Product design and sustainable recycling technologies

SWIM / HORIZON 2020

Israel, 23 - 24 July 2018

The Collection System

Lightweight packaging ….

The Collection System

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Lightweight packaging ….

The Sorting System

… Sorting and Recycling

The Costs (German System as example)

Cost reduction

*Breakdown of total costs in 2003 to the three items, estimated figures; 2011 cost split as per information from the system operators (information ruling dated 26 July 2012).

**Annual payments of the dual systems to local councils, particularly for cleaning the container locations and consumer information on separate collection.

The new Packaging Act in Germany: Increase of recycling targets

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» Higher recycling targets for all materials!
Target for plastics will increase from 36% to 63%!

Material	Target Packaging Ordinance	Target 1 Jan. 2019	Target 1 Jan. 2022
Glass	75 %	80% ✓	**90%**
Paper, board and cartons	70 %	85% ✓	**90%**
Ferrous metals	70 %	80% ✓	**90%**
Aluminum	60 %	80% ✓	**90%**
Beverage carton packages	60 %	75% ✓	**80%**
Other composites		55%	**70%**
Plastics	60 %	90%	**90%**
Mechanical recycling (plastic)	36 % ✓	58,5%	**63%**

»

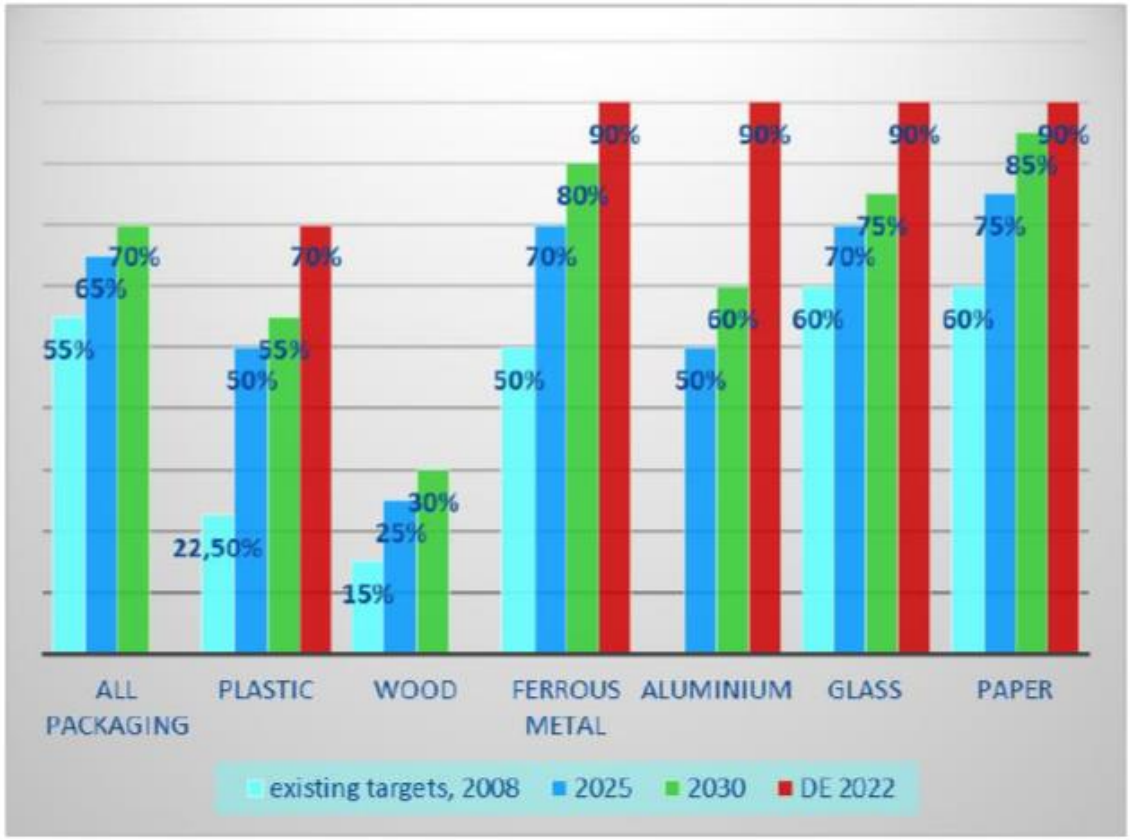
Review additional increase in the material-specific recovery targets **within 3 years after 1 Jan. 2022**

Meeting higher targets = greater sorting depth and more recycling

✓ Targets are already being achieved today

New EU waste legislation

Recycling of packaging waste



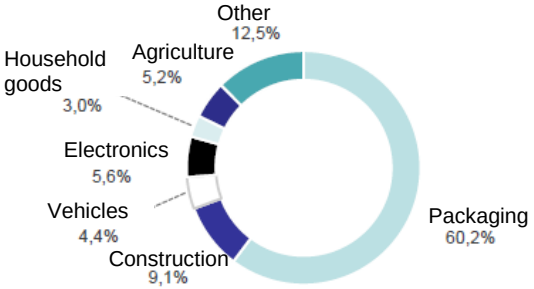
Potentials to fulfill higher quotas

Packaging as a commodity source

Packaging is by far the most important field of application for polyolefins

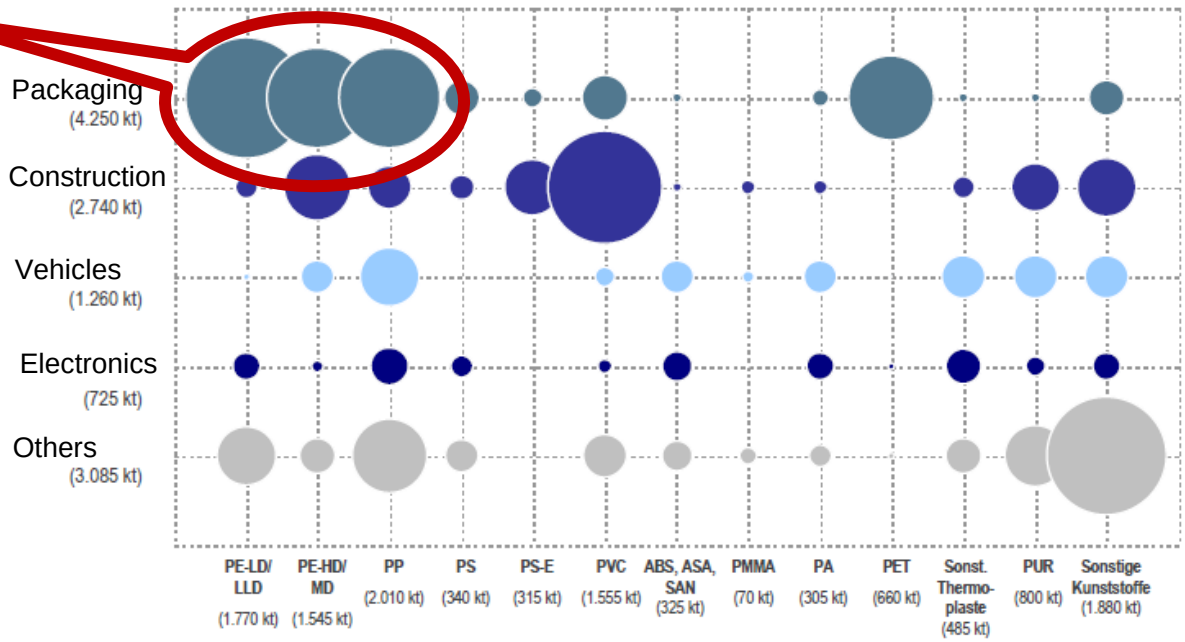
Packaging accounts for more than 60% of plastic waste

Post consumer waste 2015



Source : Consultic 2016

Polymers and their fields of application in plastics processing in Germany

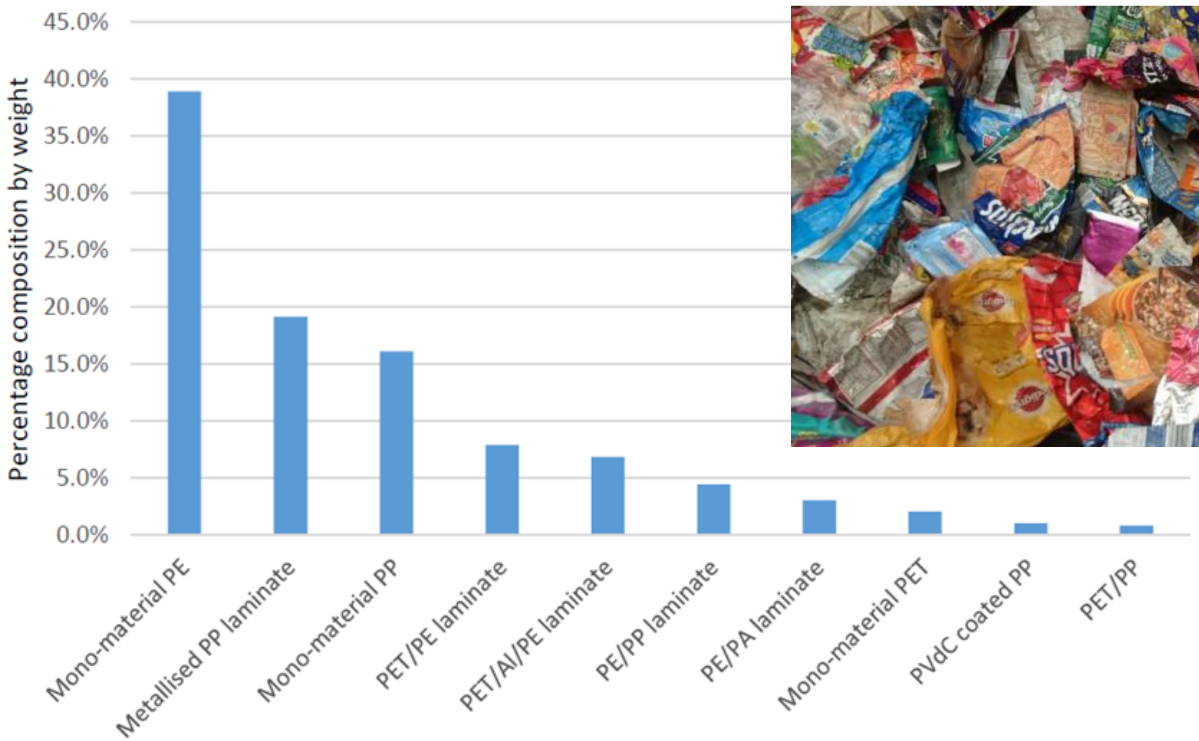


Source : Consultic 2016

→ Packaging waste is the most important commodity source for polyolefin recycling

Potentials to fulfill higher quotas

Composition of flexible packaging in residual waste by polymer structure



Reflex-Project – summary report
Axion Consulting 2016

Reflex-Study found that 80% of flexible post consumer packaging in the UK are polyolefines that can be recycled

Potentials to fulfill higher quotas

The new Packaging Act in Germany: Incentives for environment-friendly packaging

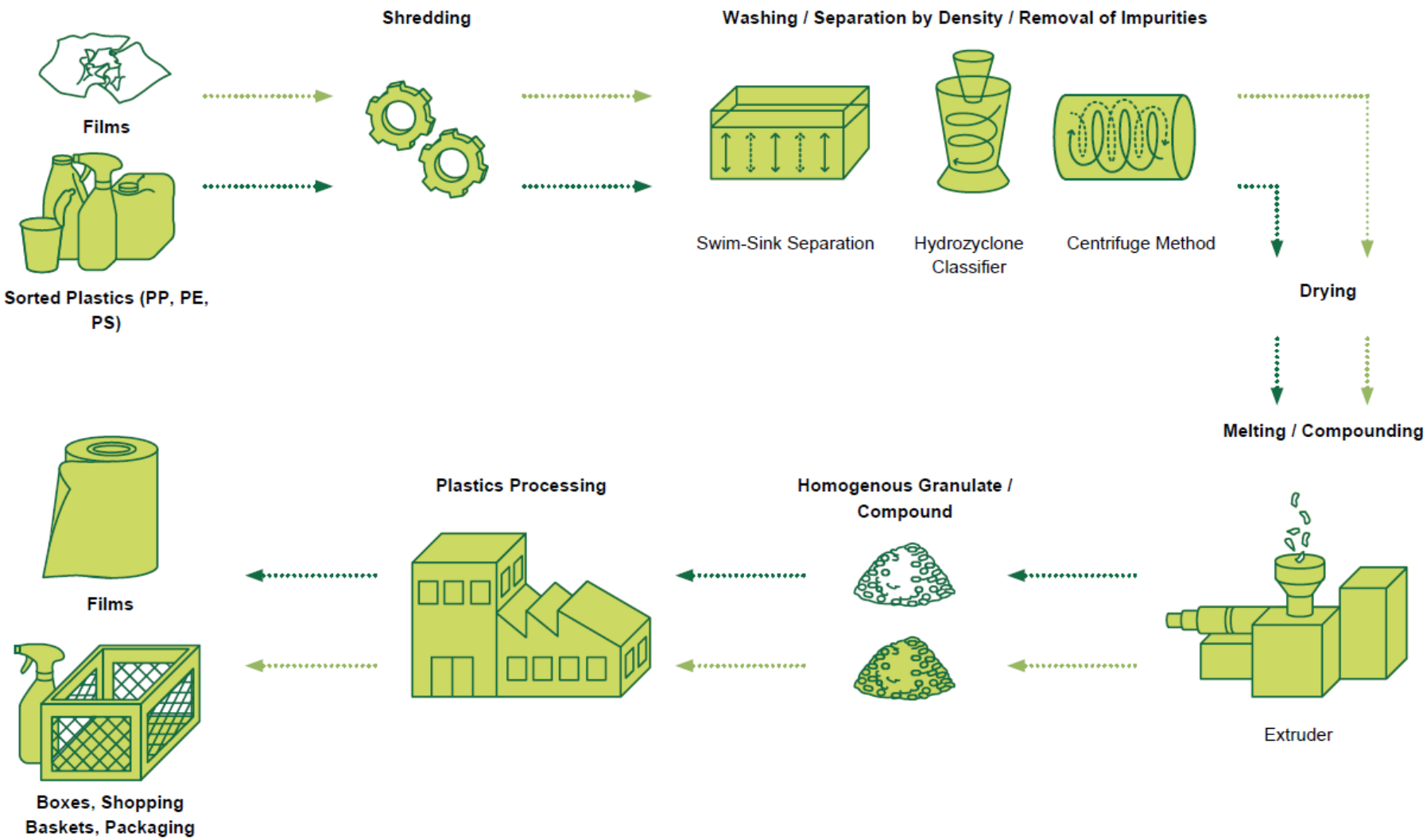
Ecologically based participation fees (§ 21)

- Growing importance of recycling capability as well as use of recyclates for obliged producers of packages
- Establishment of minimum standards for quantifying recyclability

Consequences

- Dual systems have to create incentives: for using recyclates and renewable raw materials
- Medium-term: participation fees to be fixed in accordance with ecological criteria
- Dual systems have to report proportion of participating packages that have been sent for high-quality recycling to the "Central Registry" and to the German Federal Environmental Agency
- DSD is preparing for this by e.g. offering a certification of recyclability

Mechanical Recycling of Plastics



Design4Recycling

How can packaging be recycled effectively?

- The customer is able to dispose the packaging via the yellow bag/bin ✔
- The Compliance Scheme ensures the recovery ✔
- How recyclable is the packaging in reality? ?

The actual recyclability does not merely arise from the percentage of recyclable components, but is also dependent on the detectability in automatic sorting plants, the melting behavior in extrusion processes and the amount of non-separable components (e.g. labels).

Design4Recycling

Certified Recyclability

DSD is the exclusive partner of the „Institut cyclos-HTP for Recyclability and product responsibility

- Support of the optimization process of the recyclability of packaging
- Evaluation of packaging on the basis of objective and transparent standards
- Certificate and Analysis report by the independent partners and experts of cyclos-HTP

Recyclability of packaging (i.a.)

- Behavior in the automatic sorting process
- Sortability
- Recyclability
- Not separable components

Recyclability is an important factor for modern Circular Economy

Design4Recycling – Best Practice

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Development of an optimisation concept for Nestlé the example of the Maggi-Topfinito packaging

New packaging
Verpackung

The redesigned packaging allows
themselves more efficient sort by machine

Design4Recycling – Best Practice

DerGrünePunkt

Development of an optimisation concept for Nestlé the example of the Maggi-Topfinito packaging

Old Packaging

The old packaging consists of various components and materials. It cannot be clearly sorted and recycled.

Design4Recycling – Best Practice

DerGrünePunkt

Joint development of a sustainable packaging design for FRoSTA

Optimizing

- pure material
- water-based inks
- lower material consumption

Result

- better recyclability of the packaging
- better environmental balance
- 300t less CO2 per year

HOHE RECYCLINGFÄHIGKEIT

HOHE RECYCLINGFÄHIGKEIT

- more possible applications for recycled plastic, further processing to granulate
- New packaging design protects the environment, promotes innovation and saves costs

Design4Recycling – Best Practice

MÖVENPICK „Ice Creation“

› PP cup with PP IML, sealing foil

EXQUISA „The Creamy"

› PP cup with PP IML, sealing foil

Design4Recycling – Best Practice

FROSCH „Aloe Vera Handspül-Lotion“

› PET bottle with PP/PE closure, paper label

Design4Recycling – Best Practice

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PERSIL „Universal Gel“

› PP bottle with PP/PE closure, paper label, PE-label

HOHE RECYCLINGFÄHIGKEIT

Design4Recycling – Best Practice

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HOHE RECYCLINGFÄHIGKEIT ★★★

NEUTROGENA „Deep Moisture“

› HDPE bottle with PP-label, PP/PE closures

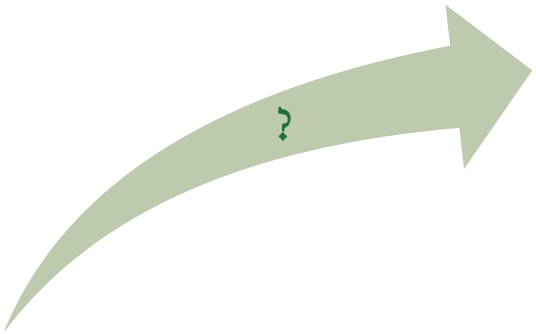
!

POM (Polyoxymethylene) Spring PP/PE packaging can be separated for recycling

A market for recyclates

Quality and Pricing – “From a single light to a “sea” of lights”

- Plastics are being perceived as a “problem”
- Think globally and act locally, initiatives needed
- Market for recyclates remains underdeveloped
  - Quality: Industry has developed successful light-house projects
  - Pricing: sustainability benefits from lower carbon footprint of recyclates not reflected in price; scaling-up brings down the price

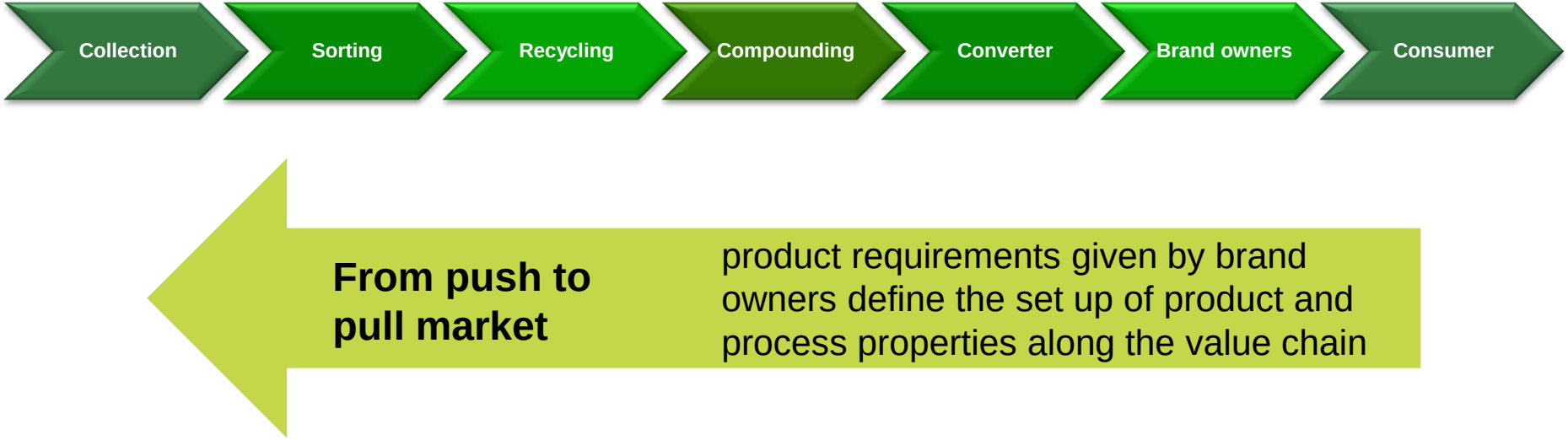


A market for recyclates

From Push to Pull

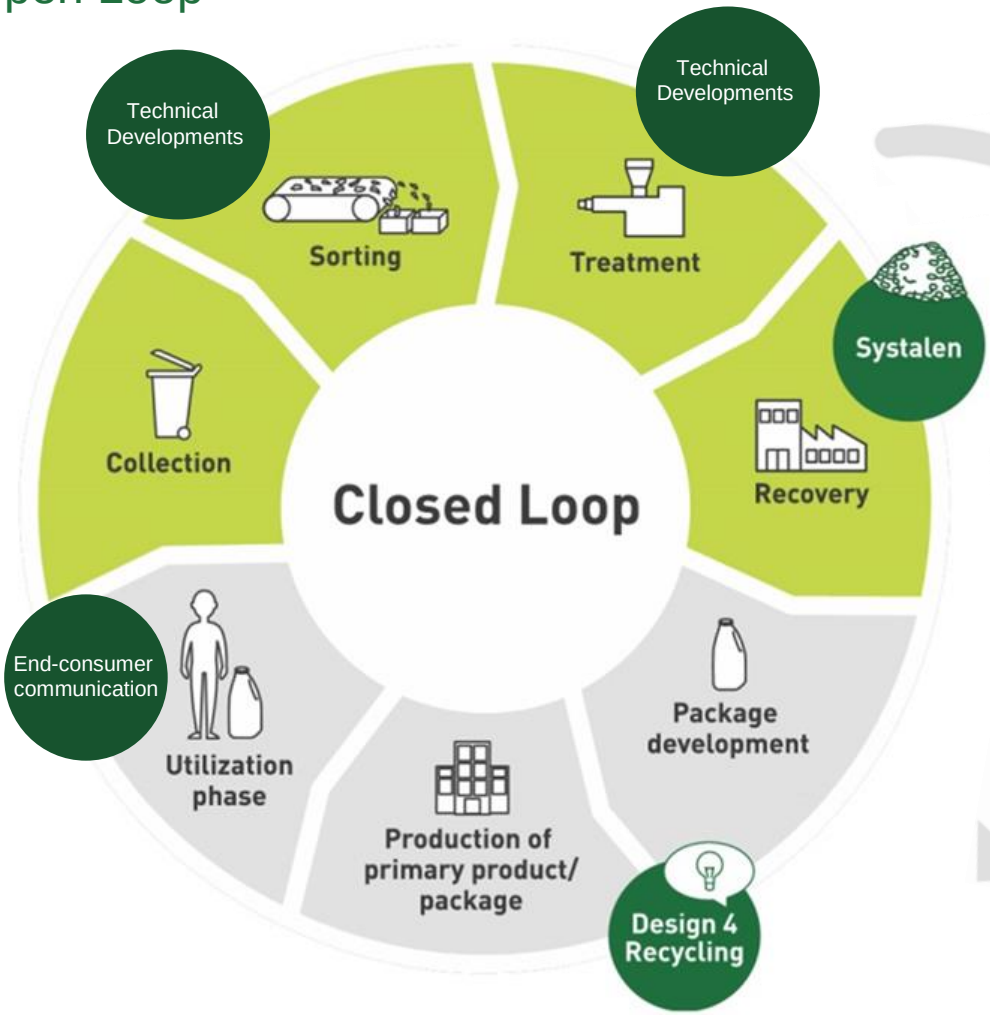
How to support multinational brand owners with high quality recycled plastics?

A recycling company needs to have a clear unterstanding about the required product properties and an abilty to translate this to the different steps along the value chain



A market for recyclates

Open Loop



Open Loop
energetic and chemical

Open Loop
mechanical:
Technical Plastics Products in durable applications

End - Consumer Products

Return into Packaging
on short notice**: Lighthouse projects**

medium term / longterm:
Raw Material Management for Plastics analogue to Metals, Glass and Paper

Closed-Loop-Recycling

DerGrünePunkt

Products made of Systalen

Shaping
the future
together

Gies®
Qualität in Kunststoff
DerGrünePunkt

As a German manufacturer of plastic products for household applications, we are fully aware of our ecological responsibilities. Which is why we have opted for Der Grüne Punkt as our permanent partner. Jointly developed and superlatively processed – our innovative ecoline series in four colors made 100 % of Systalen premium recyclate has been certified with the Blue Angel label.

ecoline - eco-friendly and sustainable

QR-Code scannen & Video anschauen

www.gies.de

GERMAN PACKAGING PRIZE

HD-PE bottle for cleaning products made of 100 % recyclate from the Yellow Sack.

Pioneering achievement.

A translucent and white material for the first time.

Genuine cycles and economical use of finite resources.

Systalen – what are the applications for the future?

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From the shelf back onto the shelf – our ambition for the future

PE

PP

- Plastic recyclates from the Yellow Bag have a very significant ecological advantage over virgin material.

- The potential applications for plastic recyclates from the Yellow Bag are now already reaching top-class qualities.

- The significant increase in plastics recycling targets in Germany will further advance technical developments.

- The use of plastic recyclates from the Yellow Bag in close-to-consumer applications and packages will increase consumers' awareness regarding the need for separate collection of recyclable materials.

From the shelf back onto the shelf:

Plastics processing firms and filling companies are called upon to try out the new raw materials for their products. This means that loops can really be closed.

Upgrading plastics processing

By using innovative technologies, the plastic recyclates obtained from the Yellow Sack are moving into new application categories.

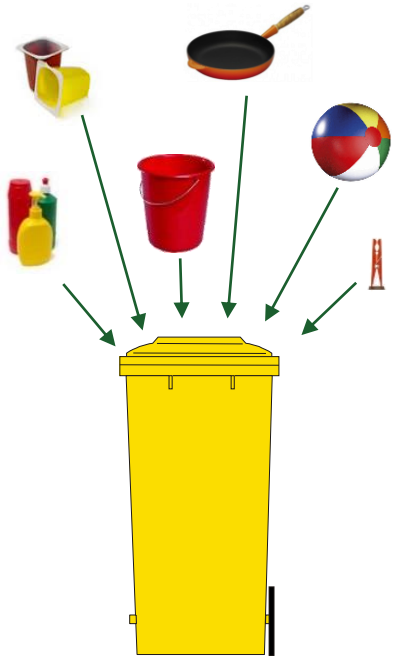
Standard colors

New colors

Potentials to fulfill higher quotas

Next logical step: recycling bin

- **Idea:** launching a single recycling bin for packaging and non-packaging of similar material (especially plastics and metals) for all private households
- **Advantages & expectations:**
  - ✓ Consumer-friendly
  - ✓ Standardized material flows and qualities
  - ✓ Extended collection for high quality recycling
- **Status quo:** Implementation of (obligatory) separate collection in Germany has been suspended and is not part of the legislation yet



Potentials to fulfill higher quotas

Expansion of recyclables collection in Germany has already been launched successfully

- More than **12 million residents** in Germany have access to a shared collection of lightweight packaging and waste of similar material (especially plastics and metals). More than a pilot project
- Implemented on a **cooperative basis** between dual systems and municipal waste management on the basis of the existing Packaging Law
- This **increases collected volumes**. However, only in regions with a simultaneous change from bag to bin system a substantial increase in volume can be observed

Extended recyclables collection: already 12 million residents

Outlook

5 Key Trends for EPR-Schemes in the Circular Economy – Balancing Harmonisation and Efficiency

1) Joint collection of all plastics and metal

2) Value chain management

3) Markets: from push to pull

4) Plastics: (dis)integration of the boundaries between **"virgin"** and **"secondary"**

5) EPR on a rise globally

- **EU framework** for boosting circular economy is necessary
- EPR-**minimum requirements**
- **No one-size fits all** solution
- **Diversity** of systems and **competition** benefit circular economy