

附件 1

MGG Metrec 及 MGG Polymers 公司簡報

WEEE Recycling Teamwork

Welcome to 5 innovations in 15 years of WEEE recycling



Chris Slijkhuis
Müller-Guttenbrunn Group – Austria
www.mgg-recycling.com

The MGG team – a concentration of experience



MGG Metrec, MGG Metran & MGG Polymers

The geographic presence of MGG



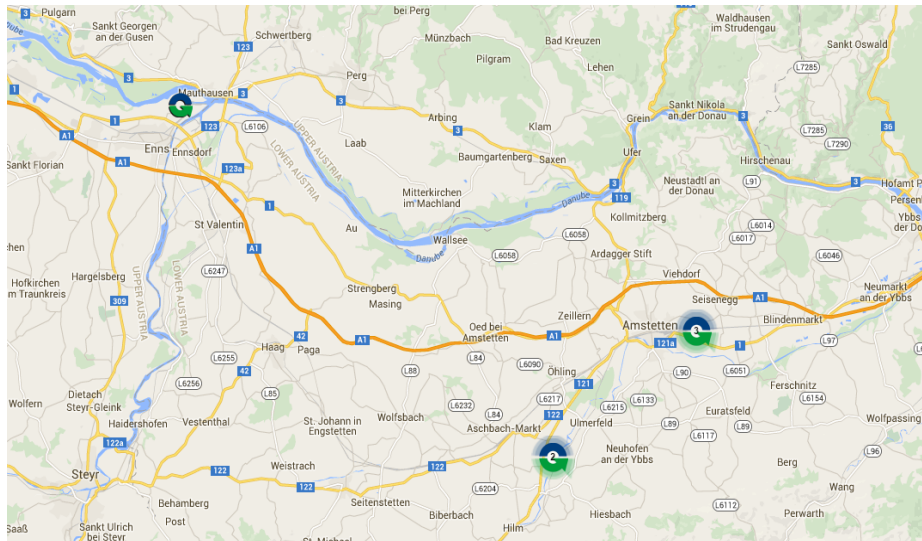
Müller-Guttenbrunn Group (MGG)

MGG Metrec

MGG Metran

MGG Polymers

Danubia Speicherei



The geographic presence MGG



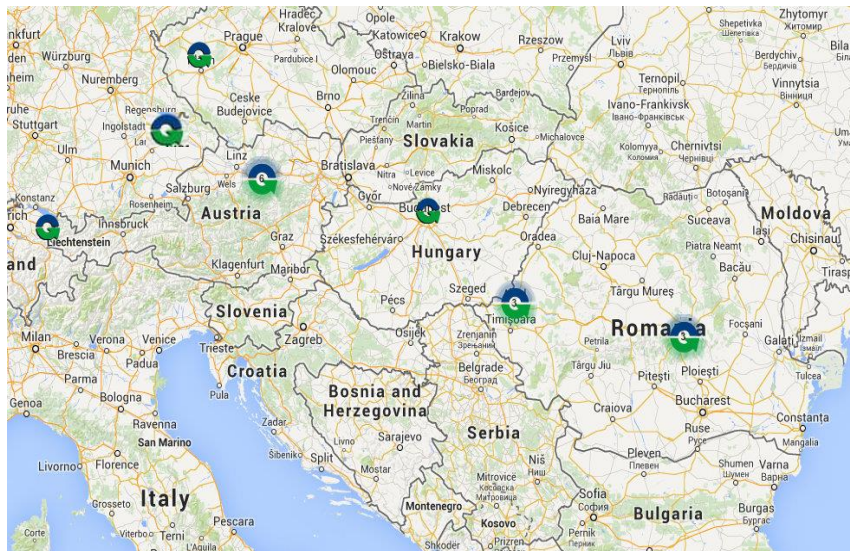
Müller-Guttenbrunn Group (MGG)

MGG Metrec

MGG Metran

MGG Polymers

Danubia Speicherei



MGG Mü-Gu Hungary



MGG Remat Arad Ro



MGG Remat Brasov Ro



MGG Metfer CZ

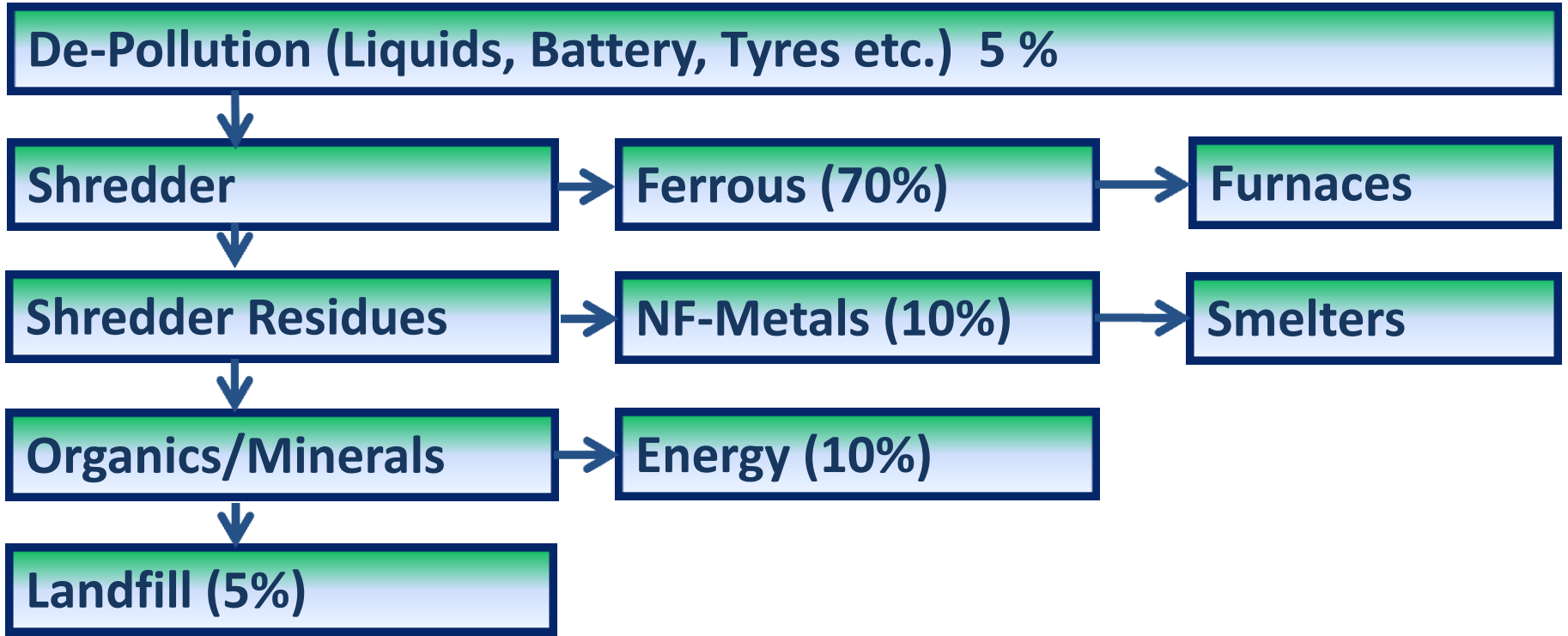


MER Steinach



MGG Trade Switzerland

ELV – Automotive Recycling the origin of the MGG business



Since 2015: 85% recycling rate and 95% recovery rate

Since opening of EU borders – loss of ELV's

In Austria per year:

- ▶ 250 000 cars are de-registered
- ▶ <50 000 ELV's are shredded in Austria
- ▶ Some 200 000 vehicles disappear



De-Facto therefore the recovery rate is only 19 %

The Müller-Guttenbrunn Group today



Key Data

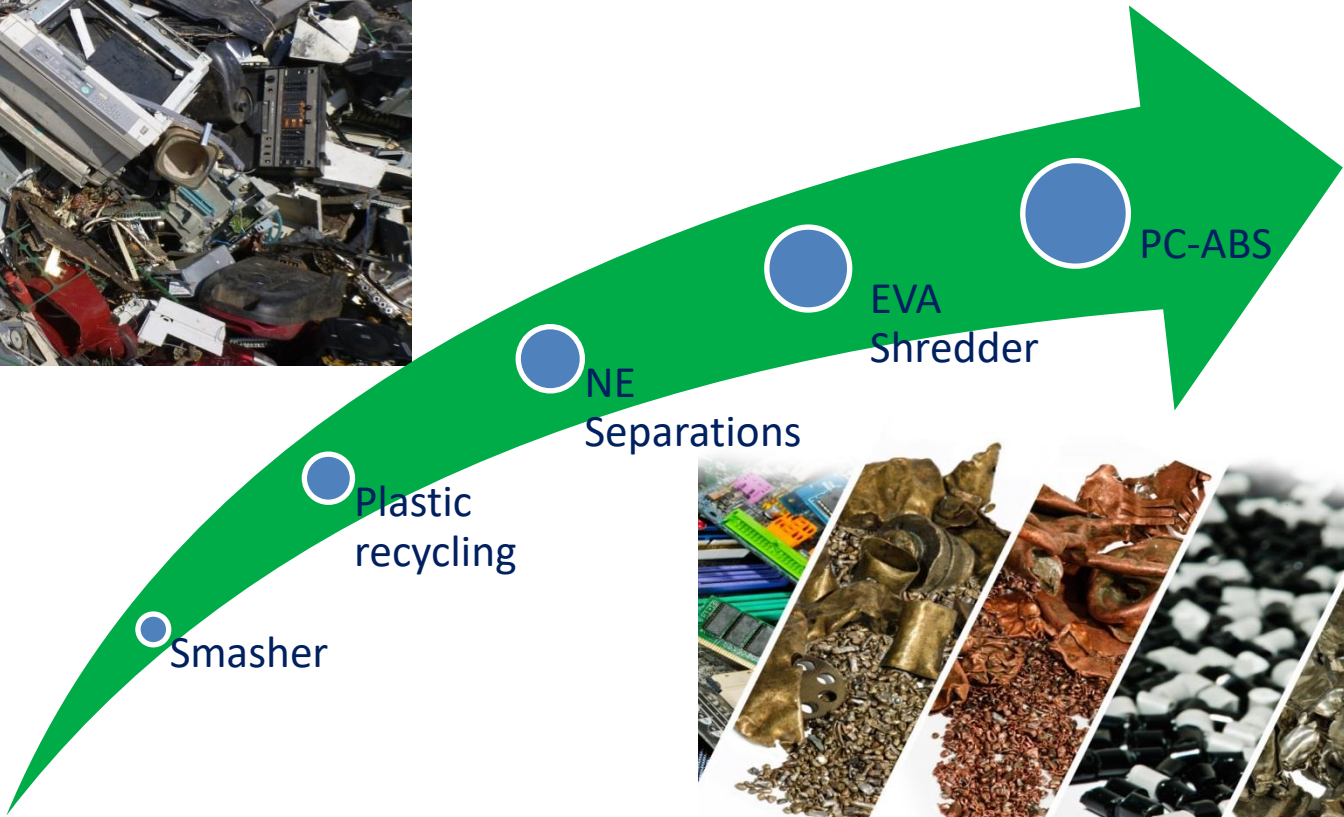
- ▶ Ferrous metals: 700.000 MT
- ▶ Non-ferrous metals: 100.000 MT
- ▶ Plastics: 50.000 MT
- ▶ Paper and carton: 25.000 MT
- ▶ WEEE Materials over 100.000 MT

- ▶ Shredders: 4
- ▶ Shears: 8
- ▶ Truck fleet: 130
- ▶ Work-force: 940
- ▶ **CO₂ Savings/Employee.Yr >1 500 MT**



CO₂ savings some 1 Mio MT vs primary materials

Five innovations in 15 years of WEEE Recycling



De-Pollution with the patented Smasher



The first generation Smasher 1.0



Invention 2004 - patented

The second generation Smasher 2.0



In service since the end of 2013

De-Pollution with Smasher 2.0



▶ MGG Patented “Smasher”

▶ Taking out

- **Hazardous components, such as**
 - Capacitors > 25mm
 - Batteries
 - Toner Cartridges
- **Valuable components, such as**
 - Printed Circuit Boards
 - Spools
 - E-Motors
- **Fractions disturbing further separations, such as**
 - Wood or other fibres



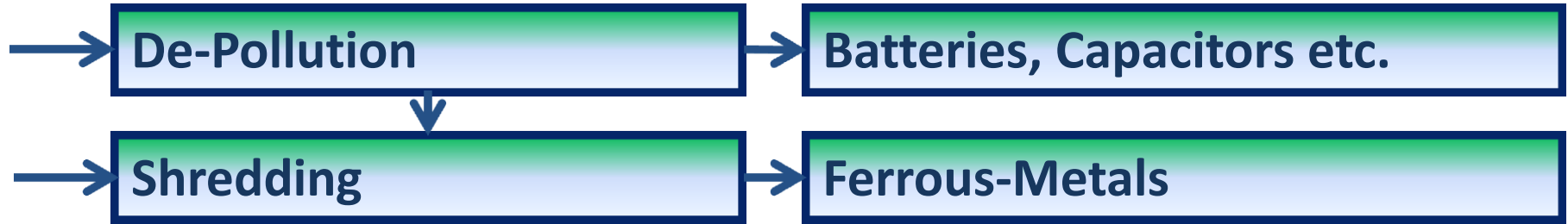
The de-pollution results with the Smasher 2.0

Small Domestic Appliances	per MT Input	in Kg/MT input	Cenelec Threshold Minimum
Spools and E-Motors	8,02%	80,22	
Printed Circuit Boards	2,49%	24,89	
Capacitors	0,19%	1,91	0,90
Toner Cartridges	0,05%	0,49	
Batteries	0,25%	2,54	1,80



Well in compliance with Cenelec CE Technical Specification EN 50625

WEEE recycling – shredding and ferrous metal recovery



Impressions of the building of the EVA shredder



An innovation that became operational February 2013

Technical data of the EVA shredder



- ▶ **Rated Capacity: 80 000 MT's/annum**
- ▶ **Power of the aggregate: 500 kW**
 - Grids both underneath and above the mill
 - Producer of Shredder: Albert Hoffmann – Germany
- ▶ **Innovations: low impact shredding & multistage magnets**



EVA Shredder, specialized for WEEE



▶ Shredding

- Extremely efficient air treatment and fire fighting techniques
- Very low noise shredding

▶ Separation of Ferrous Metals

▶ Shredder residues

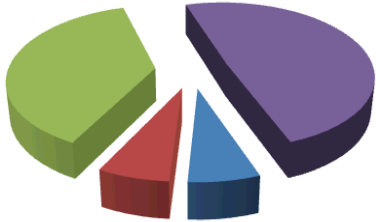
- Heavies
- Lights
- Dust fraction
- Clean air (approx. 2 mg/m³ dust)



The ferrous fraction from the EVA shredder

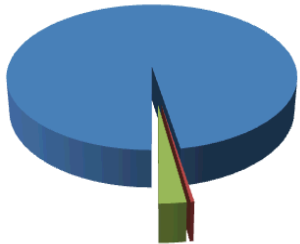
Particle size distribution HS-2

■ <5mm ■ >5 <10 mm ■ >10 <30mm ■ >30 mm



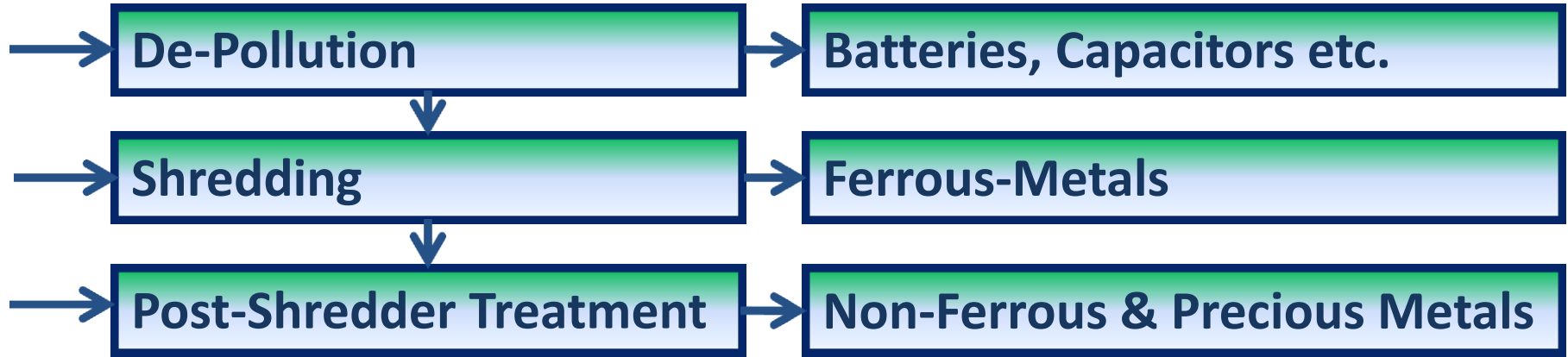
Iron scrap composition HS-2

■ Fe ■ Cu ■ Others



Free Copper < 0,15% (EFR Spec 0,25%)

WEEE recycling – non-ferrous metal recovery



Treatment of WEEE Shredder Residues

► Post-Shredder Technologies

► The dry and wet separation techniques consist of:

- Size (sieving)
- Density separations
- Induction
- Colour & other sensor based
- Surface to weight ratio's etc.

► Resulting in concentrates of

- Non-Ferrous Metals (Copper, Aluminium, Brass, Stainless etc.)
- Printed circuit boards
- Plastics



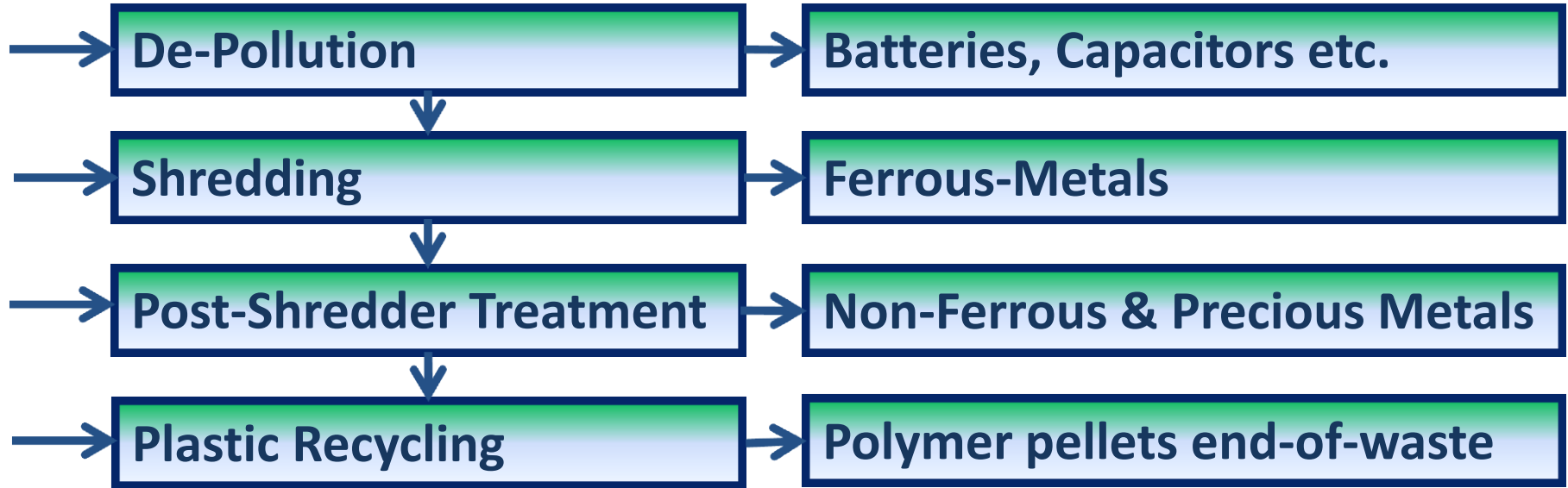
Metran's innovations are numerous



- ▶ **Highly efficient Heavy Media Plant**
- ▶ **Reduction of separation sizes from 5 mm to < 1.8 mm**
 - For copper even to almost dust
- ▶ **Introduction of several sensor based techniques**
- ▶ **Railway station on site**



WEEE recycling – PCR plastics recycling



MBA Polymers plant was opened in 2006



WEEE plastics recycling – MBA Polymers Austria



- Founded 2004 as JV
- Constructed 2005
- In operation since 2006
- Capacity 50 kMT
- PCR WEEE plastics
- ++News: since Jan, 1st ++
- MGG Polymers



COMMITTED TO
IMPROVING THE STATE
OF THE WORLD

TECHNOLOGY PIONEER 2006

MGG Polymers Plastics Recycling Goods-In Process



▶ Sourcing & Analyses

- Each receipt is assayed
- You cannot ID plastics by human eye

▶ Pre-processing – separation of

- Rest metals, printed circuit boards etc.
- Mineral fractions (Glass, Stones, Dust)
- Organic Fractions (Wood, Rubber, Fibres)

▶ Shredding to standardised flake-size



Input Material consists of 50 000 MT of WEEE Shredder Residues

Plastic recycling process MGG Polymers



▶ After pre-processing

- Pneumatic internal transport
- Basic separations
- High-tech separations

▶ After obtaining pure flakes

- Pure PP, ABS, HIPS and PC/ABS
- Extrusion Compounding to pellets

▶ End-Product is REACH and RoHS Compliant



MGG Polymers Austria is a high-tech plastics recycling plant

- ▶ **Analyses of all incoming loads**

- ▶ **Process Checks and Controls**

- ▶ **Product Quality Control**
 - Each Big Bag is checked
 - Physical and chemical analyses for REACH/RoHS compliance
 - Samples of batches are kept for 7 years



MGG Polymers is dealing both with waste and product legislations

Plastic recycling innovation

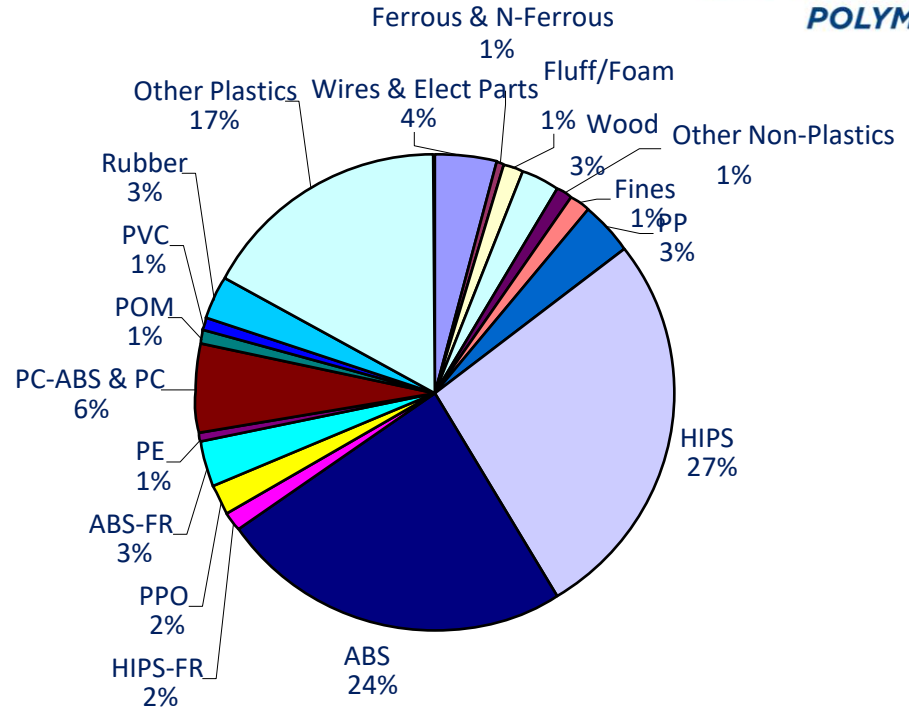


▶ Target plastics since 2006

- HIPS without BFR
- ABS without BFR
- PP

▶ Innovation 2016:

- PC and
- PC-ABS



PC-ABS as Post-Consumer Recycled material from WEEE – a world first

The Mass Balance Results of this recycling chain

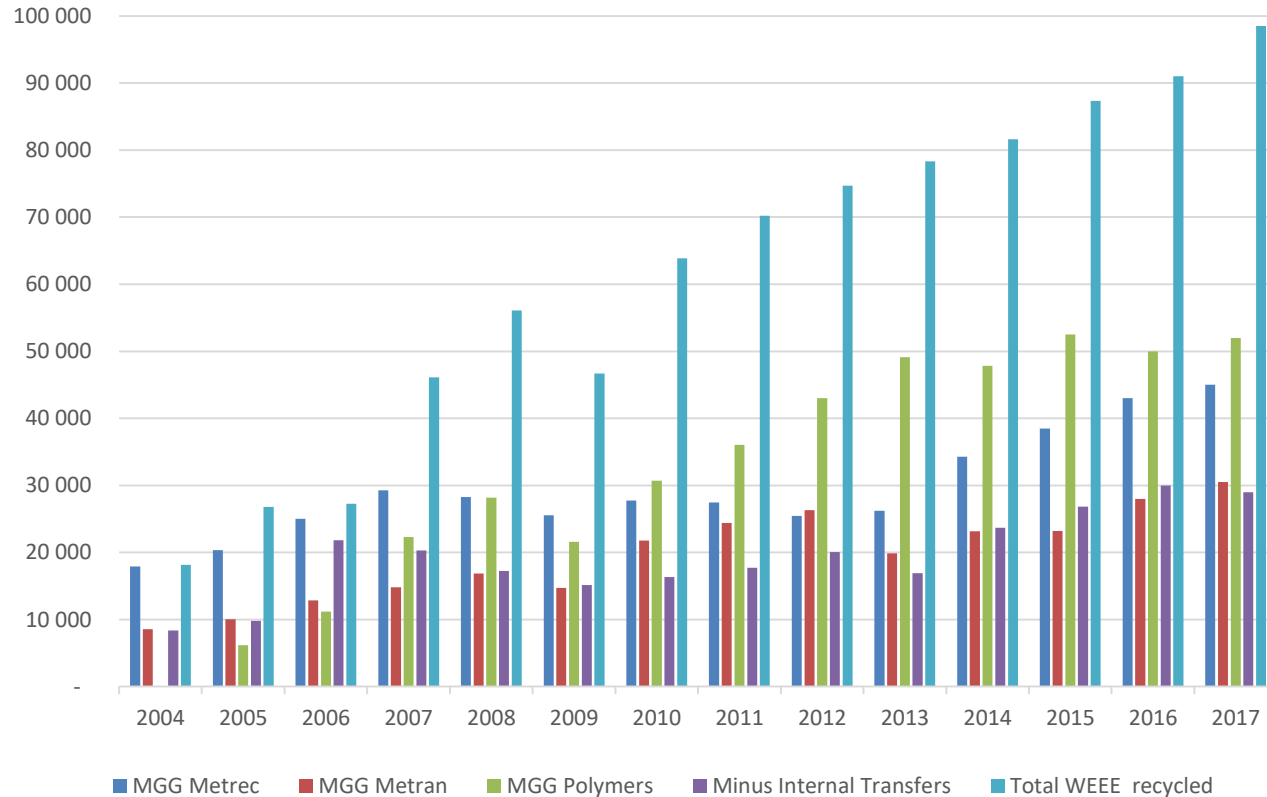
	per MT Input
Ferrous Metals	36%
Waste for energy recovery	21%
Copper	12%
Plastics	11%
E-Motors and Spools	8%
Aluminium	6%
Waste for disposal	4%
Printed Circuit Boards	2,49%
Batteries	0,25%
Capacitors	0,19%
Toner Cartridges	0,05%
Total	100%



Mass Balance	in %
Recovery rate	96%
Material Recycling	75%
Disposal	4%

Reaching well over the recycling & recovery targets set by EU for 2018

Development of the MGG WEEE volumes in Austria



WEEE Recycling in Austrian MGG companies some 100 000 MT