

PETcore Annual Conference2021

Session 1 “2019 PET Market, Collection & Recycling Rates”

Recycling PET thermoforms working group.

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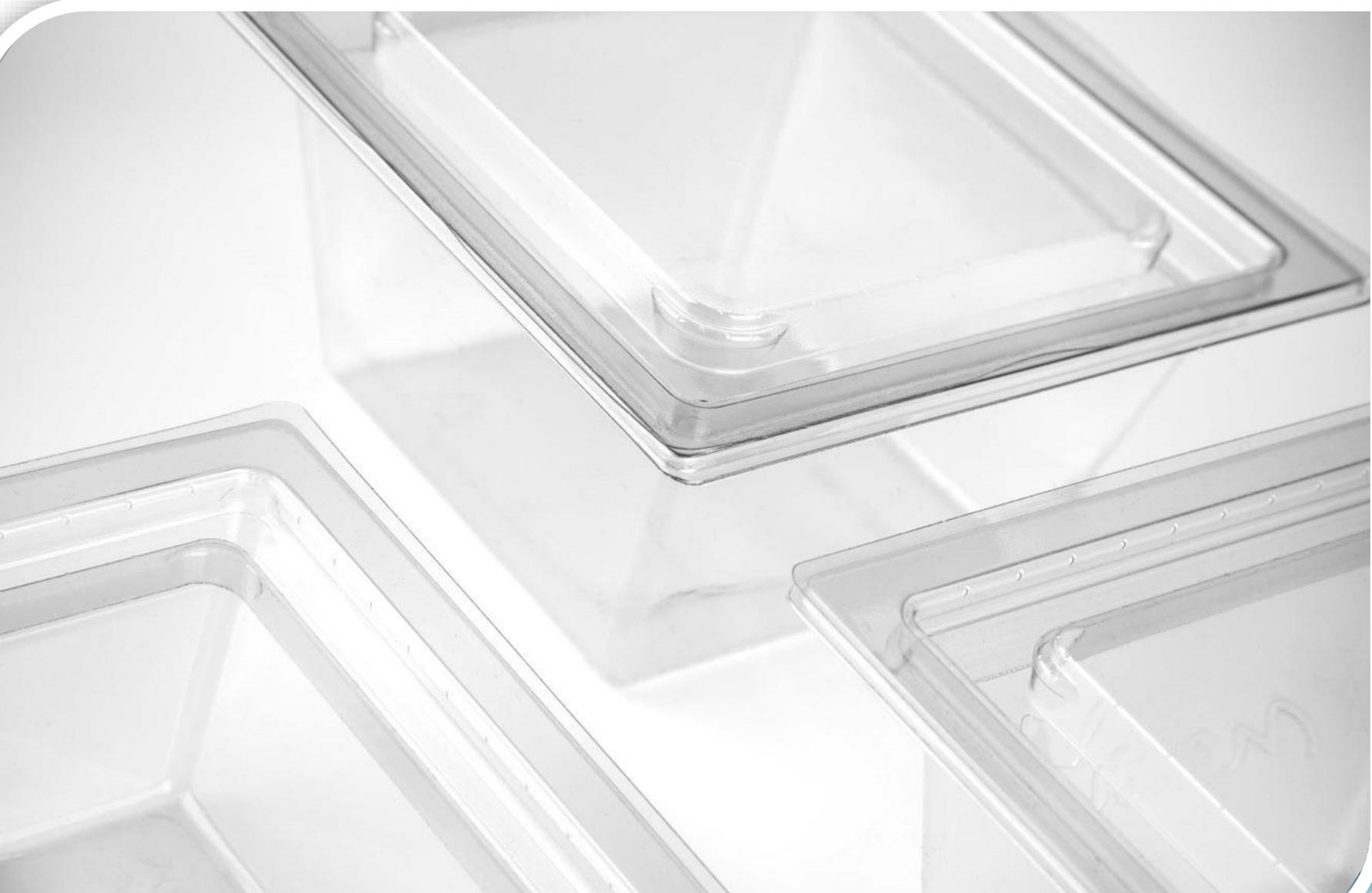
Context

2

Working Group

3

Roadmap to success



Why PET thermoforms recycling is a business opportunity

It's more than regulations and policies

There is an **increasing demand** of PCR from bottle industry after **SUP implementation**

Thermoforms, that have been one of the major consumers of rPET bottle flakes, are now looking for **alternative sources of PCR** with the aim of a true close loop

Recycling thermoforms is the final step in closing the already successful PET recycling loop.



Change in life style requiring more Packaging



Consumers are demanding a change



Major brands respond with 'sustainable packaging pledges'

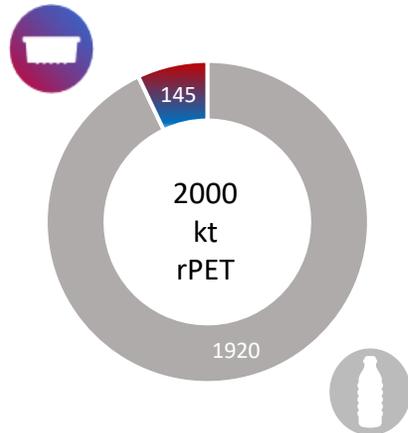


Higher PCR recycle content demand

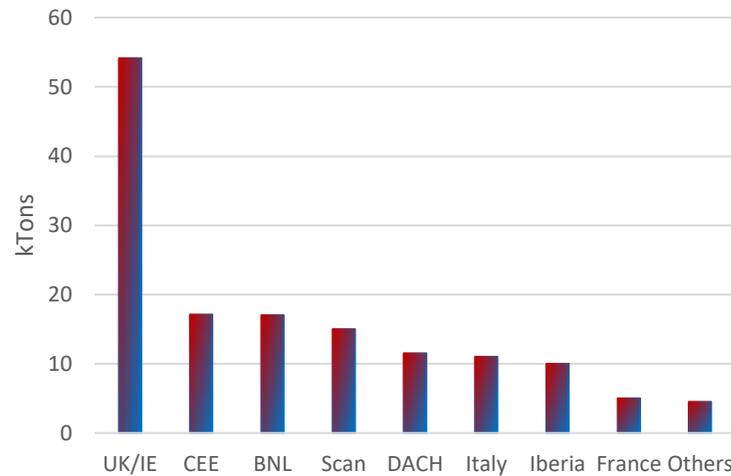
Landscape of PTTs recycling

Out of 1MTons PET sheet consumed in Europe just 15% is collected

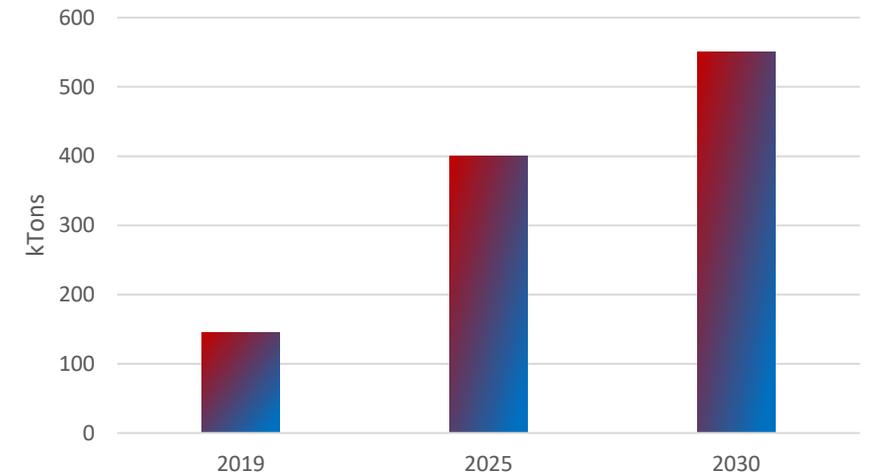
PET products collected & sorted (1)



PTTs collected in Europe (1)



PTTs collected for recycling projection (2)



Greater transparency of EPRs reporting is required in order to further improve the level of data confidence

Sources:

(1) EPR schemes reporting CITEO, COREPLA, RECOUP, FOSTPLUS and others

(2) PET Market in Europe. State of play. Eunomia



Demonstrate recyclability of PET thermoforms.

Maintain and possibly **increase the market share** of PET thermoforms in the European market.

Improve the image of **PET thermoforms as best-in-class** by promoting a value-chain approach by end users (retailers, brand owners, consumers).

Provide **sustainable and reliable end of life options** for PET thermoforms.

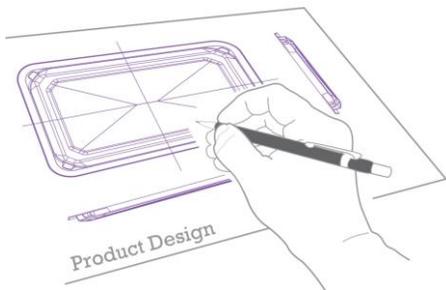
TF1.Sorting & Recycling: reports about the status of the art in collection, sorting and recycling technologies of PET thermoforms

TF2.Recyclability technical committee of the platform (SC and TC)

TF3.Demonstrate food contact compliance of rPET from trays: Both Direct contact and functional barrier technologies.

TF4.Other end applications

Design for sorting and recycling



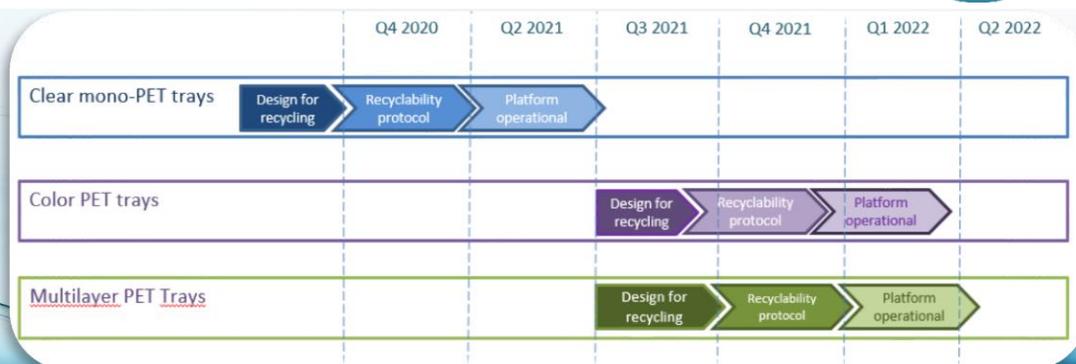
Design for sorting and recycling is the major tool for boosting trays circularity.

Design for recycling **guidelines** developed given existing recycling technologies but continuously updated by TASK FORCE 1 experts.

Different organizations publishing guidelines have to be aligned.

Full pack elements have to be taken in count.

Don't stifling innovation.

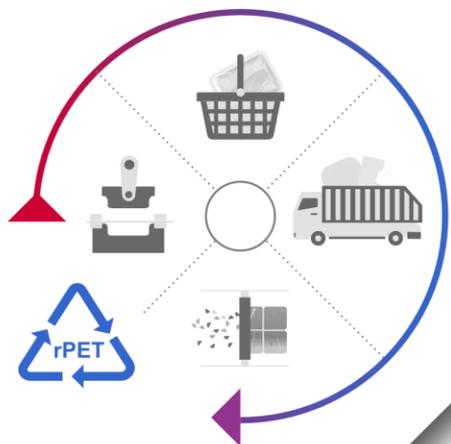


Version: Jan 2020

DESIGN FOR RECYCLING GUIDELINES FOR PET THERMOFORMED TRAYS
CLEAR TRANSPARENT TO BE RECYCLED EVEN IN FOOD APPLICATIONS

	YES	CONDITIONAL	NO	ASSESSING PROTOCOLS
Material	Full compatibility – materials that passed the testing protocols with no negative impact OR Materials that have not been tested (yet), but are known to be compatible in PET recycling	Limited compatibility – materials that passed the testing protocols if certain conditions are met OR Materials that have not been tested (yet), but pose a low risk of interfering with PET recycling	Low compatibility – materials that failed the testing protocols OR Materials that have not been tested (yet), but pose a high risk of interfering with PET recycling	All packaging should be tested according to the Petcore Europe Guidelines and PET trays Recycling protocol, evaluated by RECYCLASS.
Color	Transparent clear, transparent light blue		Metals	
Barrier	None, PET based oxygen barrier or scavenger with no yellowness effects after EPSP oven test	PET based oxygen barrier or scavenger with limited yellowness effects after EPSP oven test	EVCH, PE, any other barrier; any other oxygen scavenger	EPSP oven test
Surface	Silicone surface coating (on coating area). Antistacking characteristics. None of them should affect clarity	Any other additive (UV stabilizers, AA blockers, optical brighteners, antistacking, anti-static agents, anti-fogging (on coating area)) WITH limited effect on clarity to be measured	Any/Other/Photosensitive additives; Nanocomposites	
PRINTED Lidding films - Closure systems (if glue not harming the recycling process)	PET, OR floating combination of plastics with density < 0.95 g/cm3, NO glue residuals, if no PET, no lidding film residual on the tray. SiOx, AlOx plasma for barrier		any other printing film with density > 1 g/cm3 (to be proven with sink/float test)	EPSP sink/float test, EPSP glue removal test, EPSP oven test
INTD Lidding films - Closure systems (with or without adhesive)	NO PRINTING PREFERRED. CR plastics/combination of floating plastics with density < 0.95 g/cm3, NO glue residuals. Foamed PET based films where foamed structure is not getting destroyed @ 90°C. If no PET, no lidding film residual on the tray. SiOx and AlOx plasma for barrier		any other film	EPSP sink/float test, EPSP glue removal test, EPSP oven test
Labels (with adhesive not harming the recycling process - see labels adhesive tray)	NO LABEL PREFERRED. Plastic labels where label has a density < 1 g/cm3 in the more heavily printed and adhesive area	EPA-Free Paper labels not bearing fibers (pulping) and bleaching	Plastic labels where label has a density > 1 g/cm3 in the more heavily printed and adhesive area - Paper labels bearing fibers (pulping) - Paper containing BPA - non floating paper labels	EPSP sink/float test
Labels Adhesive	adhesives with 100% removing ratio and no adhesive residuals on flasks @ 70°C testing temperature	adhesives with 100% removing ratio and no adhesive residuals on flasks @ 85°C testing temperature	all other adhesives	Petcore Europe - PET Thermoforming WCI - adhesive removal on trays protocol
Resins on parts different than lidding film and labels	Water or alcohol soluble in 80-90°C		any other adhesive	EPSP glue removal test
Inks Printing	Non toxic, follow EU/PA Guidelines		Inks that bleed, toxic or hazardous inks	
Other Components	NO other components Preferred	Inserts in HDPE / LDPE / PP, Soular pads, bubble pads and paper & cardboard - all inserts should be completely removable and leave no traces	PKC / PS / EPS / PU / PA (Nylon) / PC / PMMA Thermoset plastics / metals; non compliant soular pads	

Establish a robust recycling stream



Design alone not enough to enhance quality.

Bales specifications must facilitate PTTs recycling.

Sorting must be improved.

Separate collection or post-selection.

- Food/non-food
- Mono/multi
- Colors

Watermarks or other identification alternatives have to be implemented.

Final consumer has to understand the value of waste and collaborate.

Major challenge lies in the ability for collection and sorting systems to capture enough pc PET trays of consistent quality going forward

Product Specification 06/2018
Fraction-No. 328-5

Sorting fraction:	PET - Trays
A Specification/Description	Used, residue-drained, system-compatible trays made of polyethylene terephthalate (PET), volume ≤ 5 litres composed as follows: 1. Trays, e.g. for meat, fruit and vegetables, salads, etc 2. Transparent PET bottles incl. secondary components such as lids, labels, etc. The supplement is part of this specification!
B Purity	At least 75% by mass PET - Trays Maximum 20% by mass transparent PET
C Impurities	Maximum total content of impurities: Metallic or mineral impurities within 1% Other metal items PVC items Opaque PET- bottles Other plastic items Paper/board/cardboard, PBC or other residues Examples of impurities: - Aluminium - Foreign materials - Compostable
D Form of Delivery	- Transportable bales - Dimension and density of truck (loading area 12.60 m x 2.40 m) - Produced with customary date - Identified with DSD bale label

Product specification 05/2016

Sorting fraction:	PET trays
A Specification/Description	Used, residue-drained dimensionally stable, system-compatible packages made of polyethylene terephthalate (PET), volume ≤ 5 litres in the following composition: 1. Trays, e.g. meat trays, fruit trays and other dimensionally stable PET packages, e.g. mugs, bowls, bottles Transparent, clear, coloured, opaque, including ancillary constituents such as label, lids, foils, inlay materials etc. 2. Transparent PET bottles System-compatible implies that the plastic is suitable for source separation or post-consumer recycling
B Purity	At least 80 mass % of PET trays and 20 mass % transparent PET
C Impurities	Maximum total content of impurities: Metallic and mineral impurities within 1% Other metal articles PVC articles Aluminium-coated plastics Other residual materials Examples of impurities: - Glass - Paper/foils - Foreign materials - Compostable
D Form of delivery	- Transportable bales - Dimensions and density of the truck (loading area 12.60 m x 2.40 m) - minimum loading of 14 t - stored in a dry place - produced using commercially available materials - identified by bale tags provided

Especificaciones Técnicas para balas de residuos de envases de PET termoformados recuperados en plantas de selección de envases ligeros y/o en instalaciones de reciclado de botella de PET

MATERIAL ADMITIDO	Limite por tipo de envase*
PET termoformado monocapa y multicapa	≥ 85%
PET termoformado monocapa	Sin limite especifico
PET termoformado multicapa	Sin limite especifico
PET botella	≤ 15%
Suma total de MATERIAL ADMITIDO	≥ 95%

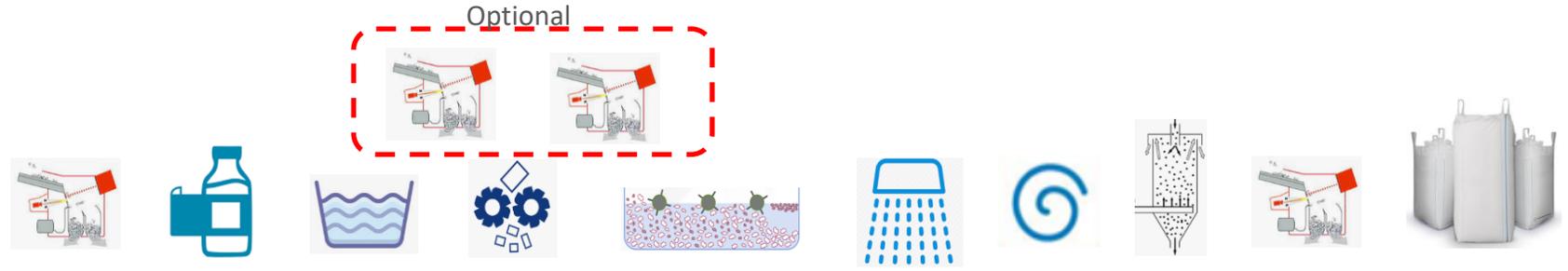
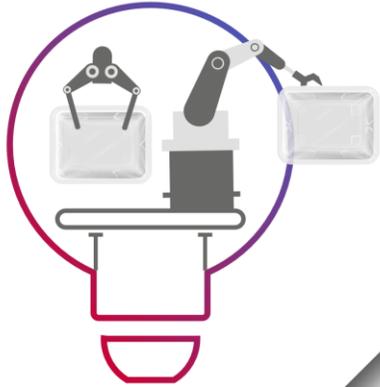
MATERIAL NO ADMITIDO	Limite por tipo de contaminante*
PET termoformado color	< 1%
PET termoformado blanco	< 0,5%
PET botella color	< 1%
PET botella blanco	< 0,5%
Film	< 2%
Poliéster textil	< 1%
PVC	< 0,1%
Aluminio	< 0,5%
Otros impropios	< 0,5%
Suma total de MATERIAL NO ADMITIDO	≤ 5%

* Porcentajes referidos al peso de la bala

Condiciones de entrega de las balas	
Dimensiones de las balas	Ancho, alto y largo = 0,80 m a 1,20 m
Peso mínimo de las balas	300 kg
Tipo de fleje de las balas	Preferible alambre
Carga mínima del camión	20 toneladas



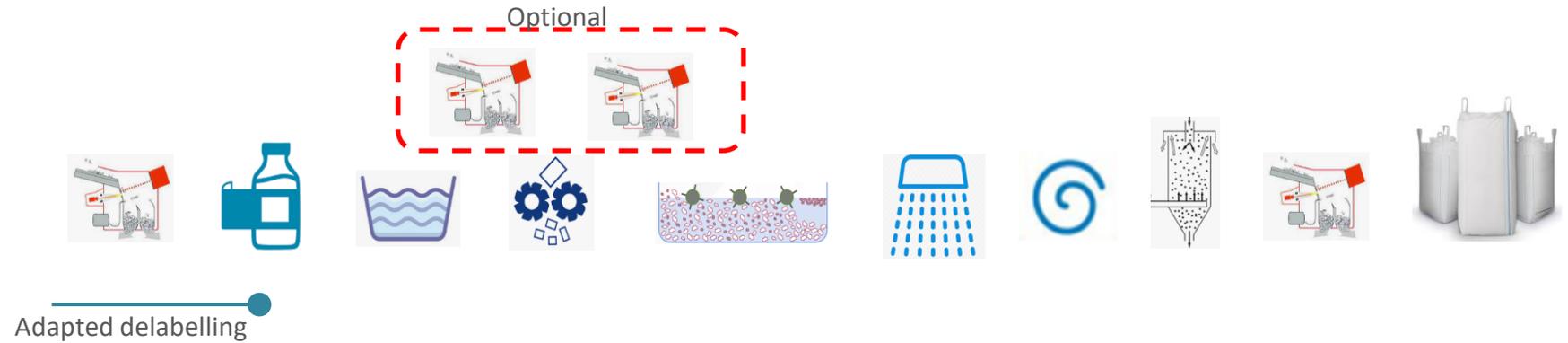
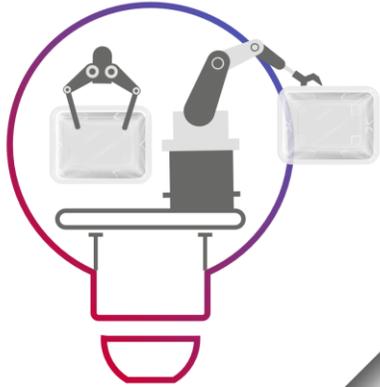
Innovate to overcome quality and technical challenges



PET Recycling process must be adapted
To ensure that most PET trays sorted for recycling are, in fact, recycled, trays need to be sorted from PET bottles for separate reprocessing in dedicated lines.



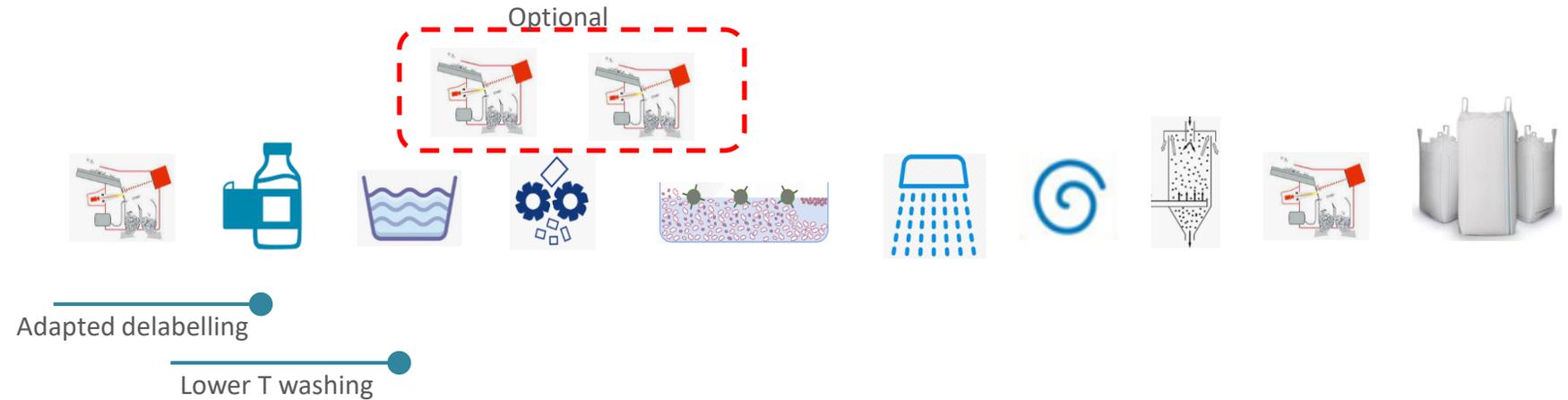
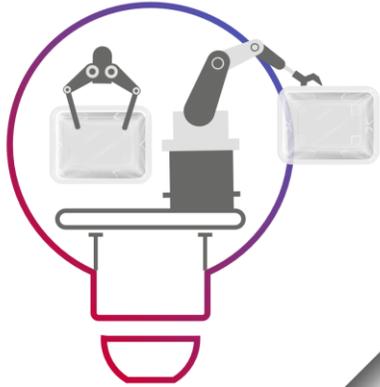
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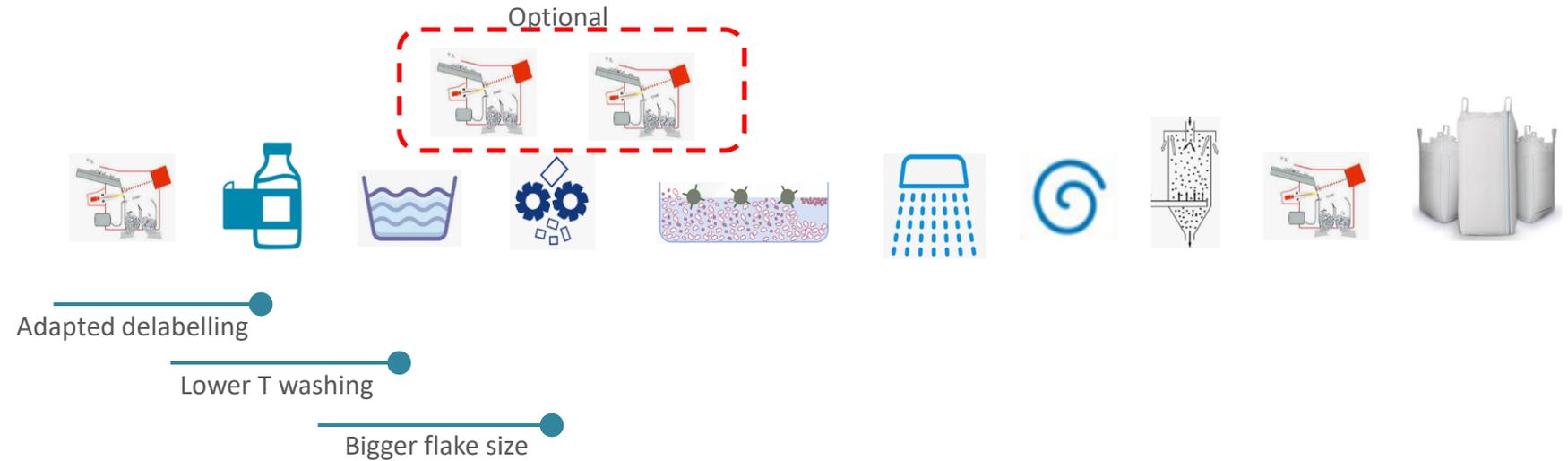
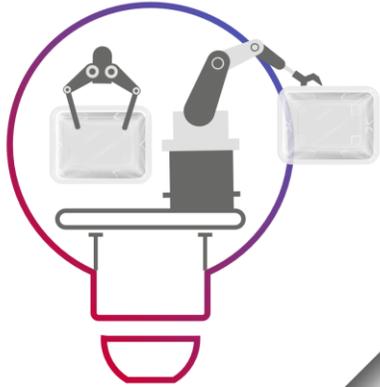
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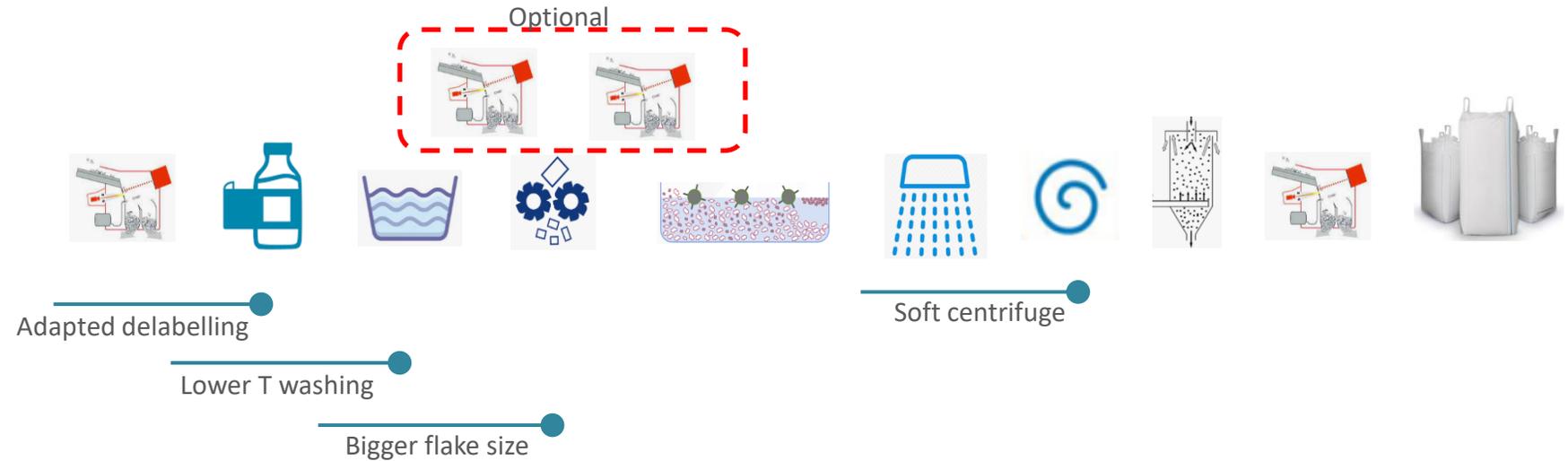
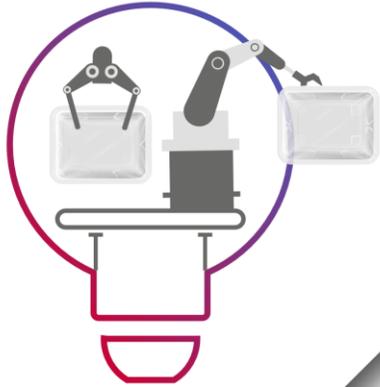


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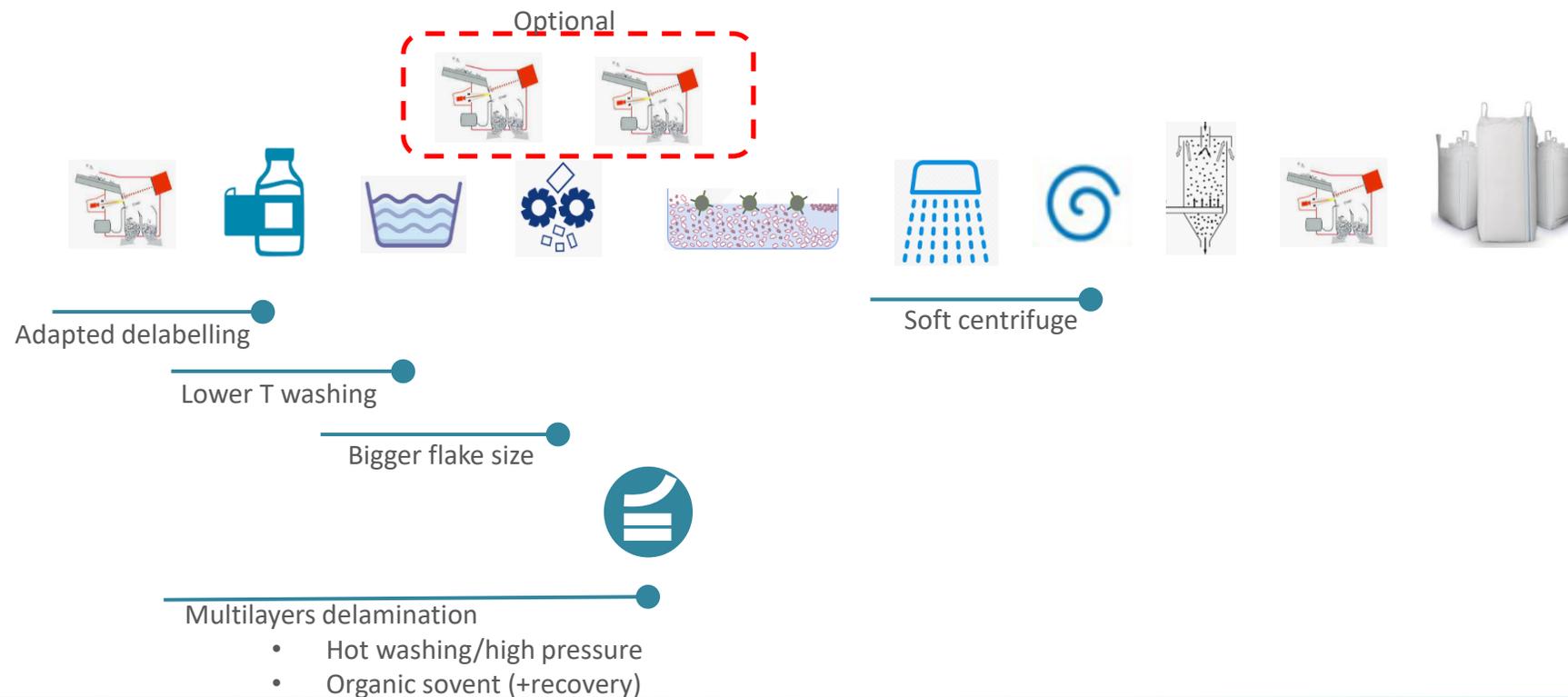
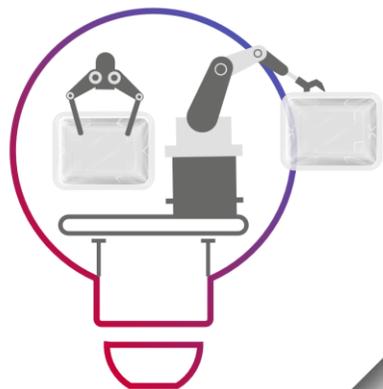


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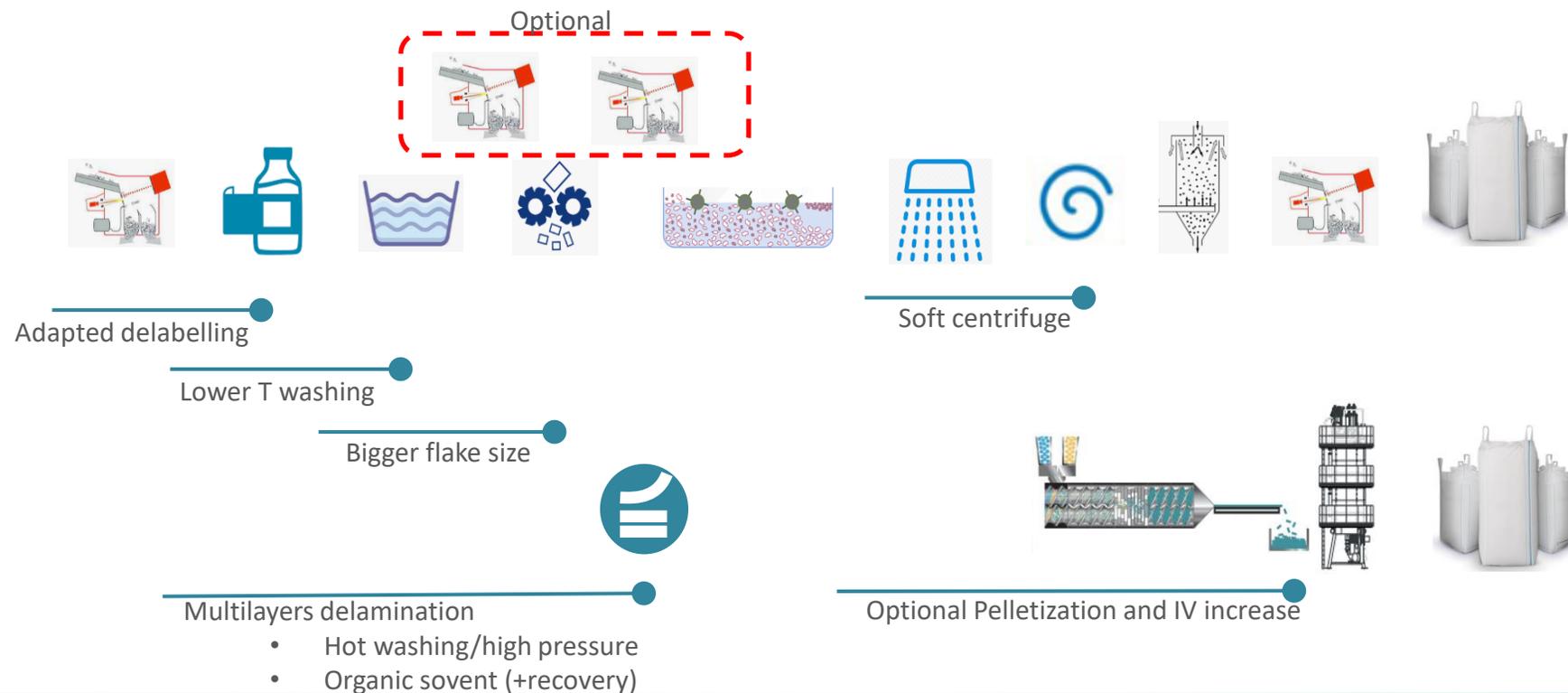
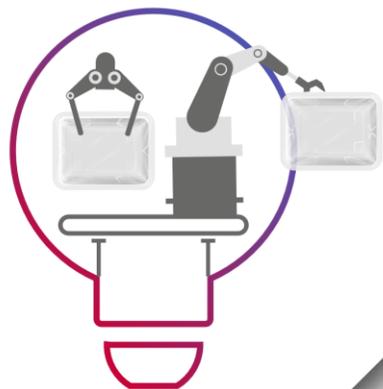


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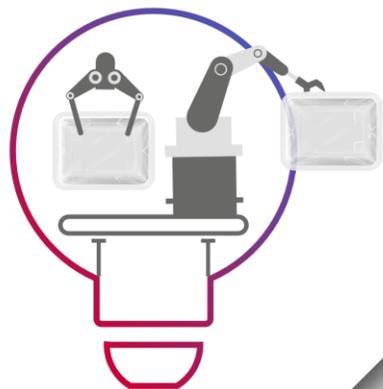


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Innovate to overcome
quality and technical
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Multilayers delamination

Hot washing using high pressure and friction.

Chemically assisted delamination: use of reactants to degrade, dissolve or minimize bonding capabilities to make possible the separation of the different layers.

Thermolaminated, coextruded and laminated with specific adhesives structures can be recycled with these processes.

Delamination allows recyclers to work in a PET mechanical recycling process without pre-sorting (mono/multi) needs.



More than
10.000 Tons of
trays recycled
using those
technologies

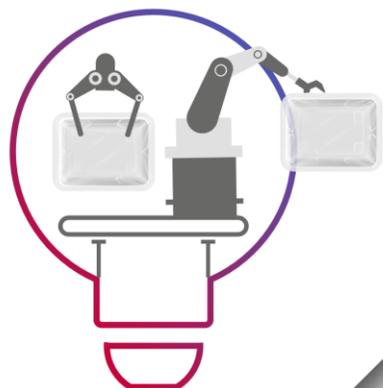


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EPTP Protocol



PET trays recyclability evaluation protocol

Evaluation of the impact on recyclability of any existing product, new design or innovation.

To ensure:

Thermoform is **compatible** with collection, sorting and recycling capabilities installed.

Properties of the new product.

Aligned with recycling guidelines.

Several labs will be homologated across Europe.

Application form and Modus Operandi already available.

Send your applications!



Demonstrate Food
contact compliance



Regulation 282/2008 and **EFSA Criteria** for Safety Evaluation do not distinguish between bottles, trays, sheets, etc. Rather it applies to recycling of food contact materials into new food contact materials

EFSA opinions :

“ The input of all the processes is hot caustic washed and dried PET flakes originating from collected post-consumer PET containers, **mainly bottles and trays**, containing no more than 5% of PET from non-food consumer applications”.*

DG Santé clarified:

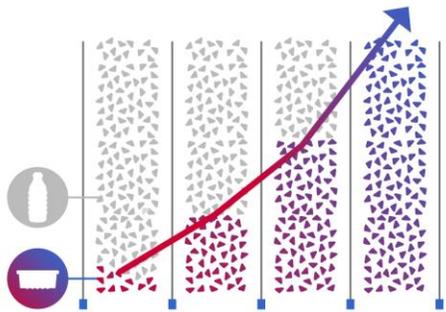
Materials and articles that have been manufactured in accordance with the European Union legislation on food contact materials could theoretically consist of 100% material originating from food trays

Functional barrier contribute to reduce potential risk

Dedicated **NIAS** risk assessment to manage uncertainty



Generate demand of rPET tray flake



Different **tax** and **legislative** initiatives are coming into force to increase recycled content.

EPRs support is basic for **boosting demand**.

Ecomodulation offering **cost incentives** for products meeting recyclability criteria and incorporating recycled material.

Packers & Retailers have to ask for **closing the loop** by using PCR from thermoforms.

Converters have to set **targets** around.

Several projects across Europe looking for incorporation of recycled content from PTTs in food packaging and other products



CITEO
Recyclage PB PET
Wellman, Valorplast, Klockner
Pentaplast, Paccor, Guillin,
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ecoembes
PET Trays Recycling
Klößner Pentaplast, Sulayr,
other converters & recyclers

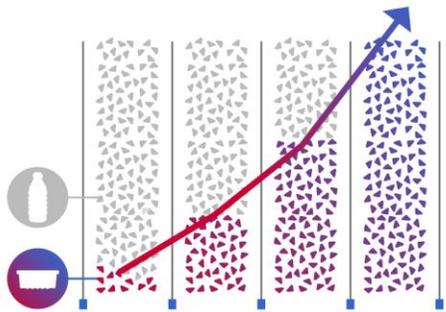
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RePETitio
Erweiterung
der PET
Circular
Economy



The roadmap to success

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target is to reach 30% Tray2Tray by 2025

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**Call to action!! We need your contribution.
Join TGW!**

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