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# Role of collection systems and other approaches for improving paper recovery in Europe



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## Personal introduction



- Graduated Engineer (M.Sc. Forestry Dresden University of Technology)
- *Carreer history:* since 1998 INTECUS GmbH  
parallel job assignments (FP5-project "PAYT", LIFE+ "HEC-PAYT")  
at Institute for Waste Management and Contaminated Site Treatment  
Dresden University of Technology
- *Current position:* Partner and authorized signatory of INTECUS GmbH  
Senior consultant waste and resources management  
Key responsibilities: material flows, international co-operations



## INTECUS GmbH Waste Management & Environment-Integrating Management

*Established:* 1991 in Dresden/Germany

*Founder:* Prof. Dr.-Ing. Bernd Bilitewski

*Profile:* **Consulting, planning** support and **research** activities with the focus being **Waste** and **Environmental Management**

*Activity record:* nearly **500 projects** in about **25 countries**

*Further details:* [www.intecus.de](http://www.intecus.de)

## INTECUS service offer

Concepts and policy support for environmentally benign waste and resources management

Waste collection systems and logistics management

Steering instruments and waste management financing

Landfill construction, remediation and aftercare planning

Material flow analyses and management

Basic design engineering, support in plant permitting, startup and optimization support for waste management facilities

Waste-to-Energy concepts and services

Industrial waste management and cleaner production concepts

Research and resource efficiency studies

International waste management co-operation and technical assistance



## PFR sources

**Pre-consumer paper**

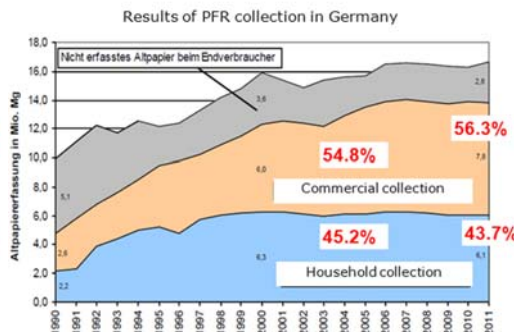
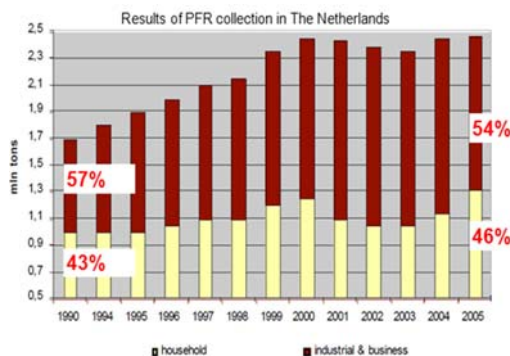
**Post-consumer paper**

Used paper sources	Used paper quantity	Used paper quality	Uniformity of material
<b>Converter and printers</b>	Considerable, large at single source	Medium to high	High
<b>Industry and trade</b>	Considerable, large to medium at single source	Medium to high, mainly corrugated	Medium
<b>Administration and offices</b>	Medium, medium to low at single source	Medium to high, mainly graphical	Medium
<b>Households</b>	High, low at single source	Low to medium	Low to medium, influenced by collection offers

## PFR collection by sources

By 2000 CEPI had established that

- 52% of the collected PFR come from trade and industry sources
- 10% from offices
- 38% from households



### France

- 67% from industry and business (including 11% from offices)
- 33% from households

Our investigations for CEPI in 2013 came to the result

- 54% of the collected PFR come from trade and industry sources
- 11% from offices
- 35% from households

## PFR collection arrangements in CEPI area

1. Please indicate by ticking the corresponding boxes the kind of schemes that can generally be found in your country for collecting used paper									
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bundles, sacks or quantities that are otherwise loosely provided by used paper generators and collected under municipal service schemes from the kerbside	Bring banks (large sized containers placed publicly accessible in the city) under control of the local waste services	Reception points (such as staffed recycling yards or collection and reprocessing depots) at which can be returned different kinds material or where used paper and perhaps other discards are taken back (even for a payment)	Bins or container which are allocated to households or buildings specifically for source-separated paper collection	Informal collectors or private vendors who frequently pass by to ask for/pick up or even buy back the used paper (or special qualities) currently at hand	Service firms or vendors who regularly pick up used paper on request (by call) or on an individual contractual basis	Reverse collection from logistic firms or suppliers in the course of or in exchange for new deliveries	Firms specialised on data destruction, i.e. secure document pickup, shredding and disposal	Single stream commingled collection of different dry recyclables inclusive used paper and paper products	Waste pickers sorting out paper from landfilled waste

Pickup	Bring	Bring	Pickup	Pickup	Pickup	Pickup	Pickup	Pickup	other
HH	HH/TI	HH/TI	HH/TI	HH	TI	TI	TI (O!)	HH/TI	-
rare	very often	often	often	very seldom	very often	often	often	rare	very seldom
	X	X	X		X	X			

PFR is no longer a waste but more and more a source of income (for TI)



## Some impressions from Europe



*Separate collection pilot Ukraine*



*Drop-off arrangement Hungary*



*Drop-off arrangement Poland*



*Drop-off arrangement Greece*



*Drop-off arrangement Spain*



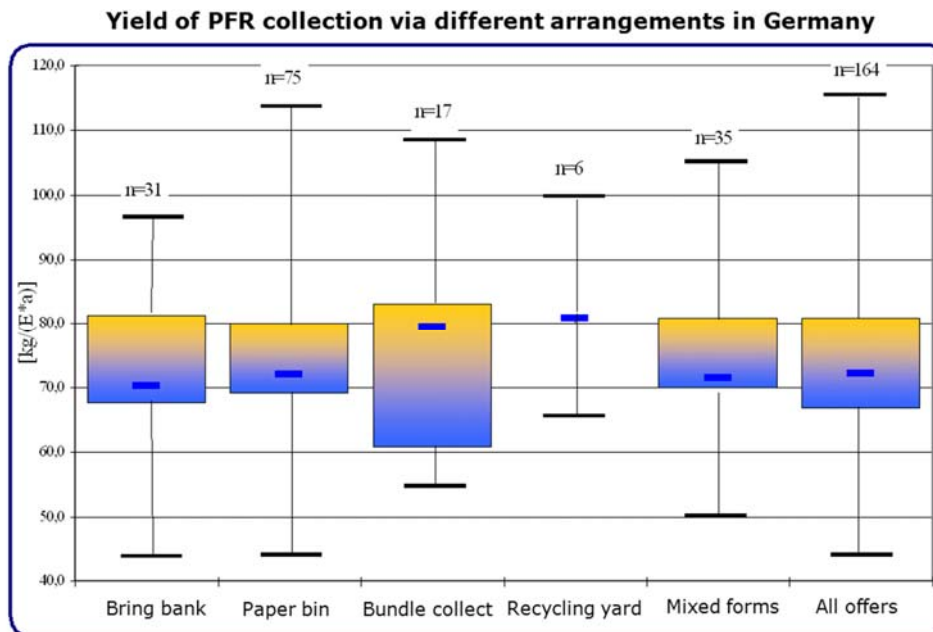
*Drop-off arrangement Valmiera, Latvia*

## How does this relate to collected PFR quantities and quality?

### The experiences from Germany

## Impacts on collected quantity

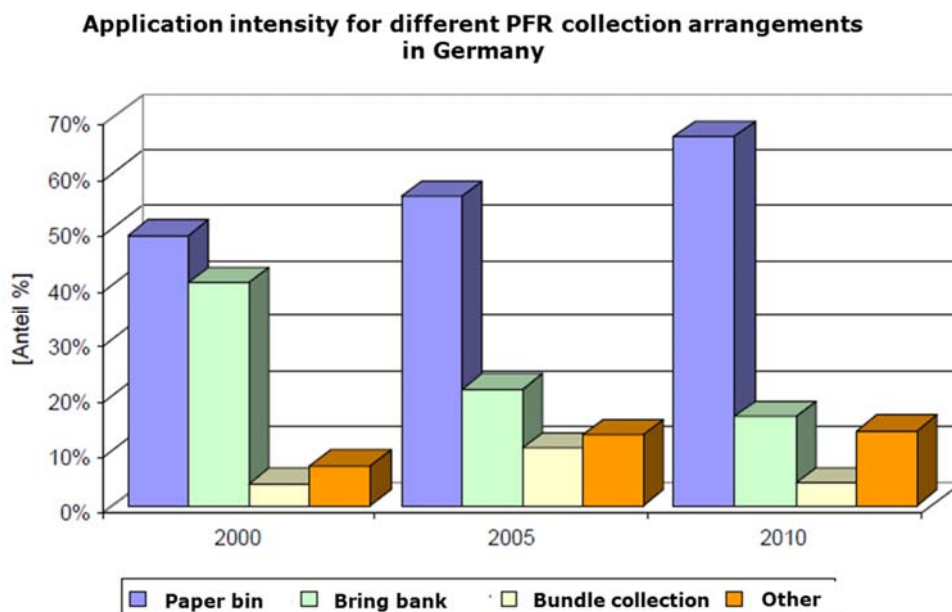
- Findings from system analyses in Germany



- Choice of collection arrangement changes little on recovered quantity
- Other factors are more influential
- Urban structure differences can hardly be seen

## PFR collection trends

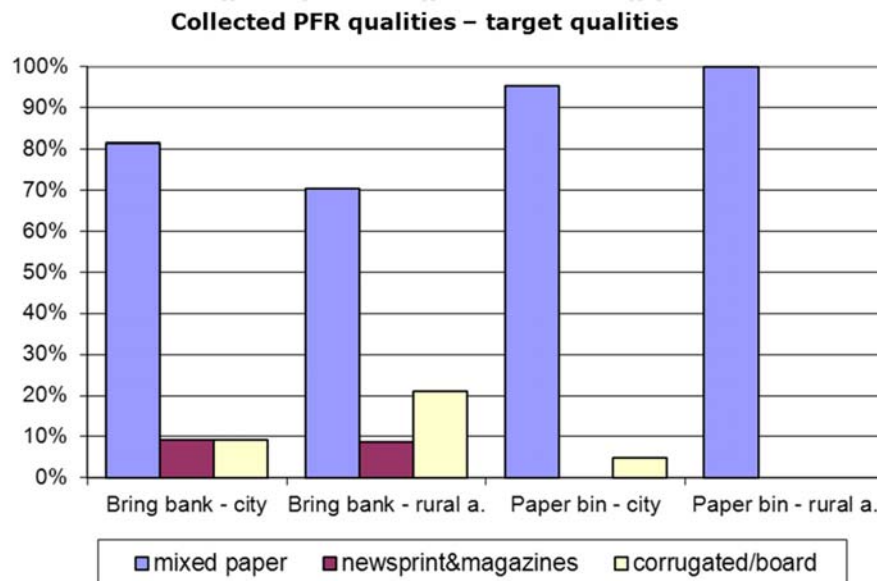
- The German case (by arrangement)



- Use of paper bin has significantly increased
- The motivation of municipal authorities to engage in a separate collection by paper grades is shrinking
- Commercial vendors step in

## The impacts on quality

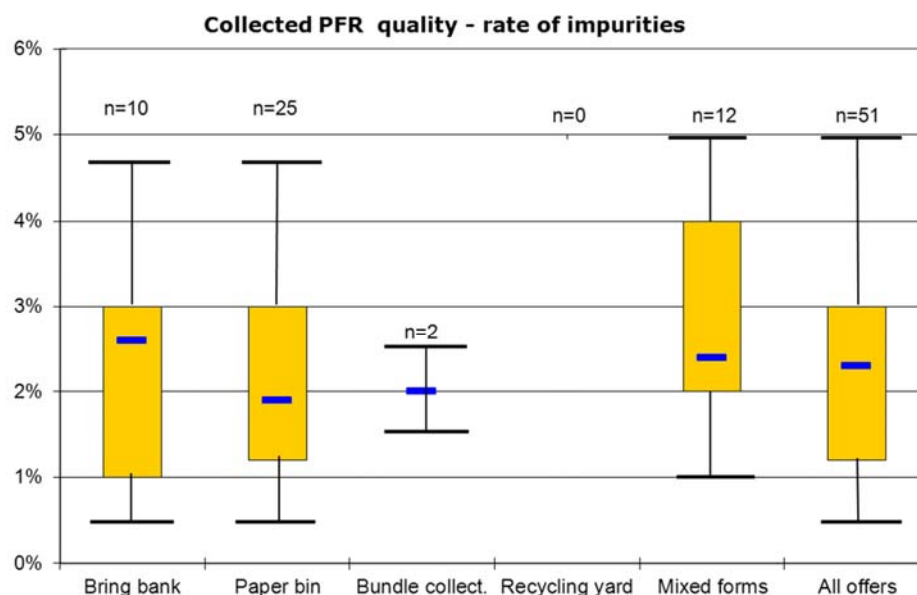
- Findings from system analyses in Germany



- Collection systems for a mix of PFR are by far dominating
- Only very few authorities offer systems for the differentiated collection by quality (this trend has been strengthened thru the massive introduction of paper bins over the last years)

## The impacts on quality

- Findings from system analyses in Germany



- Average rate of impurities over all arrangements is 2.3 M.-%, *[this is probably a German phenomenon!]*
- Bundel collection and recycling yards are known to have the best results
- Bring bank and paper bin in the same range, 0.5 % lower impurity rate in paper bin **is the past!!**

## The impacts on quality

- Findings from arrangements for mixed PFR in Germany

System	Share of paper & board packaging [%]			
	< 100,000 inhab.		> 100,000 inhab.	
	Scattered structure	Densified structure	Scattered structure	Densified structure
Paper bin	27	22	21	28
Bring bank	29	29	29	29
Bundle collection	31	30	32	29

- Lowest content of paper based packaging in the paper bin
- Bring bank and bundle collection with significant higher proportion of paper based packaging
- The likely reason is the overproportional use of this arrangements by business units (i.e. shops)

## Differentiated collection by quality

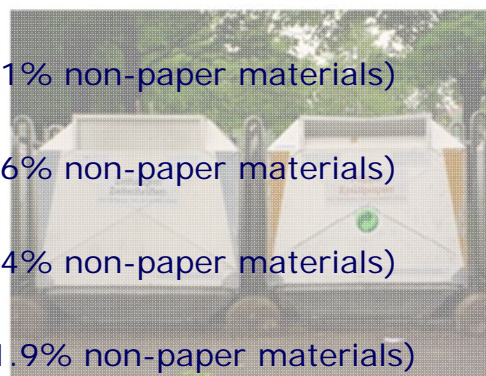
- Findings from arrangements for graphical PFR in Germany

Recycling yard: 99.5% graphical  
0.5 % undesired (of which 0.1% non-paper materials)

Bundle collection: 97.5 % graphical  
2.5 % undesired (of which 0.6% non-paper materials)

Bring bank: 96.6 % graphical  
3.4 % undesired (of which 0.4% non-paper materials)

Paper bin: 82.3% graphical  
17.7 % undesired (of which 1.9% non-paper materials)



Yield from the mixed collection:



Paper grades	Min share	Max share
Graphical and higher	57.0%	83.1%
Packaging paper and board	13.8%	39.7%
Wall paper	0.4%	4.8%
Non-paper materials	1.6%	3.6%



## What else can be derived from our studies ?

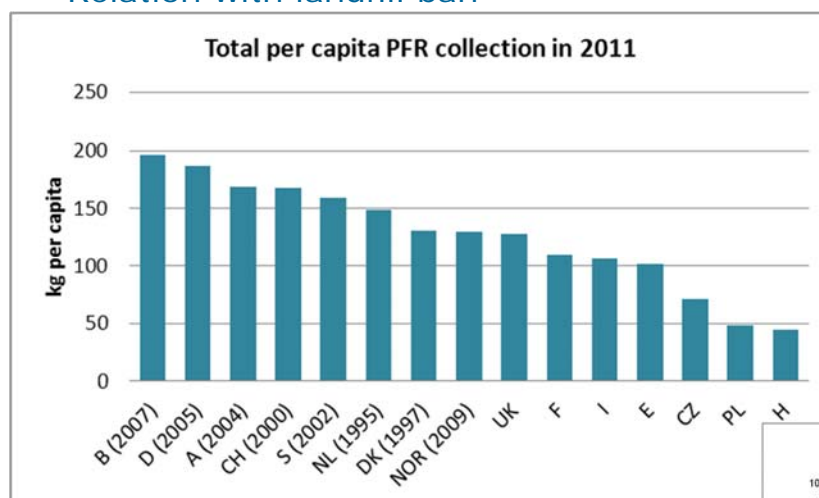
### Some lessons for Europe

*Among others, what can be done to avoid this from happening...*



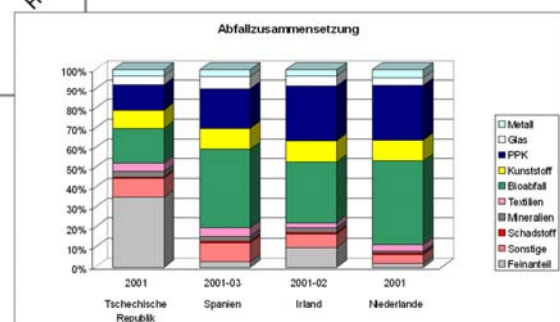
## Policy measures are important

- Relation with landfill ban



Note: year of landfill ban enforcement in brackets

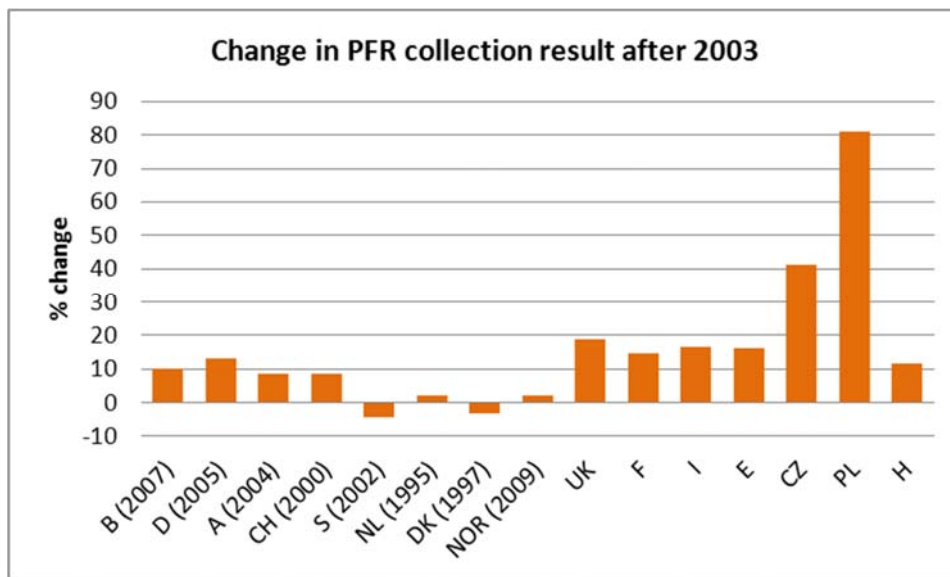
- Countries with landfill ban in place with the best results in PFR collection
- PFR availability at source must of course be taken into consideration





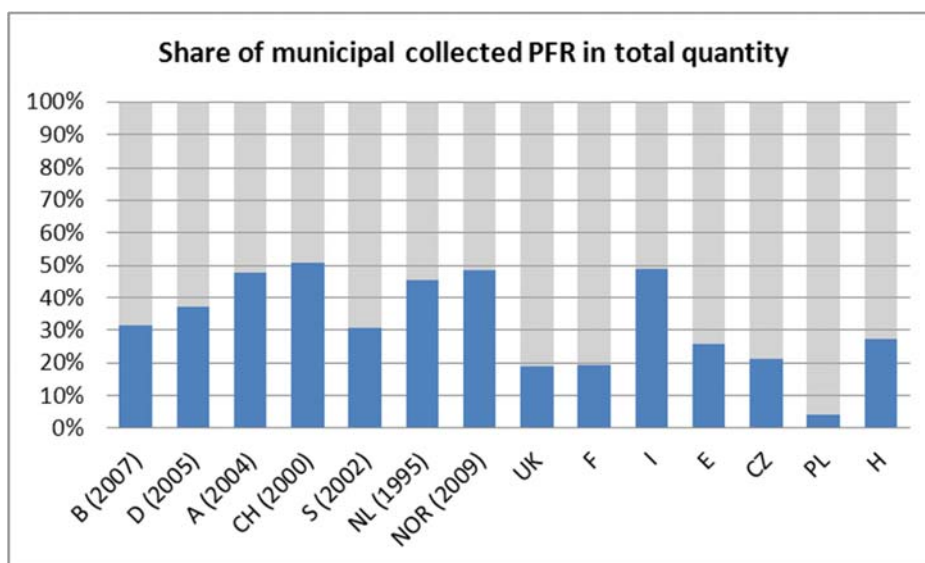
## Package of measures is needed

- Policy as a stand-alone solution with limited success



- Leading countries in average with only 5% growth of PFR collection in 8 years (and after the enforcement of landfill ban)
- Other countries with in average 29% growth
- However, much for the high recovery in the leading countries was done earlier and achieved by a package of measures

## e.g. infrastructure investments



- Strength of the leading countries is, among others, the municipalities investment into collection
- Leading countries obtain in average 38% of PFR from municipal collection
- Average of PFR from municipal collection in other countries reaches 24% only

## e.g. infrastructure investments

- Convenience and diversity of collection offers is crucial



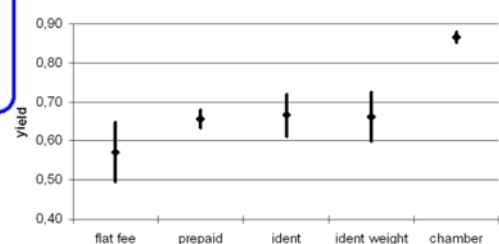
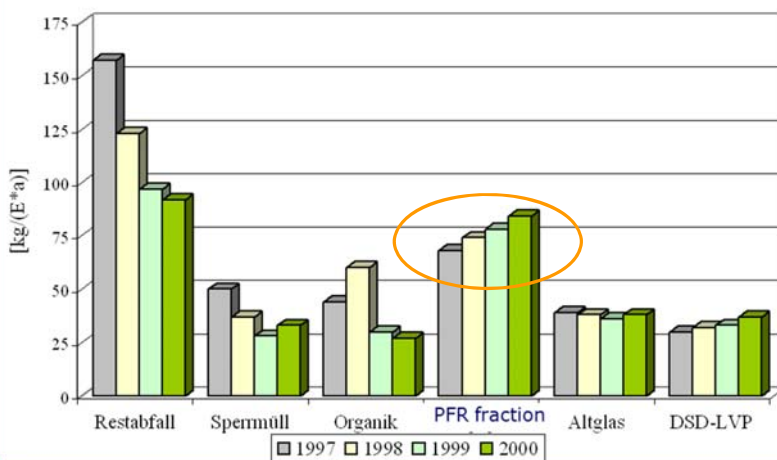
Impression from  
Ljubljana/SLO



## e.g. application of economic instruments

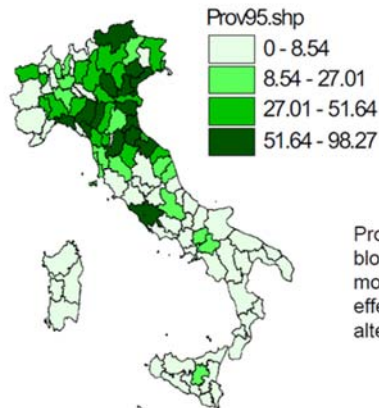
- Differentiated waste fees or Pay-as-you-throw

Development of collected waste fractions following the introduction of a weight based tariff in a German county



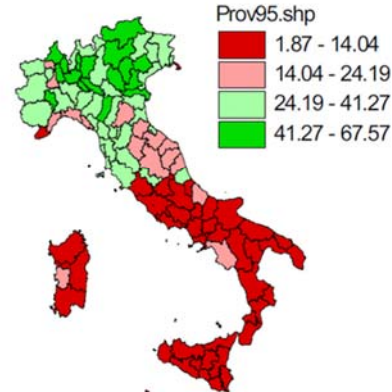
## Financial incentives have strong effect – Example Italy

Population covered  
by tariff, 2005 (%)



Processo  
bloccato? Quali  
motivazioni Quali  
effetti? Direzioni  
alternative?

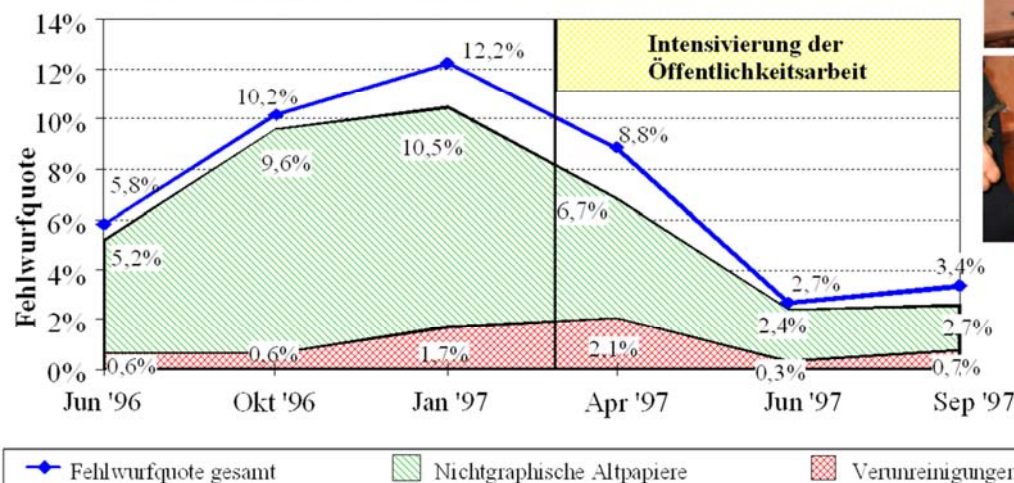
Separately collected waste  
2005 (%)



Graphic source: Massimiliano Mazzanti  
University of Ferrara & CERIS CNR Milan, 2010

## e.g. effective public education and information

**Fehlwurfquoten in Behältern MGB 1,1 m<sup>3</sup>  
für Zeitungen/Zeitschriften in Eisenhüttenstadt**



photos: SSI Schäfer



## The package of measures – Example Flanders in Belgium

### Waste management in Flanders: Policy & Tools Municipal Solid Waste (MSW) collection

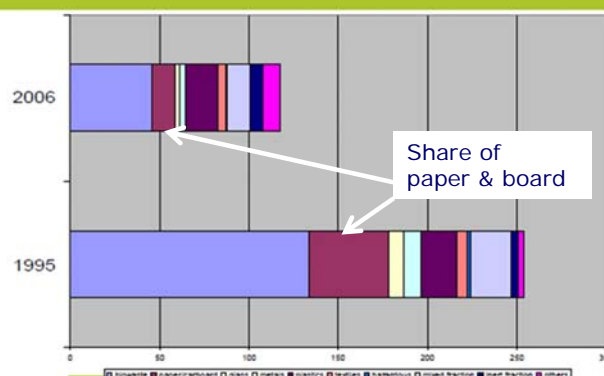


### Waste management in Flanders: Policy & Tools Waste Prevention: Financing MSW collection

Municipalities finance their waste services by imposing fixed tax (yearly) and cash tax on the residual waste (Pay-As-You-Throw, PAYT).

Combination of a fixed tax and a PAYT tax reduces residual waste.

### Waste management in Flanders: Policy & Tools Waste Prevention: Composition of the residual waste bag



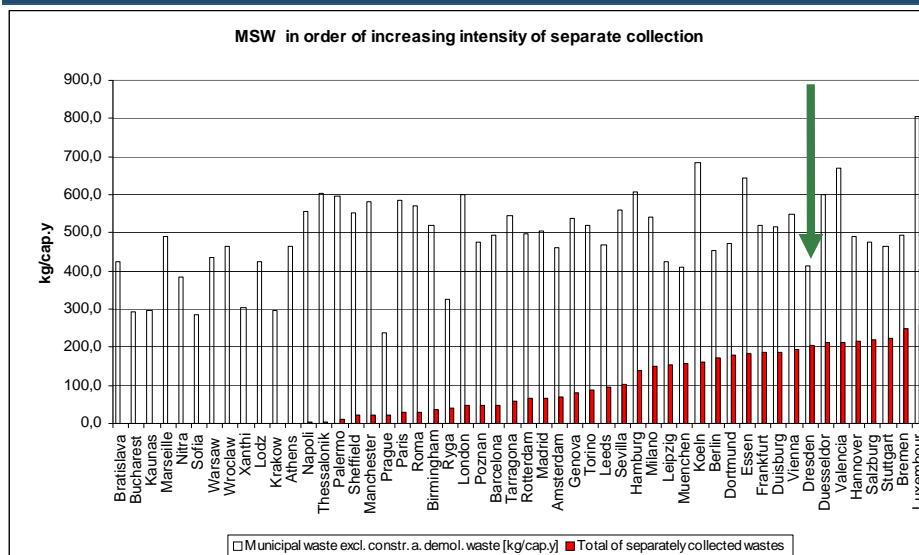
Graphic source: Anne Vandepitte  
Public Waste Agency of Flanders (OVAM)

## Do we have practicable targets?

Recyclable MSW fraction	Potential Kg/cap.y	Separately collectable quantity <b>Target</b> Kg/cap.y	Separately collectable quantity <b>Optimum</b> Kg/cap.y
Paper and cardboard	110	50	83
Glass	44	22	30
Plastics and compounds	60	19	39
Bio-bin collected organics	160	35	82
Sum	374	126	234

The target values are no theoretical constructions. They are average or optimal values of citygroup 1. Day-per-day practice in 1/3 of the 55 European cities .





Contemporary municipal  
waste collection systems



## Present where SWM-innovation is at home

WtE-plant Lautau



Gröbern landfill



Biogas plant Radeberg



MBT Dresden



## Providing know how that really helps

Bewährte Verfahren zur kommunalen  
Abfallbewirtschaftung

**Best Practice Municipal Waste  
Management**

Meilleures pratiques en maîtrise des déchets des  
communes

Испытанные методы муниципального  
менеджмента отходов

Gefördert durch  
Funded by



Erstellt durch  
Produced by



Informationssammlung über Ansätze zur  
nachhaltigen Gestaltung der kommunalen  
Abfallbewirtschaftung und dafür geeignete  
deutsche Technologien und Ausrüstungen



Information pool on approaches towards a  
sustainable design of municipal waste  
management and supporting German  
technologies and equipment



Observatoire des solutions durables pour la  
maîtrise des déchets des communes, des  
technologies et des équipements allemands



Информационный сборник по подходам к  
устойчивой организации муниципального  
менеджмента отходов и подходящим  
немецким технологиям и оборудованию



## Information tool "Best Practice Municipal Waste Management"

**Thank you for your attention**

Hálásan köszönöm a figyelmet



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