Preparation and Re-Selling of Recycled Plastic - A Business Model

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> Business model of mtm plastics
> What we recycle
> How we recycle – processing, yield, quality
> Result: Re-polyolefins for the plastics converting industry
> Problems still remain
> Conclusion
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The company

- founded in 1994, 90 employees, turnover: € 20m/y
- Managed by shareholders
- Centre of Germany
- Processing capacity output 30 kt/y / input effective 54 kt/y
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What we recycle

Input materials

> mixed plastic packaging
  (containing large amounts of flexible multi-layers)
> bulky household waste plastics
> C&I hard plastics PE/PP
Packaging waste from separate collection

Germany, Italy, Scandinavia, Netherlands, France, Britain

Nationwide bulky waste collection

optimised sorting of PP/PE concentrates from bulky household waste for mechanical recycling
What we recycle

Packaging waste from separate collection

Nationwide bulky waste collection
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Packaging waste from separate collection

Nationwide bulky waste collection
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How we recycle – quality targets

Quality targets

Re-polyolefin pellets

> in constant hot runner quality (efficient separation, friction washing, mesh filter < 180my, double degassing, homogenization)
> in large quantities
> tailored to customer wishes
Preparation

- Raw material → Shredder
  - Magnet, eddy current separator, seaves
  - Multilevel wind sifter, NIR optical sorter
- Fe-metals, NE-metals, dust, sand, fines → NIR optical sorter
- Light-weight fraction
- Waste
- PO → Grinder
  - Grinder
How we recycle – technical processing

Separation

- Intermediate buffer
- Density separation sink-float (3 lines)
- Dryer
- NIR PE / PP / NI
- NIR Color
- Dewatering
- RDF
How we recycle – technical processing

Regranulation

- Intermediate buffer
- Extruders
- Mixing silos
- Packaging
How we recycle – yield

Yield: input/output ratio

- Varies between 55% and 75%
- Paper, Humidity, Metals, non-PO-plastics, other contaminants
- Depends on collection and sorting influenced by political and legal framework and by waste markets
- Crucial factor for the economic success
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Dipolen® and Purpolen®

> Dipolen®: re-PO-pellets for the injection moulding industry for areas of application using polyethylene and polypropylene

> Purpolen®: a novel re-pellet with a broad range of colors

[Data sheets are available]
How we recycle: 
Product examples

Made from mtm-polyolefins
How we recycle: Product examples
How we recycle: Product examples

Manufactured from mtm-polyolefins
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Problems still remain

Raw materials supply

- Influence of government policies
- Lack of sorting standards

- Plastics waste is no freely available commodity.
- Scarcity leads to competition between Asian and European recyclers without level playing field.
Problems still remain

Sorting/Input quality

Residue from packed goods
- Cross contamination, odour, mould, lumps
- Easy to empty design needed

Paper
- Additional water absorption, lumps, mould
- Plastic and paper are incompatible in plastics recycling
Problems still remain

Input quality/product design

Multy-layers, paper-plastic combinations
- Lower yields, specific weight?
- Reduced mechanical properties
- Re-Product contamination

Pigments and additives
- Grayish colour
- Limited applications
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Plastic recycling is worthwhile, if ...

- Plastic waste is managed professionally by municipalities: separate collection
- Cherry picking is prevented - it will only spoil the value chain
- Plastic waste is pre-sorted into polymer type concentrates
Plastic recycling is worthwhile, if ...

> Recyclers find investment security: hop-on, hop-off won’t work
> Recyclers have sufficient know-how about the whole end-of-life value chain
> Investors don’t trust „all-in, pure-out solutions“!
Thank-you for paying attention

Visual stimulation: https://www.youtube.com/watch?v=x9rXCPIRF78

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# Product range: Dipolen® / Purpolen®

<table>
<thead>
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<th>Product</th>
<th>Dipolen® S</th>
<th>Dipolen® SP</th>
<th>Dipolen® PP</th>
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<tr>
<td>Polymer</td>
<td>PE-PP-polyblend</td>
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<td>PE-HD-dominated</td>
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<table>
<thead>
<tr>
<th>Product</th>
<th>Purpolen® PE</th>
<th>Purpolen® PP</th>
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<td>Polymer</td>
<td>PE-HD</td>
<td>PP</td>
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<td>MFI 190 °C / 2.16 kg</td>
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<td>MFI 230 °C / 2.16 kg</td>
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