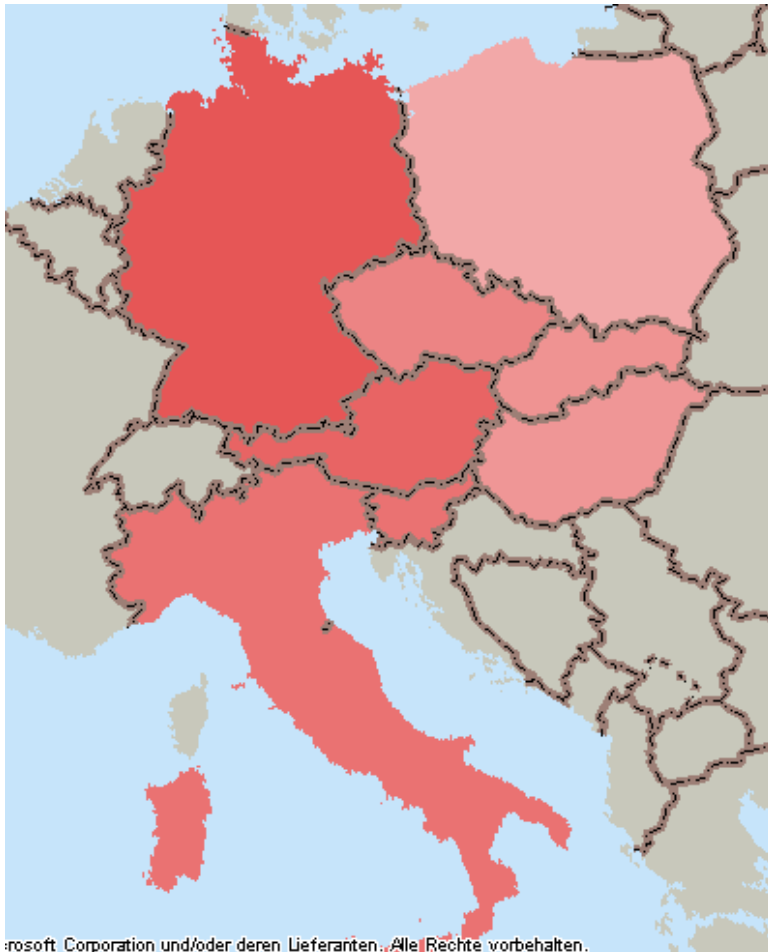


WP 4 – Improve Collection Strategies

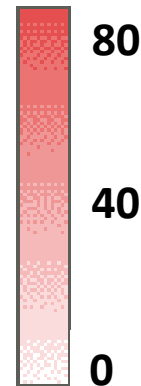


Harald Grossmann, Roland Zelm, Anja Groß, Sofia Guerrero Mercado, Nguyen Trung Cong

Current p&b recycling rates in CE



recycling rate in %



$$\text{recycling rate \%} = \frac{\text{pfr}^* \text{ collection}}{\text{p\&b}^{**} \text{ consumption}} \times 100 \%$$

*p&b = paper & board

**pfr = paper for recycling

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WP 4 – Improve Collection Strategies

The focus of WP4 was on pfr collection from households

The objective

was to develop recommendations for improving existing or initially installing collections systems taking into account all major local and regional principal variables crucial for the success of the effort.

Content

- ➔ **Stakeholders' areas of conflict**
- ➔ **Conclusions for better collection strategies**
- ➔ **Recommendations**
- ➔ **Tool for decision finding**

Stakeholders' areas of conflict

Areas of conflicts

Paper Mills
- **Quality** -

Pricing

Municipalities as decision maker.
- **Quantities** -

Open
market



Contracting

Quality
standards

Legislation

Investment
costs

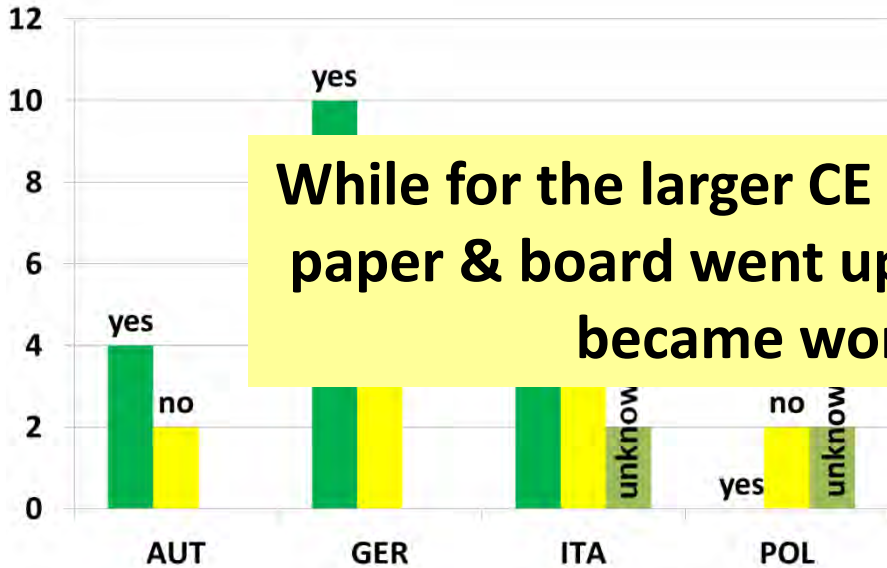
Municipalities
- **Quantity** -

**Waste
Management**
- **Profitability** -

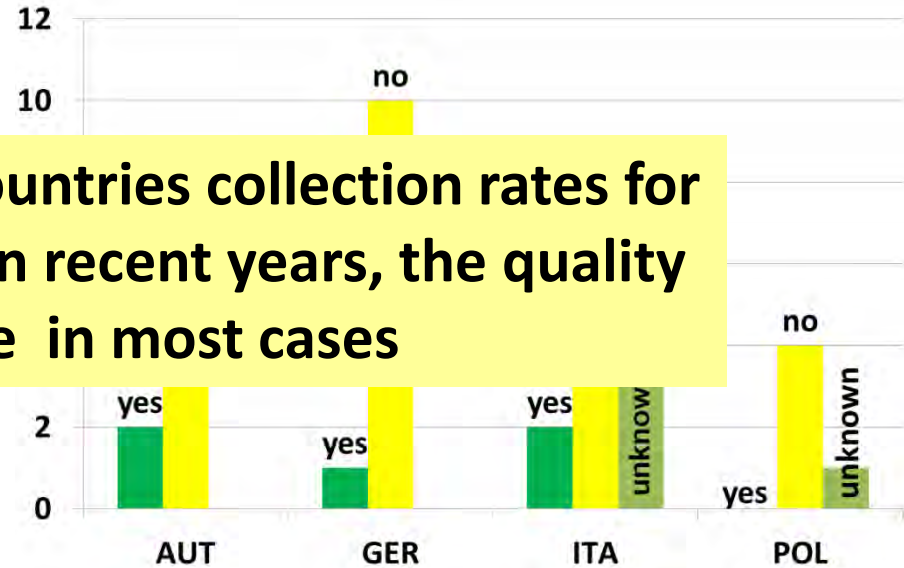
Survey on Collection Strategies: Changes observed in recent years

n = number of answers from local authorities

n increasing collection rates



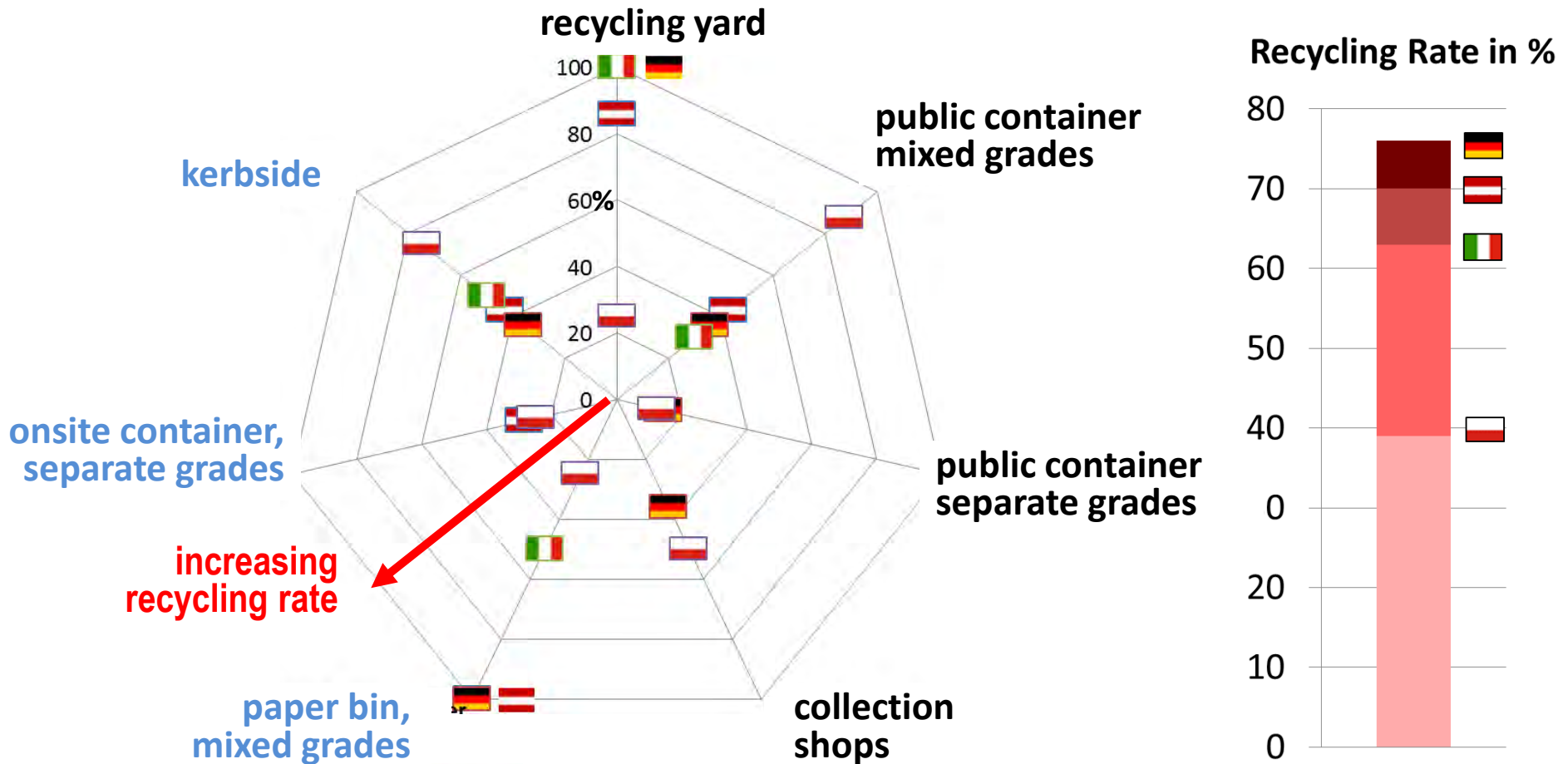
n improving quality



While for the larger CE countries collection rates for paper & board went up in recent years, the quality became worse in most cases

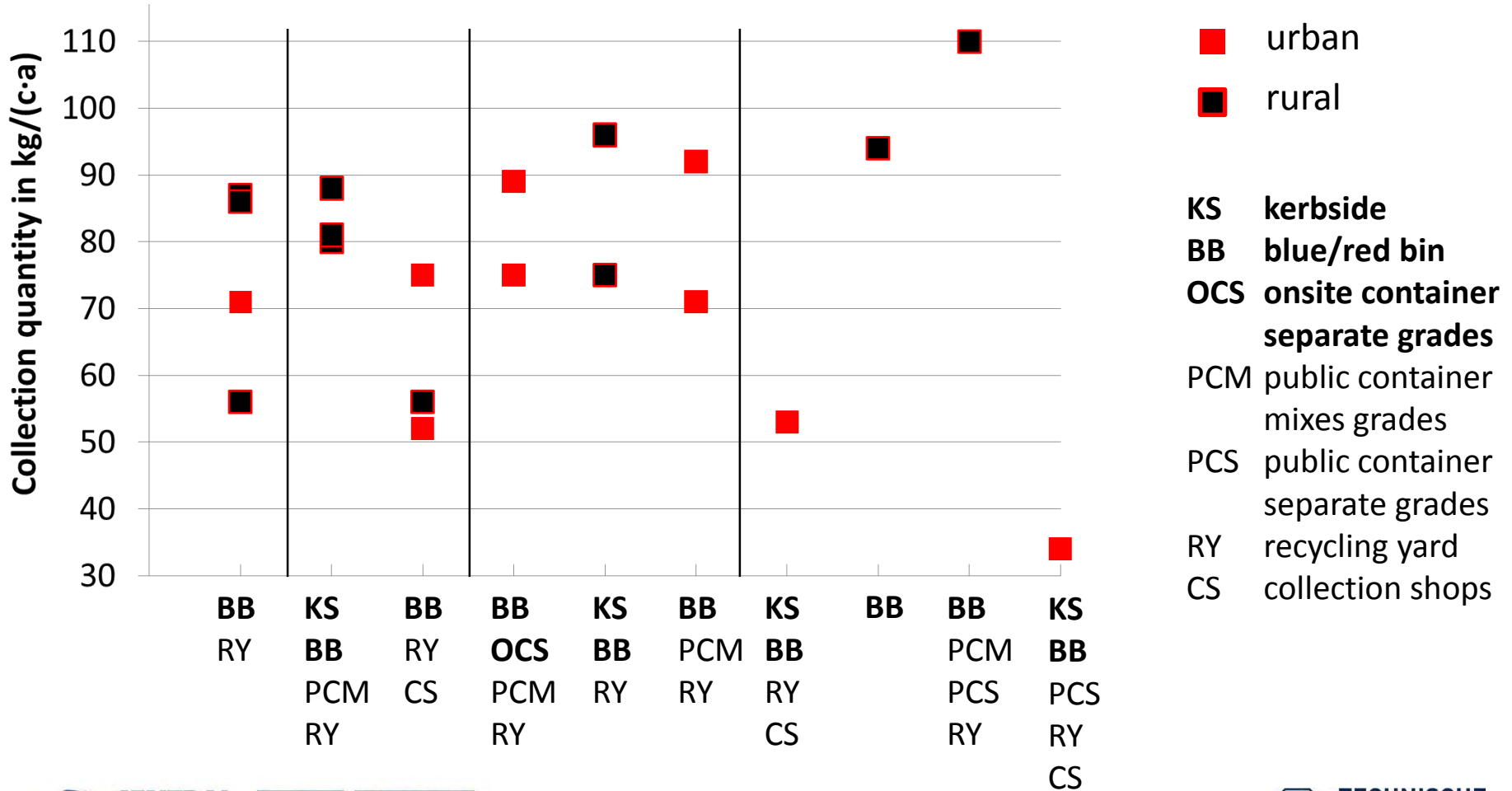
Correlation between collection system and recycling rate

39 responding authorities, data from AUT + GER + ITA + POL



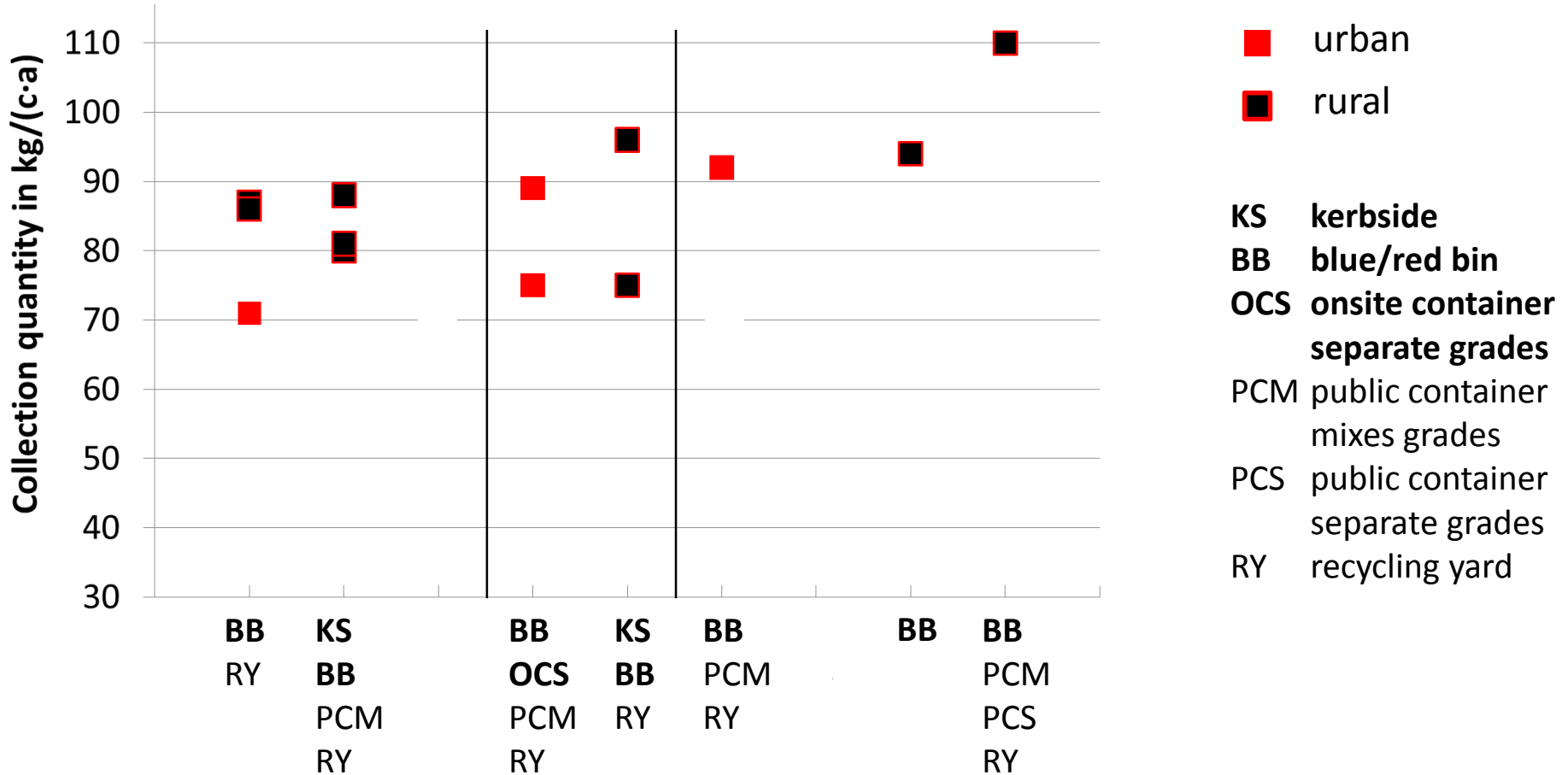
Correlation between type of collection systems and quantity

20 responding authorities, data from AUT + GER

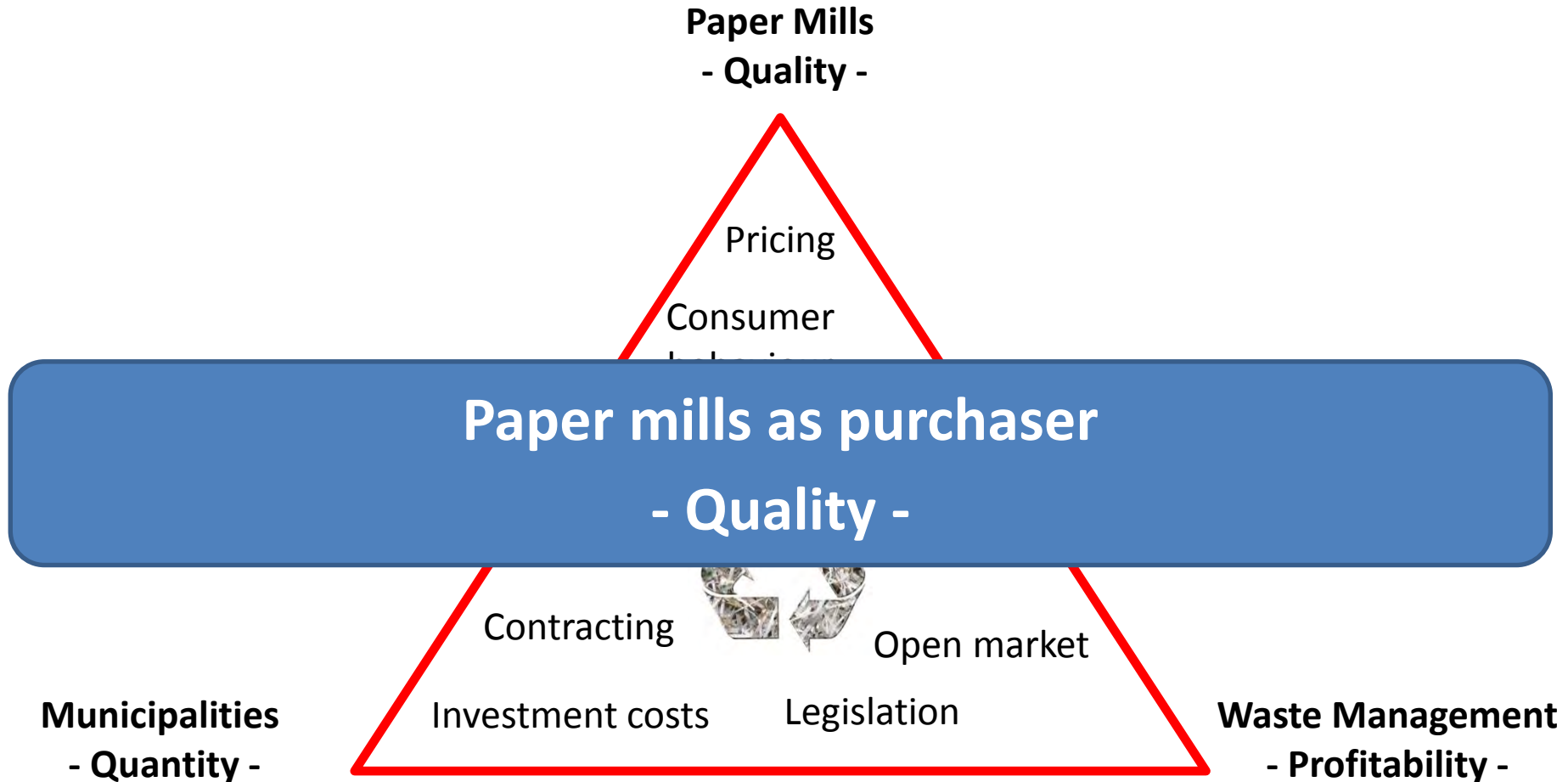


Correlation between type of collection systems versus quantity

elimination of collection shops and low GDP, data from AUT + GER

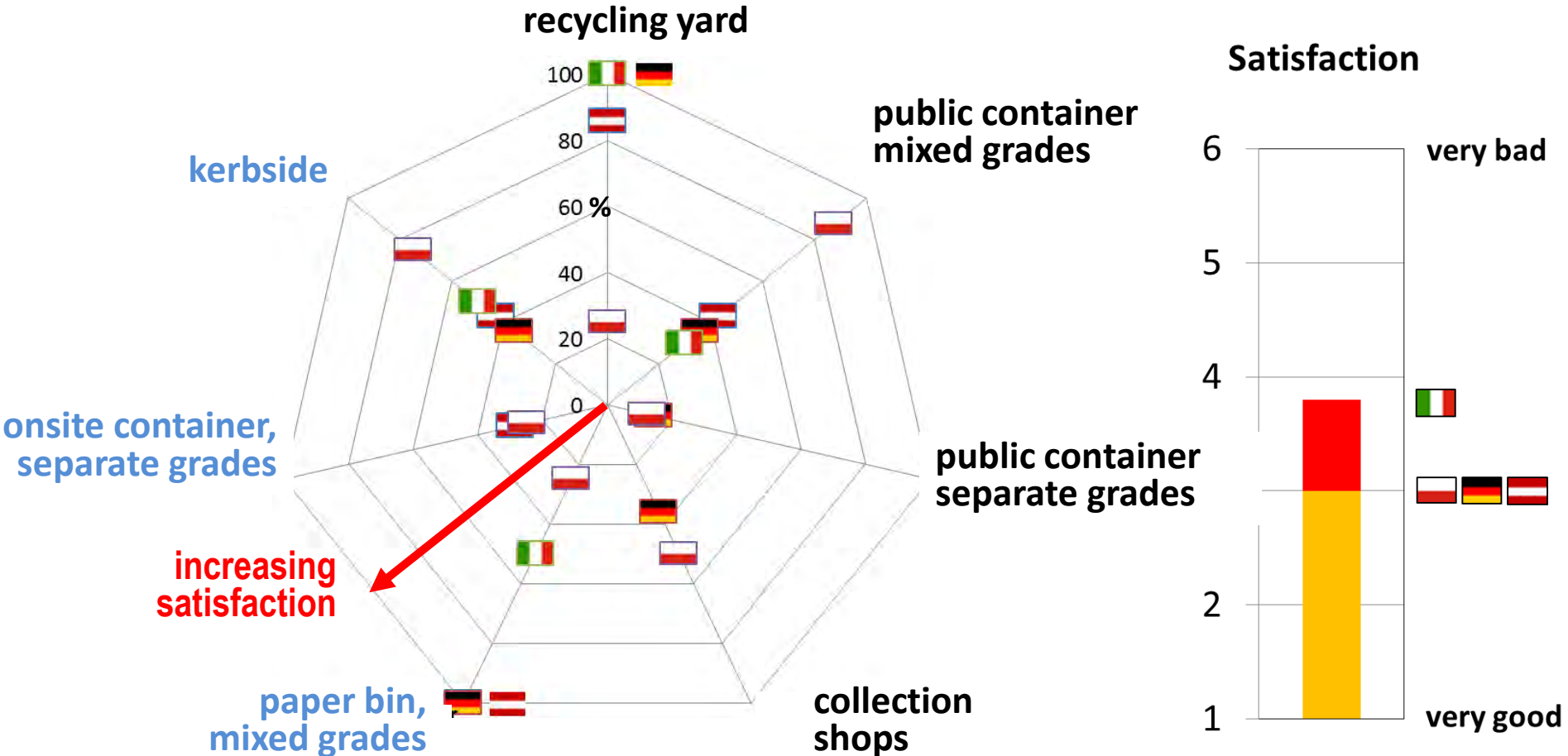


Areas of conflicts



Type of collection system versus satisfaction of paper mills

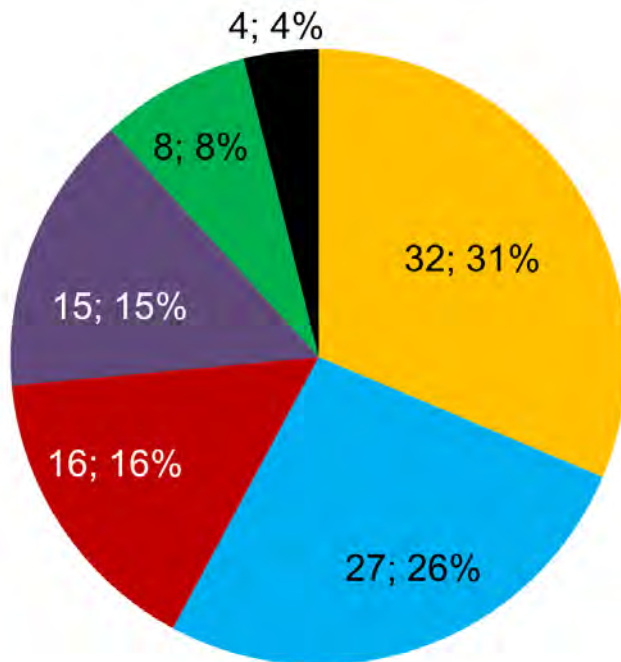
39 responding authorities, 41 responding paper mills, data from AUT + GER + ITA + POL



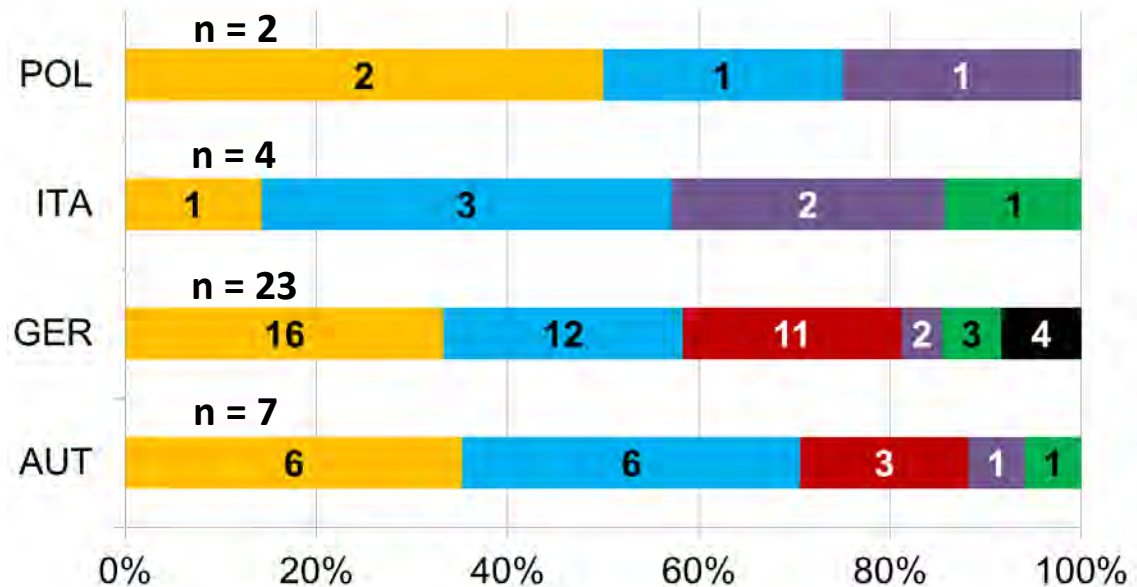
Type of problems with pfr

n = number of responding paper mills, multiple answers possible

CE data, n = 48

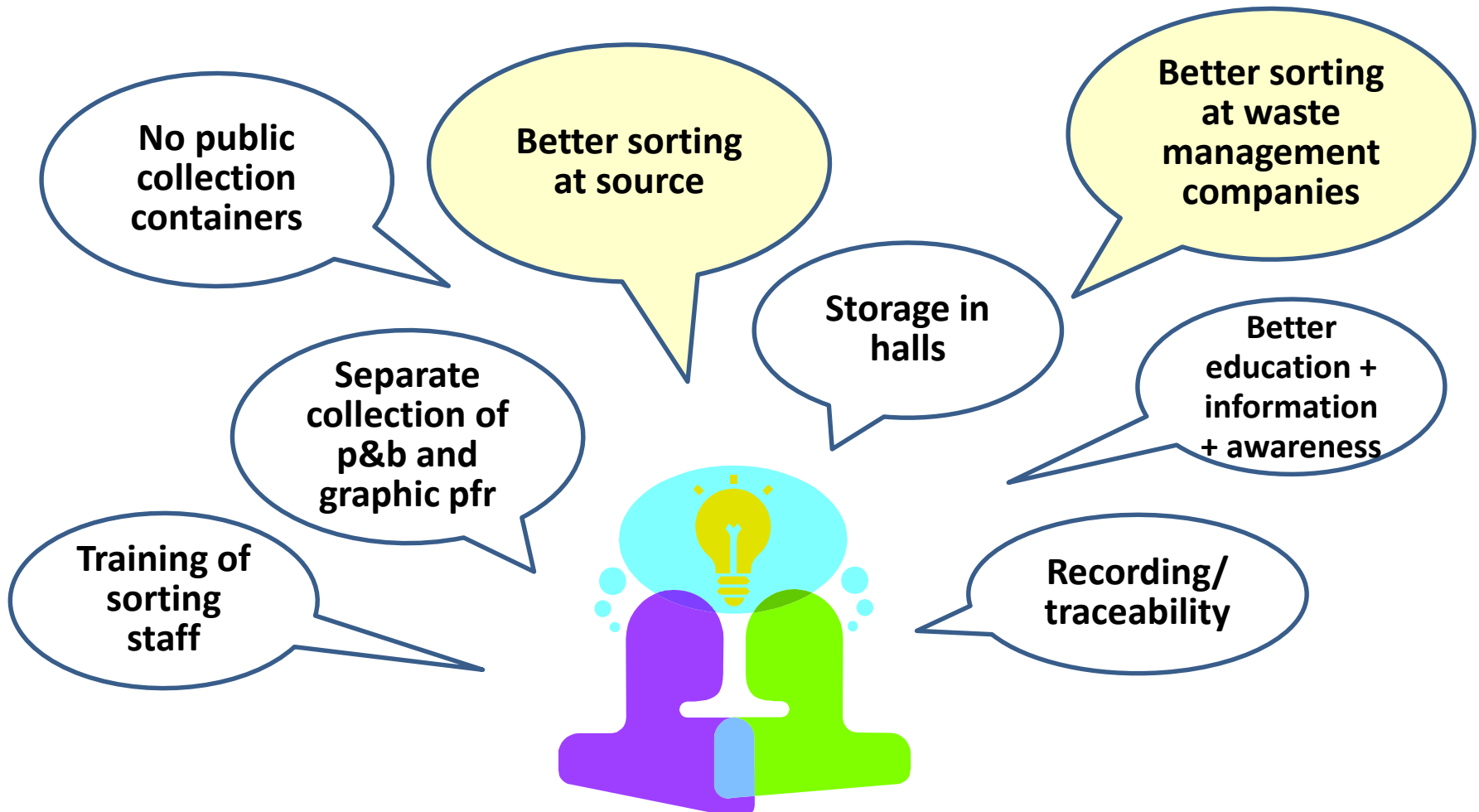


Data by selected countries

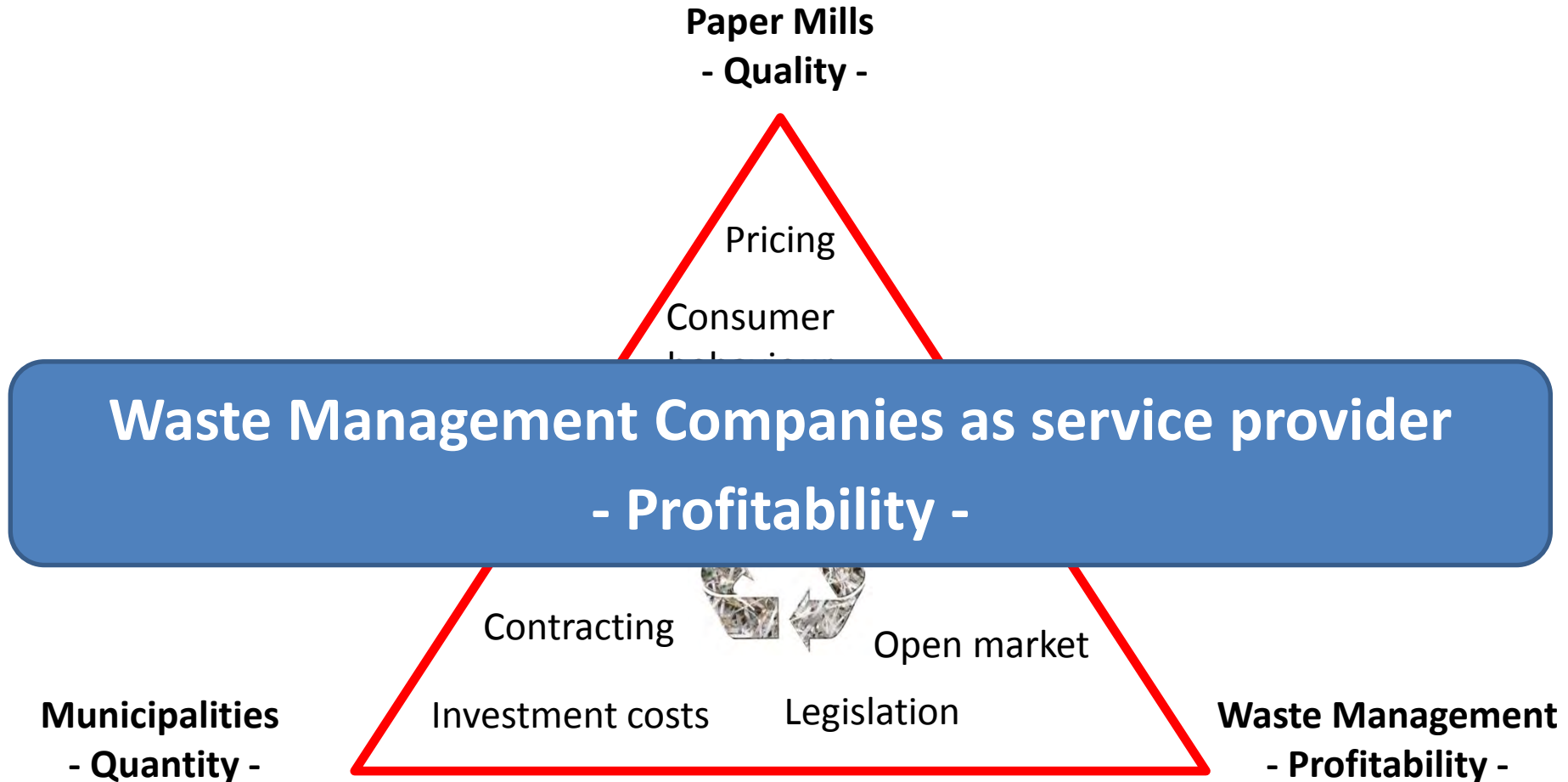


- Unusable materials
- Non-paper components
- Undesired papers
- Paper properties
- High moisture content
- Other



Ideas from paper mills to improve pfr collection



Areas of conflicts

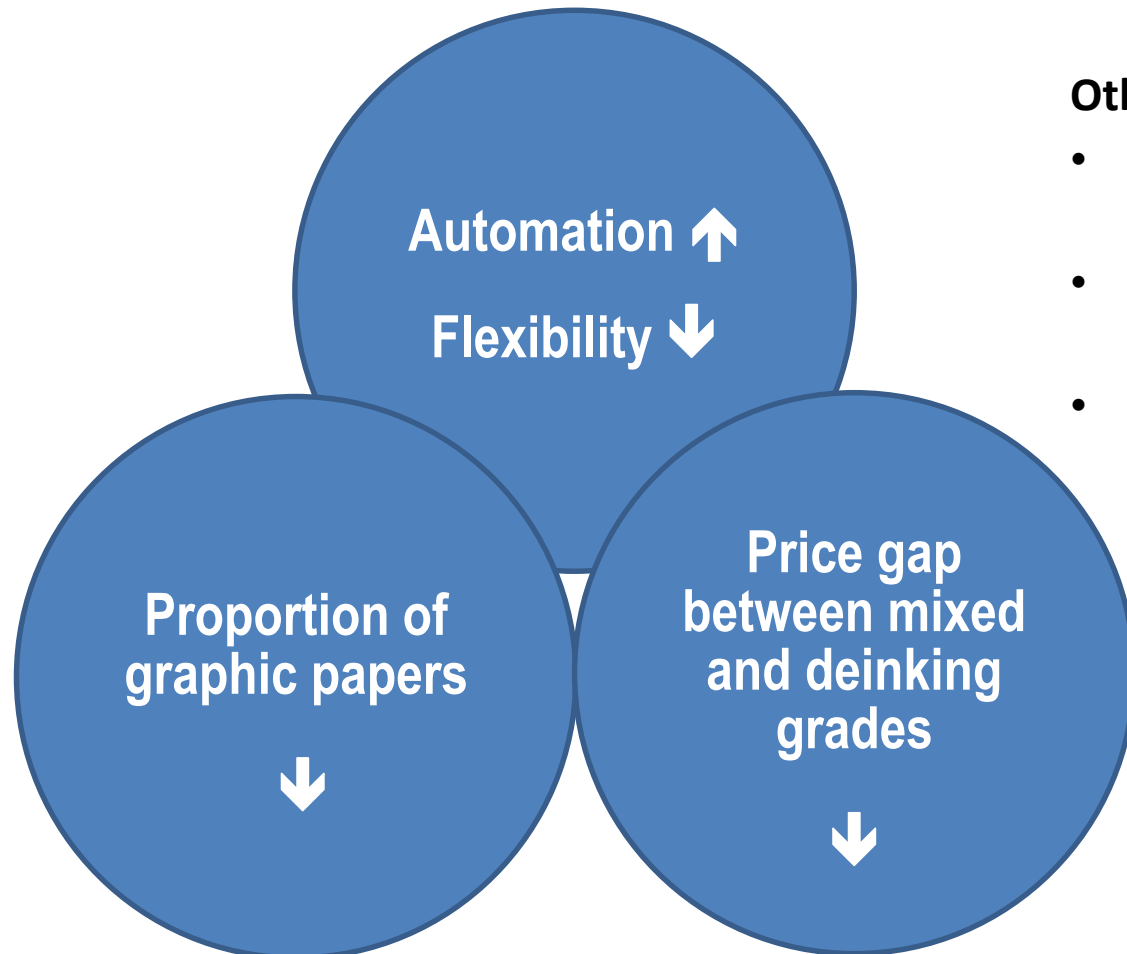


Statements concerning economic aspects of collection & sorting, Germany

		 <p>Source: WUB</p>
Examples from:	Berlin, automatic sorting plant (state of the art)	
Collection	area determined by costs for logistics	
Profitability	largely depending on external factors	
Quality	little undesired material sorted pfr: visual good quality for paper mills	

*Source: <http://www.mario-czaja.de/2014/03/gemeinsam-am-blaue-tonnen-problem-arbeiten/>

Challenges for waste management industry in Germany



Other facts:

- Short contract durations with municipalities
- Strong competition results in small margins
- Additional competition by paper mills (contracts between paper mills – local authorities)
 - (Increasing thefts and frauds)

=> Poor to non existing planning security

Challenges for waste management industry in Poland



Source: Rethink, Stora Enso 3/2012

Focus on organisational challenges/problems:

- Municipalities are free to decide about level of waste separation
- Often no sorting at point of collection
=> low quality of pfr
=> unconscious ignorance of requirements by municipalities?
- No effective control of waste management streams by authorities
- Often low technical standard of sorting plants
- Relatively low environmental awareness & too little incentives for citizens to separate recyclable fractions

Conclusions for a better pfr collection

Differences and competing objectives make the identification of ideal solutions difficult

separation +
control



Recycling yard,
collection shop



Quality
(grades, impurities)

- public containers separate grades
- public containers mixed grades
- on-site container mixed grades
- kerbside collection

high comfort

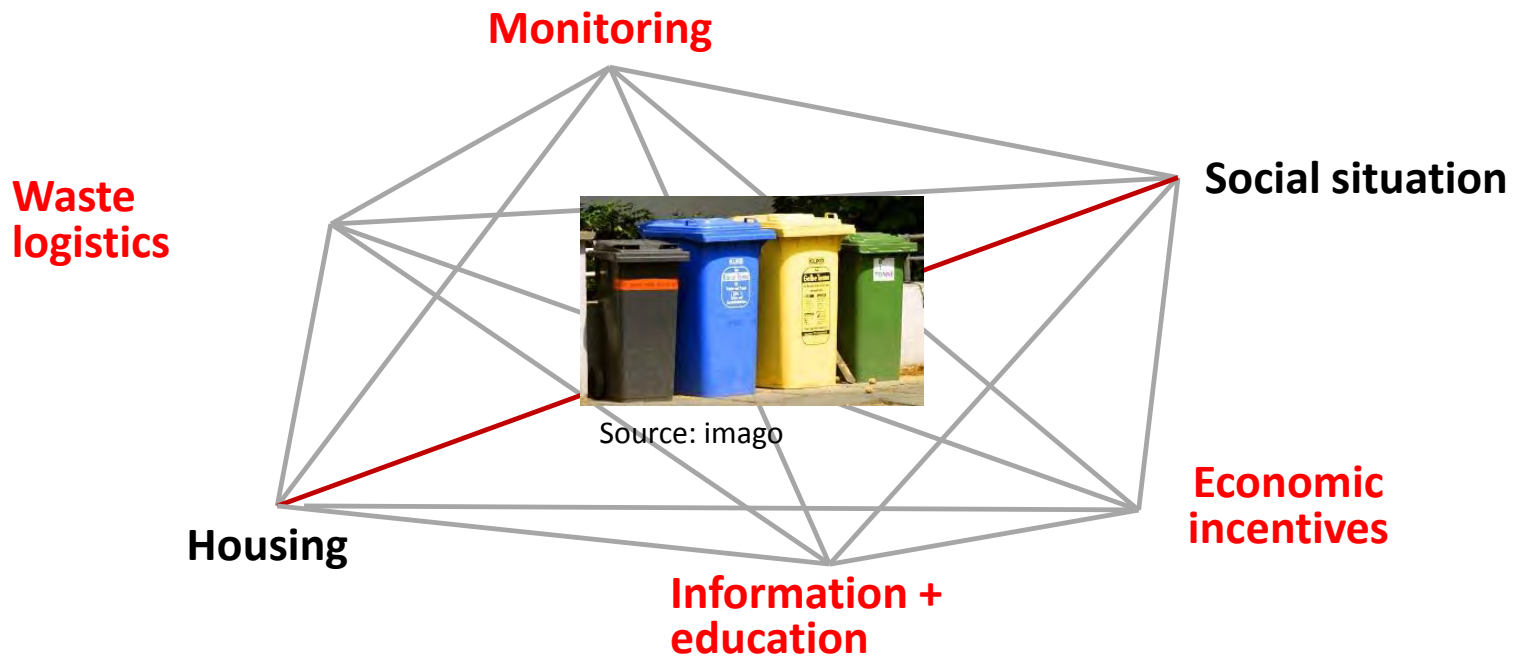


Paper bin

- No clear indication from data and other sources that certain collection systems offer overwhelming effects.
- Assessment depends upon particular stakeholder group.

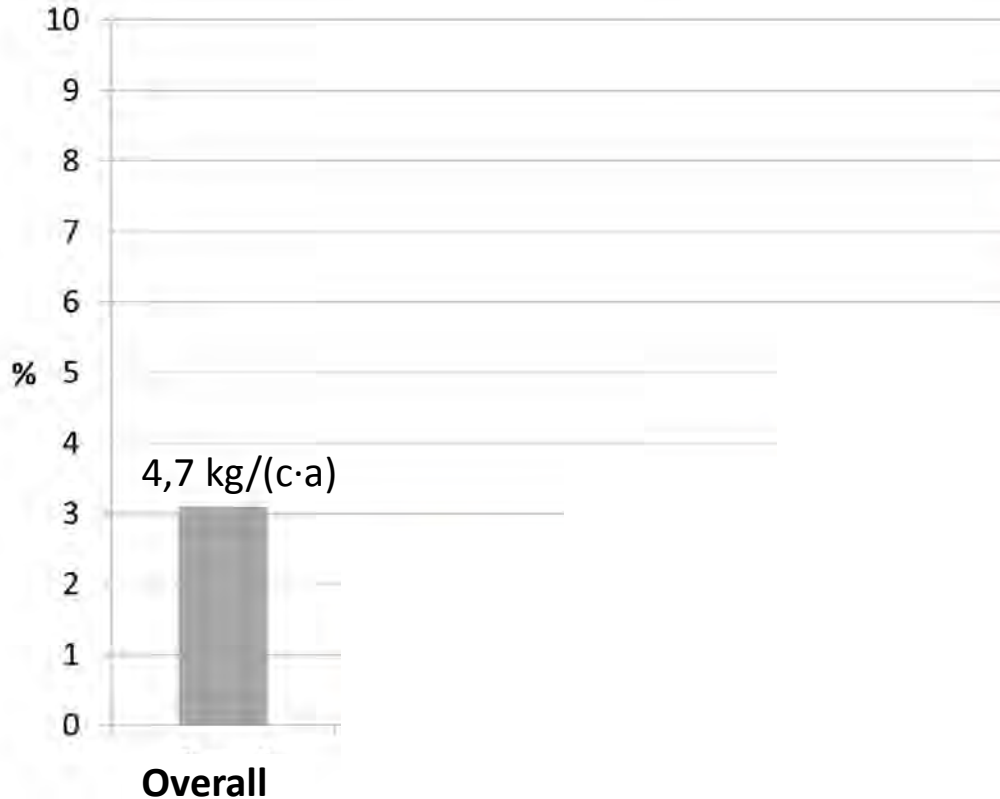
More important: socio-economic factors influence success of collection systems on a very local level

Relevant factors for waste separation apart from legal framework:



E. g. potential pfr from households depending on urbanisation/housing conditions, example from Germany

Study from Southern Lower Saxony, 2012: Recyclable fraction of p&b in residual waste¹⁾



=> **Comprehensive approach including all waste streams needed**

Recommendations
=
Reduction of areas of conflicts
+
Improvement of waste management

Reducing the area of conflict (1)

Contracting and concepts:

- **Long-term contracts** between communities and waste management companies of preferably 10 years
=> to support willingness to invest
- **Tripartite agreement** between local authorities, paper mills, waste management companies
=> to balance interests
- **Transparent contract design**
=> separation of collection and distribution (sales)
- **Rethink public private partnerships** for sorting plants especially for urban/metropolitan areas
=> waste management companies profit from technical equipment of municipalities, municipalities profit from know how of waste management companies



Reducing the area of conflict (2)

Contracting and concepts:

- **Inclusion of regional industries** in waste management concepts of municipalities
=> ensure that pfr collection strategies consider requirements of the local paper industry and existence + capacity of sorting plants, e. g. separate collection if there are paper mills producing graphic paper in the area.
- CEPI Best Practice Specifications for tendering the collection of pfr
- **Communication and education:**
- **PR activities for local use of pfr** by municipalities
=> rise awareness of importance of regional recycling loops, e. g. publication of recycling ways on municipalities websites



In der Steiermark werden von der

- Fa. Mayr-Melnhof Karton GmbH & Co KG in Frohnleiten,
- der Fa. Norske Skog in Bruck/Mur,
- der Fa. Rosegg & Rothwangl in Koglhof und der
- Fa. Bauernfeind Roman Papierfabrik AG in Frohnleiten

Papier und Kartonagen zur Ver

Source: www.abfallwirtschaft.steiermark.at

Reducing the areas of conflict (3)

Communication and education:

- **Enhance the dialogue between all major stakeholders**
=> Install a forum with meetings on a regular basis to discuss requirements and to find appropriate solutions fairly balancing diverse interests
 - **Education of other stakeholders**
=> for waste management companies/municipalities: use of same pfr quality standards, e. g. INGEDE methods
- => for municipalities: inclusion of requirements of recycling industry especially in countries with softer legal standards



Reducing the area of conflict (4)

Legislation and other aspects:

- **Obligation for implementation of recycling target rates** adjusted according to waste streams (no overall target rate) on national level
=> more specific targets considering recyclability and technical possibilities for different materials
- **Clear rules concerning responsibility** for collection from households
=> to guarantee collection independent from market price
=> to cover costs/investments for infrastructure
=> to mind lengthy litigation
- Evaluate **take-back systems for packaging** (dual systems) according to their suitability for pfr (separate collection for pure paper products is good praxis)
=> minimisation of organisational efforts



Reduction of areas of conflicts (5)

Legislation and other aspects:

- **Countrywide/Europe-wide standardised minimum waste separation**
=> no decision making on municipalities level for a low grade of separate collection
=> separate collection of pfr (clear guidelines)
- **Support of development of useful waste management technologies** helping to meet recycling rates, e. g. through tax incentives or payment to sorting plants by authorities if commingled material is delivered
=> incentives for innovation
- **Stricter control (monitoring) of waste/recyclable fraction flows** by authorities in countries with lower recycling rates

Improvement of waste management (1)

Waste logistics:

- **No commingled collection** for pfr with other recyclable fractions
- Adjustment of collection **intervals and/or container size** for residual waste/recyclable fractions
=> measurement of filling level by municipalities
- Most **user-friendly collection system** for available space
=> short ways
- **Mixture of pick up and bring system**
=> bring systems better for bulky materials and pre-sorting
- **Locked or fenced containers** for problematic collection points with public access
=> to reduce unauthorised use, thievery and contamination
- Separate collection of laminated materials (liquid packaging)



Source: private photography, Wrocław

Improvement of waste management (2)

Waste logistics:

- Location of **bring systems at highly frequented facilities**, e. g. shopping center (especially in rural areas)
- **Underground containers** for urban areas with limited space
=> Ljubljana example:
 - evenly distributed collection points within less than 150 m
 - separation of residual waste, paper, packaging, glass, organic
 - emptied on a weekly basis
 - chip cards per household
 - weighting and charging of residual waste



Source: www.ljubljana.si

Improvement of waste management (3)

Economic incentives:

- **Reward citizens** for good quality pfr
 - => e. g. credits for mixed grades from paper bins by weight and property
 - => incentives for pre-collected pfr (graphic, board) at municipal recycling yards
- Separate pfr collection should be offered **free of charge**
- **Credits** for citizens offering usable space for public **collection on private property** and care for **cleaning**
- **Personalisation of disposal fees**
 - => Pay-as-you-throw for residual waste (paying per bag, by weight, by volume)
- Adjustment of **fees for residual waste**
 - => motivate better waste separation with higher fees



Improvement of waste management (4)

Information and education:

- Waste separation campaigns and **communication of benefits and results**
- **Multichannel marketing** by authorities
=> information phone (especially after changes), poster, written information, customer magazine, social media, promotional messages on collection trucks ...)
- Municipal **waste management consultants**
=> on-site consultancy of owners, housing associations, kindergartens, businesses ...
- Recognition effect through a **countrywide consistent layout** of collection systems (uniform colour scheme and pictograms for specific collection systems)
- Consideration of **language aspects**
- **Environmental education** in kindergardens and schools, e. g. excursion to sorting plant and paper mills, collection of pfr at schools and kindergardens

Recommendations: Waste management issues (5)

papír

Noviny, časopisy, reklamní letáky



Krabičky, lepenka, karton

Kancelářský papír, sešity

Obaly z papíru jsou obvykle označeny:

FAP 20 21 22

NEVHAZUJTE MOKRÝ, MASTNÝ, NEBO JINAK ZNEČIŠTĚNÝ PAPIŘÍ!

Děkujeme Vám za spolupráci při recyklaci odpadů!

OBEC JE ČLEMEM SYSTÉMU **EKO-KOM**
www.ekokom.cz

plasty



Kelímky od jogurtů, krabičky od potravinových tuků

Plastové nádoby a láhve, PET láhve (od nápojů)

Sěčky, fólie

Výrobky z plastů

Polystyren

Obaly z plastů jsou obvykle označeny:

H1 1 H2 2 H3 3 H4 4 H5 5

NEVHAZUJTE PLASTOVÉ TRUBKY A PODLAHOVÉ KRYTINY!

Děkujeme Vám za spolupráci při recyklaci odpadů!

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sklo



Láhve od nápojů

Skleněné nádoby

Tabulové sklo

Obaly ze skla jsou obvykle označeny:

GL 70 71 72

NEVHAZUJTE PORCELÁN, KERAMIKU, AUTOSKLO, DRÁTĚNÉ SKLO A ZRCADLA!

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Prosíme, sešlápnout!



Děkujeme!

Obec je členem systému **EKO-KOM**

nápojové kartony



Krabičky od džusů, mléčných výrobků, vin apod.

Slaďte, prosím. Děkujeme!

OBEC JE ČLEMEM SYSTÉMU **EKO-KOM**
www.ekokom.cz

uniform label scheme in Czech Republic

source: presentation by Mr. Grolmus (EKO-KOM) at workshop on collection strategies in Sopron, 9.7.14 –

czyste miasto 1 lipca 2013 r. rusza nowy system odbioru śmieci w Ostrołęce

Obywcy, które zadeklarowały segregowanie śmieci są zobowiązane wrzucać poszczególne rodzaje odpadów do oznaczonych właściwymi kolorami pojemników. Pojemniki właściciele nieruchomości zapewnją we własnym zakresie.

WRZUCAMY

WRZUCAMY

- PAPIER, PAPIEROSY, PAPIEROWE TACZKI, KARTONY
- KARTONY
- KARTONY

WRZUCAMY

- DREWNO I TWORZYWA SZTYWNE
- MECH, SIENK
- DREWNIANA WYCIEMNIEZONA
- ZASTARZAŁA KUCHNIA, PRALNIA, SŁODKAR
- KUCHNIA, SŁODKAR
- KUCHNIA, SŁODKAR

WRZUCAMY

- METAL
- METAL
- METAL

NIE WRZUCAMY

NIE WRZUCAMY

- DREWNO MOJE
- DREWNO MOJE
- DREWNO MOJE

NIE WRZUCAMY

- MOCNE ZASTARZAŁA
- DREWNO MOJE
- DREWNO MOJE

NIE WRZUCAMY

- DREWNO MOJE
- DREWNO MOJE
- DREWNO MOJE

Dla smolek z odpadami niebezpiecznymi i innymi odpadami...
Dla smolek z odpadami niebezpiecznymi i innymi odpadami...
Dla smolek z odpadami niebezpiecznymi i innymi odpadami...

Announcement of a new collection scheme

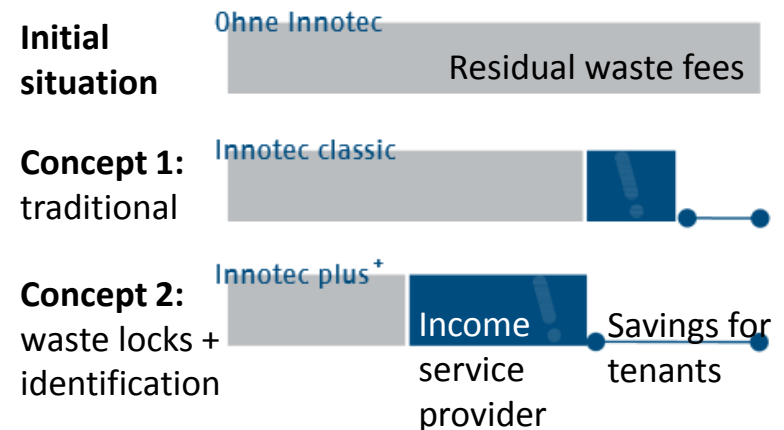
source: public information in Ostrołęka, Poland

Improvement of waste management (7)


Special solutions for large housing estates:

- **Personalised costs** especially important for motivation (high anonymity)
=> lock and identification systems (fair waste management)
- Example from Germany: use of **specialised** private or public **service partners** with closed concepts and performance contracting
=> services: analysis, consultancy, layout, information of tenants, management of collection points, clearing
=> financed by saving waste fees
- **Educational offerings** by local authorities for housing associations

Source: Image brochure of innotec abfall-management GmbH, example of reduction for waste fees and performance contracting



Tool for decision finding

The screenshot shows a web-based interface for the "Eco Paper Loop" tool. At the top left is the "Eco Paper Loop" logo. Below it is a horizontal line. The main text reads "Welcome to our decision tree!". On the right side, there is a "Next" button. On the left side, there is a "Pause the interview" button. At the bottom, there is a citation: "Sofia Guerrero, Technische Universität Dresden – 2014".

Online based tool

1. Request of local conditions and specification of area
2. Decision tree:
 - decision if change of collection systems is useful
 - including recommendations
3. Suggestions for adequate collection systems on basis of local conditions (descending priority):
 - Building structure
 - Infrastructure
 - Mobility
 - Income
 - Average age of population
 - Education

Please choose the country where you want to collect paper for recycling.*

[Please choose] ▾

Name of the region*:

How is the average income in your region compared to your country?

much lower lower average higher much higher

How is the transport (roads) infrastructure in your area compared to the average infrastructure in your country?

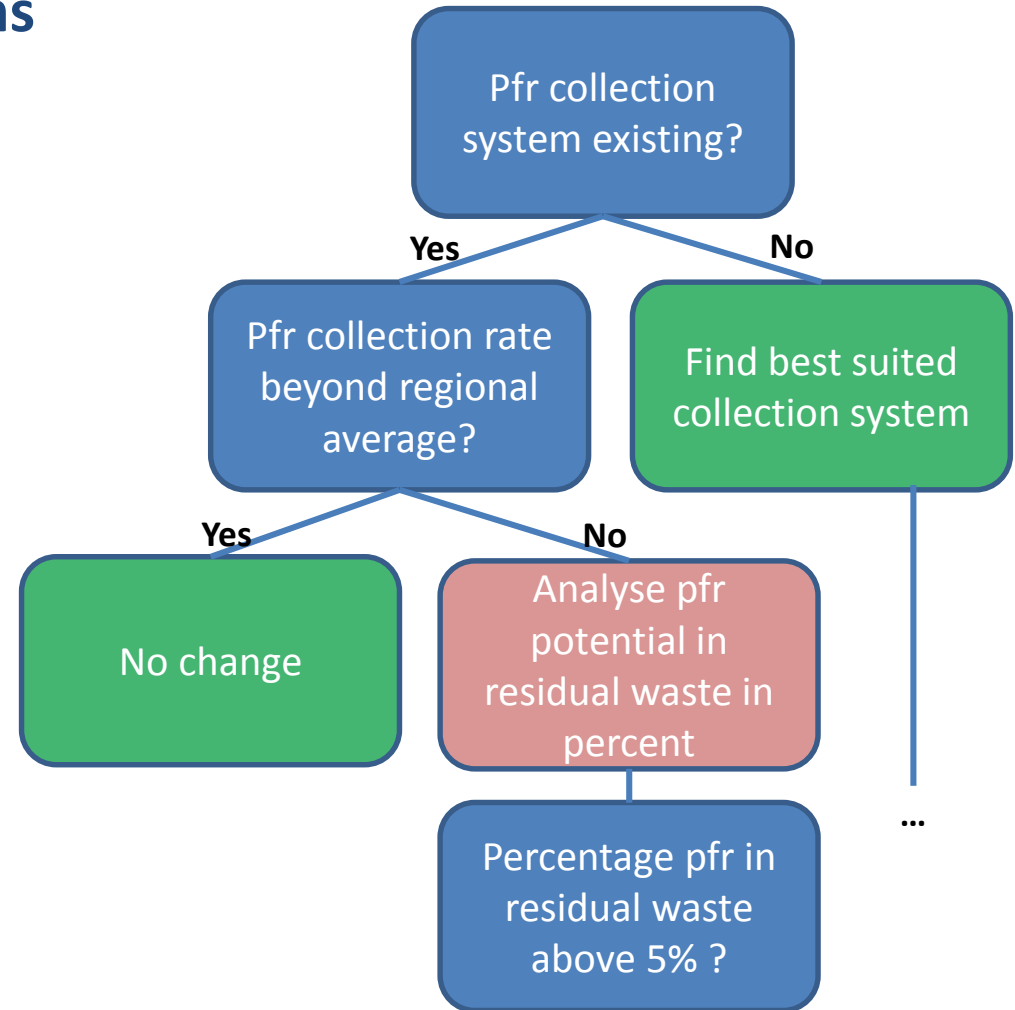
worse average better

How is the education level in your region compared to your country? The education level can be measured by percentage of tertiary education.

Example: Request for local conditions

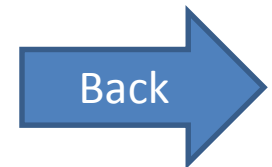
Inclusion of recommendations

- E. g. [target rates](#) for collection
- E. g. [limit for pfr](#) in residual waste
- E. g. [waste management](#) issues



Recommended target rates for collection of pfr

Country	Recycling rate	Target rate
Austria	70%	70%
Czech Republic	56%	63%
Germany	76%	76%
Hungary	47%	58%
Italy	63%	66%
Poland	39%	54%
Slovenia	64%	64%
Slovakia	49%	59%
European Union 28	69%	

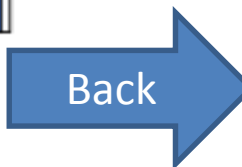
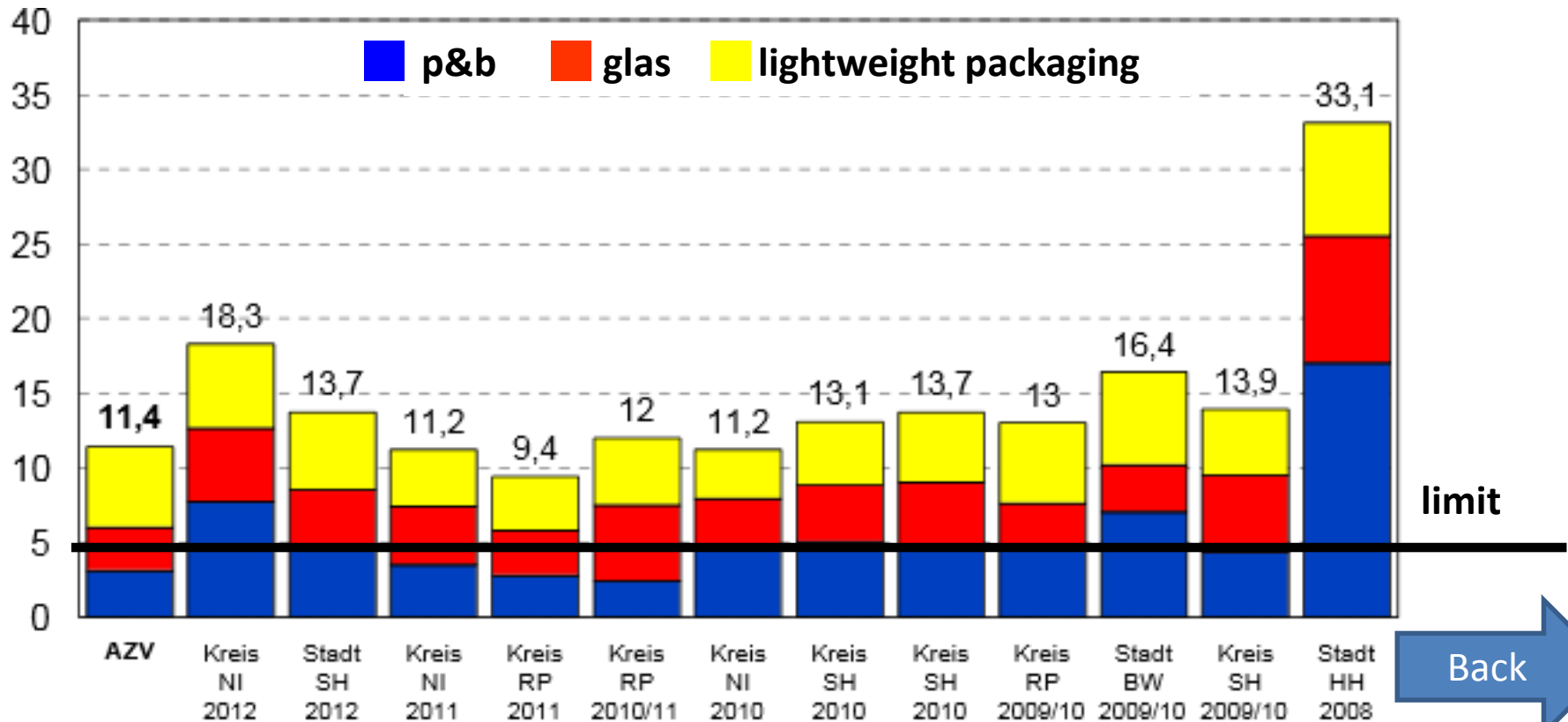


Presumption: collection rate = target rate

$$\text{Recycling rate} = \frac{\text{pfr}^* \text{ collection}}{\text{p\&b}^{**} \text{ consumption}} \times 100 \%$$

Recommended limit for recyclable fraction of p&b in residual waste

% of weight



Example for results

Dresden Neustadt:

- **Building structure:** detached, semi-detached, **rented flats in apartment buildings**, owned flats in apartment buildings, high-risers
- **Transport infrastructure:** much worse, **average**, better
- **Mobility per 1000 inh.:** < 300 cars, **300-500 cars**, > 500 cars
- **Income:** much lower, lower, **average**, higher, much higher
- **Age:** < **38**, 38–46, > 46
- **Education:** lower, average, **higher**



Suitable collection systems for your situation

Based on your given answers these are recommended collection systems for your region/area. They are listed in descending order, beginning with the most suitable.

Container or Underground Container

Containers or underground containers are placed on public ground at a place where they are reachable for citizens. Underground containers where, in contrast to normal containers, the container-body is placed underground to save space on public streets, integrate into the townscape better but have higher investment costs due to the pit that needs to be dug and the concrete casing that needs to be built. For the collection a special garbage truck is needed that can lift the containers up and for separate paper grade collection a special truck with 2 compartments or an extra collection tour is needed. The different collection points should not be further away than 500 m from the inhabitants of the area to ensure they use them.

Blue Bin

One or two bins are positioned at the citizens' property. If the goal is to collect mixed pfr, one bin is sufficient and if separate sorts are required two bins (one for graphic and the other for board) should be positioned. A collection truck is needed to collect the full bins in a reasonable interval. If there are two bins, either two collection tours or a collection truck with two compartments is needed. The blue bin concept is very comfortable for citizens and collects a good quality of pfr with few impurities.

Kerbside

The term kerbside collection system means door-to-door collection systems, where household is asked to leave their recyclable wastes on the kerbside on specified dates to be separately collected for recycling. Concerning paper and board kerbside collection, it has to be properly prepared (without plastic wrappings and inserts, the cardboard flattened) and packed (some countries demand use of special bags or the municipality might provide a special container (bin) or the public are asked to secure papers (with string) for collection). Kerbside collection for pfr leads to few impurities and good pfr quality.



Ecodesign for the Enhancement of Central Europe Paper Based Products Recycling Loop



Grant No: 4CE555P3

Thank you for your attention.



EUROPEAN UNION
EUROPEAN REGIONAL
DEVELOPMENT FUND

02.12.2014

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Der Leitfaden der Umweltdirektion der Europäischen Kommission sei an ein zweites Abfallende-Maßnahmen-Paket gekoppelt, erklärt die Confederation of European Paper Industries (CEPI). Dieses betreffe Papier, Kupfer und Glas und werde vermutlich am 9. Juli vom Regelungsausschuss abgeseget.

Im Leitfaden zur AbfRRL schreibt die Kommission, dass „der Zeitpunkt, zu dem ein Material oder eine Substanz das Abfallende erreicht, gleichzusetzen ist mit der Vollendung des Rückgewinnungs- und Recyclingprozesses“. CEPI meint, dass im Fall von Papier die Kommission nicht die Erfüllung der End-of-Life-Kriterien als Equivalent zum Recycling bezeichnen sollte.

Das Problem für Abfallentsorgungsunternehmen und Abfallhändlern sei, dass sie durch die neue Interpretation zu „Recyclern“ würden, ohne wesentliche Vorteile daraus ziehen zu können. Im Gegenzuge jedoch wären sie gesetzlich als „Produzenten“ für das Output-Material verantwortlich. Den Entsorgungsunternehmen eine derartige Verantwortung aufzubürden, würde nur die lange Liste der schlecht umgesetzten EU-Umweltmaßnahmen verlängern und nichts zu einem grünen Wachstum in Europa beitrage, übt CEPI Kritik.