



## ADVANCED SORTATION/RECYCLING TECHNOLOGIES ROLE OF EPR<sub>s</sub> TO DRIVE PACKAGING CIRCULARITY : CASE STUDY FOST PLUS (B)

### **Gian De Belder**

P&G - R&D Packaging, Sustainability  
Chair of the HolyGrail 2.0 Leadership Team (AIM)



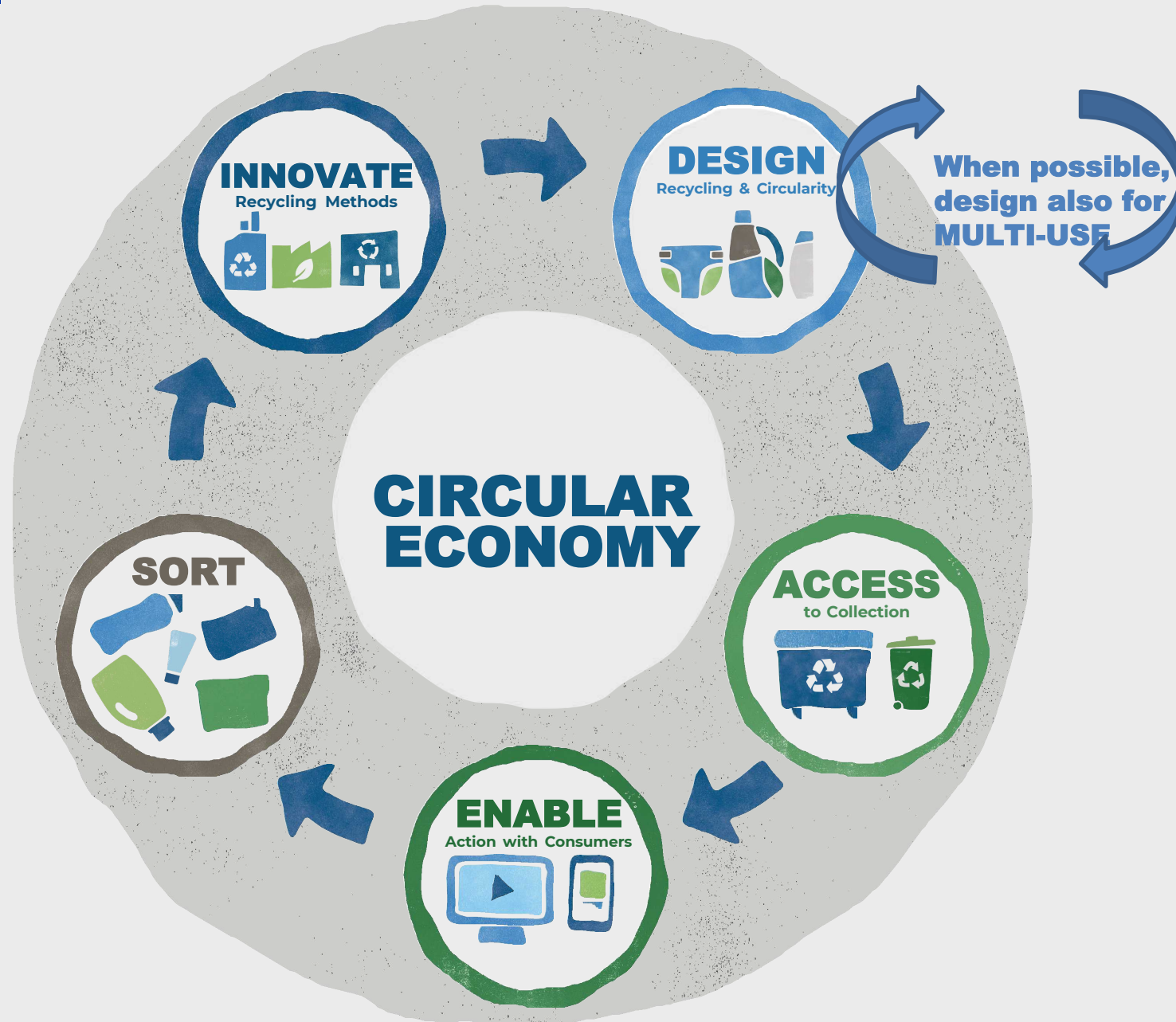
# AGENDA

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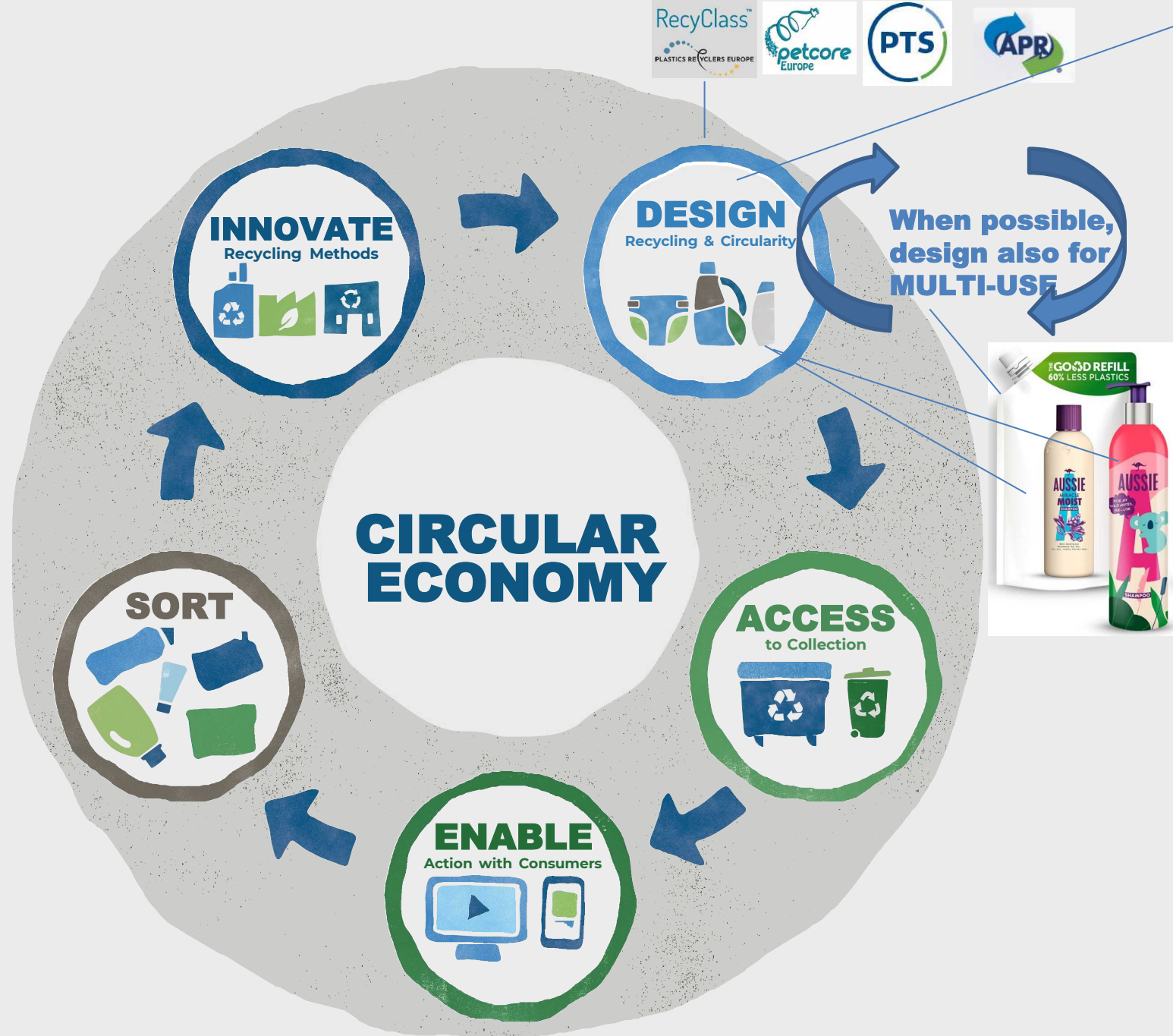
1. P&G's 5 pillar model – importance of industry definitions
2. HolyGrail 2.0 (intelligent sorting)
  - Status R&D initiative
  - What's next?
3. Perspective of a Belgian citizen: success story Fost Plus (30yrs EPR in action)
  - Overview latest recyclability results
  - Transforming the Belgian market by recent investments (MRFs + Reprocessors)
4. Key take aways

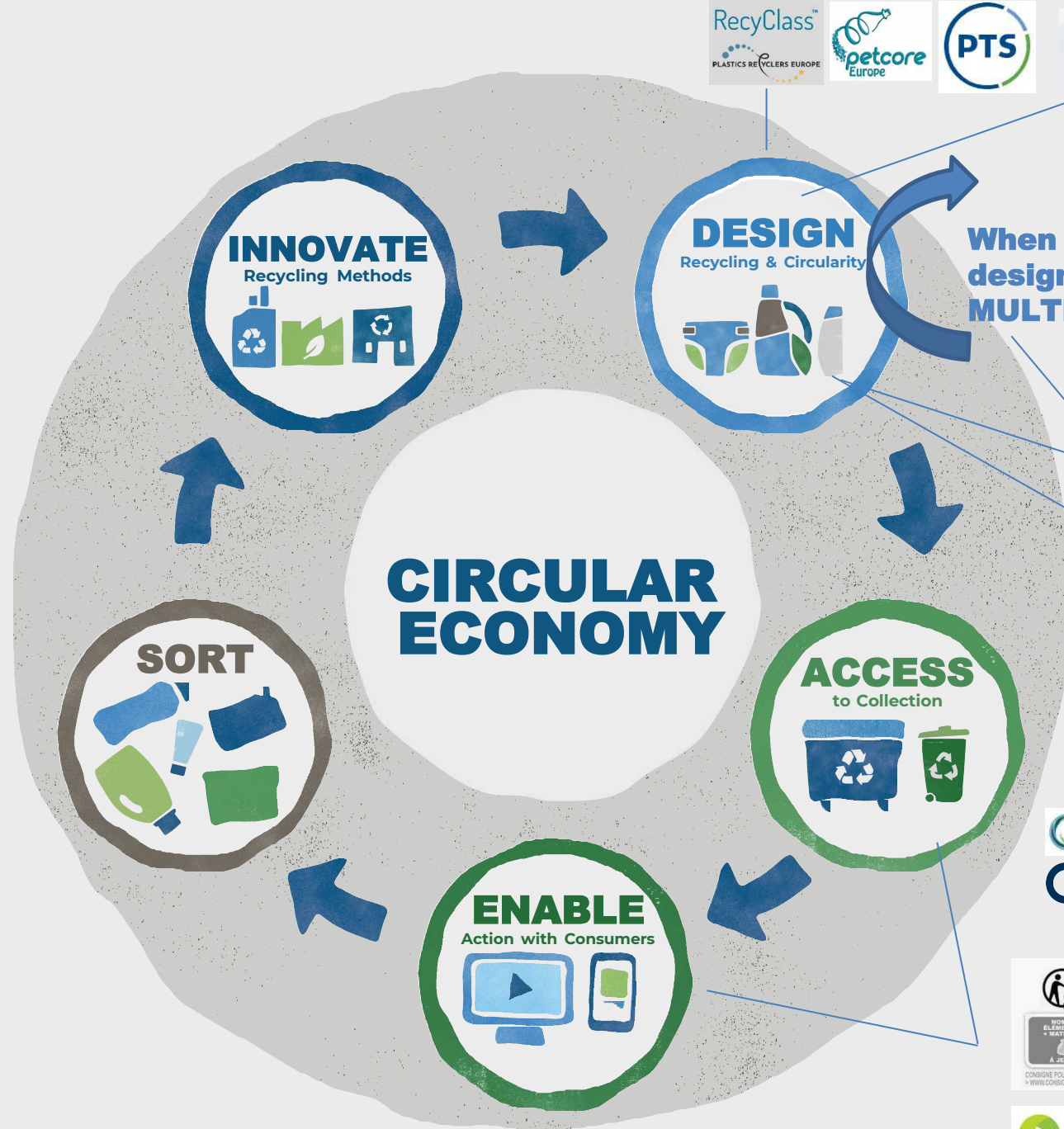
# SUPERIOR CONSUMER PRODUCTS & LEADING BRANDS







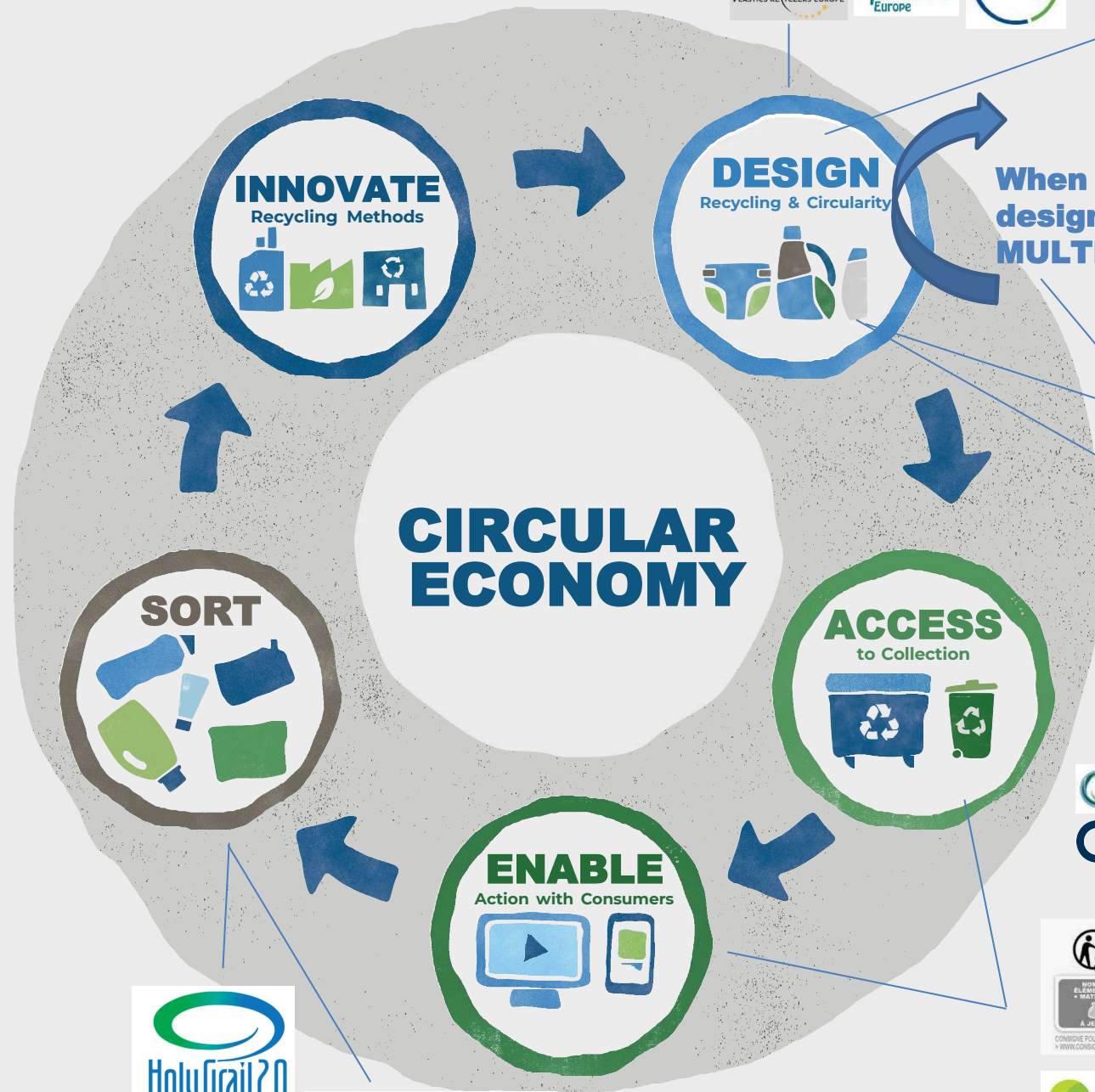




**When possible, design also for MULTI-USE**







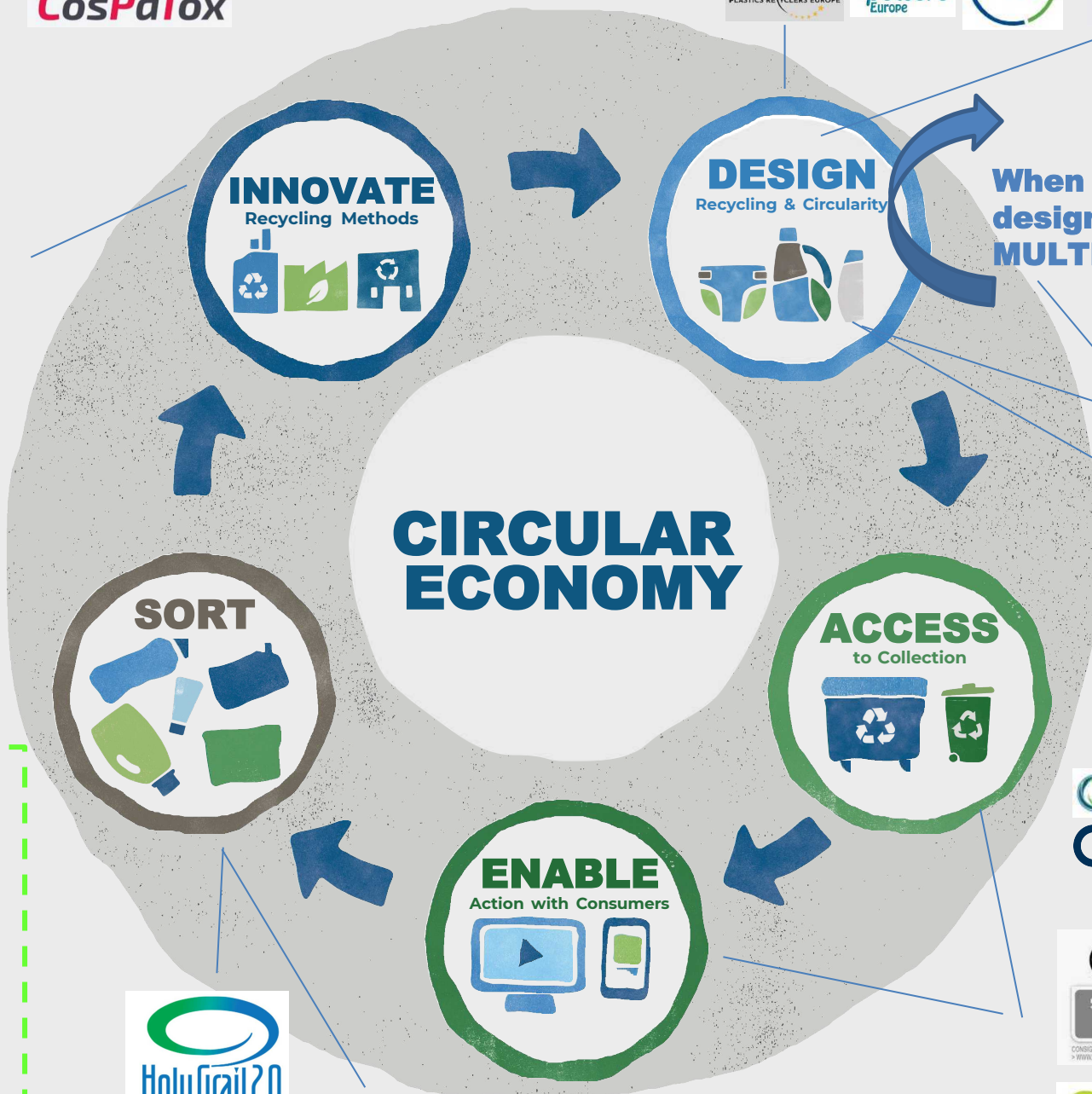
When possible, design also for **MULTI-USE**



**Mechanical recycled PCR:**



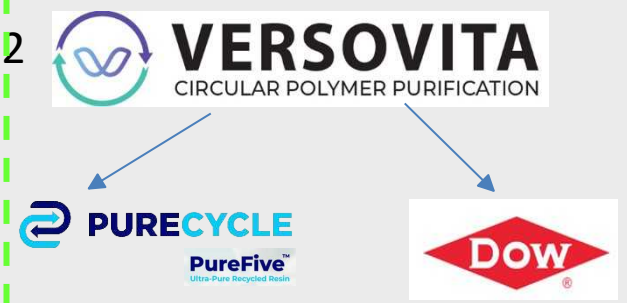
**CosPaTox**



**When possible, design also for MULTI-USE**



**Adv recycled PCR:**



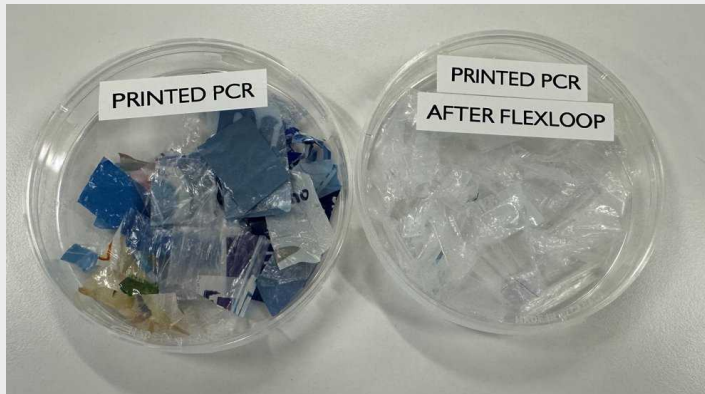


## Solvent Washing



Flexible packaging first,

Rigid packaging later

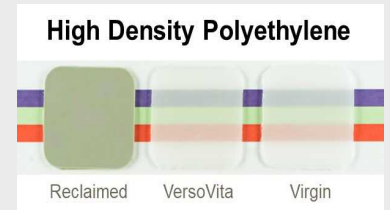


## Dissolution



PP

PE



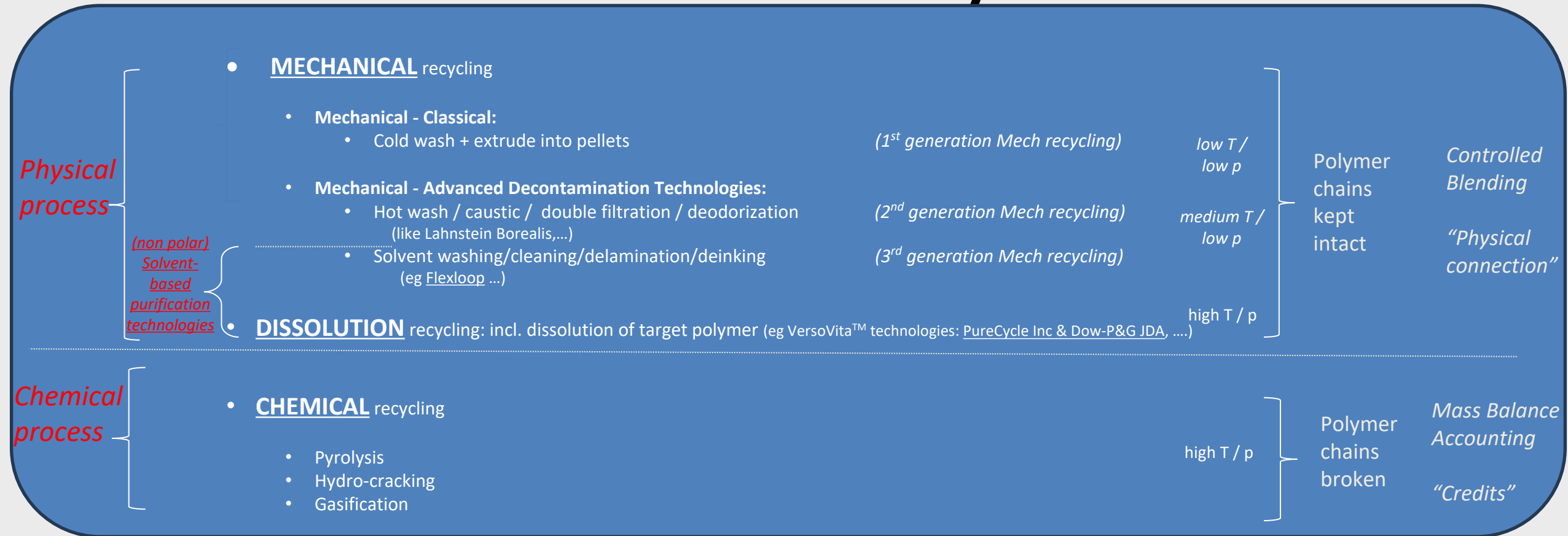
100% Virgin Resin

100% PCT PureFive™ Ultra-Pure Recycled Resin

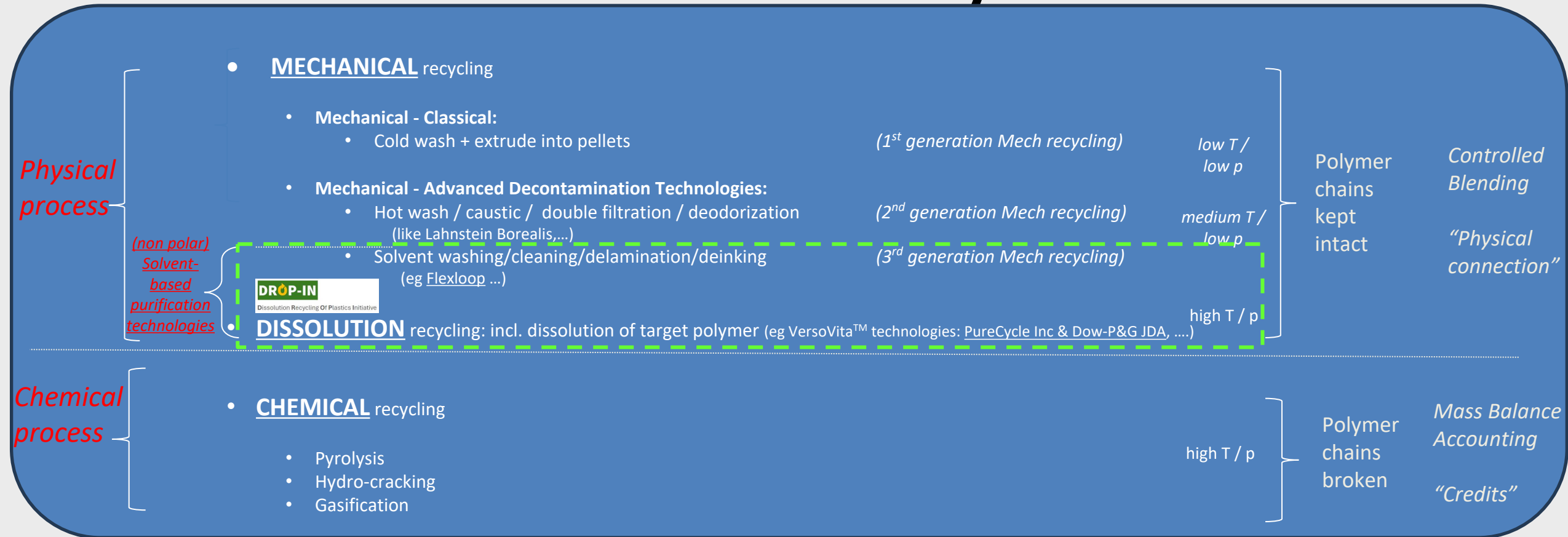
100% PCT PureFive™ Ultra-Pure Recycled Resin clarified with Milliken's Millad® NX®8000



# Industry alignment on recycling definitions for PolyOlefins



# Industry alignment on recycling definitions for PolyOlefins





# PART 2: ADVANCED SORTATION & DIGITALIZATION OF WASTE INDUSTRY: KEY REQUIREMENTS TO MEET PACKAGING CIRCULAR ECONOMY AMBITION

*DIGITAL WATERMARKS INITIATIVE – HOLYGRAIL 2.0*



**Gian De Belder**

P&G, Packaging R&D –Sustainability  
Chair of the HolyGrail 2.0 Leadership Team (AIM)

# IMPORTANCE FOR EUROPEAN MARKET: PPWR



## Recyclability:

By 1 January 2030, all packaging placed on the Union market must be recyclable, i.e.

- be designed for material recycling
- and, when it becomes waste, be collected separately, sorted into specific waste streams and recycled at scale

by 1 January 2030

by 1 January 2035

EU Comm target: 55% effective plastic packaging recycling (today best estimate HH: 21% (2020) → 45% (2030))

## Recycled content:

Minimum % in place by		Packaging type and format
1 January		
2030	2040	
30%	50%	contact sensitive packaging made from PET as the major component, except single use beverage bottles
10%	25%	contact sensitive packaging made from plastic materials other than PET, except single use plastic beverage bottles
30%	65%	single use plastic beverage bottles
35%	65%	plastic packaging other than those referred to above





# HOLYGRAIL 2.0 Membership





# HolyGrail 2.0 Objective

Prove the viability of digital watermarking technologies for accurate sorting and the business case at large scale.

## Proving the **TECHNICAL** viability of digital watermarking technologies (WP1-3), through e.g.:

- ▶ Validating of the prototype in three stages: 1° in an R&D centre (Phase 1 and Phase 2.1), 2° at a test facility on a semi-industrial scale (Phase 2.2), and 3° rolled out on a wider scale during real-time test runs in a commercial sorting and/or recycling facility (Phase 3)
- ▶ Ensuring the readability of the digital watermark embedded in print or in plastic, whilst taking into account esthetical and haptic aspects (e.g. shelf appeal)



## Proving the **ECONOMIC** viability of digital watermarking technologies (WP4), through e.g.:

- ▶ Reviewing existing and new business models, in different stages, building on key learnings from each test phase
- ▶ Addressing main market barriers, and assessing similar state-of-the-art technologies
- ▶ Examining cost improvement potential of DW detection systems, as add-on, by retrofitting or new equipment
- ▶ Perform a full techno-economic analysis, incl. cost breakdown structure for the entire packaging value chain

# INTELLIGENT PACKAGING THROUGH DIGITAL WATERMARKS

## Artwork

- ▶ Imperceptible codes, the size of a postage stamp, covering the surface of a consumer goods packaging
- ▶ Able to carry a wide range of attributes (e.g. manufacturer, SKU, type of plastics used and composition for multilayer objects, food vs. non-food usage)

... linked to a standardised database!



**Looks Like This**



**Performs Like This**



# 3D WATERMARKING FOR STRETCH BLOW MOLDING

## 3D mold enhancements

- Watermarks are introduced in molds by 5-axis laser
- Tested with heat-set as well as cold fill processes
- Works for regular as well as lightweight bottle designs



Images courtesy of P&G / Digimarc/ Logoplaste





# VARIETY OF PACKAGES TESTED AS PART OF HOLYGRAIL 2.0



Image: Lebensmittel Zeitung, 22 October 21

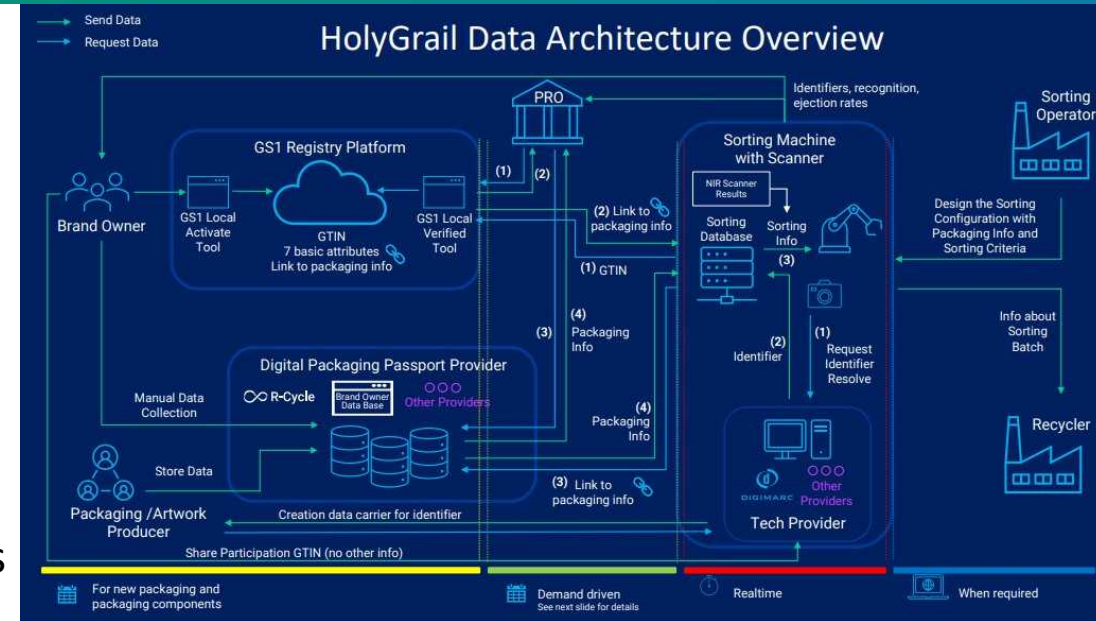
# DATA MANAGEMENT : DATA TRANSPARENCY ACROSS THE SUPPLY CHAIN

- **Open system**

- Allow signals from different technologies (DW, AI/OR, NIR)
- Data exchange system enabled and owned by GS1
- Packaging data owned by brand-owners

- **Product Attributes**

- Are linked to the GTIN
- To be aligned between different parties in the supply chain
  - Not all attributes are relevant for each step in the process





# HG2.0 R&D INITIATIVE – APPROACH TO REACH TRL9





*Successfully Completed 2021*

## Phase 1

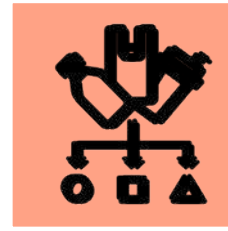
- Develop a functional HG2.0 prototype as an add-on module to detect and separate the DW packaging from packaging waste, allowing category specific sorting.



*Successfully Completed 2022*

## Phase 2

- HG2.0 prototype is tested for speed, accuracy and detection efficiency, and this for a category specific sorting based on DW detection – in combination with NIR and VIS.



*Close out JFM'25*

## Phase 3

- HG2.0 prototype will be deployed in a large-scale pilot in a commercial sorting and/or recycling facility, under standard operation conditions.

# PHASE I – PROTOTYPE DEVELOPMENT (TOWARDS TRL6)

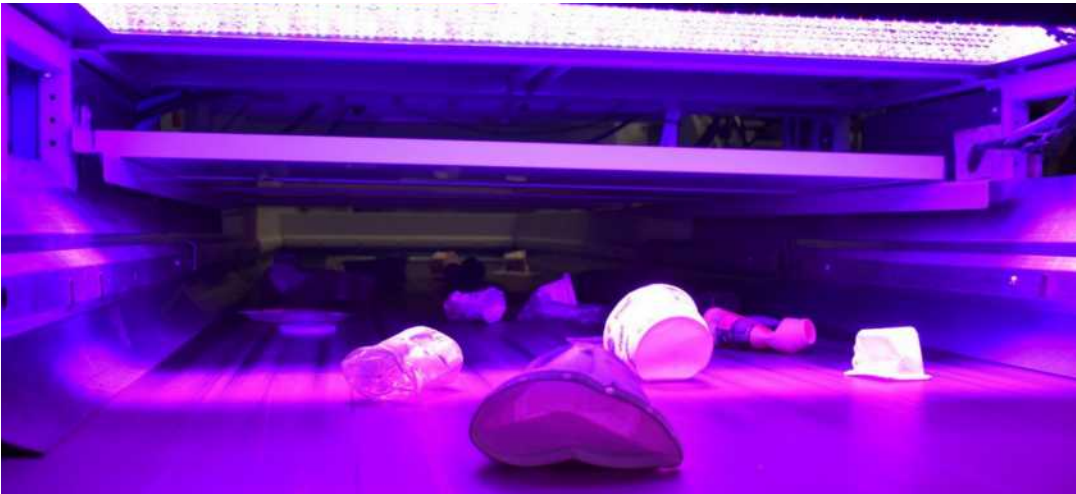




97% Detection rates  
95% Ejection rates



96% Detection rates  
95% Ejection rates



# PHASE II – SEMI-INDUSTRIAL TESTS (TOWARDS TRL7)







99% Detection rates  
95% Ejection rates  
95% Purity rates



99% Detection rates  
96% Ejection rates  
93% Purity rates



Industrial conditions  
3 m/s belt speed  
2,5 tons/hour rigids  
0,5 tons/hour flexibles



# PHASE III – INDUSTRIAL TESTS (TOWARDS TRL9)





LOOKS LIKE THIS

PERFORMS LIKE THIS



Presseinformation

### Semi-industrieller Test auf Verpackungen startet in Kopenhagen im Rahmen der Initiative Digitale Wasserzeichen „HolyGrail 2.0“

Erster Praxistest für eine effizientere Sortierung von Verpackungsabfällen / Procter & Gamble bereitet sich mit über 100 Produkten für den nationalen Testmarkt in Deutschland vor







Pictures of ALDI products digitally watermarked.

September 2023

ALDI brings products with digitally watermarked packaging to the German market



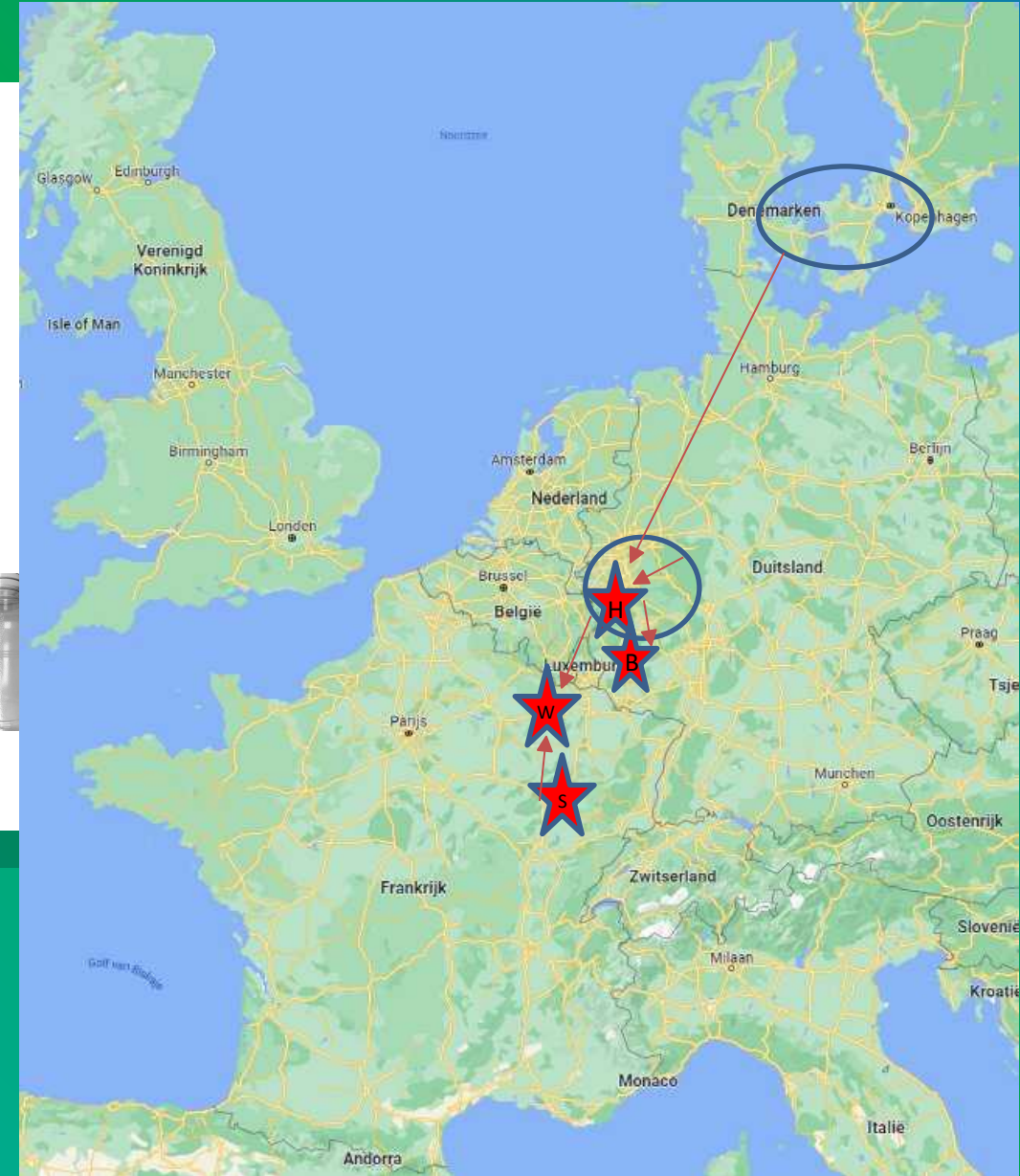
## German retailer Netto ensures efficient checkout and plastic recycling with Digimarc Recycle

11 SEPTEMBER 2023

# Phase III

## Planned test locations & material

- ▶ Committed commercial enhanced samples from brand owners & retailers: **37 ktons per year**
- ▶ Commercial enhanced pack materials launched in national markets **Denmark, France, Germany**
- ▶ **Locations for industrial tests:**
  - 1 MRF: test/capture all enhanced rigid packaging (from Germany & Denmark): Huendgen Entsorgung
  - 1 PRF (input from MRF + on-going supply + spiked volumes): focus on granular sorting
  - 2 recyclers (end to end recycling):
    - Non-food rPET bottle grade: spiked volumes + on-going supply
    - Food rPP film and hygiene LDPE grade: spiked volumes + on-going supply



# PHASE III a

## INDUSTRIAL TEST VALIDATION RESULTS OF PELLENC ST/DIGIMARC PROTOTYPE DETECTION SORTING UNIT

Results of food/non-food PET bottles separation (20 tons DW)

Fraction	Detection Efficiency (%)	Sorting Efficiency (%)
5% (single-pass sorting)	93.6	91.5
10% (single-pass sorting)	91.3	86.8
20% (single-pass sorting)	91.3	86.7
<b>Average (single-pass)</b>	<b>92.1</b>	<b>88.3</b>
10% (two-pass sorting)	96.0	95.6
20% (two-pass sorting)	95.7	94.6
<b>Average (two-pass)</b>	<b>95.9</b>	<b>95.1</b>

NEWS  
HolyGrail 2.0 validates separation of food and non-food waste in PET recycling streams

2 MAY 2022



<https://packagingeurope.com/news/holygrail-20-validates-separation-of-food-and-non-food-waste-in-pet-recycling-streams/9751.article>



Two-passing sorting showed on average:

- 96% detection rates
- 95% ejection rates

demonstrating an impressive performance of the prototype.

Proven efficacy of HolyGrail 2.0 technology in

- separating with **high granularity**, and
- **reducing impurities** in food-grade PET output streams

in recycling plants at industrial scale



Food PP



Hygiene LDPE



# PHASE III b

## INDUSTRIAL TEST VALIDATION RESULTS OF PELLENC ST/DIGIMARC PROTOTYPE DETECTION SORTING UNIT

### Results of film trials (6-12 tons test trials)

	Detection Efficiency	Sorting efficiency	Purity
PP flex	>99%	86%	77%
PE flex	90%	75%	88%

- Single pass results (vs double in reality) – no reloop!
- Non-ideal conditions (baled multiple times, mixed/sorted with Rigids (high speed sorting) to allow 4 weeks migration study)
- Reprocessing trials Borealis (mechanical recycling gen 2)

## Close out of phase 3 HG 2.0 (R&D initiative) - by end 24:

- Aug-Dec24: Robustness check DW sort add-on unit: German/Danish in-market Rigids (3 months MRF sorting):
  - capture **all** enhanced Rigids from Germany/Denmark including **PET rigids** (bottles incl SSL + trays), **PP rigids**, PE rigids, liquid carton boards, paper cups



2m80 unit



- Granular sorting (per value chain members request) & End to End non-food PET: Jan 25  
(*other recycling trials funded outside HG2.0 budget*)

P&G brands:  
(multiple SKUs)



PET recycler:



Ambition: closing the loop on HPC PET bottles



# MARKET ADOPTION STRATEGY (ROLAND BERGER STUDY)



## WHAT AFTER HOLYGRAIL 2.0?



This is an independent, objective, neutral report, designed for the entire waste management value chain. Some stakeholder categories will have opposing views, incl. to one another. This report is not customized to highlight different stakeholder category views.

## Executive summary: HolyGrail market adoption strategy

### 1 Opportunity for value creation through digitalization

- Household packaging waste management value chain is battling structural problems, from **lack of high-quality recyclate**, to **limited transparency of waste volumes** and flow management, **heterogenous collection**, **limited sorting**
- A **transformational change** is required to **boost current recycling performance and mitigate rising system costs** (which transfers into higher EPR fees), thus **creating value for the entire value chain** – achievable also by **value chain digitalization**
- We focused on **advanced sorting digitalization** as this would increase quality of recycling feedstock and output value, as well as enhance **circularity of plastic packaging**

### 2 Digitalization technologies

- Sortation digitalization (highly needed due to slow progress of current solutions) can be achieved via **two emerging technologies which complement NIR**:
  - **Digital watermarking** is **currently the technology which could underpin all use cases for digitalization**, not only advanced sortation, and is it is likely to provide superior detection accuracy, in particular for flexible plastic packaging and more complex waste streams
  - **Object recognition** could be used successfully for a **number of sorting use cases**; however boundaries of effectiveness and overhead to manage flexible (and multi-layer) film are not yet fully known; ability to sort multiple SKUs from complex streams not developed

### 3 Compelling case of digital watermarking


- **Direct (minimum) benefit** (from higher-quality/ more granular plastics streams and improving sorting efficiency) estimated at **EUR 0,5-0.9 bn/ year in 2030 (biggest potential for flexibles)**
- The **direct net (minimum) benefit** (total benefit minus costs in sorting stations and brand owners' costs for license fees and artwork changes) **estimated at EUR 0,2 - 0,5 bn/y in 2030** (25 price scenarios)
  - **10-14% increase** in HH packaging **recycling rates** (required to meet **55%** target)
  - **0.5Mio tons/yr PCR in addition**
  - **2.2Mio tons/yr PCR sorted better**
- Regain a portion of the up to **9 Mio tons/yr of household plastic packaging not collected in EU 27+3**

### 4 Next steps

- **Change momentum needs to start with brand owners and retailers**, as they are the ones who can derive value and need to meet their goals (recycling targets, mitigation of increasing EPR cost pressures)
- In the mid to long term adoption should happen at **European level** - This would be a complex multi-stakeholder effort, requiring a deliberate and intentional demonstration to validate value creation potential across all key stakeholders
- **France**, as pilot market, is recommended by project management team



Flex: PP food

- MoU 
- Develop more DW technology providers: (Filigrade, Polytag... )  
[Digital Watermarks Initiative HolyGrail 2.0 announces collaborative project with FiliGrade Sustainable Watermarks](#)







- Focus on business models and commercial roll-out: initial landing strips Belgium, Germany....



# TOWARDS A BELGIAN LANDING STRIP

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- **Objective:** Unlocking circularity of PP flex stream in Belgium via demonstrated business case
- **Expected timescale:** First enhancements by Q4'24 - 2 years (Sorting in market Mid '25 – End '26)
- **Material:** Flexible PP packaging food grade
- **Sorting technology for the market demonstration:** Digital watermarking
- **Recycling technologies:**
  - Mechanical recycling with Advanced Decontamination Technologies
  - Dissolution recycling
- **Deliverables:** Pipeline of pre-sorted food contact flex PP for recycling trials with 3-4 recyclers.  
Material value estimations and ROI calculations for both recycling and sorting business cases
- **Costs&funding:** Fixed, unlimited license fee model contracted via a central buyer for digital watermarks; full trials and logistics costs tbc; proposed funding by (tiered) extended 2 year HG 3.0 membership model and NGO funding



# STAGED APPROACH

## Project Preparation

- Alignment on a robust plan
- Recycling paths clarified with required volumes defined
- Project cost and funding clarified
- Project Governance agreed
- Q4 '24 Enhancement of packages with DW begins

## Step 1 - Market Demonstration ('25-'27)

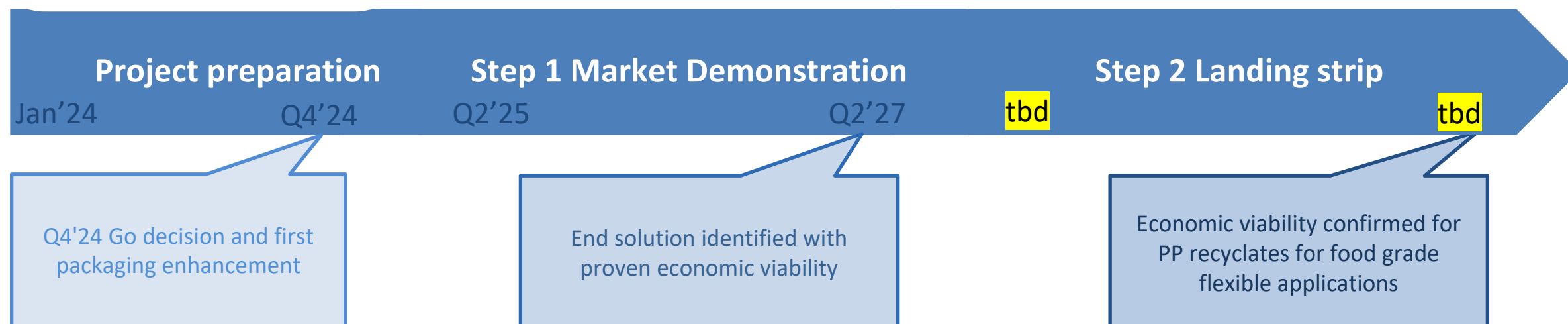
**Location:** Hündgen (DE) with the existing HG 2.0 Phase 3B line

- Sorting of “other flexibles” fraction from Belgium to extract enhanced fraction of food PP films
- Recycling trials on enhanced fraction to assess different recycling technologies
- Initiate EFSA approval process
- Steadily increase number of participating Brand Owners and Retailers, and enhanced volumes

## Step 2 - Landing strip ('27-'29 tbd)

**Location:** Belgium

- Sorting at a central Belgian location (e.g. Ecoo Houthalen) and recycling where appropriate based on step 1 learning with a minimum participation level
- Commercial off-take agreements in place for non-food contact applications
- EFSA approval in process– target end '29. (Expected to require acceleration)





# PARTICIPATING COMPANIES

## Brand Owners and Retailers Participating (with volumes indication)

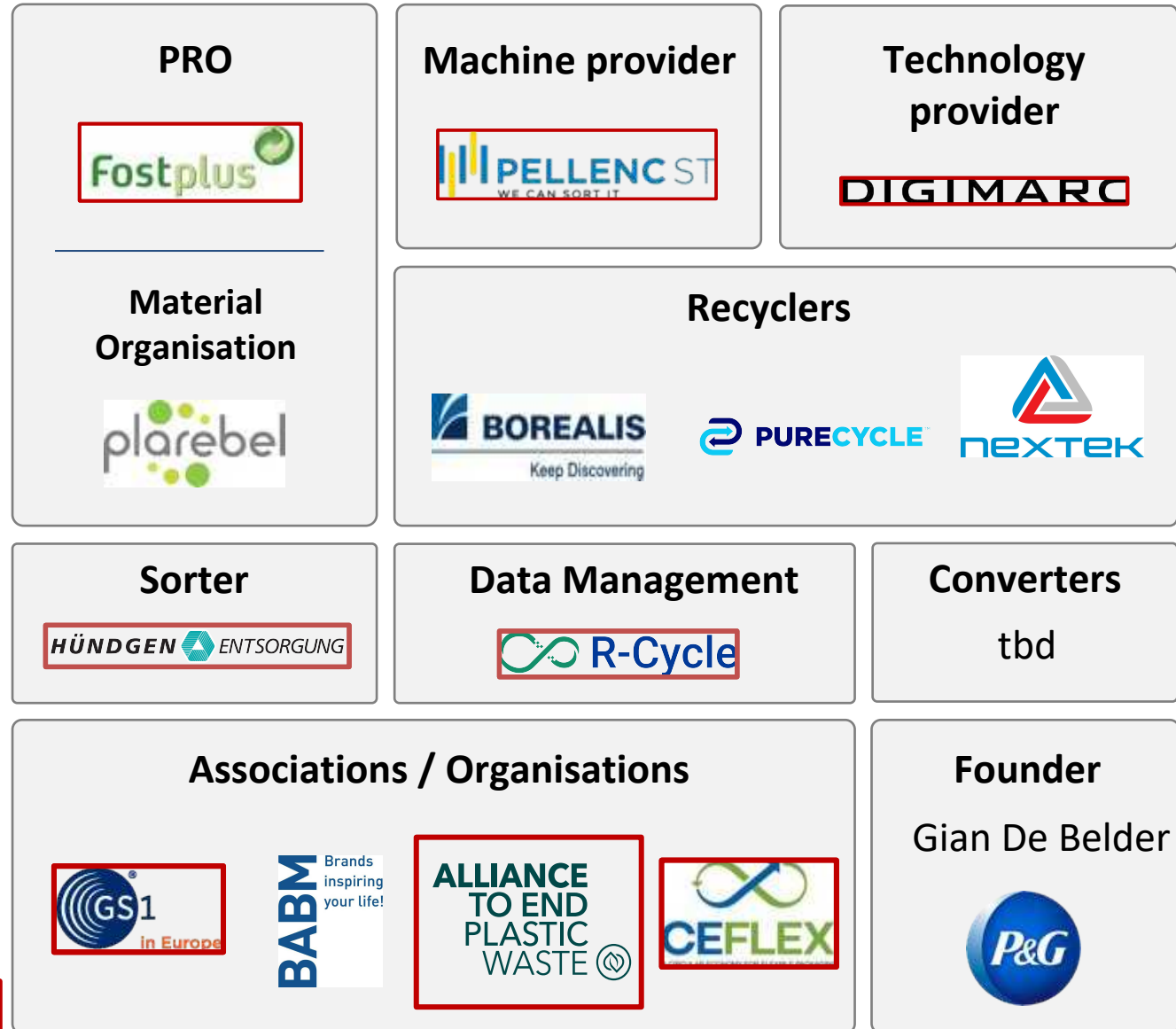


**FERRERO**

Your company name here?

In conversation with other main brand owners and retailers

Companies in the Core Team





## CONTACT

### Digital Watermarks Initiative – HolyGrail 2.0



EU Transparency register ID no.:  
1074382679-01

Avenue des Gaulois 9  
B-1040 Brussels  
Belgium

[HolyGrail 2.0 Website](#)  
[HolyGrail 2.0 Email](#)





## PART 3: PERSPECTIVE OF A BELGIAN CITIZEN: SUCCESS STORY 30YRS FOST PLUS

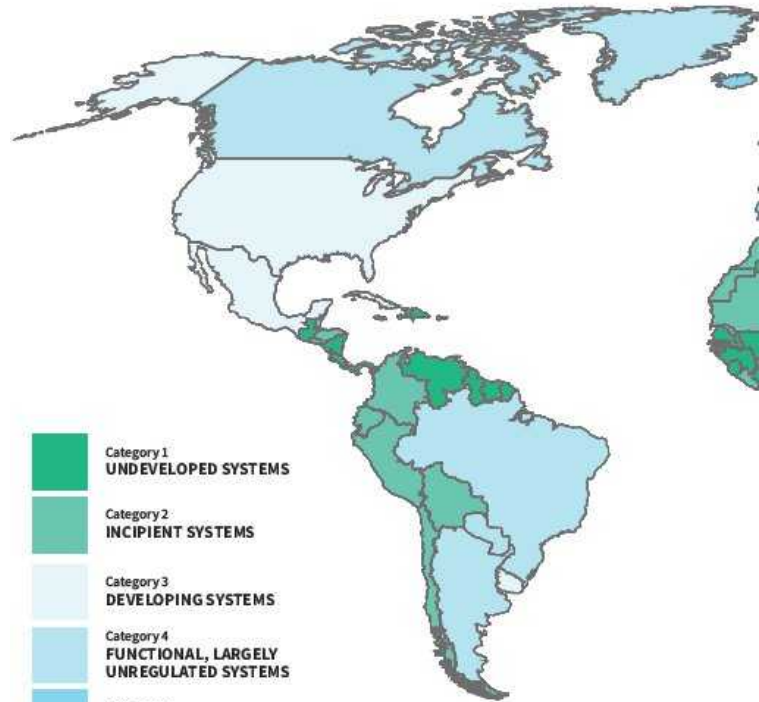


By building sustainable material chains, Fost Plus contributes to a better society and a cleaner environment for all.

Fostplus 30

# ONE OF THE WORLD'S BEST PERFORMING EPR SYSTEMS

## Plastic Recycling Maturity Categories Global Overview (2023)



- Category 1  
UNDEVELOPED SYSTEMS
- Category 2  
INCIPIENT SYSTEMS
- Category 3  
DEVELOPING SYSTEMS
- Category 4  
FUNCTIONAL, LARGELY UNREGULATED SYSTEMS
- Category 5  
ADVANCED SYSTEMS WITH CHALLENGES
- Category 6  
DEVELOPED PERFORMING SYSTEMS
- Uncategorised  
PENDING DATA REVIEW

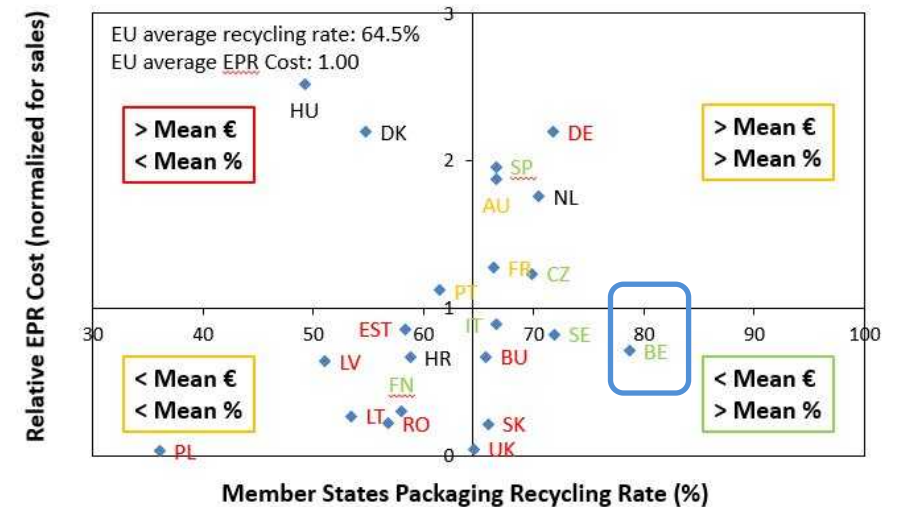
Cat 3 (developing systems): USA

Cat 4 (functional, largely unregulated systems): Canada (now rapidly evolving into 5!)

Cat 6 (developed performing systems): **Belgium**, Germany, Netherlands, Norway and South Korea

## Internal assessment (2016)

### Relative Cost of EPR for Packaging Waste in the EU



- Single PRO + Expra (not for profit association) (SP, IT, BE, CZ, SE, FN)
- Transition Single PRO to Competition (FR, AU, PT)
- Competition (DE, UK, RO, BU, EST, PL, SK, LV, LT)
- State Scheme (HU, DK, NL)

# KEY = UNIFORM SYSTEM

## Belgium: a federal state



3 Regions:

- Flanders (6 mio inhabitants)
- Wallonia (4 mio)
- Brussels (1 mio)

Regions are competent for waste management,  
but have created a joint legislation for packaging waste:  
“Interregional Cooperation Agreement”

735kty packaging on market (2023)

**Our recipe for success: a uniform recycling scenario**




Note: EPR system for C&I packaging:





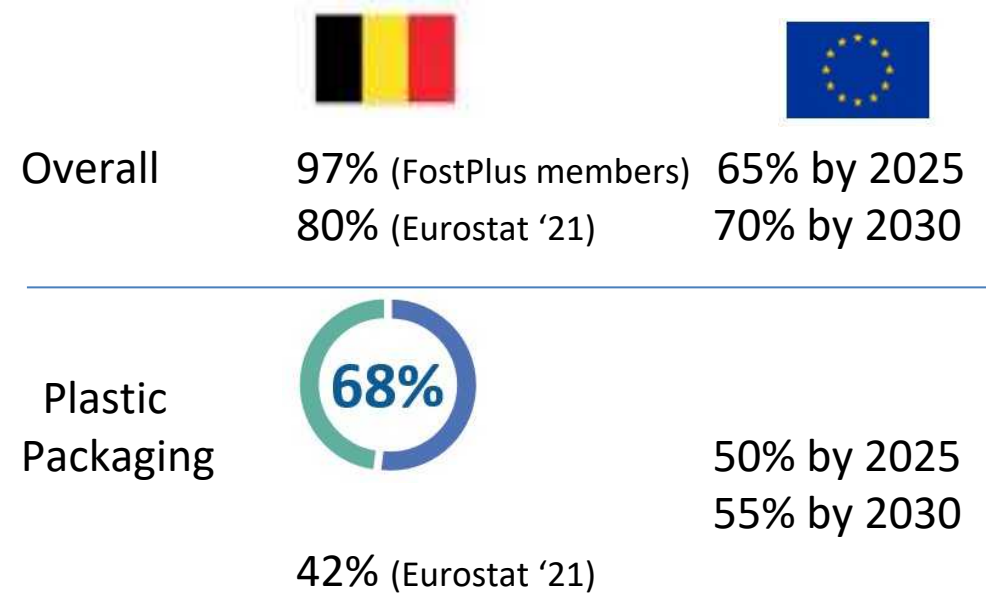
# PART 3: PERSPECTIVE OF A BELGIAN CITIZEN: SUCCESS STORY FOST PLUS

## Secret Sauce:

- Citizens' education (# generations +  )
- Uniform & selective Collection of all HH packaging
- Uniform Sorting
- Material ownership (till sorted bales)
- Transparency
- Non-for-Profit
- Net-cost principles
- Long-term contracts with MRFs and re-processors
- Optimized cost mechanism (benchmark municipalities)
- Focus DfR: support, modulated EPR and phase out problematic packs (discouragement fee obstructive packs: ! 3.91 EUR/kg))
- Anti-litter campaigns – active participation citizens
- Invest & build a local circular economy
- Originally created by obligated industry ; 3 pillars:
  - Effectiveness (collect + sort + reprocess)
  - Efficiency (cost effective)
  - Sufficiency (local chains)



## Results HH packaging recycling:



## Further improvements:

- Extending sorting at home
- Capturing more out-of-home

# EXTENDING SORTING AT HOME

## Sorting additional plastic packaging types for recycling



# + 8 kg

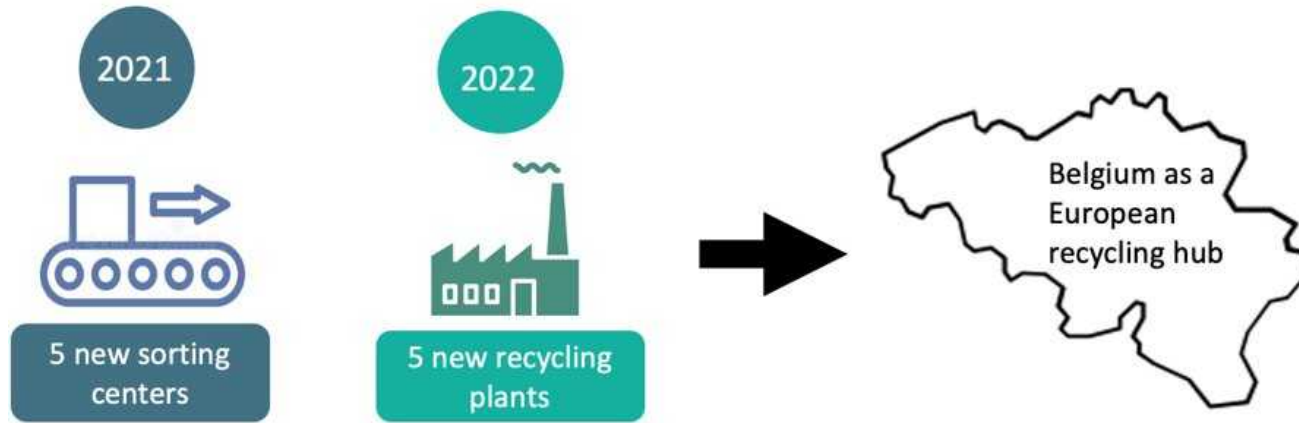
per inhabitant per year

In 2023, for the first time, also available for non-packaging

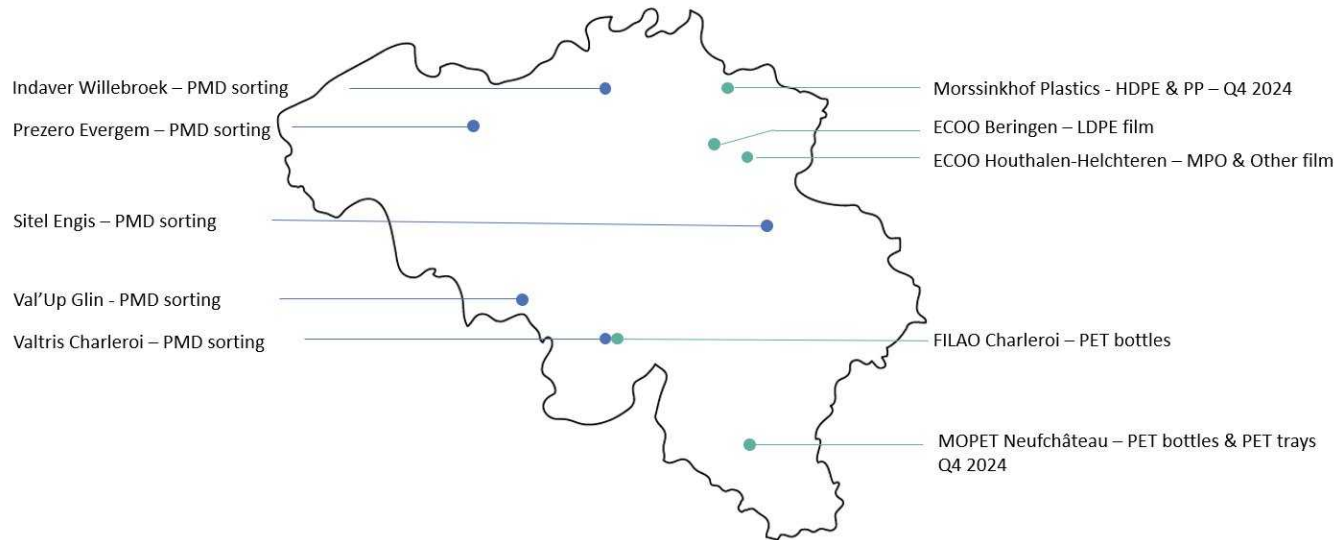


- Extension of sorting message from plastic bottles and flasks to almost all plastic household packaging
- From 160 Ktons to **+250 Ktons** per year

# INVESTMENTS IN MRFs AND REPROCESSORS



## Belgium as European recycling hub



MRFs/Re-processors: 9 yrs contracts  
 (€1 Billion invested in local circular economy)

New: 35kty residue after-sort  
 (5yr contract ; €35Mio investment)  
 → residues from 5 MRFs: still 30-40% recyclables!  
 (non compliant items, process losses and incorrect sorting)!



# CAPTURING MORE OUT-OF-HOME

## PMD COMPANIES



26 kT collected in 2023

By collaborating with private waste operators and Valipac

## SECTOR APPROACH



Education and trainings

Adapted sorting rules and support

## LITTER



Expertise with and for local authorities

As an answer to the expansion of the Extended Producer Responsibility



# (EU) KEY TAKE AWAYS

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- Need to launch more intelligent sorting / improved recycling technologies (and uniform industry definitions)  
→ importance of dissolution recycling
- PROs play a crucial role to move us into Circular Economies: consumer education, organizing collection / sorting / reprocessing & continuous improvements, invest in new-to-the-world technologies and facilities
  - Low EPR cost / high recycling rate systems are preferred, typically:
    - transparency: overall operational costs, EPR fees (eco-modulated)
    - single PRO system
    - non-for-profit PRO (managed by producers)
    - material-neutral system
    - “net-cost” principle
  - Belgian’s Fost Plus system as role model
- Transparency and consumer education are KEY
- Harmonized approaches (vs state level / province levels) are KEY

# THANK YOU!



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**BACK UP**

# 1<sup>ST</sup> DETECTION ADD-ON MODULE: (Phase 2)



+



> 230 product SKUs (2D, 3D, combined)



## Digital Watermarks Initiative HolyGrail 2.0 achieves significant milestone with the successful semi-industrial validation of detection sorting unit

**Press release for immediate release – Brussels, 30 March 2022** – The Digital Watermarks Initiative [HolyGrail 2.0](#), driven by [AIM](#) – European Brands Association and powered by the [Alliance to End Plastic Waste](#), has achieved a significant milestone with the successful validation, after semi-industrial testing mimicking real-life conditions, of the prototype detection unit for digital watermarks. The results show that the digital watermark technology can achieve more granular sorting of packaging waste at scale, such as developing separate food and other new PCR streams that currently do not exist (e.g. for cosmetic or detergent applications). This would open up new recycling streams, effectively overcoming limitations of current near-infrared (NIR) sorting technologies, and drive a true circular economy for packaging. Consistent high results across all tested categories of plastic packaging material of 99% detection, 95% ejection and 95% purity rates, on average, demonstrate an impressive performance of the first prototype. Developed by the machine vendor [Pellenc ST](#) and the digital watermarks technology supplier [Digimarc](#), the detection unit is now ready for industrial-scale pilots, which are planned to start later this year. Details on industrial partners and packaging scope will be released at upcoming conferences.

Category	Detection Rate[1] (Estimate)	Ejection Rate[2] (By weight)	Purity[3] (By weight)
Rigid PP	99%	95%	96%
Rigid PE	98%	96%	99%
Rigid PET	99%	98%	95%
Flexibles	99%	91%	90%
<b>Average across packaging materials</b>	<b>99%</b>	<b>95%</b>	<b>95%</b>

Table 1: Average single sort results from mixed packaging waste streams (watermarked samples + contamination (non-watermarked samples + other pack material classes)). Typical industrial process conditions have been used in these trials (belt speed of 3m/s; Loading: Rigids running at ~2.5 tonnes/hr; Flexibles at ~0.5 tonnes/hr). Success criteria (after 1st sort) for detection efficiency/ejection efficiency/purity are 95%/95%/92% for rigid packaging, 95%/87%/90% respectively for film packaging (in line with industrial specifications).

LCBs	99,95%	98,85%	
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# 2<sup>ND</sup> DETECTION ADD-ON MODULE: (Phase 2)



+



> 230 product SKUs (2D, 3D, combined)



Validation of second prototype machine takes HolyGrail 2.0 one step closer to industrial scale

Brussels, 15 June 2022 – The Digital Watermarks Initiative [HolyGrail 2.0](#), driven by [AIM](#) – European Brands Association and powered by the [Alliance](#) to End Plastic Waste, has achieved a new significant milestone with the successful semi-industrial validation of its second prototype detection unit combining digital watermarks and NIR detection. Developed by the machine vendor [Tomra](#) and the digital watermarks technology supplier [Digimarc](#), the detection unit demonstrated high results across all tested



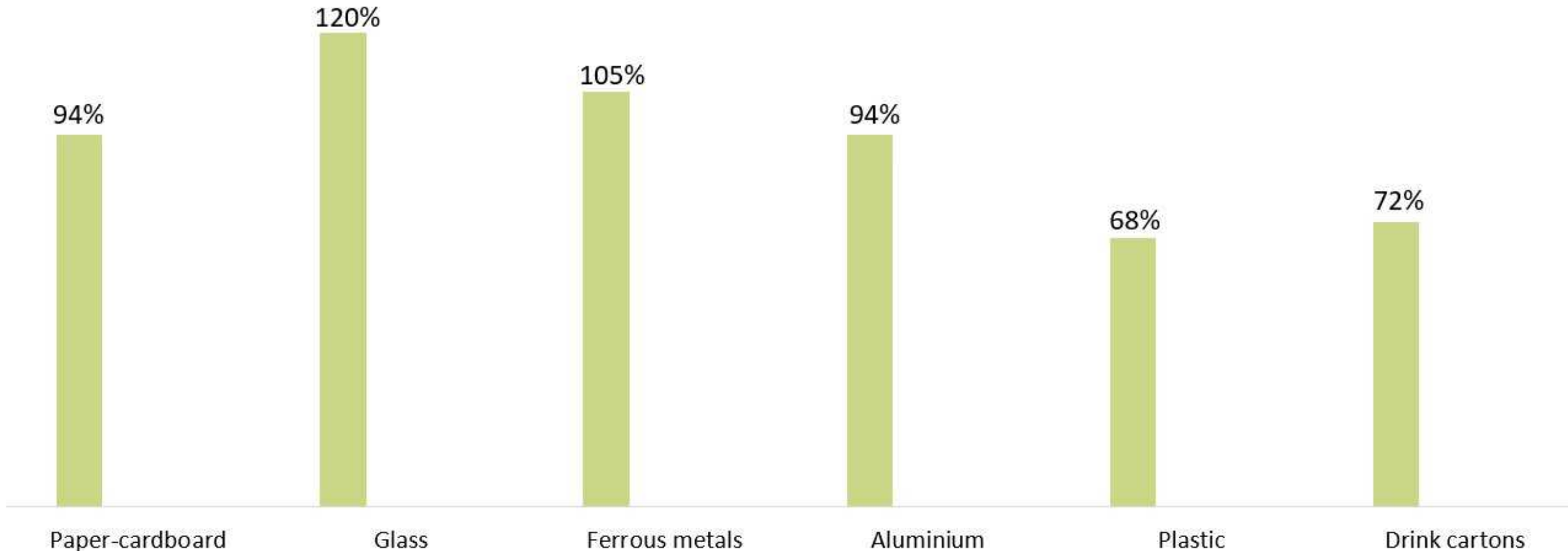
Category	Detection rate (by count)	Ejection rate (by weight)	Purity rate (by weight)
Average of rates for PP	99,6%	99,6%	94,2%
Average of rates for PET	99,1%	95,7%	92,6%
Average of rates for Fibre	98,9%	97%	93,1%
Average of rates for PE flexibles	97,6%	92%	90,8%





## Results 2023

The high recycling rates reflect our **societal impact** and **added value**. Undoubtedly, the local circular economy takes form. At the same time, there is a growing ecological awareness. Citizens, authorities, companies – everyone must play their part. Fost Plus wants to cultivate a shared **sustainable mindset**.



# Green dot rates 2025 – fost plus Belgium

[The Green Dot rates | Fost Plus](#)

Sustainable packaging are financially rewarded

- 16 different tariffs, based on the circular deficit per material – incl. hazardous packaging
- The better recyclable, the lower the contribution
- Reduction equals a lower contribution
- Strong deterrent tariff for obstructive packaging

## Green Dot rates 2025 per material (EUR/kg)

Materials	Category	Rate (EUR/kg) excl. VAT
<b>RECYCLED</b>		
<b>General</b>		
<b>Glass</b> Bottles, flasks and jars in glass. This does not apply to packaging in pyrex, crystal or natural opal glass that contains more than 600 ppm fluorine.	001	0,0960
<b>Paper-cardboard</b> Packaging elements in paper-cardboard which either consist of at least 85% paper fibre * or are assessed as recyclable according to the CEPI protocol	002	0,1503
<b>Steel (≥ 50%)</b> All packaging elements that contain at least 50% steel*	003	0,1117
<b>Aluminium ≥ 50µm (≥ 50% Alu)</b> All packaging elements that contain at least 50% aluminium in weight and have a thickness greater than or equal to 50 µm.	004	0,0481
<b>Aluminium &lt; 50µm (≥ 50% Alu)</b> Packaging elements thinner than 50 µm containing at least 50% aluminium	013	0,0481
<b>Beverage cartons</b> Any packaging element in laminated cardboard – with or without a cap – that consists of cardboard/aluminium/plastic or cardboard/plastic, with a minimum of 50% paper fibre * This is usually used to package liquids, mainly dairy products and fruit juices	008	0,8180
<b>Cork</b> Packaging elements made of cork	016-02	0,5855
<b>Rigid plastics</b>		
<b>PET – Bottles and flasks - Transparent colourless</b> Colourless bottles and flasks in transparent PET with at least 95% PET*	005-01	0,2718
<b>PET – Bottles and flasks - Transparent blue</b> Blue bottles and flasks in transparent PET with at least 95% PET*	005-02	0,7252
<b>PET – Bottles and flasks - Transparent – other than colourless and blue</b> Bottles and flasks in transparent PET, with another colour than colourless or blue with at least 95% PET*	005-03 (of 011-04)	1,0527
<b>PET – Bottles and flasks – Opaque</b> Bottles and flasks in non-transparent PET with at least 95% PET*	011-06	1,3893

Materials	Category	Rate (EUR/kg) excl. VAT
<b>PET (mono) – Hard packaging elements other than bottles and flasks - Transparent</b> Hard packaging elements, other than bottles and flasks, which consist of transparent thermoformed mono APET, like trays and cups <i>Note: this category does not apply for cups &amp; trays in multilayer transparent PET for which 011-05 applies or PET opaque thermoformed PET for which the category 011-08 applies</i>	011-05-A	1,1244
<b>PET (multi) – Hard packaging elements other than bottles and flasks - Transparent</b> Hard packaging elements, other than bottles and flasks, which consist of transparent thermoformed multilayer PET, like trays and cups, consisting of APET/PE, APET/PE-EVOH-PE or APET-EVOH-APET <i>Note: this category does not apply for cups &amp; trays in transparent mono APET for which 011-05-A applies or PET opaque thermoformed PET for which the category 011-08 applies</i>	011-05	1,1244
<b>PET – Hard packaging elements other than bottles and flasks - Opaque</b> Hard packaging elements, other than bottles and flasks, which consist of non-transparent thermoformed PET, like trays and cups with at least 95% mono APET or 95% APET/PE* or cPET	011-08	1,7609
<b>PP – Bottles, flasks and other rigid packaging</b> Hard packaging elements, including bottles, flasks and caps with at least 95% PP*	011-01	0,8049
<b>PS &amp; XPS – Hard packaging, except for EPS (Expanded polystyrene, styrofoam)</b> Hard packaging elements containing at least 95% PS or 95% XPS (Extruded polystyrene foamed trays)* <i>Note: This category does not apply to EPS (styrofoam), for which the category 014-01 EPS (styrofoam) applies</i>	011-02	0,9195
<b>EPS (expanded polystyrene, styrofoam)</b> Hard packaging elements consisting of at least 95% of EPS (styrofoam)*	014-01	0,5855
<b>PE – Bottles, flasks and other hard packaging</b> Hard packaging elements in PE including bottles, flasks and caps, trays, cups etc. with at least 95% PE*	011-03 (of 007)	0,5150
<b>Flexible Plastics</b>		
<b>PE – Films</b> Flexible packaging elements with at least 95% of PE*	011-07	1,2844
<b>PP – Films</b> Flexible packaging elements with at least 95% PP*	011-09-A	1,9546
<b>Other plastic films</b> Other flexible packaging elements consisting of at least 95% plastic (e.g. mixed PO and multi-materials such as e.g. PET/PE, PA/PE, OPP/PETmet/PE and similar combinations) <i>Note: this category does not apply to compostable or biodegradable plastic packaging (014-02), to aluminium laminates or PVdC films, PETG or PET GAG (014-03) and to plastic films containing at least 95% PE (011-07) or PP (011-09-A)</i>	011-09	1,9546
<b>OBSTRUCTIVE PACKAGING</b>		
<b>Household packaging that obstruct the collection, sorting or recycling</b> Cf application rules p. 6	–	3,9092



**Volgende ophalingen**

Woensdag 11/09

 **TEXTIEL**

Donderdag 12/09

 **HUISVUIL**

Vrijdag 13/09

 **PMD**  **GFT**

[? Mijn afval werd niet opgehaald](#)

**Jouw recyclagepark**

Schelle

Kapelstraat 144, Schelle

