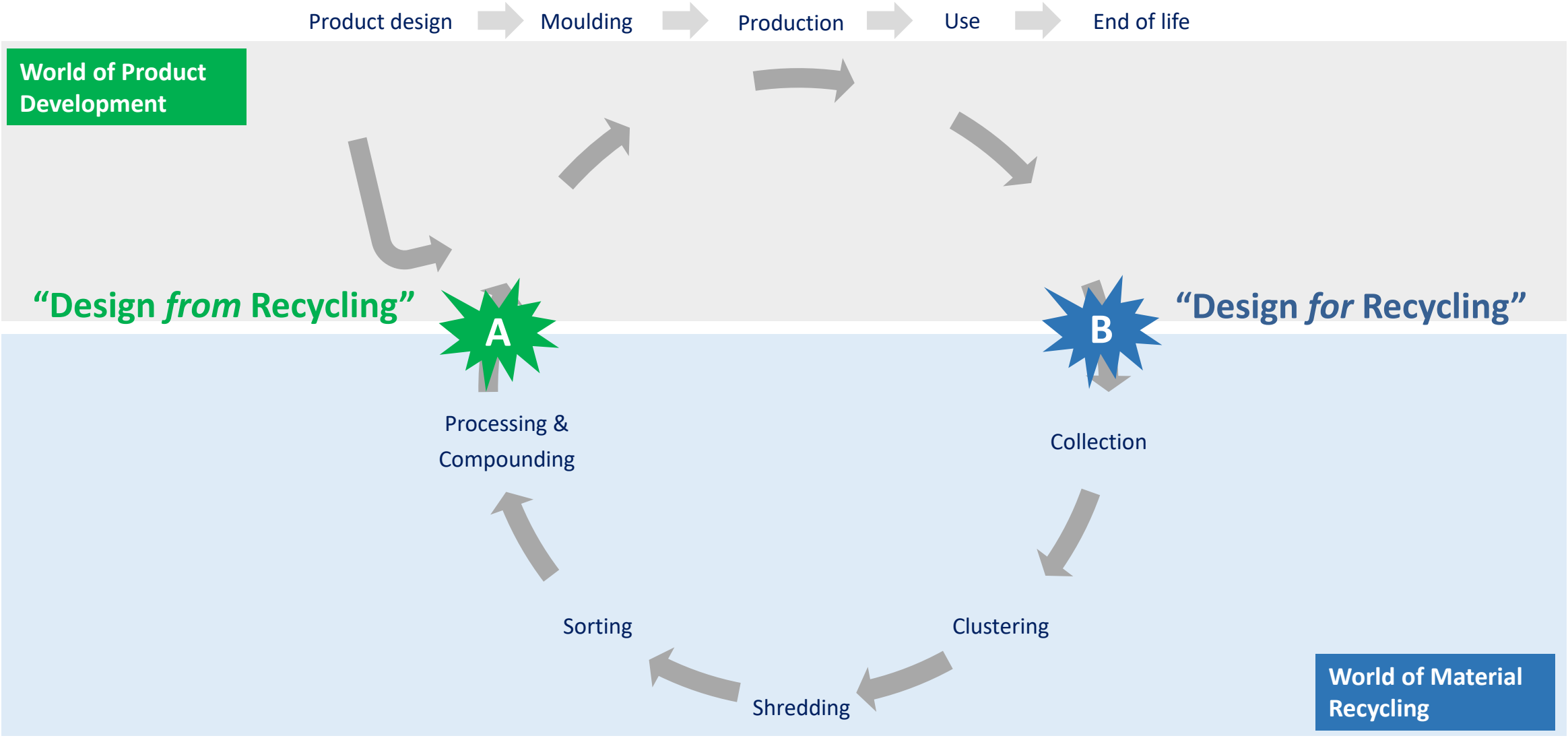
The "Circular Economy" side

The "Non-Toxic" side

Recycler



Closing the missing link in the Circular Economy



Book-Recommendation: [Design from and for Recycling \(Poly-CE\)](#)

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A Never Given fact was given by the Ever Given.....



...as it wedged the Suez Canal for 6 days and it was major global news for this amount of time and beyond.

Do you know that this is happening day-in-day out with waste?

The plastics recycling industry is facing this just now with the plastics delegated act implemented last January. All mixed WEEE plastics need notifications.

If Europe is serious about the Circular Economy, this needs to be changed urgently.



We call it the "big waiting".....

- ▶ Huge files are involved
- ▶ Many authorities still need original signatures
- ▶ Files are sent to all authorities involved
- ▶ No harmonized rules and procedures
- ▶ Interpretations can differ per country/region
- ▶ It is linked to major costs
- ▶ But most importantly.....with huge delays



More and quicker processes are required.....

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Legislation overview Brominated Flame Retardants



EEE Products

IT electronics

(microprocessors, computer servers, modems, printers, copy machines...)

Consumer electronics

(hair dryers, heaters, TV sets, laptops...)

White goods

(tumble dryers, dishwashers, washing machines...)

Plastic Parts

Housing

Printed circuit boards

Cables

Connectors

HBCD

DecaBDE³

c-PentaBDE

c-OctaBDE

BDP

RDP

TBBPA

DOPO

EBP

ATH

MDH

ATO

Br'd PS

Mel.Cyanurate

Regulations

Annex XIV

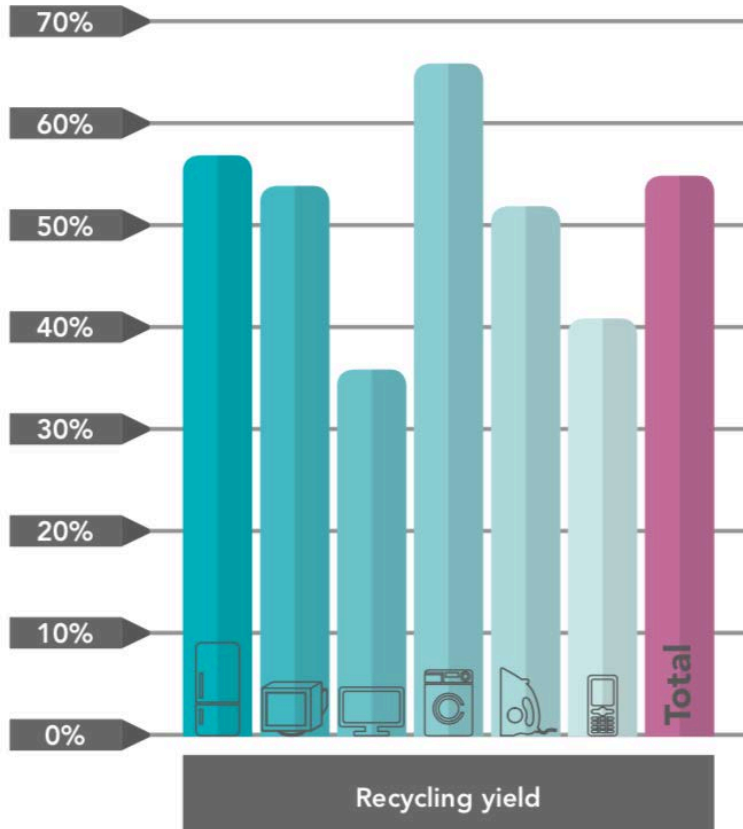
POP under Stockholm

Restriction under RoHS

Restriction under REACH

No restriction

Impacts of continuous discussions about BFRs



recycled plastics output /
input to plastic recycling process

Source: [SOFIES Study](#)

Mainly influenced by

Share of target polymers

- ▶ Mainly PP, PE, ABS, PS and PC-ABS – averages some 50 %
- ▶ Can be **separated**

Additive loadings

- ▶ Switch to alternative FRs would not improve yields
- ▶ Some **alternative FRs could even worsen recycling yields,**
- ▶ These can become **“regrettable substitutions”**

Continuous and complex discussions

- ▶ This debate about thresholds runs **over 15 years.**
- ▶ An almost collapse with the 10-ppm threshold for **Deca-BDE**
- ▶ And this discussion is **ongoing again and again**
- ▶ **POP BFRs** today only represent **15% of the BFR charged plastics**
- ▶ Cycle: **Stockholm, Basel, POP Regulation, REACH, RoHS, WEEE**

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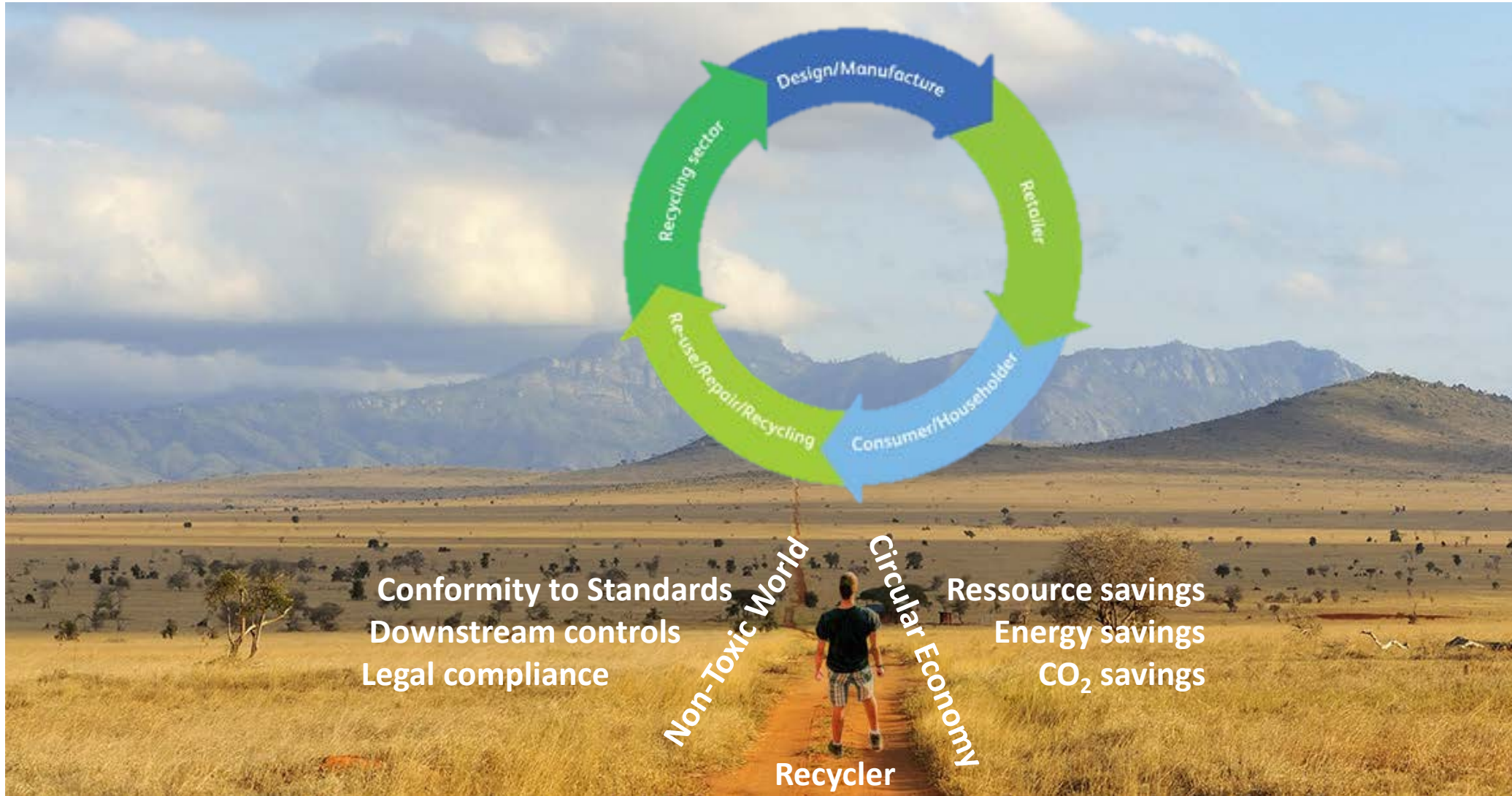
Circular economy and harmonization

- ▶ Recycled resources re-enter Circular Economy
- ▶ Need to comply with product legislation (REACH)
- ▶ Here is where the analyses should take place
- ▶ And this should be based upon harmonized rules

- ▶ Often requires measurements of SOC's
- ▶ There is an inflation of classifications as hazardous
- ▶ Recycling technologies developed to remove SOC's
- ▶ Recycling facilities may not take in hazardous waste
- ▶ Simpler and harmonized rules are needed



Let's please strike the right and intelligent balance.....



between “Non-Toxic” and “Circular Economy” objectives

GRACIAS
ARIGATO
SHUKURIA
JUSPAXAR
DANKSCHEEN
TASHAKKUR ATU
YAQHANYELAY
SUKSAMA
EKHMET
TINGKI
BIYAN
SHUKRIA
THANK
YOU
BOLZIN
MERCI
MAKETAI
MIMMONCHAR
SPASSIBO
SNACHALHYA
NUHUN
CHALTU
WABEEJA
MAITEKA
YUSPAGARATAM
HUI
WAHNYABAAD
ANHA
ATTO
MERSI
SPASIBO
DENKAUJA
NENACHALHYA
UNALCHEESH
HATUR
GUI
EKOJU
SIKONO
SAINCO
MAAKE
LAH
GRAZIE
MEHRBANI
PALDIES
GOZAIMASHITA
AGUYJE
FAKAAUE
KOMAPSUMNIDA
MERASTAWHY
GAEJTHO
TAVTAPUCH
MEDAWAGSE
BARIKA
BAHKA
MAKETAI