

**INEOS**  
Styrolution



**Polystyrene – a circularity  
champion**

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# Polystyrene and dairy packaging:

An excellent combination!



## Recyclable

- Can be recycled via mechanical recycling, depolymerisation, dissolution, gasification, pyrolysis
- Meets food-contact regulations after being recycled



## Faster to process

- 20% to 30% faster processing speed, particularly with form-fill-seal (FFS) machines
- Doesn't need to be pre-dried
- Can be rapidly moulded into its final shape



## Easier to process

- Large processing window due to its amorphous structure – less chance of waste compared to other polymers
- Can withstand several processing cycles while maintaining mechanical properties



## Ideal choice for multi-pack yoghurt pots

- Portionability – PS is the only packaging material that can be snapped off easily into smaller units



## Excellent properties

- Less PS needed to obtain same degree of strength and stiffness compared to other polymers



## Great footprint reductions

- Low scope 2 in FFS processing due to amorphous polymer
- Depo advantage over pyrolysis
- Strong footprint reduction agenda for virgin

# Sour cream cup with 30% mrPS

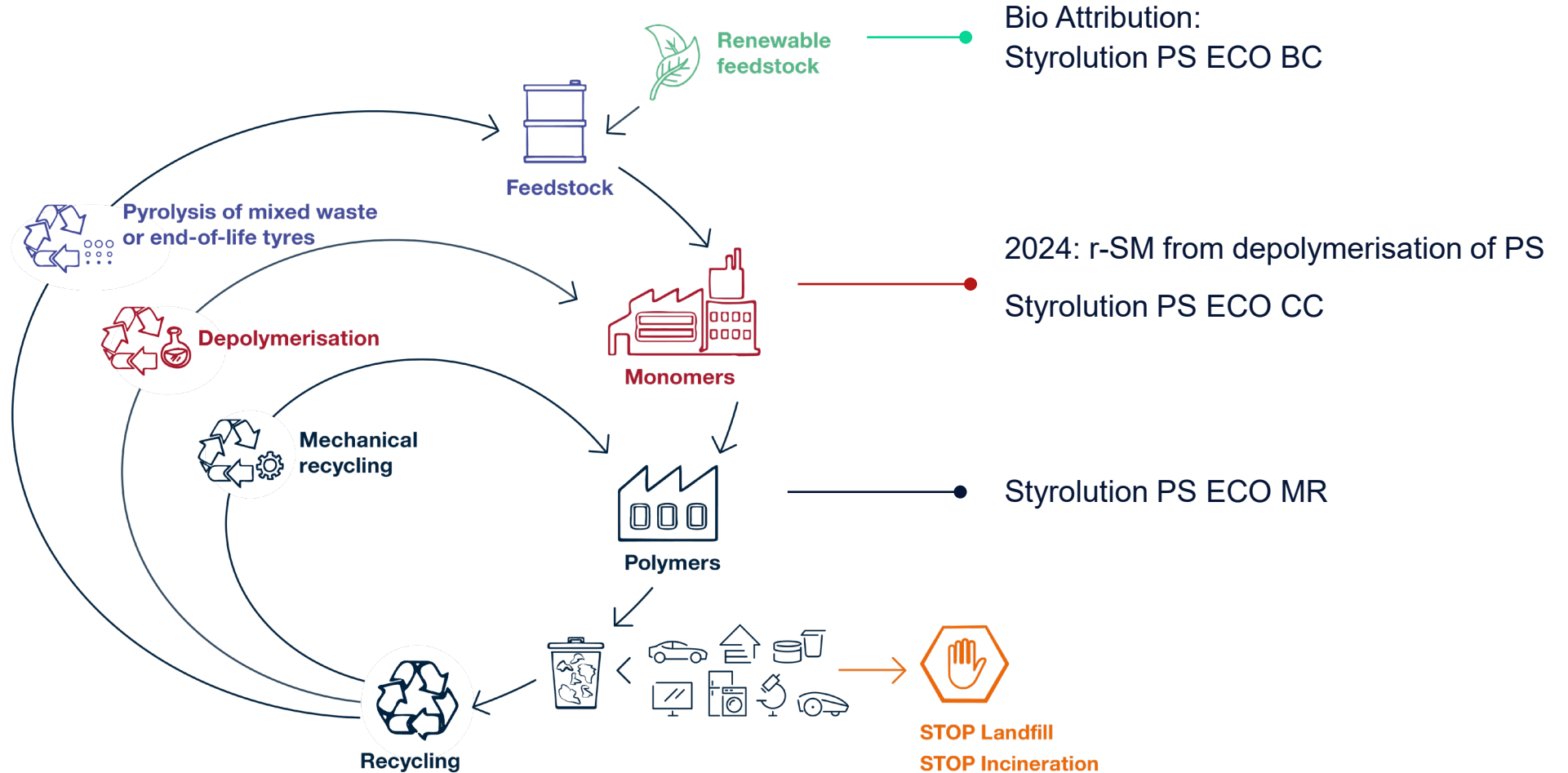
Now in your (German) supermarket

- PS is recyclable back to direct food contact
- MR-PS is a drop in solution
- First customers
  - Prepare for PPWR
  - Move towards SBTi targets
- German Packaging Award Winner



# Recycling technologies and bio feedstock

Pathways to circularity for styrenics



# Mechanical recycling of polystyrene

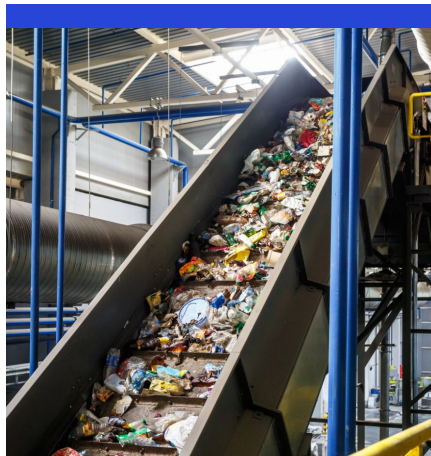
Leading to 99.9% polystyrene purity



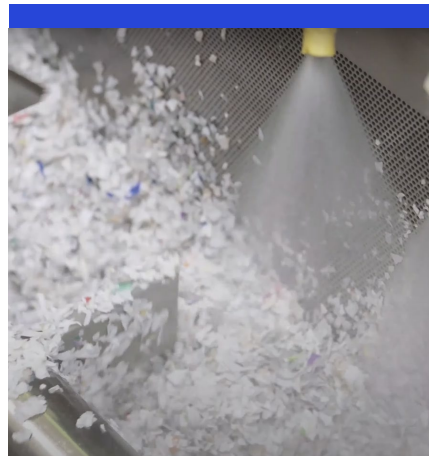
Bales of polystyrene



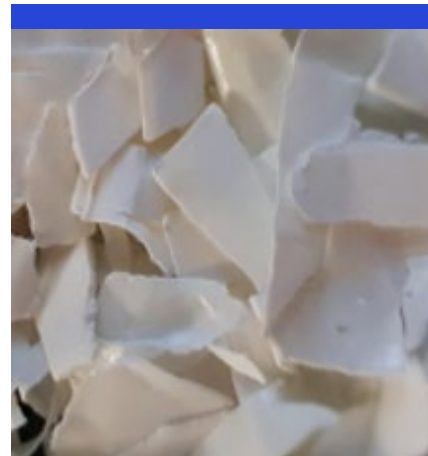
Sorting by food/  
non-food/ by  
colour



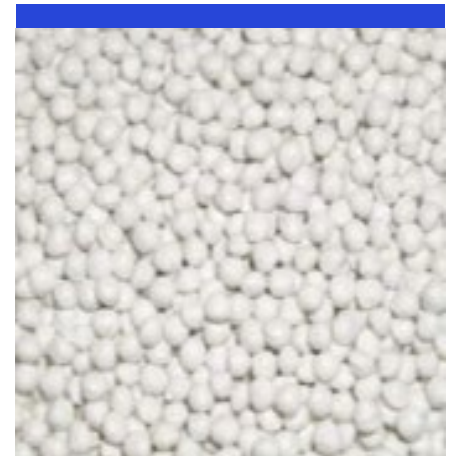
Hot washing



Flake sorting



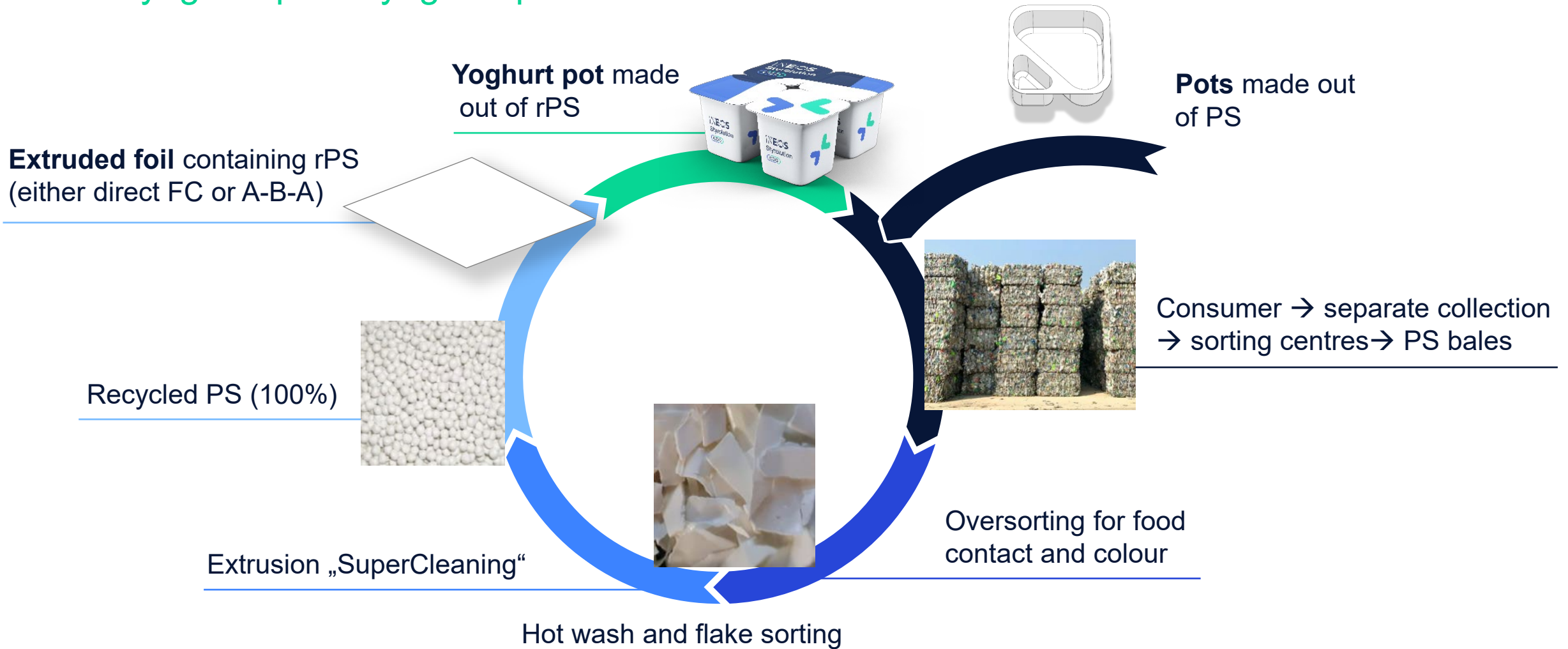
Super cleaning &  
melt filtration



**The result:** Recycled polystyrene suitable for use in food-contact applications

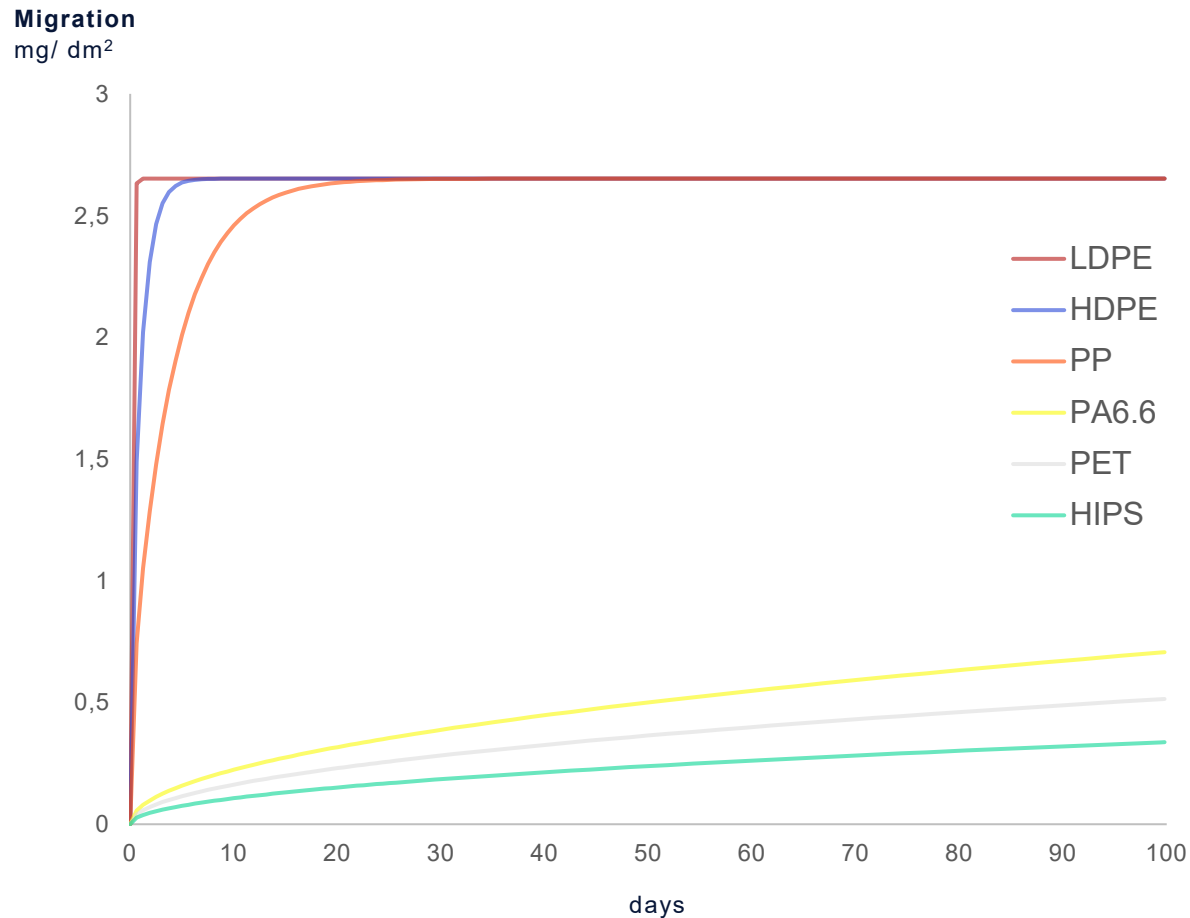
# Perfect cycle

From yoghurt pot to yoghurt pot



# The power of PS waste: Low contaminations

Low diffusion polymer – even more than PET



Kinetic modelling, diffusion coefficients from Ap model (calculated for a molecule 250 g/mol,  $c_{p,0}=1000$  mg/kg, 40 °C, 300  $\mu$ m film thickness). Source: A Störmer Fraunhofer IVV 7/2/23

- Polystyrene is a low diffusion polymer – even more than PET
- Due to its properties, it takes up little contamination in the waste stream and when recycled doesn't diffuse out contamination
- This makes it **safe** and **perfect for mechanical recycling**, even in highly demanding food packaging applications
- **Refrigerated applications** with short best before dates are an **additional safety!**

# Intensive testing

Colour



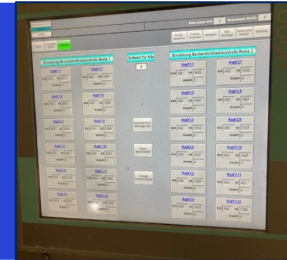
Migration



Print quality



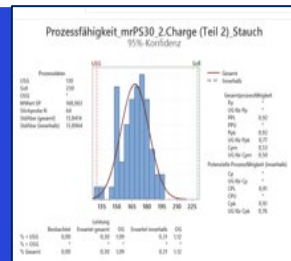
Processing parameters



Smell/  
taste



Packaging  
test



Transport  
test



# Regulatory

## Update



- InSTY has **passed** Local Authority **Audits** for MR – the register of “novel technologies” will show status “**Active**”
- We completed 2 years (**5 reports**) of monitoring our mechanical recycling. >very many lots have been analyzed in detail.
- **EFSA opinion** has been requested by INSTY (and SCS) immediately with 4<sup>th</sup> report in **April 25**
  - No postponement expected (large set of data available)
  - **Positive EFSA opinion expected** - timeline is unclear (2026)

# Closing the loop

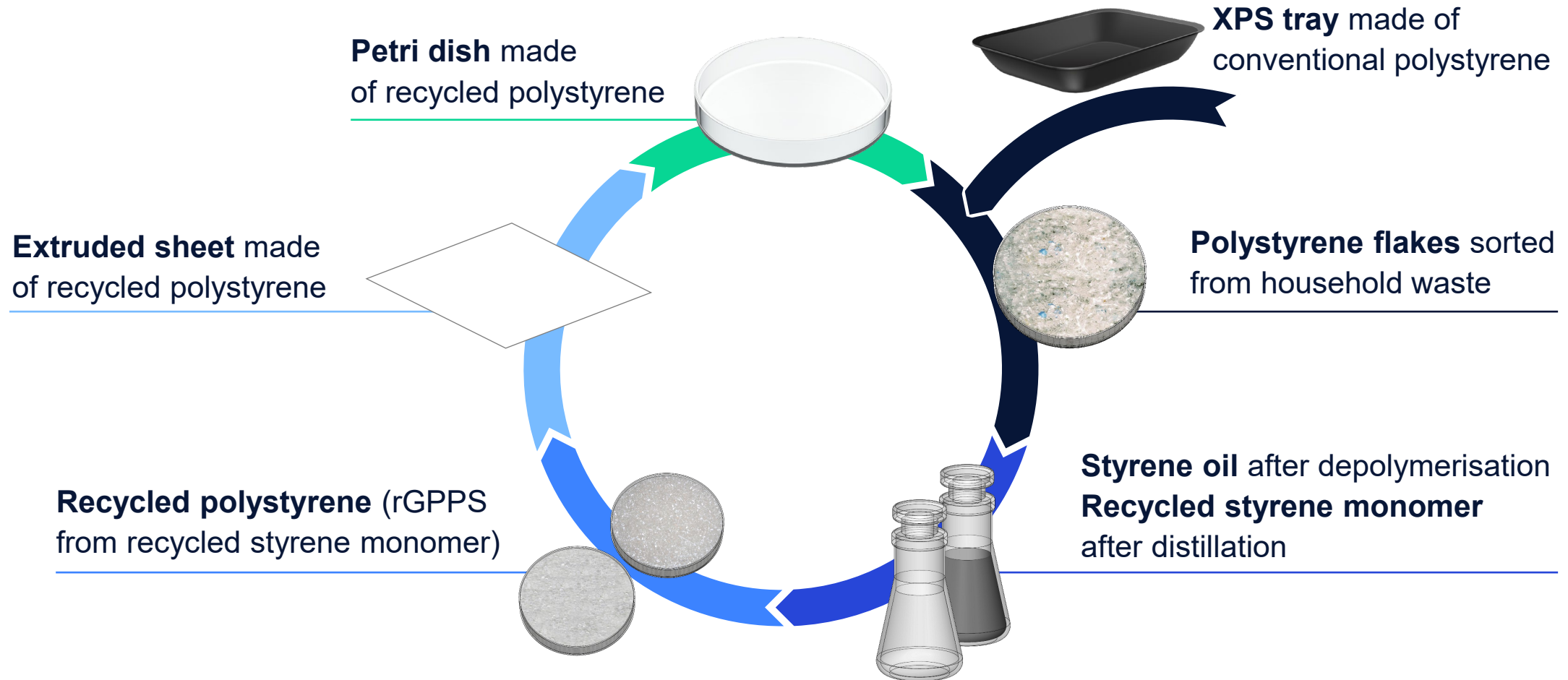
here PS recycling happens



- First depolymerisation plant in Europe
- Capacity 26 kt
- Excellent footprint (compared to e.g. pyrolysis)
  
- First rSM deliveries received
- French dairies close the loop
- Larger press releases around start up and at the opening ceremony in September

# Depolymerisation process

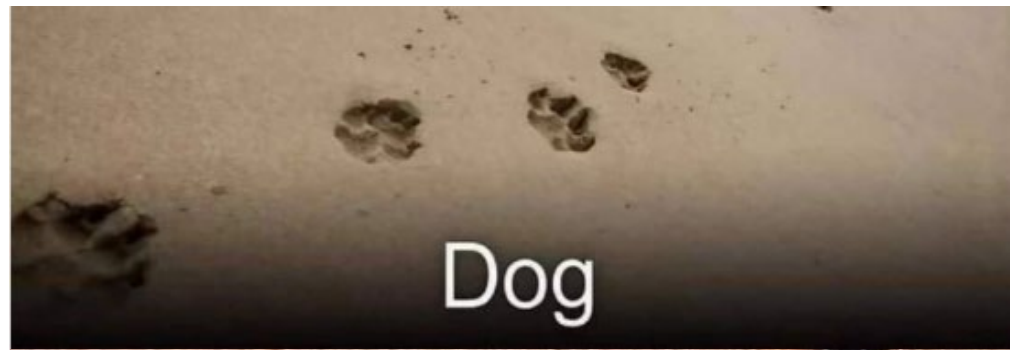
Rather up- than downcycling



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# Footprint





Dog



Horse



Idiots

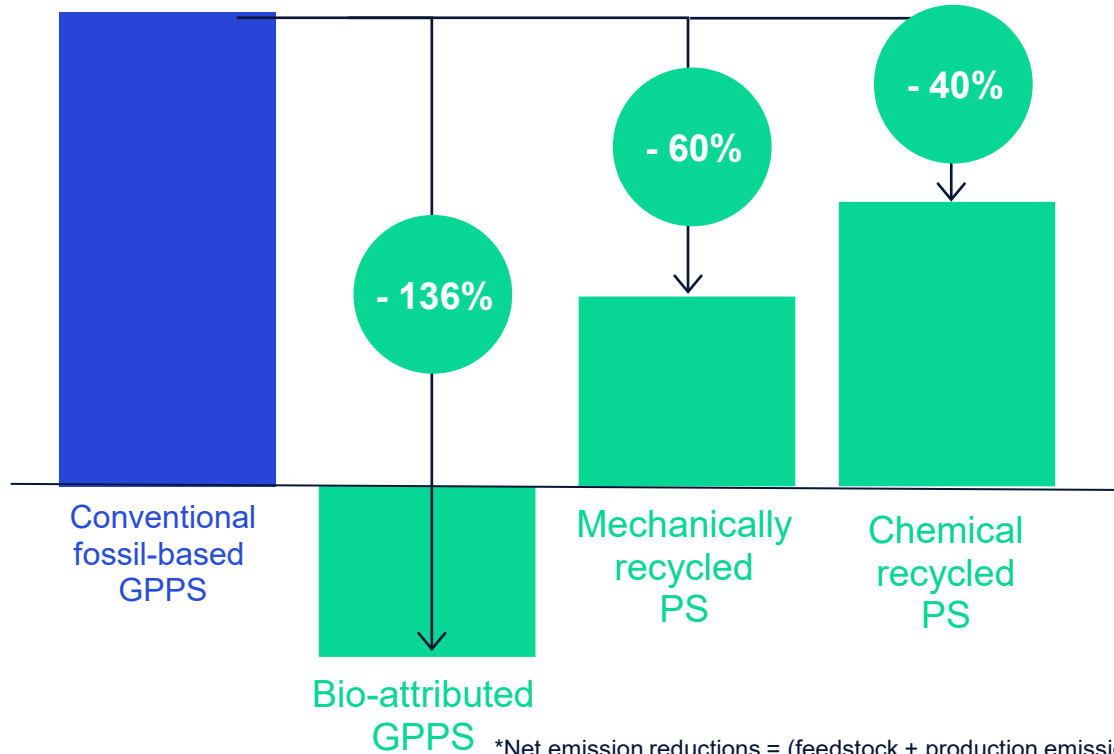
Source: LinkedIn ESG Professionals Group

# PS Eco solutions

## Footprint overview

Cradle-to-gate CO<sub>2</sub>-eq/ AU<sup>1</sup> material produced

Emissions from fossil-based material/ bio-attributed material



\*Net emission reductions = (feedstock + production emissions) Savings correspond to the emissions of fossil feedstock avoided via attribution

<sup>1</sup>AU – Arbitrary Units; CO<sub>2</sub>-equivalent based on an arbitrary mass of production

Data based on 100% bio-attributed styrene; values and methodology 3rd party assessed. | Conventional value based upon Plastics Europe Eco-profile of polystyrene

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# PS: at the forefront of circular food packaging solutions

## Mechanical recycling

- Enables perfect closed circle: from yoghurt pot to yoghurt pot
- Today 70% recycling quota, but rather downcycling to flower pots

## Depolymerisation

- Can preferably use foamed feedstocks (EPS, XPS)
- Enables recycling of Styrene monomer back into all kind of Styrenics
- Great footprint

## Chemical Recycling Pyrolysis

- PS does not disturb pyrolysis
- Not sorting it out is a loss for the above mentioned recycling technologies
- Can handle mixed plastics waste

rPS is a perfect circular material, but it needs an industry widespread adoption

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PS: *I love you!*



Polystyrene. Made for recycling – with a bright future in the circular economy.

[Styrolution-ECO.com](https://www.styrolution-eco.com)