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AGENDA

MARCH 20 - BRUSSELS

8:30-8:50	**Welcome and registration**	
8:50-9:00	**Opening remarks**	Mathilde Taveau, Plastics Recyclers Europe
9:00-9:15	**Key-note** Advanced materials strategy with highlights on circular economy	Team Leader, EU Commission
9:15-9:30	**PRIMUS Project Overview** Presentation on the Project´s goals, methodologies and achievements	Jani Pelto, VTT
9:30-10:15	**PRIMUS Best Practice Book** Overview of general findings from PRIMUS.	Julia Cilleruelo Palomero, GreenDelta
10:15-10:45	**Coffee Break and Networking**	
10:45-11:30	**Synergies with Sister-Projects** Communication strategies and findings in the diversity of pilots.	Carolina Mejia, MONDRAGON Melpo Karamitrou, RNANOLAB (Precycling) Pieter Willot, VITO (INCREACE) Benjamin Porter, TRINSEO (ABSolEU)

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MARCH 20 - BRUSSELS

	TECHNICAL ADVANCEMENTS	REGULATORY RECOMMENDATIONS	DIGITAL TOOLS AND STAKEHOLDERS´ RECOMMENDATIONS
11.30-12:00	**Recycled materials for automotive sector** Ainara Telleria, Cikautxo Beñat Madariaga, Maier	**PRE-1000 tool** Andromeda Scoppio, Plastics Recyclers Europe	**Sustainability Assessments & EcoProfiles** Julia Cilleruelo Palomero, GreenDelta
12:00-13:00	**Lunch Time**		
13:00-13:30	**Results from home appliances pilot: washing machine** Ainara Telleria, Cikautxo	**POPs Regulation** Ana Rita Neiva, Coolrec Andromeda Scoppio, Plastics Recyclers Europe	**Digital Product Passport** Teresa Oberhauser, Circularise
13:30-14.00	**Coffee Break and Networking**		
14:00-14:30	**Food-contact solutions** Ana Rita Neiva, Coolrec.	**Food-contact Regulation for recycled plastics** Mathilde Taveau, Plastics Recyclers Europe	**Stakeolders´ engagement** Eve-Liis Roosmaa, Tallin university
14:30-15:00	**Recap for the parallel sessions and closing remarks**		
15:00-15:30	**Networking**		

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Opening remarks

Mathilde Taveau, Regulatory Affairs Manager
Plastics Recyclers Europe

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Key-note

Advanced materials strategy with highlights on circular economy

Javier Sanfélix, Team Leader
European Commission

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Javier Sanfelix

Team Leader at European Commision

PhD in engineering sciences in the field of environmental and economic impact assessment of batteries for electric vehicles. Currently Team Leader for advanced materials at the Industrial Transformation Unit at the European Commission – DG Research and Innovation. Before I worked at the Joint Research Centre of the European Commission providing scientific support for polices in sustainable production and consumption, with a focus on circular economy strategies..

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#AdvancedMaterials

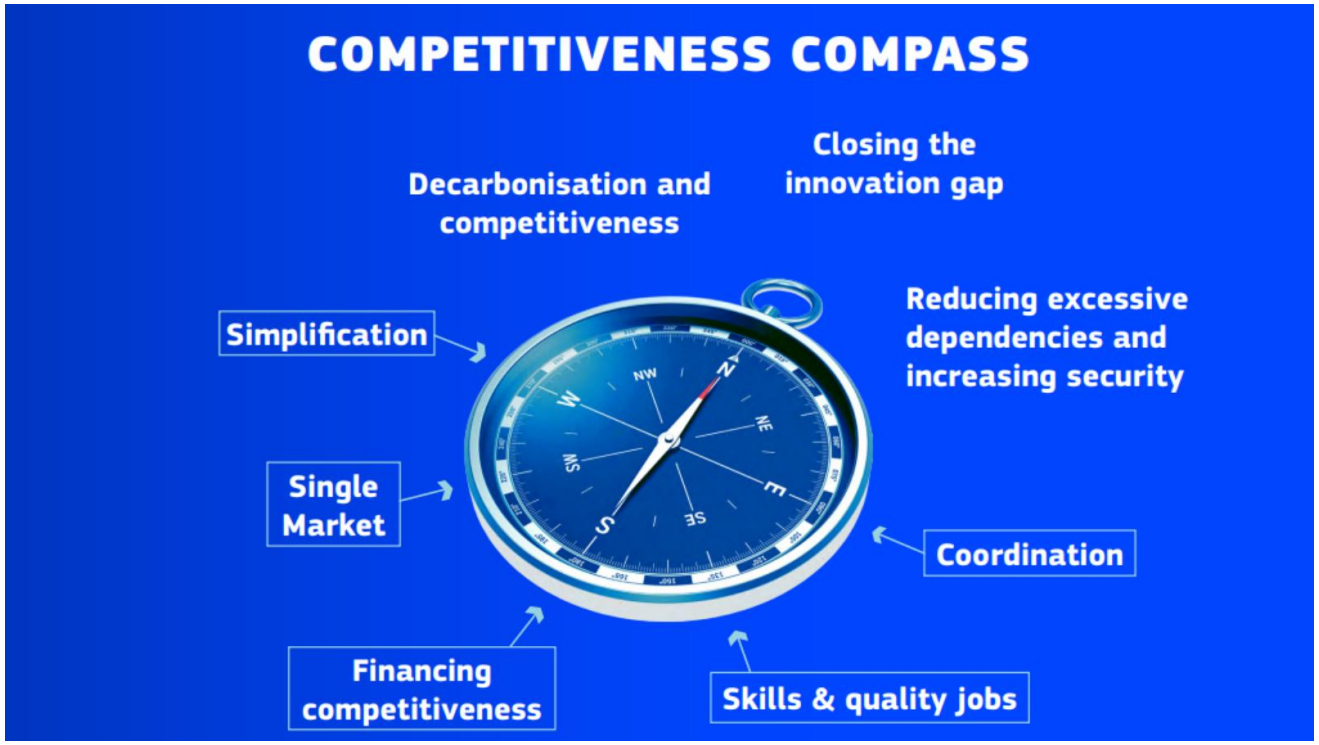
ADVANCED MATERIALS FOR INDUSTRIAL LEADERSHIP

PRIMUS Final Event
20 March 2025

European Commission

New Commission

New political guidelines and strategy

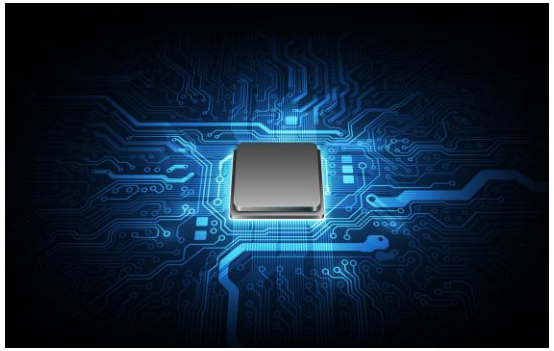
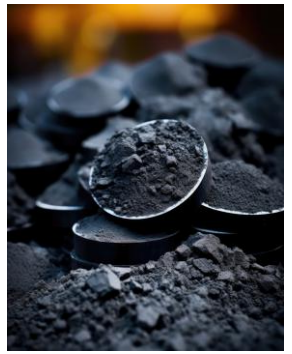


European Commission

Advanced Materials

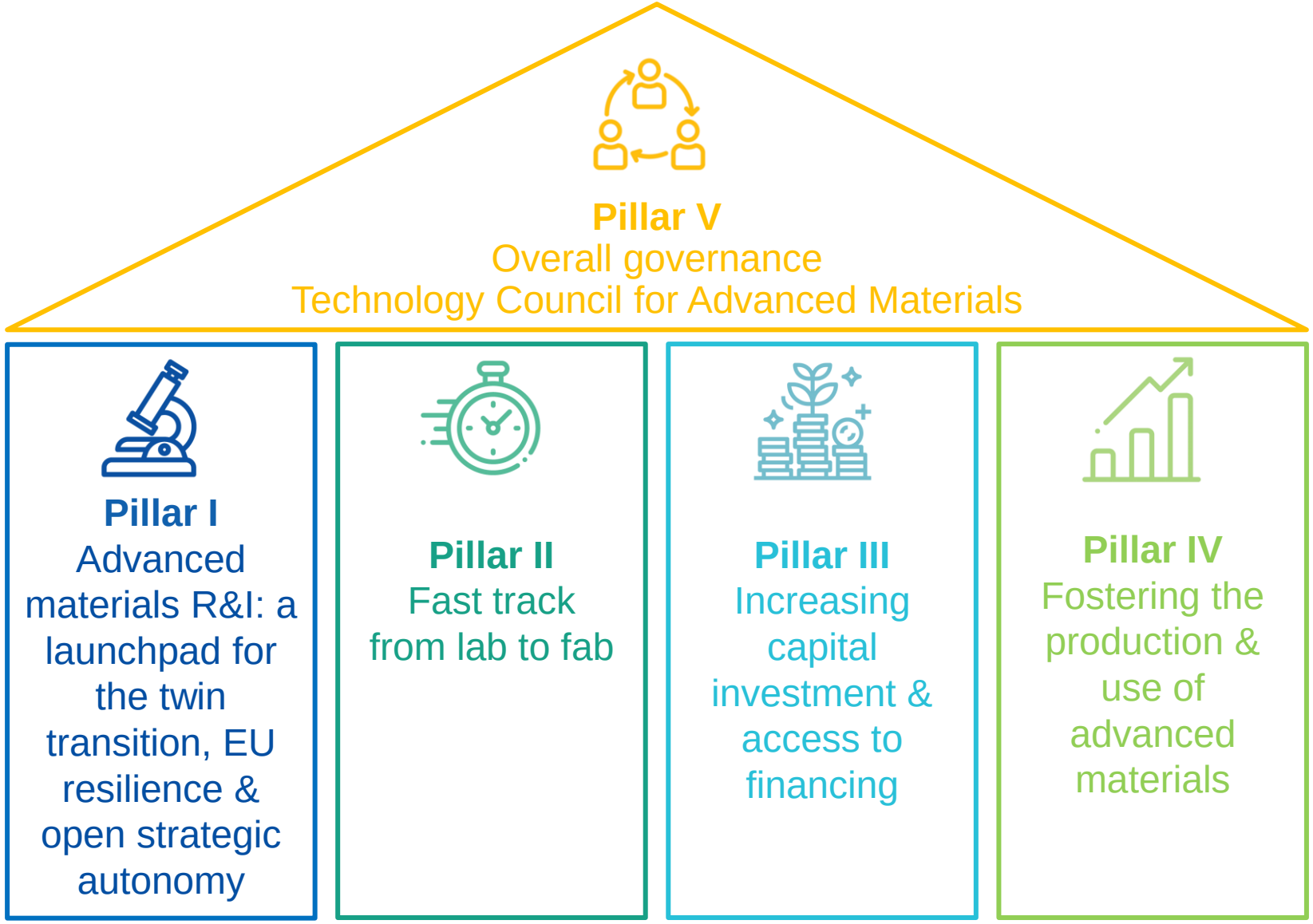
- Advanced materials as **key enablers & innovation drivers** for the **Green Deal** & **Digital Transition** **across sectors**



- **Increasing demand** expected
  - improved **efficiency** & **performance** for **circular**, **safe & sustainable** products
  - **clean energy technologies**
  - potential to **substitute** Critical Raw Materials

The Advanced Materials Strategy



EU Commission Communication COM(2024) 98 final 27.02.2024

European Commission

European R&I

Priorities – focused on needs

- **Common R&I objectives and priorities**: co-created with Member States*

*see **Annex** to Communication for **preliminary list of R&I priorities**

- **Crosscutting priorities**

  Digitalisation, Safe and Sustainable by Design (SSbD), Circularity

Some of the actions

- Co-programmed Horizon Europe **partnership**
  Innovative Advanced Materials for the EU – IAM4EU
- **Material Commons**
  European digital infrastructure for advanced materials R&I
- Single-entry catalogue for access to **Technology Infrastructures**
- **Advanced Materials Academy:** expected to be operational by Q4 2025
  European Institute of Technology call, grant agreement expected March
- **Important Projects of Common EU Interest** – candiate IPCEI on circular advanced materials.

Clean Industrial Deal

- Energy-intensive industries
  - Steel, metals, and chemicals, to support decarbonisation, switch to clean energy, and tackle high costs, unfair global competition, and complex regulations
- Clean-tech sector
  - Heart of future competitiveness and necessary for industrial transformation, circularity, and decarbonisation.

Clean Industrial Deal

➢ Circularity and Access to Materials

High dependence of EU industry on critical raw materials. Materials are not reused sufficiently, precious materials are being thrown away

- Ensure lower prices and higher availability for critical raw materials by organising joint purchases (through an EU Critical Raw Material Centre)
- The New Circular Economy Act will reduce dependencies on primary materials imports and create business opportunities

➔ Increase circular material use rate from 11.8% today to 24% by 2030

Conclusion

- Expected outcome of the call ‘Paving the way to an increased share of recycled plastics in added value products’ are a key priority for the Commission
- Circularity is fundamental for advanced materials
- Clean Industrial Deal will support the regulatory framework for a circular economy
- Upcoming funding opportunities for upscaling innovation under Horizon Europe and candidate IPCEI

Thank you

javier.sanfelix@ec.europa.eu

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PRIMUS Project Overview
Goal, methodology and achievements

Jani Pelto, Principal scientist
VTT

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Jani Pelto

PRIMUS project
www.primus-project.eu

Principal Scientist VTT

VTT

PRIMUS coordinator
Plastics engineer, D.Sc. (Tech.).
Jani has worked at VTT since 2001.
Wide experience in developing polymers and thermoplastic blends and composites for many technical applications, electrical, biomedical, etc.
Expertise in compounding, extrusion, polymer material science.
Founder and developer of advanced mechanical recycling platform at VTT
Vast experience in industrial R&D project management at VTT.

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PRIMUS partners' location

start: **01.05.2022**
duration: **3 years**
budget: **6,9M€**
TRL: **3-6**
partners: **10+2 AE**

01.UEF (WP2 lead)

02.VTT (coordinator, WP3)

03.TLU

04.GD (WP6 lead)

05.CIR (WP5 lead)

06.COR

07.PRE (WP1 lead)

08.CK (WP4 lead)
09.CKT (CK AE)

10.MAIER

11.MTC (MAIER AE)

12.MON (WP7 lead)

PRIMUS OVERVIEW

GOALS, METHODOLOGIES AND ACHIEVEMENTS

OBJECTIVE

Give an overall view on the Scope and Goals of the project

Explain the Methodologies (Tools and tasks) on how we have addressed the Technical and psychological barriers limiting the use of plastics with recycled content in high-value products

Explain our four demo cases,:
2 in Automotive and 2 in Home appliances

Mention our biggest achievement in the Primus project to be explained in more detail in the following presentations

PRIMUS SCOPE AND BIG GOALS

ADDRESSING THE BARRIERS FOR HAVING HIGH RECYCLED CONTENT IN TECHNICAL PLASTICS

PRIMUS promotes the usage, **acceptance and safety of plastic recyclates** to be used in added value product made of technical plastics and elastomers, focusing on **traceability of materials to increase transparency** in the plastics value chain.

01 **Create quality** and safe recyclates through technological innovations

02 Support the use of recycled plastics as safe raw materials with **traceability**

03 **Demonstrate** application with 4 novel added-value demo cases in automotive and home appliances

04 Support recyclates market with
1) Advanced mechanical recycling,
2) Debromination of plastics
3) Chemical analytics

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METHODOLOGIES

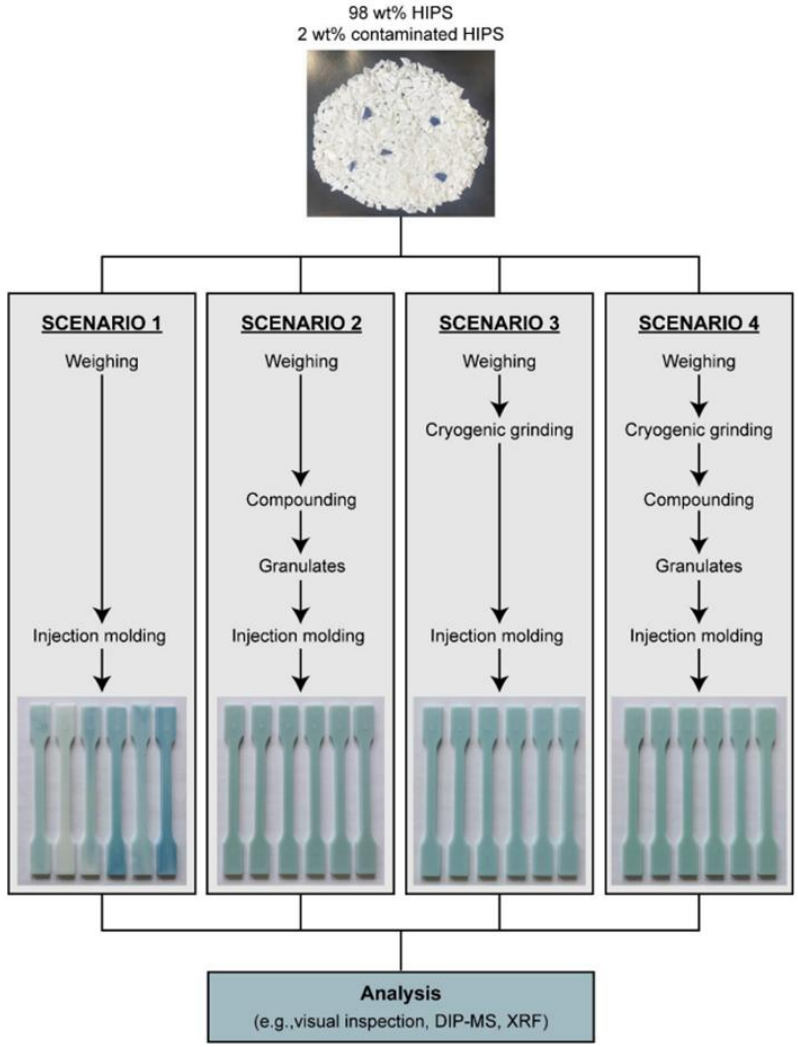
1 STANDARDS AND LEGISLATION

1.1 Map the current legal framework surrounding the waste to product interface to compile an **EU broad definition of recyclate.**

1.2 Validate, standardize and promote the **PRE 1000*** among recyclers to ensure recyclate compliance to product legislation

1.3 Assess and **create guidance** for food contact material status by means of substance risk assessment with the case of recycled HIPS from the refrigerator stream

e.g. a glimpse (on the right) from our sampling scenario for quantifying bromine in a recyclate production batch



*) a voluntary industry standard, **PRE 1000**, for the screening of substances. This standard enables recyclers to analyse the recycled material in a cost-effective manner & thereby prove compliance to the relevant product legislation, such as REACH, RoHS or POP.

METHODOLOGIES

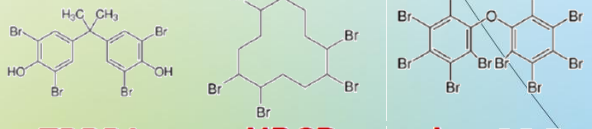
2 DEBROMINATION OF WEEE PLASTICS

2.1 Debromination of WEEE plastics HIPS and ABS

- Analyse different methods for removal of **BFRs by extractions** using $scCO_2$, DES or other simple aqueous based solvents
- Focusing on **scalable** processes
- Catalytic **debromination** of BFRs

2.2 Develop a **realistic sampling protocol to quantify BFRs** guidance document to be application in PRE-1000 standard

- Cross-validation of the sampling protocol using colour markers and BRFs
- Available for and hopefully to be applied by recyclers in the future



TBBPA

HBCD

decaBDE

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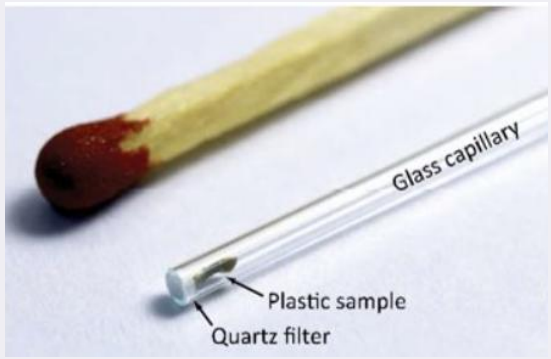
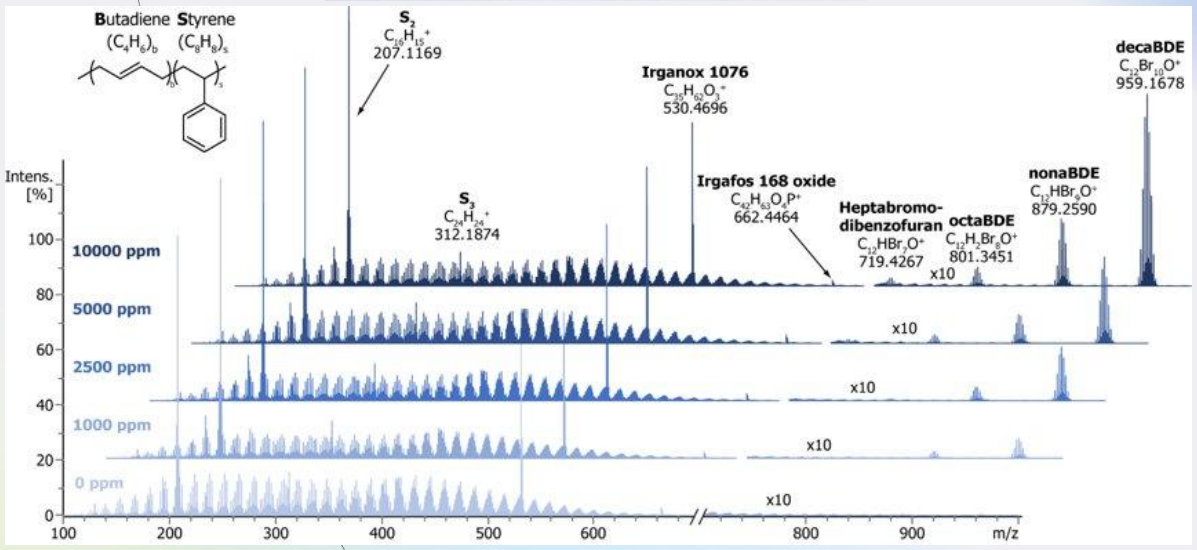
METHODOLOGIES

3 RECYCLATE SOURCING AND CHARACTERIZATION



3.1 Development of sampling and standard analyse

- Research how is done now (analytical methods)
- Verify in laboratory (e.g. DIP-APCI-MS[1,*] , other GC-MS & LC-MS)
- Understand recyclers methods (e.g. X-ray fluorescence), their strengths and limitations and correlate those with more advanced methods



3.2 Degradation management

- Spectral measurement of BFRs [2] and attempts to quantify polymer degradation (AHS and sensor fusion)

3.3 Instrumented mechanical recycling process

- Inline VOC measurement
- inline rheology measurement & control

1) **Grönlund K., *et al*. Direct Mass Spectrometric Analysis of Brominated Flame Retardants in Synthetic Polymers (2024) *ACS Omega*, DOI: 10.1021/acsomega.4c04059**

2) Sormunen T., *et al.* Raman spectroscopy combined with active hyperspectral sensing for classification of waste plastics containing brominated flame retardants: A sensor fusion approach (2024***)*** *Waste Management and Research*. DOI: 10.1177/0734242X241287736

METHODOLOGIES AND ACHIEVEMENTS

4 PLASTIC FORMULATION FOR TARGETED APPLICATIONS & PROCESS

4.1 Generation of tailor-made technical plastics and elastomers with high recycled content

4.2 Industrial Applications

- **Pilot 1: r-PC/ABS** for automotive interior, >80% recycled content
- **Pilot 2: r-PP/EPDM** (r-TPV), automotive cooling circuits, > 20% up to 40% to recycled content
- **Pilot 3: r-HIPS** refrigerator inner liners, 70% recycled content
- **Pilot 4: r-EPDM rubber**, washing machine door gasket, 20% recycled content

METHODOLOGIES

5 PRODUCT TESTING AND VALIDATION

5.1 Automotive Industry standards

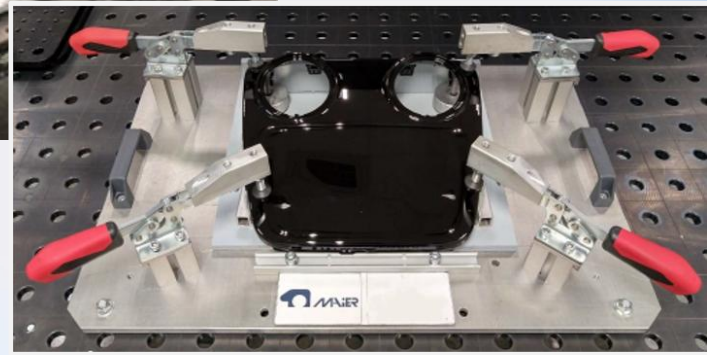
- Mechanical testing (console), pressure testing (pipes) according to real world product specifications
- Validation tests
- Aesthetics, paintability, chemical compatibility

5.2 Validation of the recyclability of r-PC/ABS and r-TPV

- Re-processing
- VOC emissions

5.3 Food contact r-HIPS as per EU Regulation 10/2011

- Closed-loop recycling and upgrading process for r-HIPS
- Non-intentionally added substances (NIAS)
- Overall and specific migration
- PRE-1000



r-PC/ABS (VTT), 2K injection moulded dashboard console (ABA) MAIER

r-PP/EPDM, Extruded & thermoformed tube CIKATEK

METHODOLOGIES

6 QUARANTEE A GOOD QUALITY AND SECURED SUPPLY CHAIN

Investigate how to guarantee supply and generate demand

6.1 Suppliers and recyclate certification

6.2 Access to public data, e.g. new Eco-profiles

6.3 LCAs & sustainability assessment of recyclers facilities

6.4 Quality-quantity match-making model (QQMM), definitions of high quality (VTT)

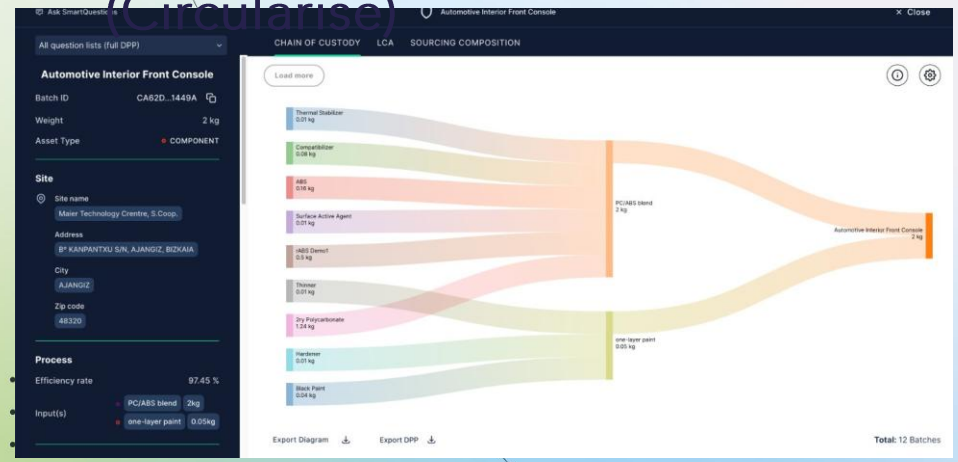
6.5 Traceability and Digital Product Passport of recyclates

- Blockchain
- +All complementary data directly attached to the blockchain
- Zero-knowledge proof (full backward traceability)

LCA (Green Delta)

+

Blockchain (Circularise)



METHODOLOGIES

STAKEHOLDER STUDY & CITIZEN AND CONSUMER ANALYSES

Make visible the **drivers, general attitudes and possible barriers of using recyclates** in consumer plastics products

7.1 Consumer study (N=6000) showing regional trends in the awareness and behaviour Estonia, Finland, Germany, Spain

7.2 28 interviews with 33 **stakeholders** from 10 European countries,

- home appliance and automotive parts manufacturers;
- plastic parts manufacturers outside home appliance and automotive sectors;
- industry trade associations; research and consulting organisations
- recycling companies;

7.3 Results presented in an extensive report **(Primus D6.4) ,** highlighting the barriers from business perspective and from the regulations side

Recycled plastics are crucial for sustainable production but require ***strong infrastructure and legislative support***. Manufacturers, especially from larger countries, support clearer and stricter EU regulations to balance market forces and sustainability goals, while smaller manufacturers report challenges in meeting regulations designed with larger players in mind, leading to competitiveness issues

"/.../ in the European Union, we now have the microplastic regulation, which, as I understand, was primarily written to address the environmental impact of polymer producers in large European countries. But now the entire EU has to implement it. And now, /.../ the administrative burden, which is aimed at preventing microplastic leakage from raw material producers, needs to be applied even by our small manufacturers. But /.../ being part of this process, I know it was written with large European countries in mind. /.../ here's an example where some of the EU's legislative changes or directives are designed for a different target group, but they end up affecting everyone. And then there are some of these inevitable challenges that we must adapt to. However, we will certainly try to keep the burden to a minimum. We definitely want to do this with the least amount of burden because it's not really relevant for us. We don't have polymer production, which was the actual target. Here manufacturers only process it. So, there are nuances like this. In summary, the goal is to avoid overregulation, but in principle, the whole direction is understood /.../." (ITA1 [Industrial Trade Association])

When it comes to sustainability, ***another tension appears between the OEMs and their suppliers***. Market logic does not seem to benefit sustainability as suppliers need to comply with the requirements of the OEMs to ship their products all over the world, thus generating great amounts of CO_2. Therefore, the option of producing closer to the consumers is sometimes seen as impossible or very difficult, as one of the interviewees noted:

"/.../ before, some years ago, you could be a local supplier. I mean, you could supply for some OEMs in Europe and then not supply in some other regions. But at the moment, you cannot do that. The OEMs want to have a global supplier that can supply for their modelling in Germany or in Romania or whatever, and then the same supplier MUST supply for the model in Asia, for the model in North America or South America. So, it's something that you need to adapt to. You cannot say, no, I want to produce only in Europe, or I want to produce only in China. So, at the end we are not in the position of deciding that /.../." (APM1)

COMMUNICATION AND DISSEMINATION ACTIVITIES

MAIN HIGHLIGHTS

Considering website visitors, social media followers, newsletter subscribers, video viewers, MOOCs students, podacast audience

19.842 people reached

2 stakeholder groups

citizens

5 social media channels

Facebook (622), Instagram (123), Twitter (374), LinkedIn (948), YouTube (10.7K)

6 podcast episodes

Trash Talkin´! Podcast (audience: 133) Available at Spotify and YouTube.

industrial

13 peer reviewed scientific papers

Access to all of them thought the Private Industrial Website: Join the Industrial Community!

31 events and conferences

Posters, presentations, papers and communications.

7 training MOOCs

Available for free at Udemy!

8 webinars/online round-tables

Boosting Plastic Recycling webinar series

2 policy recommendations

Published on PRIMUS website.

1 best practice book

Published on PRIMUS website.

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PRIMUS Best Practice Book

Julia Cilleruelo Palomero,
Sustainability Consultant & Researcher, Communications
GreenDelta GmbH

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Julia Cilleruelo Palomero

PRIMUS project
www.primus-project.eu

Sustainability Consultant & Researcher, Communications
GreenDelta

PRIMUS Sustainability Manager
Experienced in sustainability, Life Cycle Assessment (LCA), data management, and communications.
Julia has a bachelors in General Engineering and a masters in Electrical Engineering focusing on Renewable Energies. She has been working with LCA for 5 years, firstly with her own startup on a platform for data and further as a consultant and researcher at GreenDelta for projects in a range of topics.

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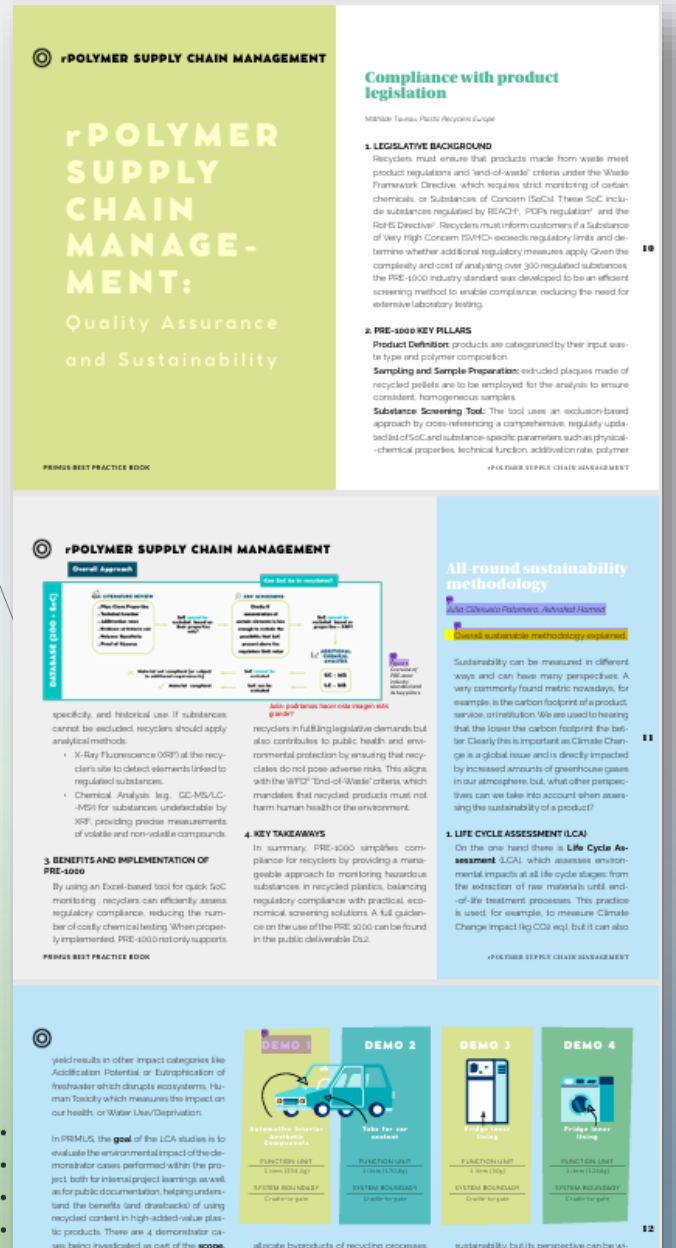
PRIMUS BEST PRACTICE BOOK



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CONTENT

PRIMUS Best practice book

CONTENT

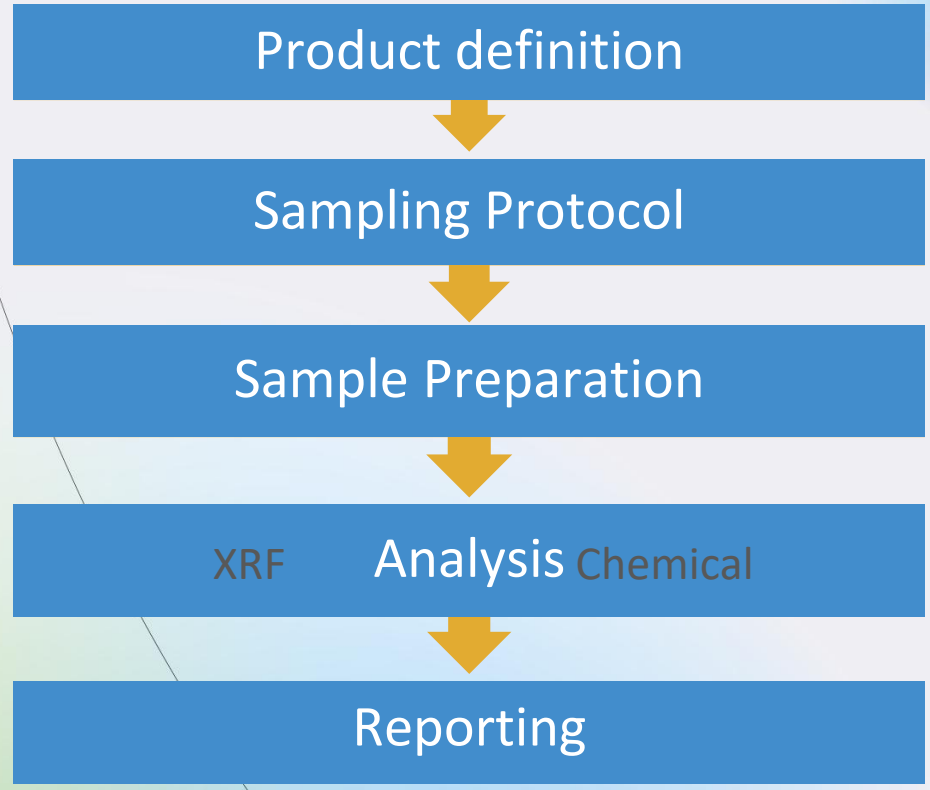
PRE-1000

Plastic Recyclers Europe

VALIDATED

D1.2

- Voluntary industry standard.
- Enables plastics recyclers to obtain the necessary information for general **product regulation requirements** related to SoCs (i.e., REACH and POPs regulation) and remain **compliant with the existing legislation**.
- Provides an **easy-to-use tool** (Excel file) that allows a first and **quick monitoring** of SoCs. It allows plastics recyclers to state with confidence their compliance with the chemicals legislation.
- When properly implemented the PRE 1000 standard should be considered a solution to ensure fulfilment of article 6.1(d) of the WFD, i.e., the **End-of-Waste criteria** relating to not having an overall adverse effect on human health and the environment.



QUALITY-QUANTITY-MATCH MODEL

VTT

Feed-stock	Factors	Requirements	Criteria	Desirability	Feasibility	Viability	Stakeholder
				(0–4)		(0–4)	
Available or potential plastic feedstock quantity	Feedstock quality	Collection	Closed loop	4	*		Design from recycling potential based on stakeholder perspective
			Application based	3	*		
			PCR-mixed	1	*		
			PIR-mixed	2	*		
		Further sorting	Not needed	4	*		
			White/Neutral	1	*		
			95 wt% FCM	1	*		
			Polymer type	1	*		
			PRE 1000	1	*		
			Rigid-flexible	1	*		
		Washing	Not needed	4	*		
			Decontaminated	4	*		
			Hot washed	3	*		
			Cold washed	2	*		
			Not washed	0	*		
	Technical quality of recyclate	Recycle condition	Regrind 95% FCM	4	*		
			Regrind, flake	1	*		
			SSE, Regranulate	2	*		
			TSE, upgraded to 95 wt% FCM	3	*		
		Content	Recycle wt%	1	*		
			Additives wt%	1	*		
			Main plastic wt%	1	*		
			Non-target wt%	1	*		
		Aesthetics	Transparency	2	*		
			Gloss level	1	*		
			White	1	*		
			Neutral	0	*		
			Good	4	*		
		Olfactory performance	Can be improved	2	*		
			Smelly	0			
			Unknown	0			
		Mandatory Material Properties	Viscosity value	1	*		
			Density	1	*		
			Humidity and ash content	1	*		
			Mechanical data	1	*		

INDEX

Feed-stock	Factors	Requirements	Criteria	Desirability	Feasibility	Viability	Stakeholder
				(0–4)		(0–4)	
Available or potential plastic feedstock quantity	Continues-Technical quality of recyclate	Optional Material Properties	Shear curve	0	*		Design from recycling potential based on stakeholder perspective
			Heat deflection	0	*		
			Shrinkage		*		
			Intended processing data	0	*		
			Migration data	0	*		
	Value chain robustness	Data quality level	3 MI, 1 MP	1	*		
			10 MI, 4 MP	2	*		
			14 MI, 5 MP	3	*		
			15 MI, 8 MP	4	*		
		Quality management	ISO 9001	1	*		
			ISO 17025	1	*		
			RECYCLASS	1	*		
			PRE 1000	1			
			CEN/TS 16010	1	*		
			CEN/TS 16011	1	*		
		Value chain status	Established	4	*		
			Developing	3	*		
			Emerging	2	*		
			Unknown	1	*		
		Main barrier for scalability	Throughput	1			
			Logistics	1			
			Legislation	1			
			Standardisation	1			
			Consumer perspective	1			
			Price	1			

- Sets an example framework for demand driven circular economy in WEEE and end-of-life vehicle plastic.
- Intended for brand owners and stakeholders in **matching recyclate quality level with their intended product specification.**
- Feedstock quality, technical quality of recyclate, value chain robustness included.

→ INDEX

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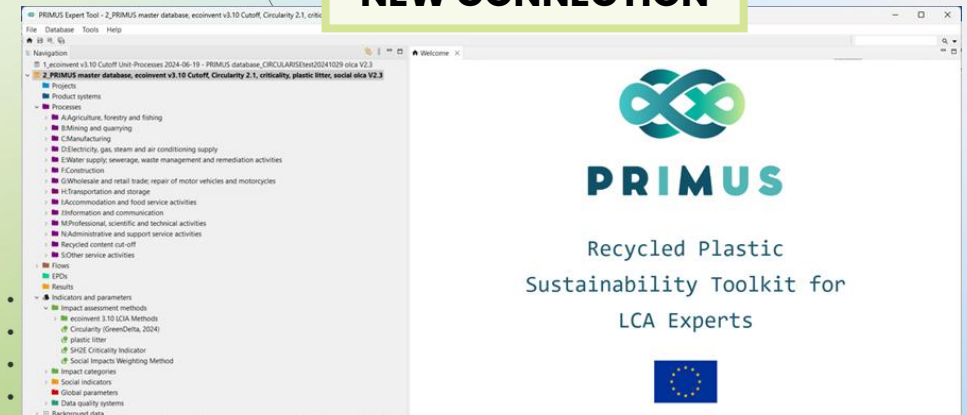
TRACEABILITY AND DIGITAL PRODUCT PASSPORT OF RECYCLATES

Circularise

- Data + Verification = Traceability
  - Secure communication for high-quality recycling
    - Material Composition
  - Primary data for life cycle assessment (LCA)
    - Energy use
  - Increased trust in material/product claims
    - Safe handling of materials
  - Clear chain of custody for the material/product
    - Origin & source

NEW CONNECTION



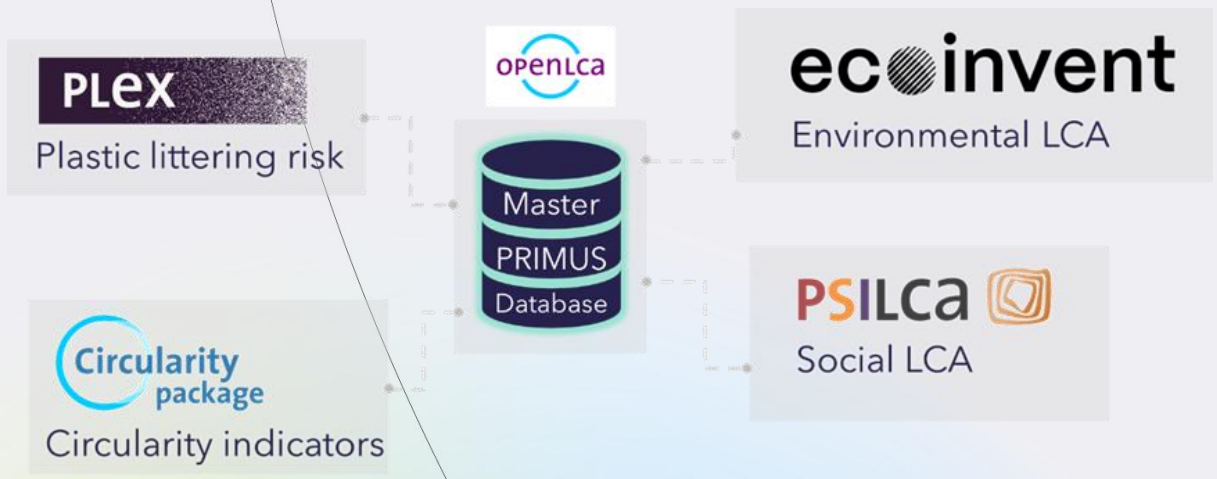
ALL ROUND SUSTAINABILITY METHODOLOGY

GreenDelta

- Life Cycle Assessment (LCA)
- Social LCA
- Circularity indicators
- Plastic littering risk

... combined!

- System Dynamics



ECOPROFILES

GreenDelta

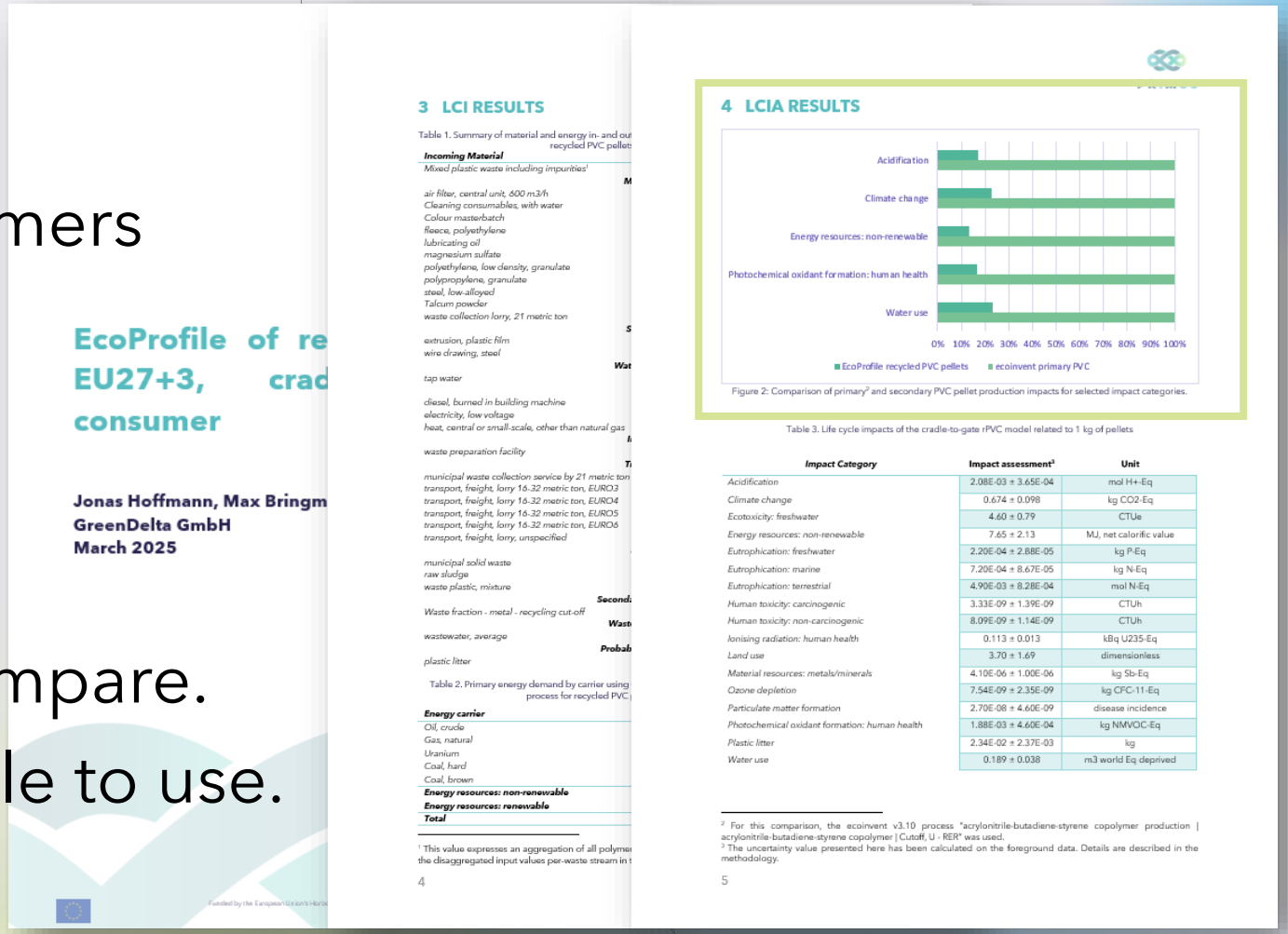
rMPO, rLDPE, rHDPE, rPET, rABS, rPS, rPP and rPVC

Sustainability datasets for mechanically recycled polymers

- European average
- Regionalised
- Focus on WEEE waste

Recyclers will be able to compare.

LCA practitioners will be able to use.



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PROCESS INNOVATION

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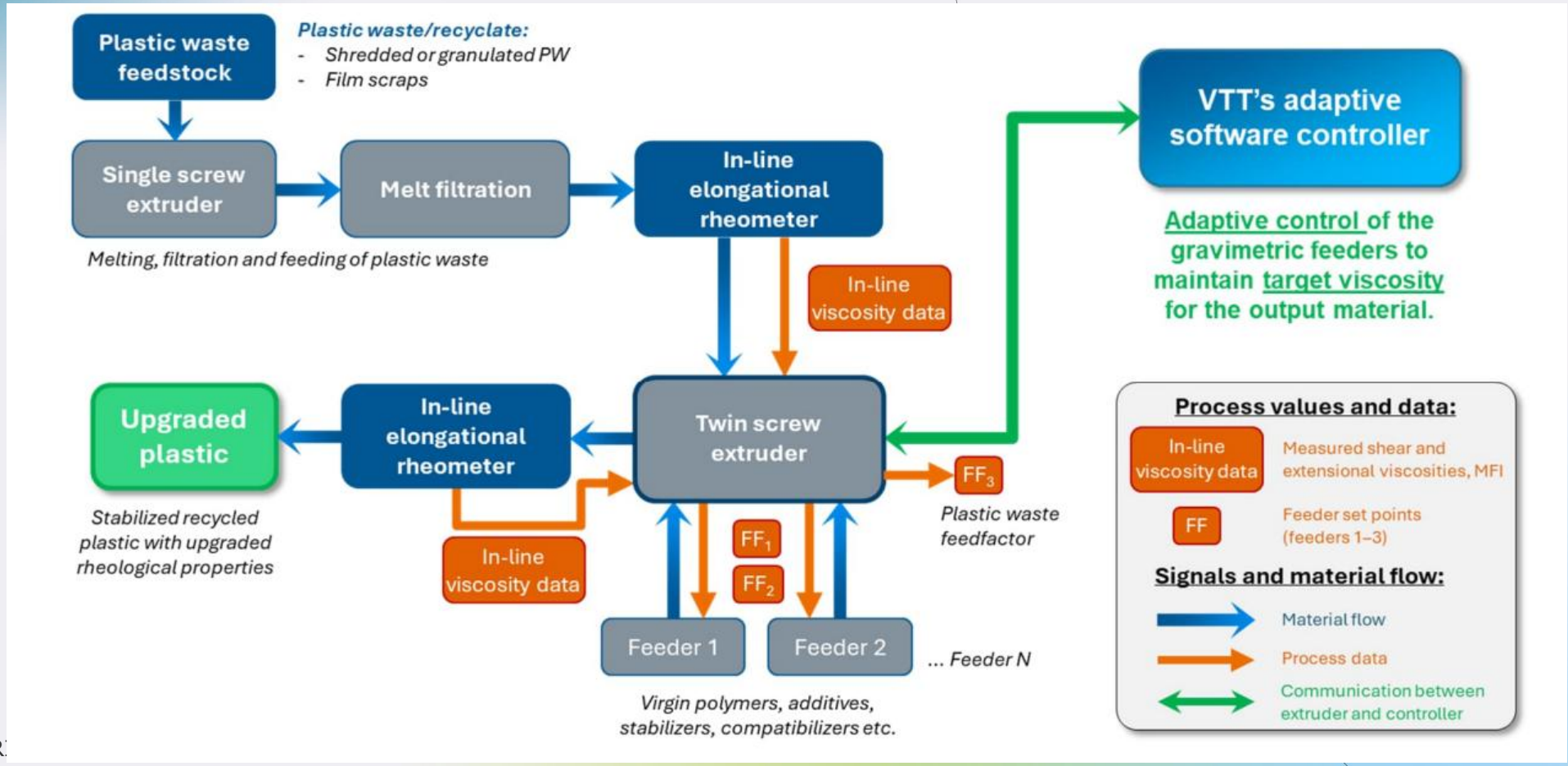
"ADVANCED" MECHANICAL RECYCLING

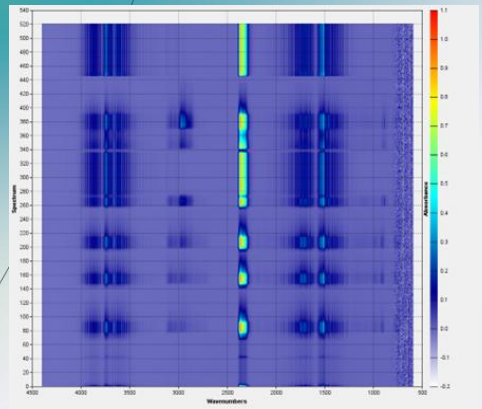
VTT

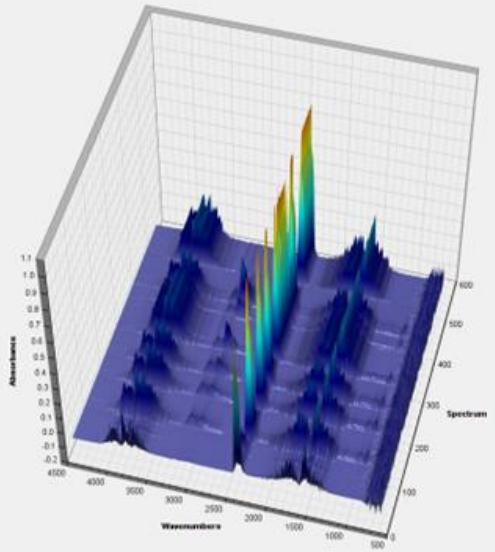
Additives and primary resins are blended or compounded with recyclate in an **inline controlled way**.



INLINE VOC ANALYSIS

VTT





- A protocol for detecting brominated gaseous compounds from melt plastics was established.
- It is vital to measure and control the VOC emissions during processing of plastics, especially when dealing with recycled streams.
- It was demonstrated that brominated gaseous compounds can be detected, identified, and quantified using the inline, in-situ FT-IR gas analyser.

DEGRADATION MANAGEMENT

VTT

- SWIR hyperspectral imaging was used to map, for the first time, the degradation degree of recycled material.
- ABS and HIPS, two of the most relevant polymers in WEEE plastics were studied.
- The heatmaps of degradation time showed the importance of using hyperspectral images as opposed to single-point NIR spectroscopy.

DEBROMINATION BY EXTRACTION AND CATALYSIS

University of Eastern Finland & VTT

AIM: Develop an efficient process to remove Brominated Flame Retardants (BFR) is essential to facilitate the recycling of a broader range of plastic waste.

1. Selective BFR extraction was achieved by controlling the solvent composition, extraction temperature, and processing time.
2. Extraction efficiency was highly dependent on the particle size of the polymer.
3. Antimony can be extracted by a separate extraction step.
4. Nickel based catalysts in aqueous media were promising for efficient bromine removal from the extracted BFRs without catalyst poisoning issues

MASS-SPECTROMETRY ANALYSIS

University of Eastern Finland

- Direct Insertion Probe Mass Spectrometry (DIP-MS) was found to be a viable tool for rapidly screening plastic grades, additives including antioxidants, plasticizers, light stabilizers, as well as halogenated and phosphorous flame retardants.

→ ***minimal sample prep required***

→ Qualitative and semi-quantitative determination

- Good correlation between the XRF and the MS was observed

K. Grönlund *et al.*, Direct mass spectrometric analysis of brominated flame retardants in synthetic polymers, *ACS Omega* **9**, 33011 (2024).

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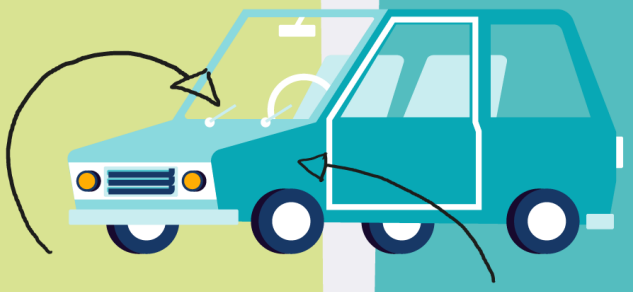
PRIMUS DEMONSTRATOR CASES

DEMO 1

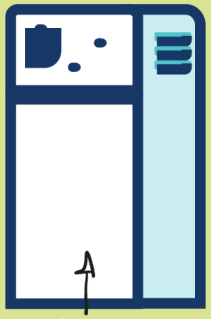
Automotive Interior Aesthetic Components

DEMO 2



Tube for car coolant

DEMO 3



Fridge inner lining

DEMO 4

Washing machine door seal

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DEMO 1 – AUTOMOTIVE INTERIOR AESTHETIC COMPONENT (RPC/ABS)

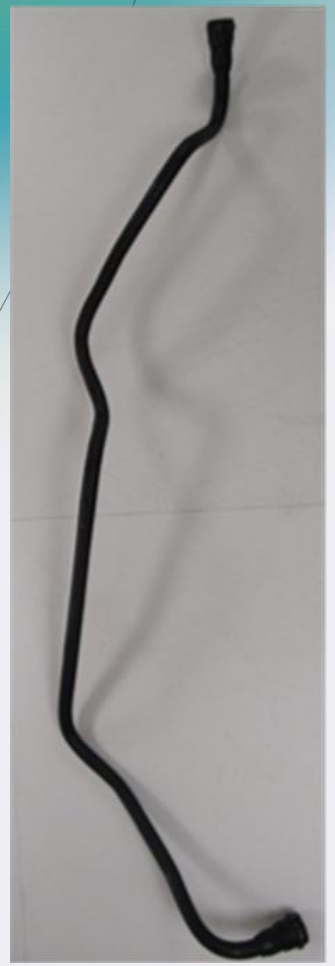
VTT, Maier, GreenDelta

Input material	Recycled content scenario	Origin
rPC	62%	Post-consumer waste from NL
rABS	>20%	Post-industrial waste from ES
ABS	20%	Primary material from ES

- It is technically possible to apply >85% recycled polymer (PCR) in the plastic formulation (rABS, rHIPS, etc.) with selected and extremely well-sorted streams.
- Combination of post-consumer and post-industrial recyclates is preferred to achieve desired material properties.
- Large improvements in all environmental and circularity assessments. (<84% Ecotoxicity (freshwater) impacts, 48% less extraction in metals and minerals resources, 27% decrease in Climate Change, and 22% less fossil resource extraction)

DEMO 2 – AUTOMOTIVE COOLING CIRCUIT (RPP/EPDM)

Cikatek, GreenDelta



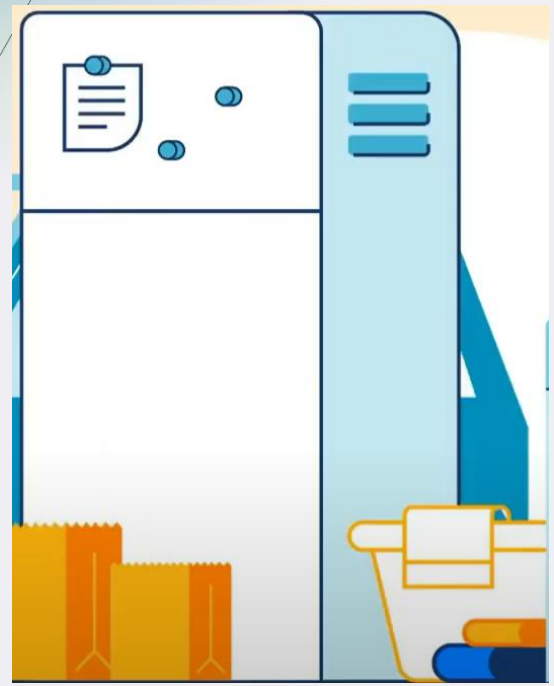
Input material	Recycled content scenario	Origin
EPDM	10.5%	Market average
rEPDM	10.5%	Post-industrial, same company
PP	37.5%	Market average
rPP	12.5%	Post-industrial, another company
Paraffinic oil	22%	
Fillers	7%	

- The recycling scenario improves by around 10% to 20% in nearly all LCA Impact Categories.
- Circularity can be easily compromised by a worse performance.
- Use of post-industrial scrap helps the environmental score but post-consumer is preferred for Circular Economy.
- Post-consumer rPP is being tested.

DEMO 3 – RHIPS FOR REFRIGERATOR LINERS FOR FOOD CONTACT (RHIPS)

Coolrec, VTT, PRE, GreenDelta

"Fridge-to-fridge"



Input material	Recycled content scenario	Origin
HIPS	17%	Market average
rHIPS	70%	Post-consumer fridges, primary data
Impact modifier	12%	
antioxidant	2%	

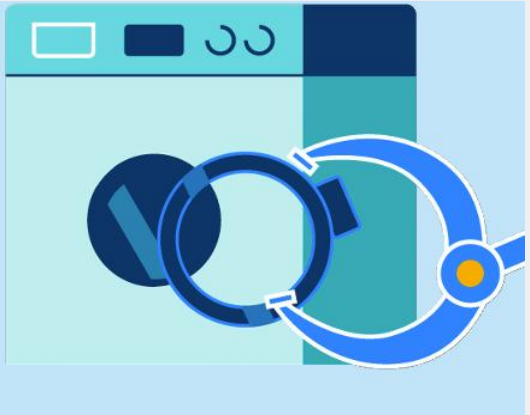
- For the **food contact application**, the level of contamination of rHIPS must be carefully monitored both in the input and output batches of the mechanical recycling process.
- *Advanced mechanical recycling* line was used.
- Comparable properties to food grade primary HIPS were achieved.
- 42% decrease Climate Change.
- Electricity at recycling facility and transportation NL – FI is a concern.

DEMO 4 – WASHING MACHINE DOOR SEAL (REPDM)

Cikatek, GreenDelta

"Rubber seal-to-rubber seal"

Input material	Recycled content scenario	Origin
EPDM	23%	Market average
rEPDM	10%	Post-consumer washing machines
Fillers	39%	
Paraffinic oil	28%	



- 20% recycled content gave unsatisfactory prevulcanisation signs.
- Improvement in all sustainability metrics, but small.

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SOCIETAL PERCEPTION AND ENGAGEMENT

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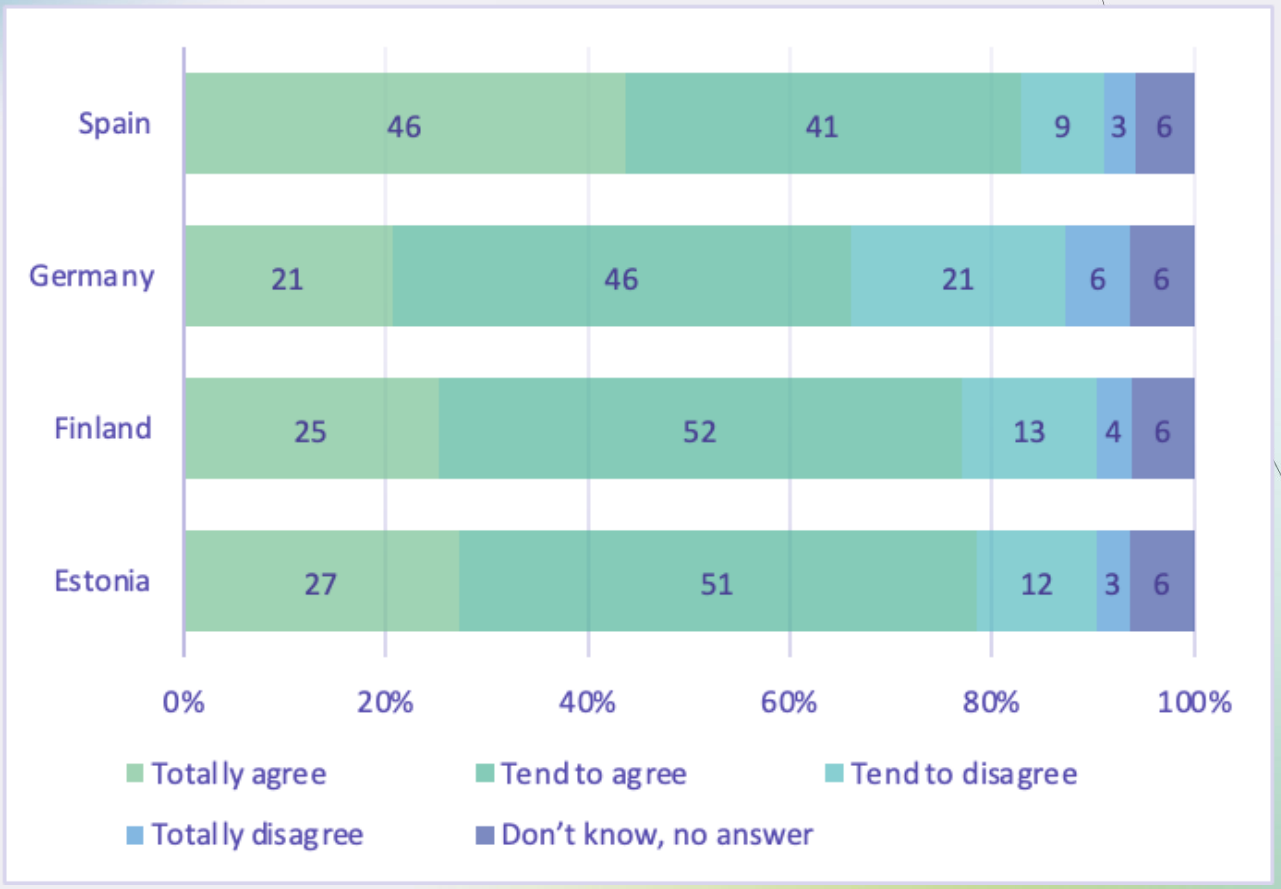
GENERAL PUBLIC'S PERSPECTIVES OVER PLASTICS

Tallinn University

- Survey 2023 (Spain, Finland, Germany, Estonia), 6000 people

Q8) Are you worried about the environmental impact of everyday products made of plastic?



GENERAL PUBLIC'S PERSPECTIVES OVER PLASTICS

Tallinn University

- Citizen and consumer awareness and acceptance of recycled plastics survey in 2023 in Spain, Germany, Finland, and Estonia.
- The findings reveal overall public environmental concern (several questions addressed this) and behavioural commitment to recycled plastics, although with country variations.
- Concerns relate mainly to health safety, followed by the lack of long-term studies on recycled plastics (somewhat more so in Estonia and Spain), and inadequate regulations or standards (particularly in case of Spain). Another barrier is relatively low awareness regarding recycled plastics, because considerable proportion of survey participants have difficulty to answer questions specifically about this material.

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GENERAL PUBLIC'S PERSPECTIVES OVER PLASTICS

Finally, **raising awareness** about regulations, the plastic lifecycle, innovative recycling technologies, and the ecological impacts of recycled materials is crucial for fostering acceptance and promoting sustainable practices amongst consumers.

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GENDER-PERSPECTIVE ON PLASTIC RECYCLING

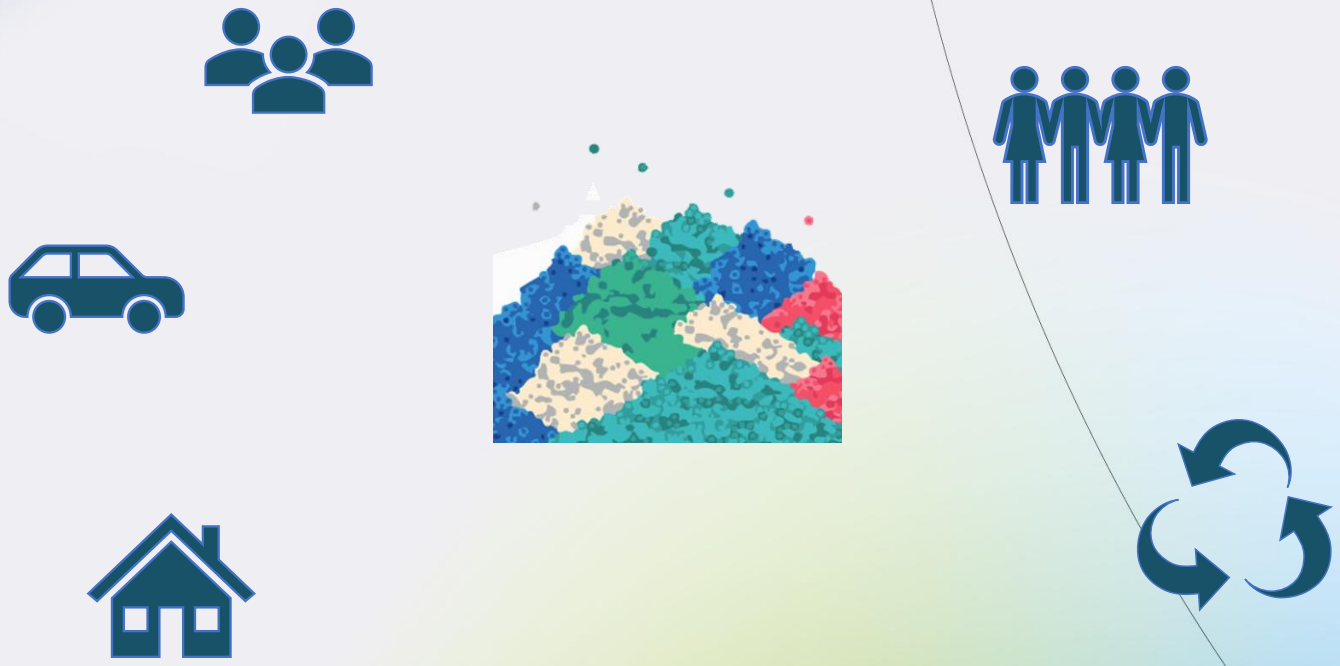
Tallinn University, GreenDelta

- In general, relatively similar results.
- Women are considerably more concerned about environmental issues and severity of plastic pollution.
- Both men and women consider choosing products made of recycled plastics instead of conventional plastics as an environmentally friendly action.

INDUSTRIAL STAKEHOLDER PERSPECTIVE AND ENGAGEMENT

Tallinn University

28 interviews, several discussions, and 2 webinars.



INDUSTRIAL STAKEHOLDER PERSPECTIVE AND ENGAGEMENT

Tallinn University

- Collaboration among legislative bodies, waste collectors, recyclers, and manufacturers was seen as essential to creating a circular economy.
- The automotive sector expressed concerns over rapid regulatory changes, which can overwhelm industries needing time to adapt.
- Home appliance and automotive producers recognized the need to balance economic, environmental, and social sustainability, though these goals often conflict.
- Recyclers see opportunities to enhance recycling technologies but stress the need for better cooperation.
- For consumers, affordability often outweighs sustainability concerns. While sustainability ranks highly in surveys, it does not always translate into purchases.

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CONCLUSIONS & KEY MESSAGES

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CONCLUSIONS

An overview of the findings of PRIMUS project was presented, covering sections on

- Process innovation
- Demonstrator case application
- Societal perception and engagement

QR CODE OF BEST PRACTICE BOOK

Thank you!

COFFEE BREAK

& NETWORKING

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Synergies with Sister-Projects

Carolina Mejia, MONDRAGON (PRIMUS)
Melpo Karamitrou, RNANOLAB (Precycling)
Pieter Willot, VITO (INCREACE)
Benjamin Porter, TRINSEO (ABSolEU)

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SYNERGIES WITH SISTER-PROJECTS

Communication strategies and findings in the diversity of pilots.

AGENDA

1. Introduction & purpose of the session
2. Overview of Sister-Projects
3. Sector-Specific Pilots across projects
4. Joint Activities & Collective Impact
5. Q&As

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SISTER – PROJECTS

PRIMUS, Precycling, ABSolEU, and INCREACE are four **sister projects funded by the European Commission** under Horizon Europe (HORIZON-CL4-2021-RESILIENCE-01-10), **working to enhance the share of recycled plastics in high-value products.** Through innovation, sector-specific pilots, and cross-project collaboration, they contribute to a more sustainable and resilient economy.

OBJECTIVE

This session will showcase the **synergies between four Horizon Europe sister projects**—PRIMUS, Precycling, ABSolEU, and INCREACE—highlighting their collaborative efforts to advance plastics recycling.

Speakers will present key pilots, joint initiatives, and shared insights to pave the way for increased use of recycled plastics in high-value applications.

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Carolina Mejía Niño

PRIMUS project
www.primus-project.eu

Senior Innovation Project Manager at

MONDRAGON | GIZATASUNA LANEAN | Finantzak Industria Banaketa Ezagutza

PRIMUS C&D&E manager is experienced in Circular Economy, Industry 4.0 and Smart Cities R&D projects. After an Architect Degree, she did her three masters in urbanism, innovation and project management. She is working as a Senior Innovation Project Manager at MONDRAGON Corporation for the past 8 years, boosting R&D technologies of more than 200 companies, as well as leading MONDRAGON´s Environmental Forum.

Melpo Karamitrou

Precycling project
www.precycling-project.eu

Senior Research at

R-NANO

Dr. Melpo Karamitrou is an experienced materials scientist specializing in advanced polymers and nanostructured materials research. After a MSc and PhD in materials and polymer science, she worked in industry and a European agency, gaining expertise in resin chemistry and legislation. For the past four years, she has been a Senior Researcher at R-NANO, managing EU-funded projects on polymeric materials.

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Pieter Willot

INCREACE project
www.increace-project.eu/

Materials manager and Circular Economy at

vito

Pieter´ is a researcher at VITO focusing mainly on a circular economy for plastics. After obtaining his PhD in Polymer Chemistry, he spent 6 years working in the plastic processing industry, moving from material engineering to material & product sustainability. From here, he made the shift into sustainability consulting and later joined VITO to stimulate the transition to an efficient and effective circular system for plastics.

Benjamin Porter

ABSolEU project
www.absoleu.univ-cotedazur.eu/

Global Sustainability Business Development Manager at

TRINSEO

Ben Porter is Global Sustainability Business Development Manager at Trinseo, where he accelerates Trinseo's portfolio transformation toward more sustainable plastic solutions across industries. Porter joined Trinseo in 2013 and since then assumed different technical and customer facing roles. He holds a master's degree in industrial engineering from Helmut-Schmidt-University/Universität der Bundeswehr Hamburg.

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OVERVIEW OF SISTER-PROJECTS

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PRecycling

Plastics Recycling from and for home appliances, toys and textile

Project start/end: 01.04.2022 - 31.03.2026

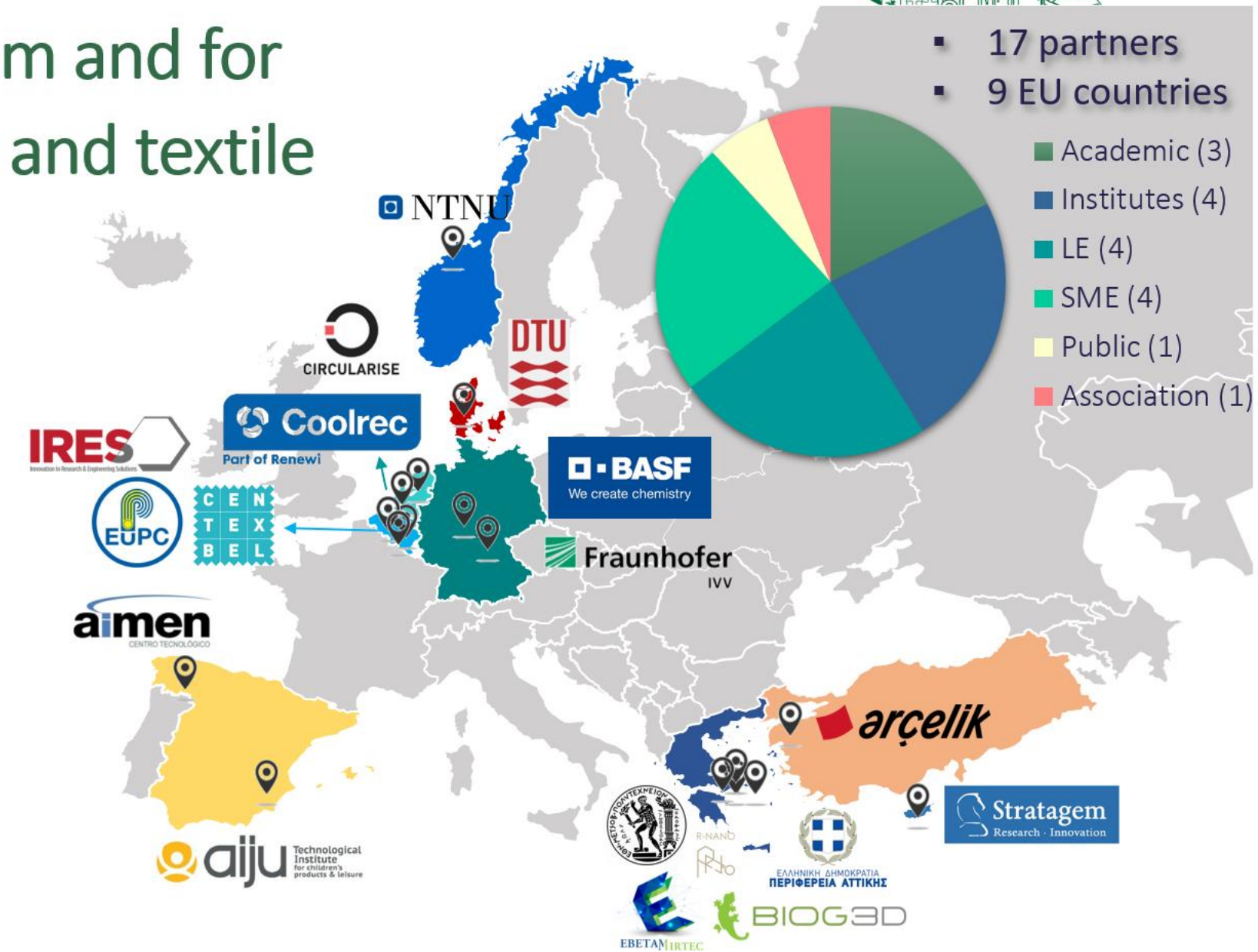
Funding: ~7M €

TRL: 4 (5) → 6 (7)

Coordinator: Prof. Costas Charitidis, NTUA
charitidis@chemeng.ntua.gr

Website: www.precycling-project.eu

LinkedIn: https://www.linkedin.com/company/precycling-project/



PRecycling at a glance

To develop an **easy-to-use methodology for:**

- **sampling and analysis** procedures of recyclates
- **recyclate** definition

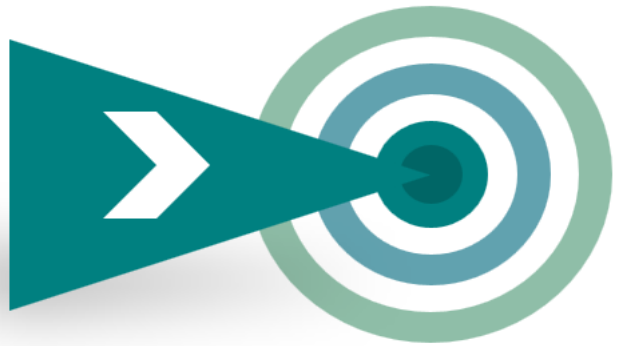
To promote the **circularity** and **safety** of plastic materials:

- **polymer recycling** based on the degradation degree
- production and verification of **recyclate's quality**
- **smart traceability** solutions
- digital information management

'waste to product' transformation is scalable, replicable, traceable, commercially viable, **safe to** use and with predicted lifetime.

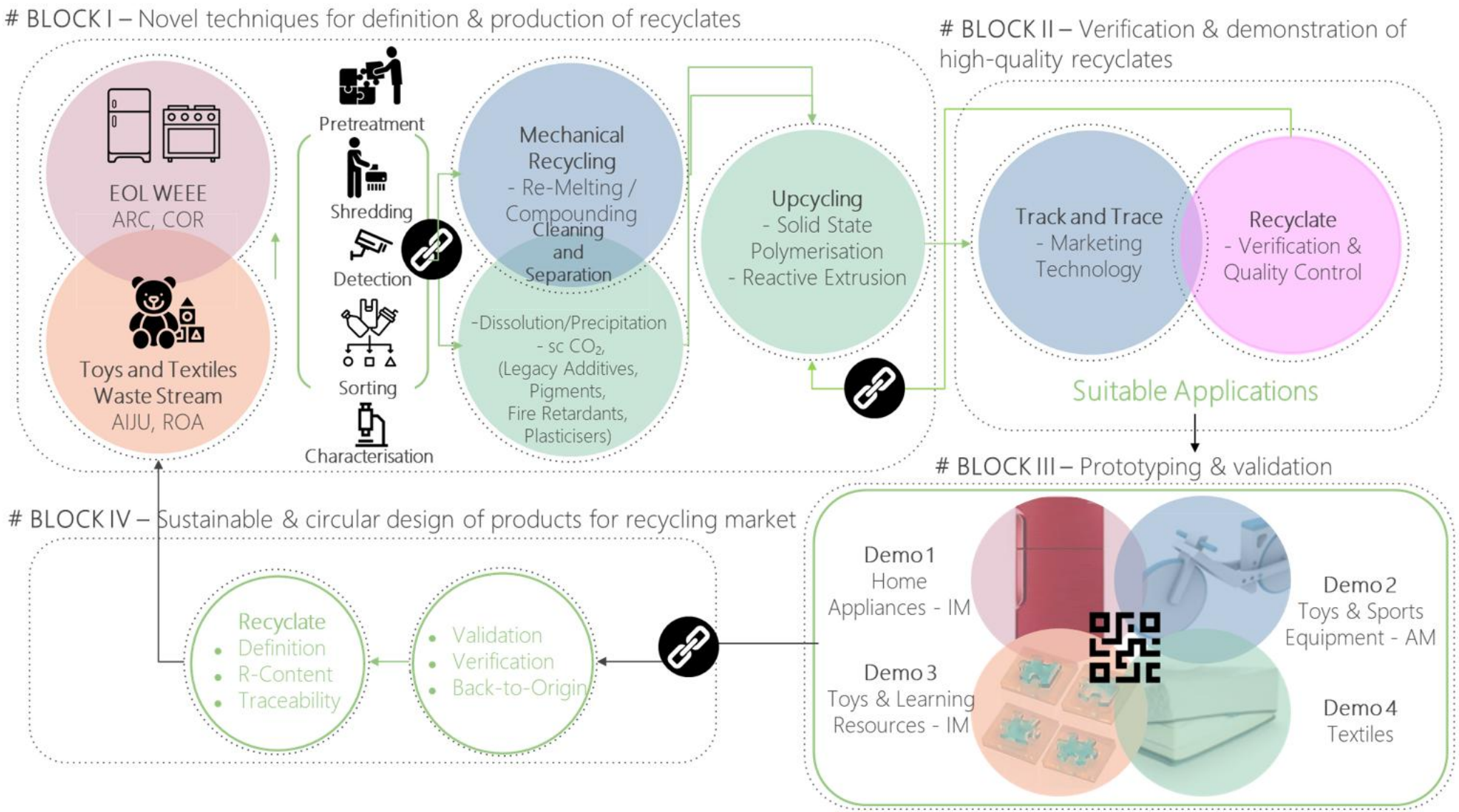
New added value products from recycled materials for **home appliances**, **toys** for children and **textiles**

A **high quality,** unique material made from **recyclates** can find a new use, both within the **same and new supply chains**.



The challenge:
*changing the **'waste problem=cost'** for the EoL disposer to a **'re-born product=value'**, which is **fully recycled and safe,** preserving the embedded value as it moves through the whole process, will be faced by the proposed methodology.*

PRecycling concept



Challenges and solutions

PRecycling

ANALYSIS AND CHARACTERIZATION OF WASTE MATERIALS

Challenges

Variance in PWS

Sorting methods limitations

No harmonized sampling procedure

No harmonized 'recyclate' definition

Solutions

- Methodology for **mapping of PWS &** calculating **recyclate content**
- Advanced **multi-signal sorting** & characterization (LIBS, Raman)
- **Material map** and a **unique material "fingerprint"**
- **Robust sampling** for analysis procedures and quality control
- **Sorted** materials analysis

HIGH QUALITY RECYCLATES PRODUCTION

Challenges

Contaminants, SVHC, FR

Small sample limitation

Limited polymer failure prediction

Solutions

- **Detection and removal of legacy additives** (selective dissolution, scCO2)
- **Degradation degree** methodology for prediction of product lifespan
- **Novel strategies** for recycling/upcycling and recycles reprocessing
- **Recyclates analysis** methodology, verification and quality control

TOOLS FOR TRACING MATERIALS

Challenges

Lack of digital literacy, investment costs and security issues

Solutions

- **Molecule's spectral signature** (pigments, UV stabilizers, GF, FR etc.)
- **Digital traceability** - a digital information management through the whole value chain
- Advanced **digital platform** for recycling decision making/product development

LCA/LCC/sLCA | **Circular and sustainable products** | **Digital Twins** | **Social engagement**

INCREACE

INCreasing **RE**cycled content in **A**dded value products for a resilient and digitized **C**ircular **E**conomy

Horizon Europe funded:
EUR 7.2 M

Duration:
June 2022 – June 2026

17 partners

E-waste plastics: the neglected resource

Recyclates used in new products 3.2%

5 Business Cases at the heart of the project

PHILIPS

VORWERK

skaza

Cabka

skaza

Source: ar-bsef-report.pdf (consultdss.com)

Key achievements

- **Clustering** of product categories for separate recycling based on composition
- **Recycling** experiments of different WEEEP fractions with 3 technologies + characterization
- **System map** to understand the leverage points per business case
- Design experiments to improve **collection systems**
- **Material Flow Analysis tool** on efficiencies & losses of different mechanical recycling steps
- **Regulatory & Policy** landscape + Stakeholder analysis
- **Recyclability Assessment Tool** (Webinar on 26.03.25 at 16h)
- **Circular Economy framework** for plastics recycling

Work in progress

- Demonstrators in progress to proof concept
- White paper for policy makers
- Life Cycle Assessment & Techno-economic analysis
- …

Key achievements

- **Clustering** of product categories f
- **Recycling** experiments of differen
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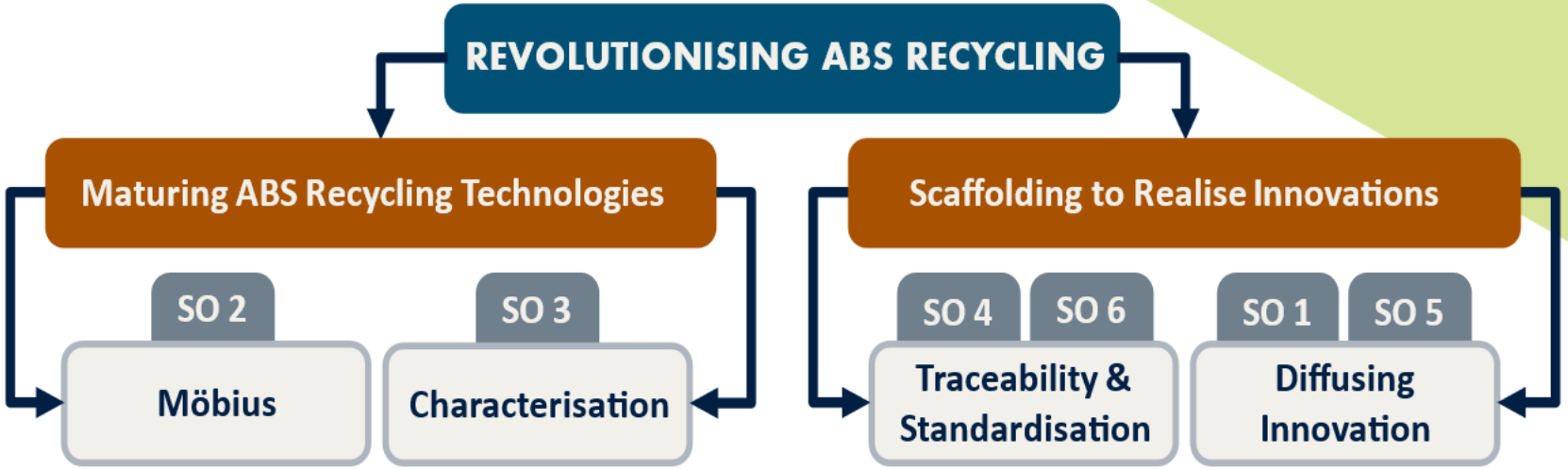
- **Recyclability Assessment Tool** (Webinar on 26.03.25 at 16h) PHILIPS PEZY GROUP
- **Circular Economy framework** for plastics recycling vito

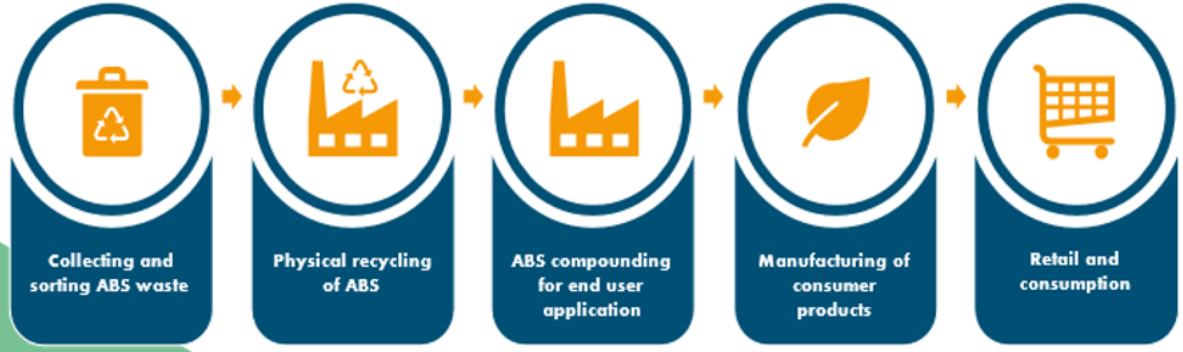
Work in progress

- Demonstrators in progress to proof concept VORWERK skaza Cabka PHILIPS
- White paper for policy makers ETH zürich vito Fraunhofer IZM
- Life Cycle Assessment & Techno-economic analysis Fraunhofer IZM ETH zürich
- …

ABSolEU Objectives & Consortium



The twelve partners of ABSolEU cover the entire value chain of ABS



- 1 ABS recycler – Galloo Plastics (FR)
- 1 ABS producer – Trinseo NL
- 2 Research centres – TNO (NL) and RISE (SW)
- 2 Universities – University Côte d'Azur (FR) and University of Aveiro (PT)
- 1 Institute specialized in stakeholder engagement - Prospex Institute (BE)
- 1 company specialized in tracability – Jotne (NO)
- 1 standard institute (SIS)
- 3 iconic brand owners (ABS end-users)

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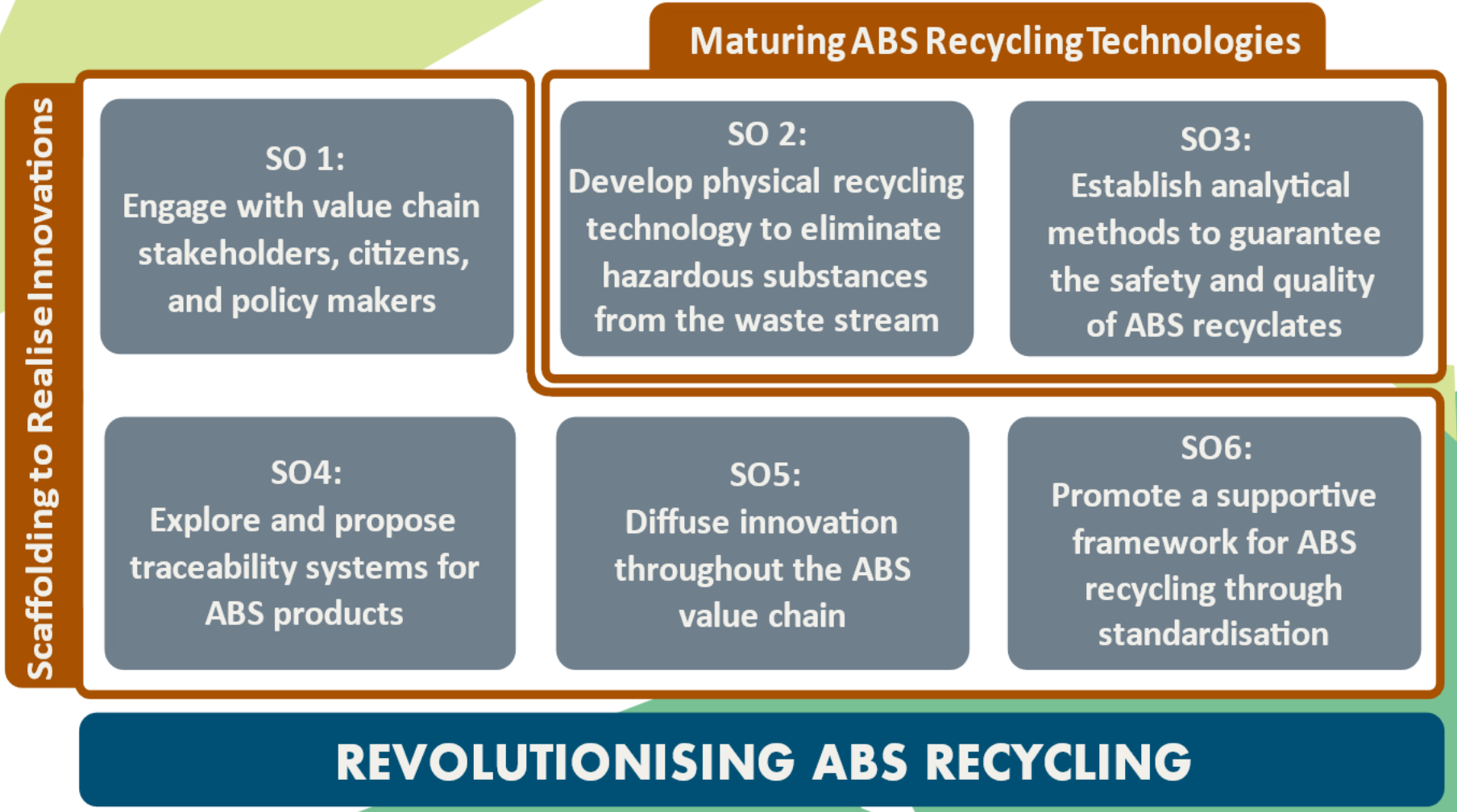
ABSolEU Objectives



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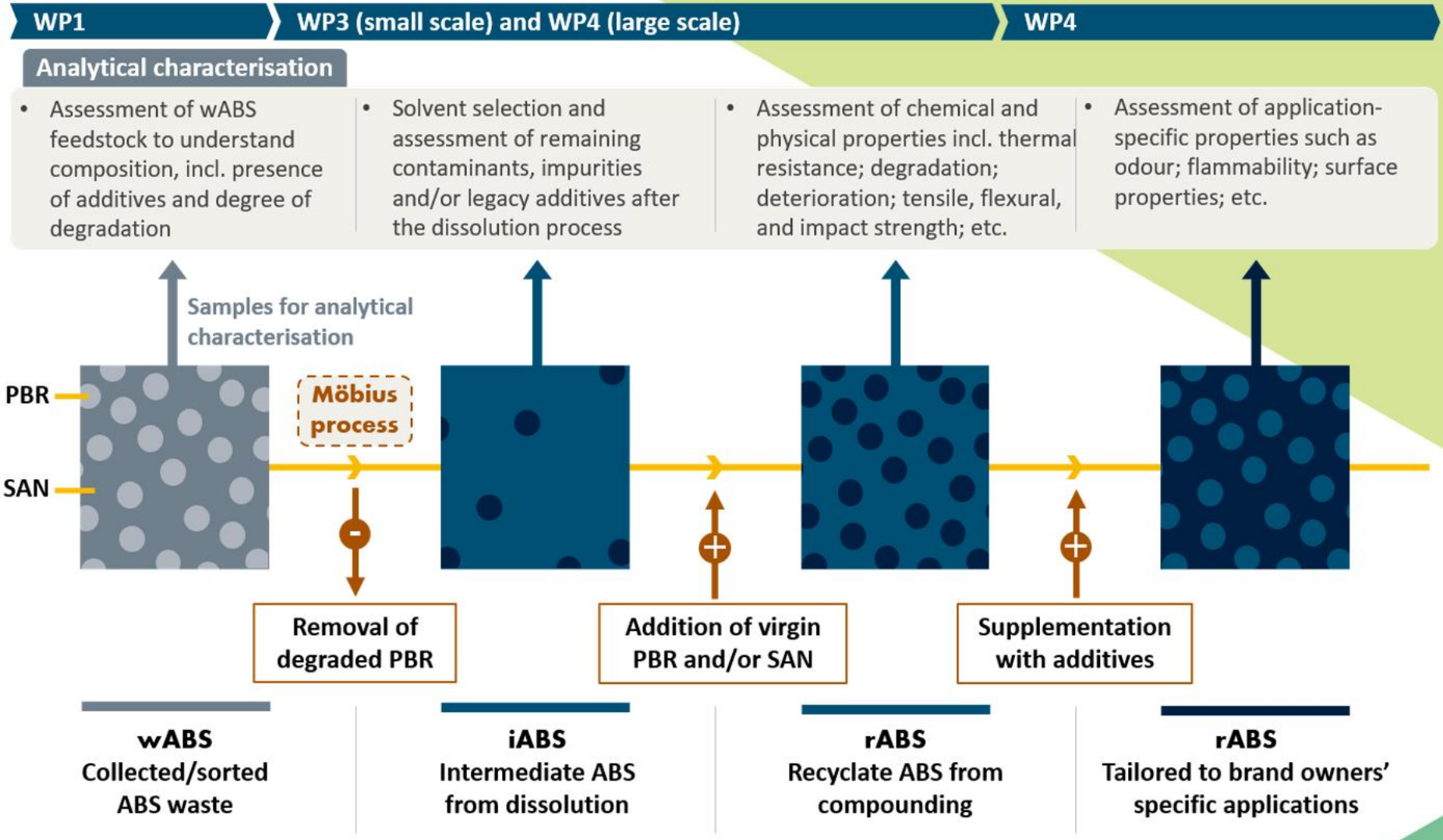
Methodology



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SECTOR-SPECIFIC PILOTS ACROSS PROJECTS

HORIZON EUROPE GA No. 101057067

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SECTOR-SPECIFIC PILOTS ACROSS PROJECTS

HOME APPLIANCES SECTOR

Application / Pilot	Sister-project	Manufacturer	Material - % of recyclates	Main challenges	Main Findings
Washing machine door seal	PRIMUS	Cikautxo - Spain	EPDM – 20% of recycled content	- Chemically compatible with detergents - Durability response in use for 28,7 hrs - Surface rugosity.	- Post-consumer recyclates – home appliances. - Grinding with blades. - Max 20% of recyclate.
Washing machine filter pump	PRecycling	Arçelik - Turkey	PP-GF30% - 100% of recycled content	- Chemical resistance to detergents - High strength - Melt flow rate	- Glass-fiber reinforced PP - Post-consumer PP - Closed-loop recycling from WEEE to WEEE
Refrigerator Evaporation Cover	PRecycling	Arçelik - Turkey	HIPS - Targeting 100% of recycled content	- Chemical resistance to detergents, oils and lubricants - High strength - Melt flow rate	- Post-consumer HIPS - Closed-loop recycling from WEEE to WEEE
Oven Part Card Plastic Holder	PRecycling	Arçelik - Turkey	PA-GF30% - Targeting 100% of recycled content	- Flame retardancy - High strength - Thermal resistance	- Glass-fiber reinforced PA66 - Post-industrial PA66 - Closed-loop recycling from WEEE to WEEE

SECTOR-SPECIFIC PILOTS ACROSS PROJECTS

HOME APPLIANCES SECTOR

Application / Pilot	Sister-project	Manufacturer	Material - % of recyclates	Main challenges	Main Findings
Charging pistol electrical car	INCREACE	Skaza	PC composite	Flame retardance	Highly specific requirements typically not specified for recyclates
Home composting bin	INCREACE	Skaza	Virgin ABS to recycled PP	Chemical resistance, product assembly	Managing material & product changes
Toothbrush	INCREACE	Philips		Medical contact requirement	Availability of specialty polymers for highly regulated markets and quality requirements

SECTOR-SPECIFIC PILOTS ACROSS PROJECTS

FOOD-CONTACT AND TOYS SECTOR

Application / Pilot	Sister-project	Manufacturer	Material - % of recyclates	Main challenges	Main Findings
Refrigerator liners	PRIMUS	Coolrec - Nederland	HIPS – 40-70% of recycled content	- r-HIPS assessment and reformulation for suitable samples for food safety tests - Mechanical properties and melt viscosity for extrusión-thermoforming. - NIAS screening and migration test.	- vHIPS sheets contain a higher concentration of PS oligomers than the ones made with rHIPS. - Substances detected on the flakes were not detected on the thermoformed sheet.
Steam coorker basket	INCREACE	Vorwerk	PP composite	Food contact materials	Strictly defined or closed loop collection systems are currently required for FC PP
Toys – Plastic boat	PRecycling	AIJU - Spain	PP - Targeting 100% of recycled content	- Compliance with EN71 standards for toy safety - Consumer acceptance-odor	- Injection moulding - Closed-loop recycling from toys to toys - Open-loop recycling from WEEE to toys
Toys – Padel Racket	PRecycling	BIOG3D - Greece	ABS - Targeting 100% of recycled content	- Design for AM - Filament with a consistent diameter - Compliance with EN71 standards for toy safety - Consumer acceptance-odor	- Additive manufacturing - Open-loop recycling from WEEE to toys

SECTOR-SPECIFIC PILOTS ACROSS PROJECTS

FOOD-CONTACT AND TOYS SECTOR

Application / Pilot	Sister-project	Manufacturer	Material - % of recyclates	Main challenges	Main Findings
Toys - Fairytale Board	PRecycling	BIOG3D - Greece	HIPS - Targeting 100% of recycled content	- Design for AM - Filament with a consistent diameter - Compliance with EN71 standards for toy safety - Consumer acceptance-odor	- Additive manufacturing - Open-loop recycling from WEEE to toys
Textiles	PRecycling	CENTEXBEL - Belgium	PET - Targeting 100% of recycled content	- Intrinsic viscosity, flow behavior - Fiber mechanical strength - Compliance with OEKOTEX standards	- Reactive extrusion of chain extenders - Melt spinning - Closed-loop recycling from fiber to fiber
Toys – automotive and home appliances waste	ABSolEU	Trinseo + LEGO	50%	- removal of dangerous chemicals (FR/UV) - converting waste from one application into feedstock for another	- dissolution is viable recycling technoloy - total value chain needs to be involved

SECTOR-SPECIFIC PILOTS ACROSS PROJECTS

AUTOMOTIVE SECTOR & OTHER

Application / Pilot	Sister-project	Manufacturer	Material - % of recyclates	Main challenges	Main Findings
Automotive interior (Fascia Central Console)	PRIMUS	Maier - Spain	PC/ABS – 80% of recycled content	- Injection and surface/aesthetics necessities. - 2K injection (Bi-material). - Painting process. - Rubbing and chemical resistance tests.	- Diverse formulations for champion. - The result is linked to the material formulation, and the tuning of the injection, painting and curing process.
Cooling circuit	PRIMUS	Cikautxo - Spain	PP/EPDM – 20-40% of recycled content	- Hardness, Tensile strenght, elongation at break, MFI, burst pressure, fatigue (200.000 cycles). - Air aging and coolant aging.	- Post-industrial recyclates – automotive cooling circuit - Reprocessability of TPV material
Storage Pallet	INCREACE	Cabka	PO (PP/HDPE)	Electrostatic Discharge requirements	Contaminations in recyclate can influence additive behaviour

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JOINT ACTIVITIES & COLLECTIVE IMPACT

HORIZON EUROPE GA No. 101057067

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JOINT ACTIVITIES & COLLECTIVE IMPACT

Communication Key Messages defined among the sister-Projects.

CITIZENS

1. **From Waste to Value: Shift the Perspective**
   Waste is a valuable resource that can be transformed and reused, supporting material circulation and environmental protection.
2. **Your Actions Matter! - Make Recycling**
   Meaningful and Easy – Participating in collection and community initiatives helps turn waste into valuable resources, making recycling effortless and impactful.
3. **Recycled is Premium: Join the Movement**
   Advances in recycling technology ensure that recycled materials meet high-quality standards, preventing waste buildup and promoting sustainable innovations.

INDUSTRIAL, TECHNICAL, AND POLICY STAKEHOLDERS

1. **Unlock High-Quality Plastic Recycling**
   Advanced recycling technologies ensure pure, safe, and high-performing plastic recyclates, driving industry adoption of sustainable materials.
2. **Enable a Supportive Legislative Landscape**
   Updating regulations and expanding recycled content targets across industries can accelerate the transition to a circular economy.
3. **Transform Waste into Systemic Value**
   Collaboration across the value chain enhances recyclates' competitiveness, fostering a resilient and efficient recycling system.
4. **Design for Recycling: Building the Future of Circularity –** Prioritizing recyclable product design enables efficient material recovery and high-quality recyclates, making circularity scalable and sustainable.

JOINT ACTIVITIES & COLLECTIVE IMPACT

Join Webinars and Seminars

Sister-projects meetings

- Three online-meetings.
- Collaboration paths defined:
  - "Recyclates" definition
  - D&C plan – webinars, stakeholder engagement, 4-5 key messages

PRIMUS Podcast chapter: Trash Talkin´!

- Collaboration episode dedicated to **Germany** with **INCREACE** sister project.
- Participation of **Fraunhofer** as guest in the episode.

https://www.youtube.com/@primusproject6368/podcasts

The Green Tech - ITRB

Event in collaboration with various projects, coordinated with sister-projects.

REPURPOSE, REDONDO, SURPASS, ESTELLA, CIMPA, Creator, STOPP, Plast2bcleaned, ABSOULEU **INCREACE, PRE-CYCLING, PRIMUS**, GREEN3D, among others.

TheGreenTech INNOVATION FORUM 2024

PRIMUS "Boosting Plastic Recycling" Webinar Series

- Collaboration webinar dedicated to **Stakeholder´s involvement and activities** with **Precycling** sister project.

PRecycling +PRIMUS Webinar Stakeholder...

https://youtu.be/Un-TceEaVDg?si=zfMGkECz2XPFIK2j

JOINT ACTIVITIES & COLLECTIVE IMPACT

Join Webinars and Seminars

Sister-projects meetings

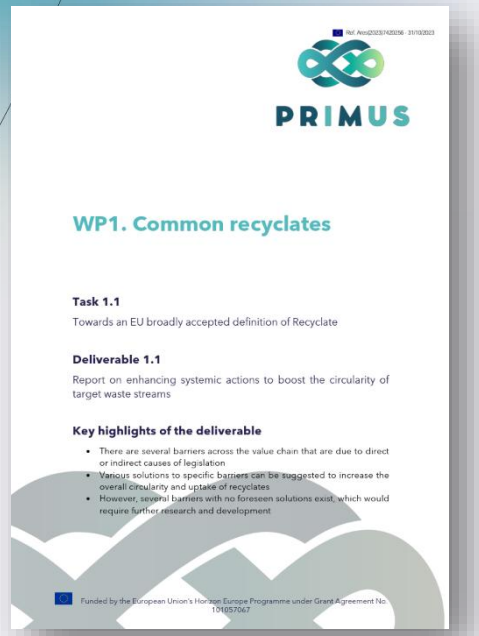
Hubs4Circularity COMMUNITY OF PRACTICE

Joint Webinar with the sister-projects in to disseminate core messages to the network of the Hubs4Circularity project

Sister-projects social media efforts

JOINT ACTIVITIES & COLLECTIVE IMPACT

Defining Recyclates in Europe



Published by PRIMUS 31/10/23

Objective

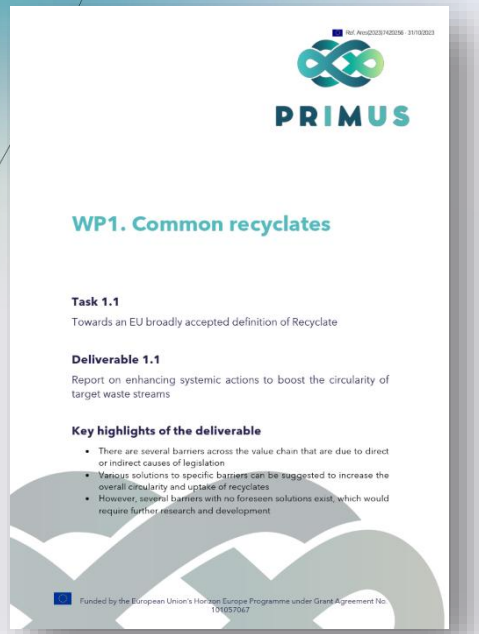
- Review the current **key legislations related to the WEEE and ELV plastic waste** streams and the waste to product interface.
- **Interviews of value chain actors** as well as a Pan-European workshop to identify and validate legislative barriers and needed actions to boost the uptake of recyclates.
- The overall aim is **to identify and enhance systemic actions to boost the circularity of target waste streams** of PRIMUS.

Key Findings

- There are several barriers across the value chain that are due to **direct or indirect causes of legislation.**
- Various solutions to specific barriers can be suggested to **increase the overall circularity and uptake of recyclates.**
- However, several barriers with no foreseen solutions exist, which would require further research and development.

JOINT ACTIVITIES & COLLECTIVE IMPACT

Defining Recyclates in Europe



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Results shared with sister-projects

PRecycling

- **Mapping and review of existing definitions** related to plastic recycling in standards or formal documents published or under development
- Identification of needs for standards in plastics recycling system and **gaps on terminology and definitions**
- PRecycling will suggest recommendations and propose terms relevant to the project that are not covered by the existing ones.
- **PRecycling recyclate handbook – Interactive tool** of recycling related terminology handbook with final conclusions on plastic recyclate terminology
- **Incorporating the key findings of the sister projects**.

INCREACE

Work in progress – deadline mid-2026

ABS of EU

Multiple Value Chain Labs held
Multiple Citizen Labs held
Greener Polymers Recycling Workshop
Policy brief – deadline mid-2026

PRIMUS

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HORIZON EUROPE GA No. 101057067

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Breakout sessions

Mathilde Taveau, Regulatory Affairs Manager
Plastics Recyclers Europe

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BREAKOUT SESSIONS

Programme

TECHNICAL ADVANCEMENTS

Improving the performance of processes and recycled materials.

REGULATORY RECOMMENDATIONS

Understanding the role of legislation in the development and production of recyclates.

DIGITAL TOOLS AND STAKEHOLDERS´ RECOMMENDATIONS

Developing tools to enhance traceability and boost the use of recyclates.

BREAKOUT SESSIONS

Programme

	TECHNICAL ADVANCEMENTS	REGULATORY RECOMMENDATIONS	DIGITAL TOOLS AND STAKEHOLDERS´ RECOMMENDATIONS
11.30-12:00	**Recycled materials for automotive sector** Ainara Telleria, Cikautxo Beñat Madariaga, Maier	**PRE-1000 tool** Andromeda Scoppio, Plastics Recyclers Europe	**Sustainability Assessments & EcoProfiles** Julia Cilleruelo, GreenDelta
12:00-13:00	**Lunch Time**		
13:00-13:30	**Results from home appliances pilot: washing machine** Ainara Telleria, Cikautxo	**POPs Regulation** Ana Rita Neiva, Coolrec Andromeda Scoppio, Plastics Recyclers Europe	**Digital Product Passport** Teresa Oberhauser, Circularise
13:30-14.00	**Coffee Break and Networking**		
14:00-14:30	**Food-contact solutions** Ana Rita Neiva, Coolrec	**Food-contact Regulation for recycled plastics** Mathilde Taveau, Plastics Recyclers Europe	**Stakeolders´ engagement** Eve-Liis Roosmaa, Tallin university

BREAKOUT SESSIONS

Programme

TECHNICAL ADVANCEMENTS	REGULATORY RECOMMENDATIONS	DIGITAL TOOLS AND STAKEHOLDERS´ RECOMMENDATIONS
ROOM Banquet 3	ROOM Flex 2	ROOM FLEX 3

11.30-12:00	**Recycled materials for automotive sector** Ainara Telleria, Cikautxo Beñat Madariaga, Maier	**PRE-1000 tool** Andromeda Scoppio, Plastics Recyclers Europe	**Sustainability Assessments & EcoProfiles** Julia Cilleruelo, GreenDelta
12:00-13:00	**Lunch Time**		

LUNCH TIME

ENJOY!

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BREAKOUT SESSIONS

Programme

	TECHNICAL ADVANCEMENTS	REGULATORY RECOMMENDATIONS	DIGITAL TOOLS AND STAKEHOLDERS´ RECOMMENDATIONS
	Banquet 3	**Flex 2**	**Flex 3**
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COFFEE BREAK

& NETWORKING

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BREAKOUT SESSIONS

Programme

	TECHNICAL ADVANCEMENTS	REGULATORY RECOMMENDATIONS	DIGITAL TOOLS AND STAKEHOLDERS´ RECOMMENDATIONS
	Banquet 3	**Flex 2**	**Flex 3**
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Recap for the parallel sessions and closing remarks

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NETWORKING

THANK YOU FOR COMING

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