



NONTOX

Removing hazardous substances to increase the recycling rates of WEEE, ELV and CDW plastics



This project has received funding from European Union's Horizon 2020 research and innovation programme under grant agreement N°820895

Nazarena Vincenti

Plastics Circularity Multiplier Conference,
14th October 2020

Agenda



◆ NONTOX in short

◆ The challenge

◆ The solutions

◆ The input streams

◆ NONTOX results

◆ Clustering projects



NONTOX in short



Budget 5 million euros

Duration 3 years (2019-2022)

The NONTOX value chain → 12 partners from 7 European countries

- collection scheme (manufacturers' representative)



- treatment plants



- research technology organizations



- universities



NONTOX in short

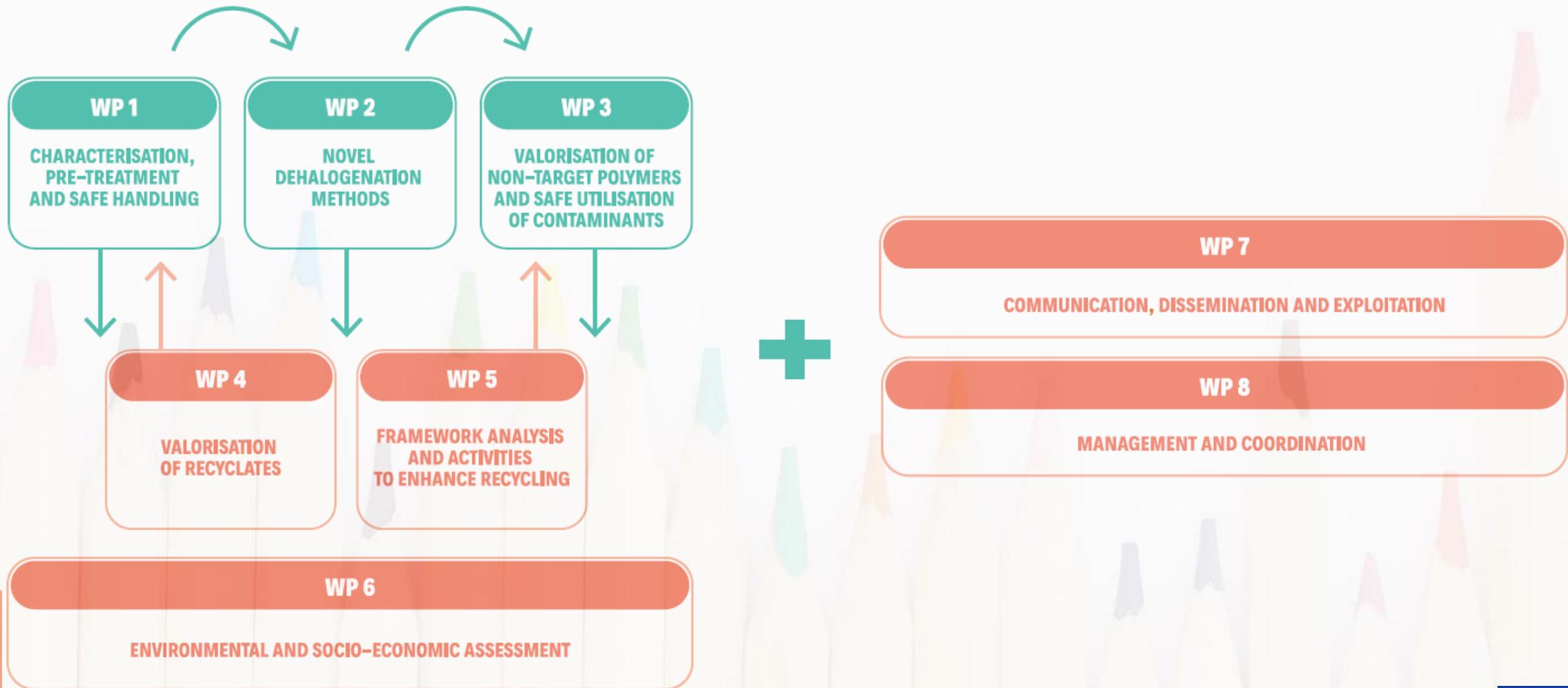


NONTOX aims to develop a cost-effective solution able to **increase the recycled volume** of the **plastic fractions contaminated by legacy additives** and other substances of concern, from **three key waste streams** (WEEE, C&DW and ELV) realising the creation of recycled plastic material characterised by high quality and safety standards.

- **SO1** Optimise and demonstrate the efficacy of different technologies to extract hazardous substances
- **SO2** Develop and improve techniques for efficient characterisation and pre-treatment of hazardous plastic waste
- **SO3** Increasing the efficiency, sustainability and competitiveness of the entire system by the valorisation of process residues and non-target plastic waste
- **SO4** Boost the market uptake of plastic recycling technologies and of their recycled products by a systematic evaluation of potential techniques to upgrade recyclates towards potential wider applications range



NONTOX in short

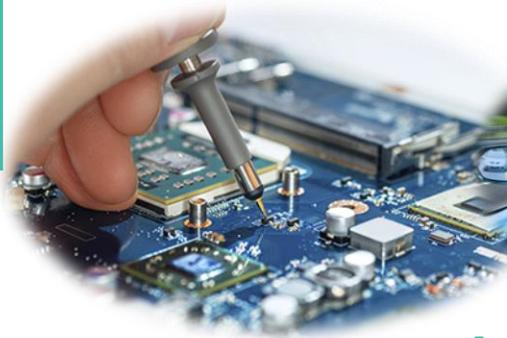


The challenge



Plastics are nowadays used in a large variety of applications because of their diverse properties. To ensure certain properties and specific characteristics plastics are mixed with **hazardous additives** such as **flame retardants**, **stabilizers** and **plasticizers** which have led to tightened legislation. The safety issues and the obligation to remove these hazardous substances **is challenging for the recycling sector**.

Electrical & Electronic
6.2%



Building & Construction
19.8%



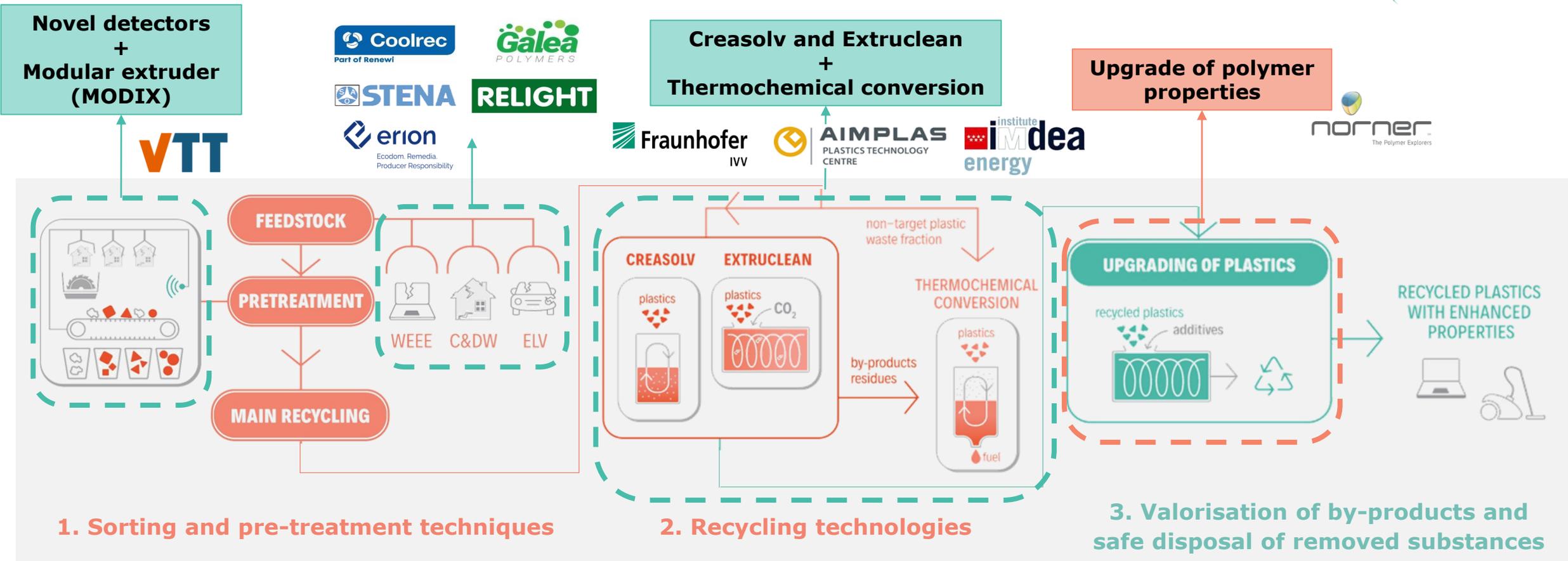
Automotive
9.9%



Packaging
39.9%



The solutions



- 4. Evaluation of environmental, social and economic aspects
- 5. Analysis of the framework (regulatory, eco-design)

The input streams

- Waste Electrical and Electronic Equipment (**WEEE**)
- End-of-Life Vehicles (**ELV**)
- Construction & Demolition Waste (**C&DW**)



NONTOX results (1/4)

SMALL DOMESTIC APPLIANCES SAMPLE

1. **Sample characterization:** determination of halogen content per input material

XRF - Result Input [ppm]	
Abbr.	Average
Br	13,948
Cl	11,653

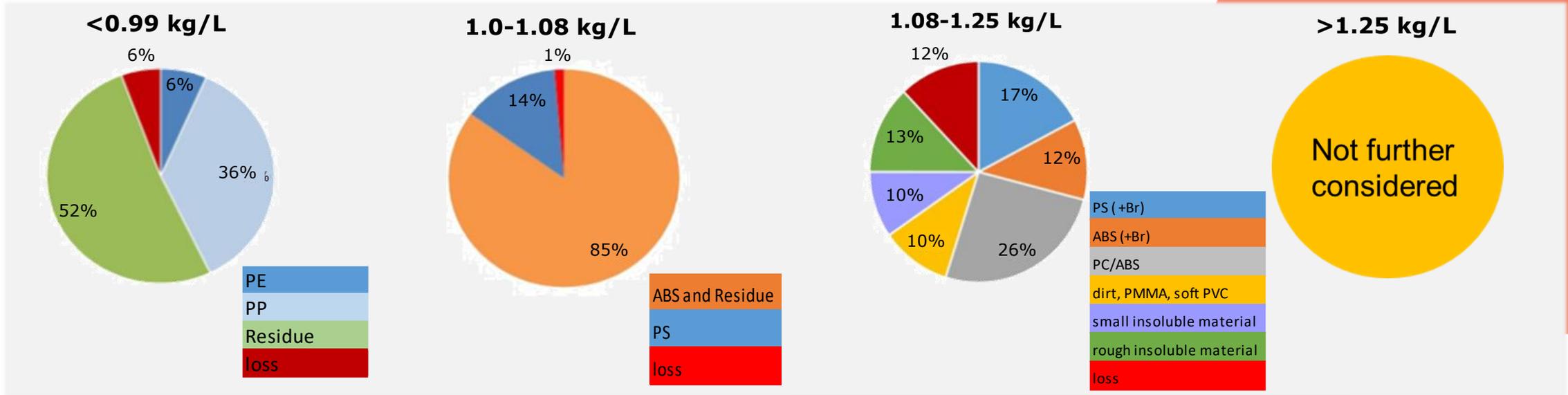


NONTOX results (2/4)



SMALL DOMESTIC APPLIANCES SAMPLE

2. **Density separation:** materials are cleaned and separated into single polymer streams



NONTOX results (3/4)



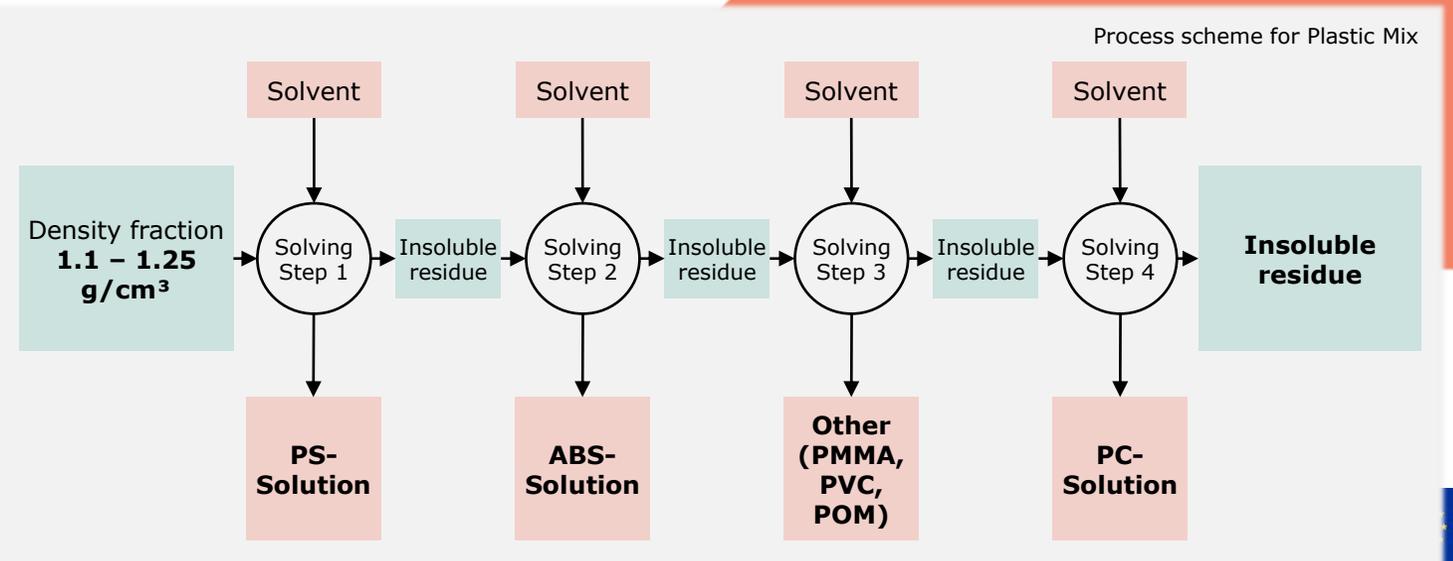
SMALL DOMESTIC APPLIANCES SAMPLE

3. Determination of bromine and chlorine contents in different density classes

XRF - Result different density classes [ppm]				
Abbr.	< 1.0 kg/L	1.0-1.08 kg/L	1.08-1.25 kg/L	> 1.25 kg/L
Density classes	11%	30%	35%	20%
Br	1,027	2,598	33,327	8,506
Cl	268	771	7,303	36,917

+ about 4% losses

4. **CreaSolv treatment process** is applied on the polymers within the plastic mix fraction 1.1 – 1.25 g/cm³

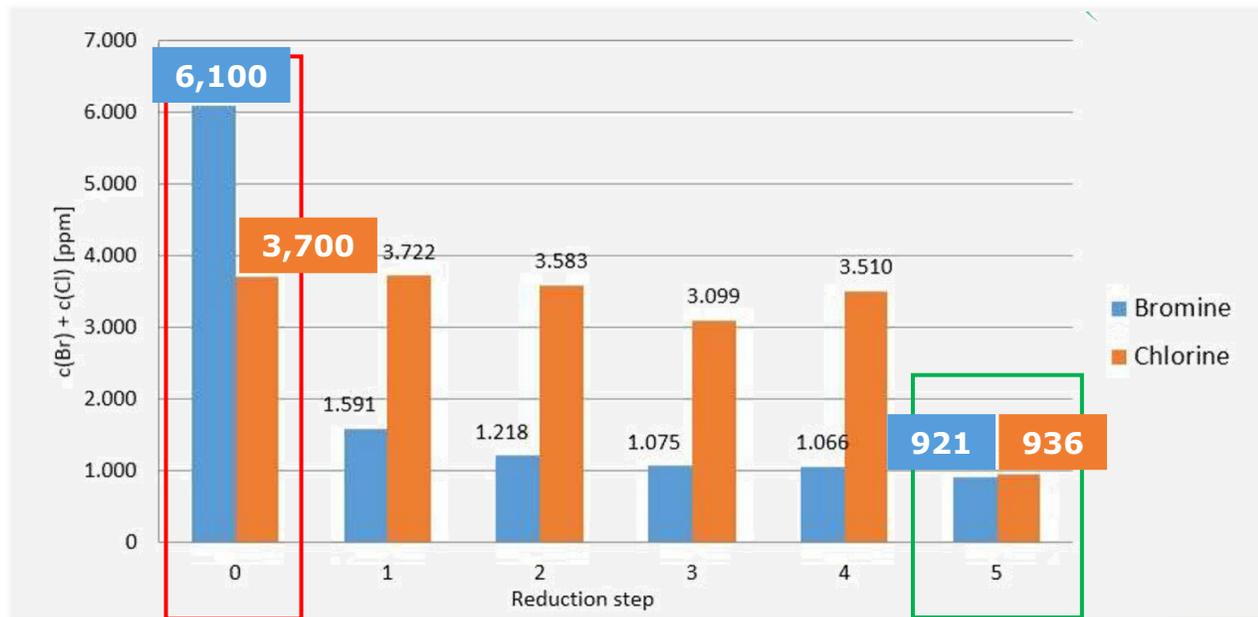


NONTOX results (4/4)



SMALL DOMESTIC APPLIANCES SAMPLE

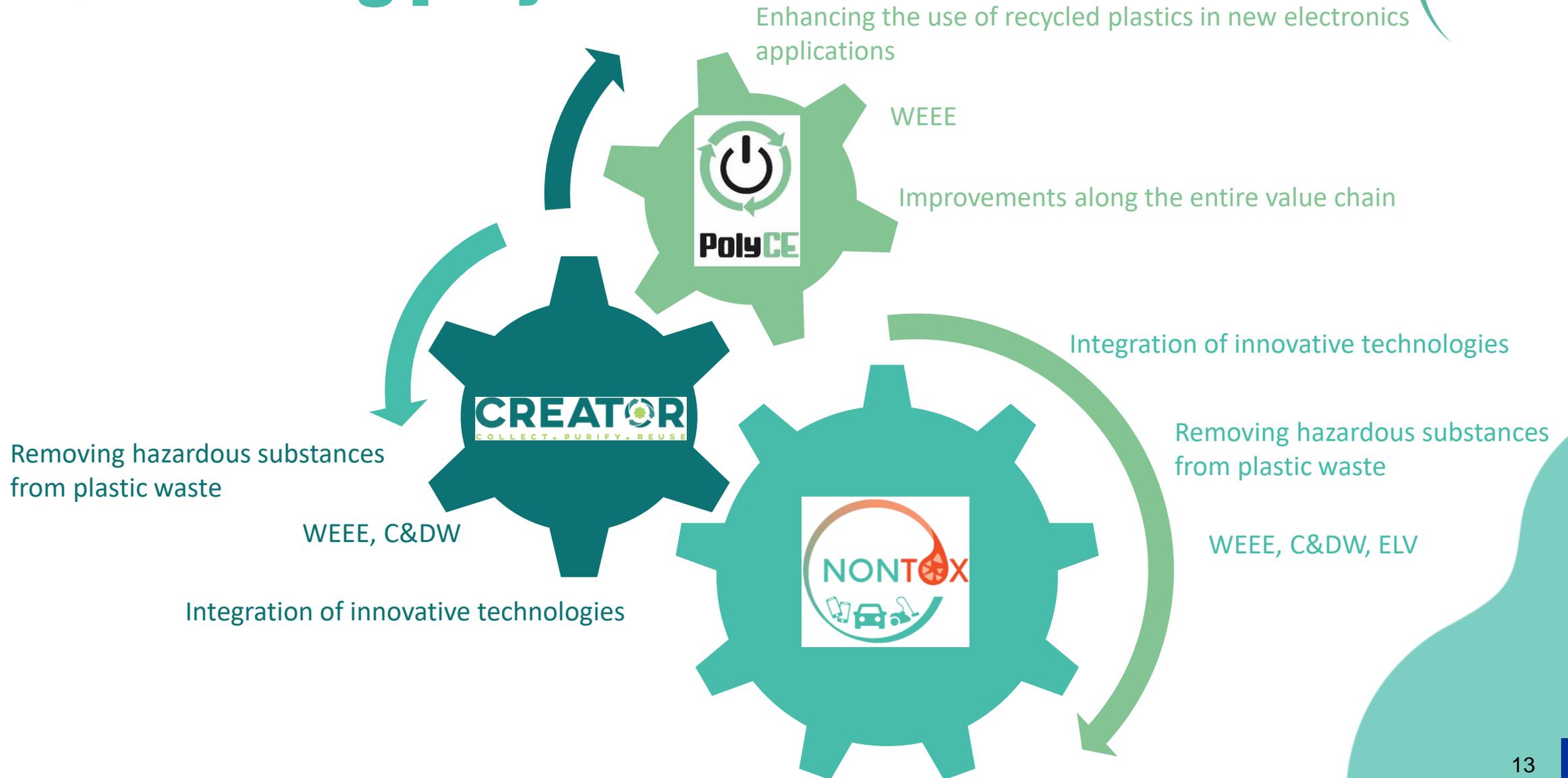
5. **Chlorine and Bromine content reduction in PC**, throughout the washing/reduction steps, is respectively of 74.0% and 84.9%



6. **Next steps** → (i) upgrade of the materials to enable a suitable performance; (ii) evaluation of environmental, social and economic aspects



Clustering projects





<http://nontox-project.eu/>

Follow us



Thanks for the attention



This project has received funding from European Union's Horizon 2020 research and innovation programme under grant agreement N°820895