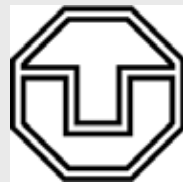


# Applications of Pay-As-You-Throw in Germany – Saxony and the City of Dresden as Good Practice Examples



*Jan Reichenbach*



VIII Workshop on Municipal Waste Prevention



SETMANA EUROPEA  
DE LA PREVENCIÓ DE RESIDUS  
DEL 20 AL 28 DE NOVEMBRE DE 2010



## Personal introduction

*Profession:* Dipl.-Ing. (M.Sc.) Dresden University of Technology

*Carreer history:* since 1998 **INTECUS GmbH**  
2001-2006 and again since 08/2009 parallel job assignment at  
**Institute for Waste Management and Contaminated Site  
Treatment at Dresden University of Technology**  
(FP5-project "PAYT" and LIFE+ project "HEC-PAYT")



*Current position:* **Senior consultant** natural resources and waste management

## INTECUS GmbH



*Established:* since 1991 in Dresden

*Management:* Prof. Dr.-Ing. habil h.c. Bilitewski / Grad. Eng. Wagner

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

*Work record:* more than **400 projects** in about **20 countries**

# HEC-PAYT – an ongoing initiative




is a project funded by the European Commission, within the framework of the LIFE Environment programme

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- Programme**
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- Pilot application
- Forums - Meetings
- Publicity Actions
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- Current status in partner countries
- What is PAYT
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## LIFE+ Environment Programme - Pay as you throw

### Ερωτηματολόγιο Σχετικά με τις: "Δυσκολίες Εφαρ Συστημάτων ΠΟΠ στην Ελλάδα και Προτάσεις για Υπέρβασή τους"

Το παρόν ερωτηματολόγιο απευθύνεται σε ανώτερα & ανώτατα στελέχη των απορριμμάτων από υπουργεία, ΟΤΑ, κόμματα, φορείς, επιχειρήσεις και άλλους σχετικούς φορείς. Το περιεχόμενο του ερωτηματολογίου αφορούν την εφαρμογή των συστημάτων ΠΟΠ στην Ελλάδα, και προτείνονται αρθρών αυτές οι δυσκολίες και να γίνει εφικτή η εφαρμογή τους στο π

Αν θέλετε να κατεβάσετε το ερωτηματολόγιο και να το συμπληρώσετε,

### Second Forum invitation

View the Programme here  
Click here to view larger image

Ερωτηματολόγιο δημοτών σχετικά με εναλλακτικές χρεώσεις διαχείρισης απορριμμάτων





**Π.Ο.Π.**  
Παράρτημα Ολοκλήρου  
Δίκτυο υπηρεσιών στην Ελλάδα των απορριμμάτων

**Πρόσκληση**  
12 Ιανουαρίου 2010  
Ώρα: 10:00 π.μ. - 2:00 μ.μ.

Η εκδήλωση θα πραγματοποιηθεί στο Δημαρχείο Ελευσίνης, Αίθουσα Δημοτικού Συμβουλίου Καρόλου & Αλέξανδρου, Ελευσίνα

Beneficiaries' meeting in Germany

visit: [www.payt.gr](http://www.payt.gr)



# Legislation as the entrance

## European Law

- **Council Directive on Waste (75/442/EEC) Article 15**  
→ *promulgating the ‘polluter pays’ principle*

## Federal Republic of Germany

- **Basic Law**  
→ **Federalism, Self-Government of Communities**  
→ *financing public services from charges, rights to impose charges*

|                           | A | B | CH | CZ | D | DK | F | FIN | GR | I | IRL | L | NL | P | S | SP | UK  |
|---------------------------|---|---|----|----|---|----|---|-----|----|---|-----|---|----|---|---|----|-----|
| <b>Legislative basis</b>  | ✓ | ✓ | ✓  | ✓  | ✓ | ✓  | ✓ | ✓   | ✓  | ✓ | ✓   | ✓ | ✓  | ✓ | ✓ | ✓  |     |
| <b>Charges mandated</b>   |   | ✓ | ✓  |    | ✓ |    |   |     |    | ✓ |     | ✓ |    |   |   |    |     |
| <b>PAYT stipulations</b>  |   |   |    |    | ✓ |    | ✓ | ✓   |    | ✓ |     | ✓ |    |   |   |    |     |
| <b>PAYT applications</b>  | ✓ | ✓ | ✓  | ✓  | ✓ | ✓  | ✓ | ✓   |    | ✓ | ✓   | ✓ | ✓  |   |   | ✓  |     |
| <b>Volume-tariffs</b>     | ✓ | ✓ | ✓  | ✓  | ✓ | ✓  | ✓ | ✓   |    | ✓ | ✓   | ✓ | ✓  |   |   | ✓  | (✓) |
| <b>Weight-tariffs</b>     | ✓ |   | ✓  |    | ✓ | ✓  | ✓ | ✓   |    | ✓ | ✓   | ✓ | ✓  |   |   | ✓  |     |
| <b>Chamber installat.</b> | ✓ |   | ✓  |    | ✓ |    |   |     |    | ✓ |     |   | ✓  |   |   |    |     |

## Free State of Saxony

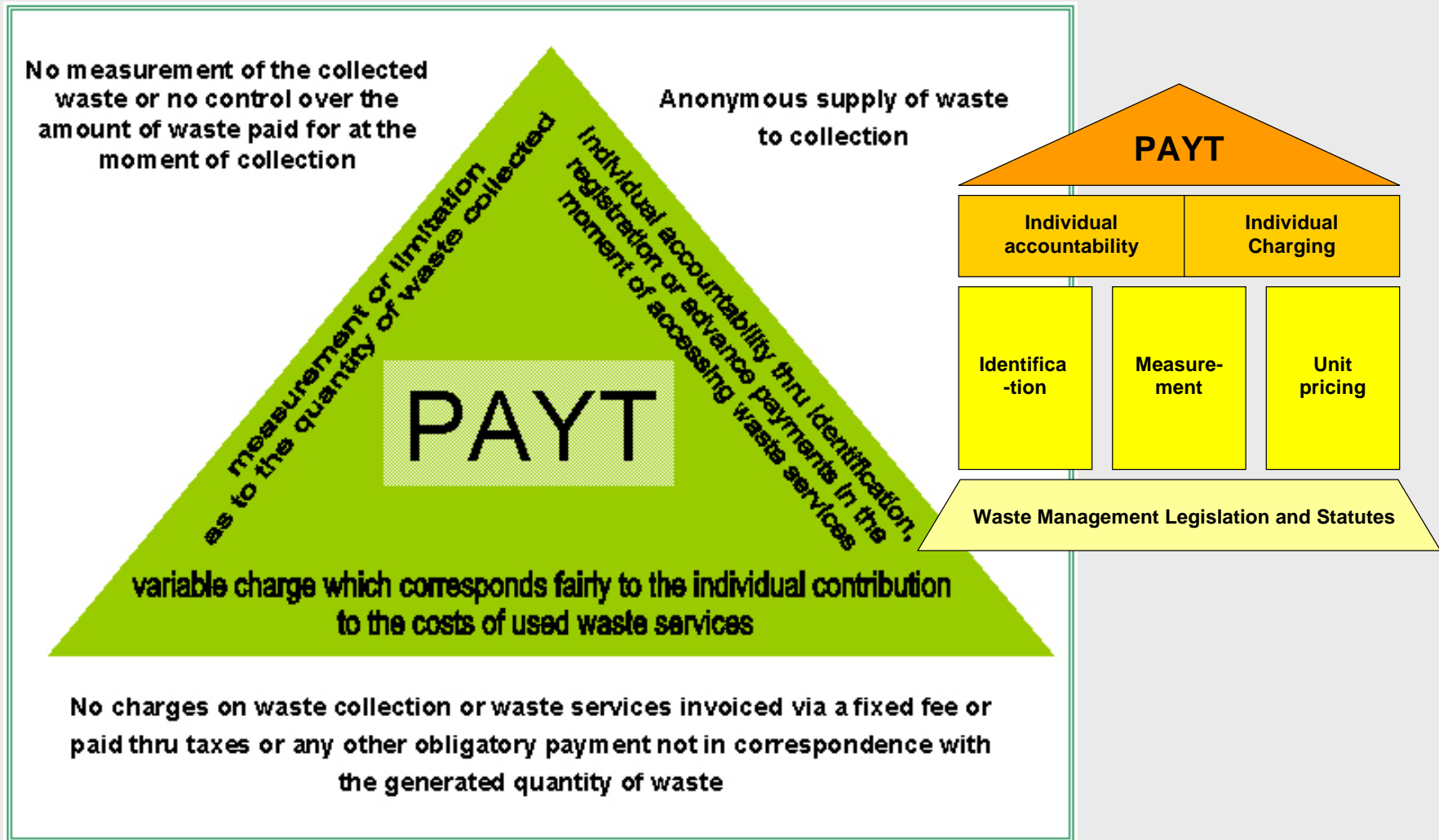
- **Saxon Waste Management and Soil Protection Act**
- **Municipal Code of Saxony**
- **Local Rates Law**

## Principles of waste charging in Germany

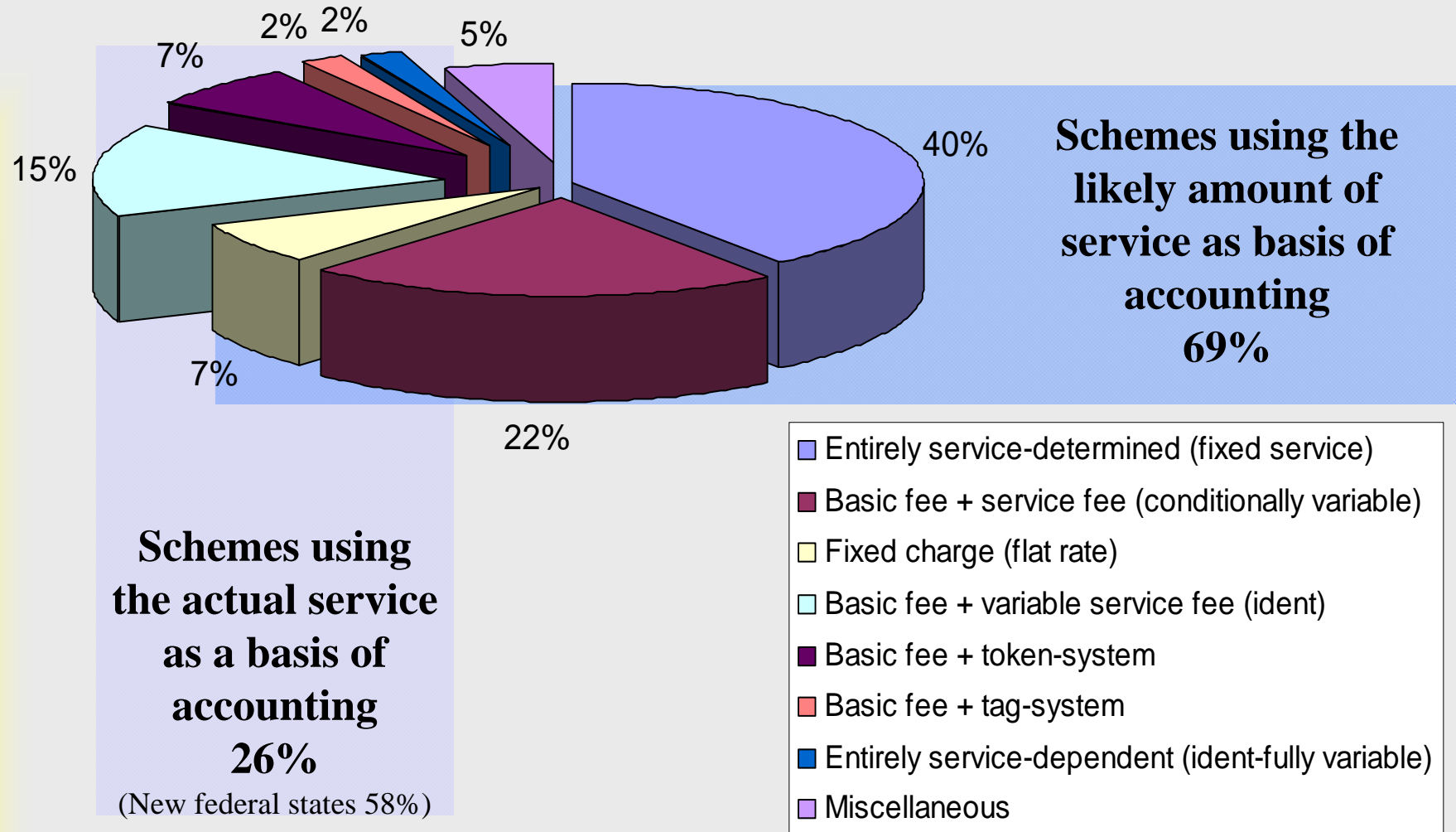
- **each person produces waste and thus should be contributing to financing the waste management**
- **charges must be cost-covering to finance all waste management tasks**
- **no cross-financing of other community expenses and services shall take place**  
*(i.e. surplus revenues returned to citizens in form of charge reductions)*
- **charges should create incentives for avoidance, utilization or environmental friendly disposal of waste**  
*(Saxony with avant-garde, people-friendly legislation*  
→ *mandatory chargeable minimum as low as 4.6 ltr per capita\*week*  
→ *other federal states >8-16 ltr per capita\*week)*



# PAYT vs. other ways to get waste services paid

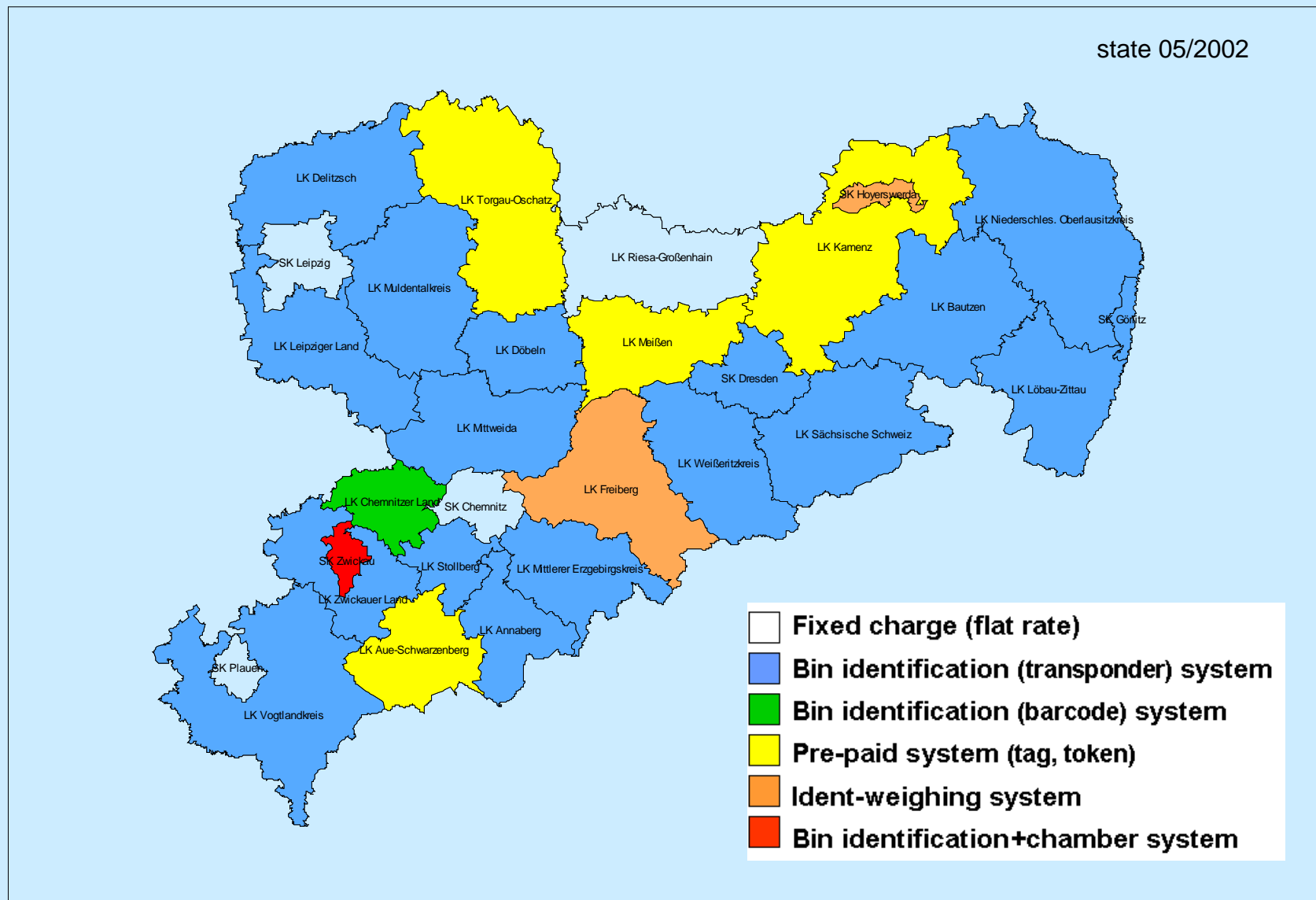


# Measuring basis in the waste charge models in Germany



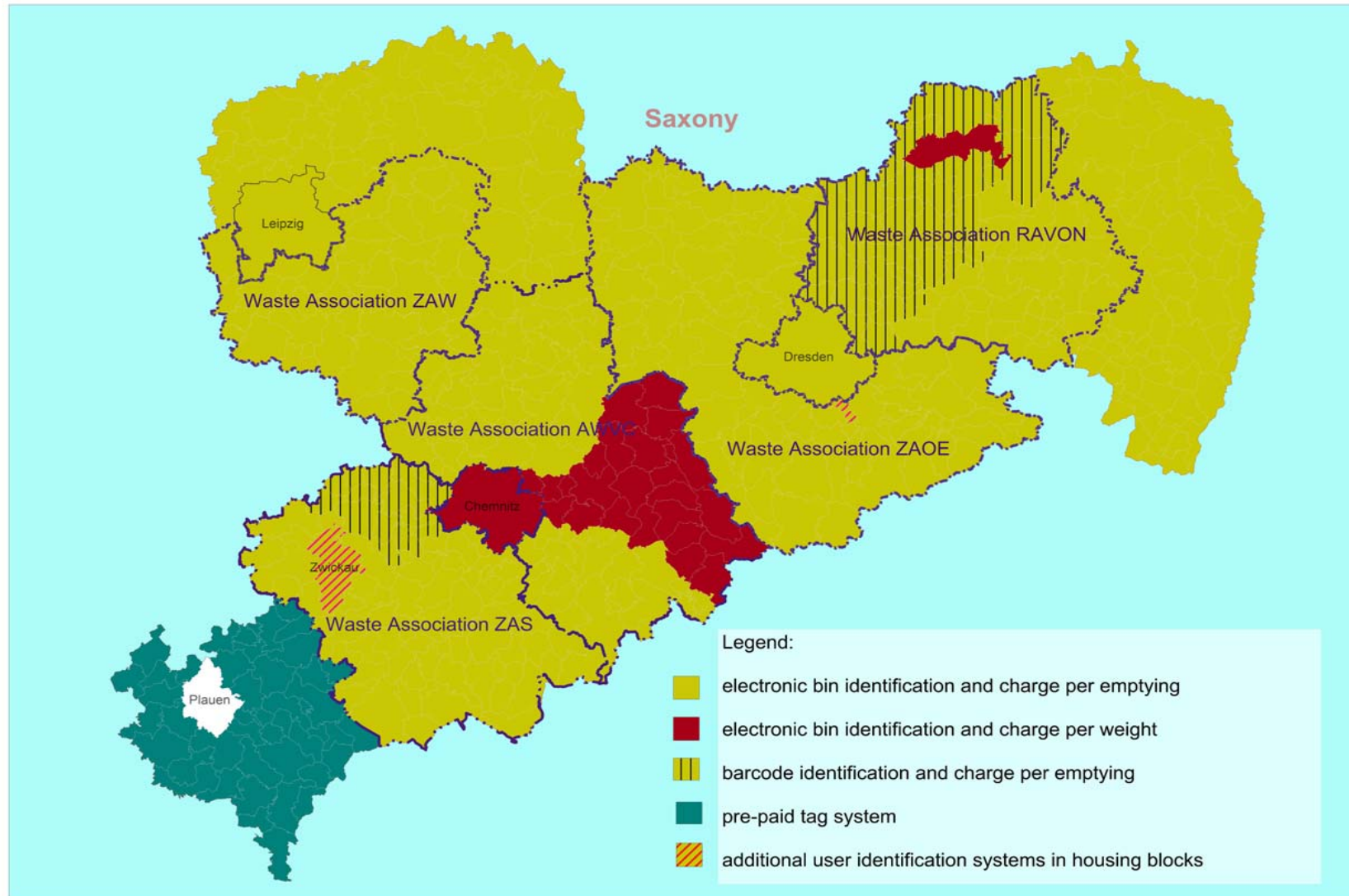
Source: Einzmann, Turk, Fricke in Müll & Abfall 8/2001

# PAYT implementation in Saxony - 2002



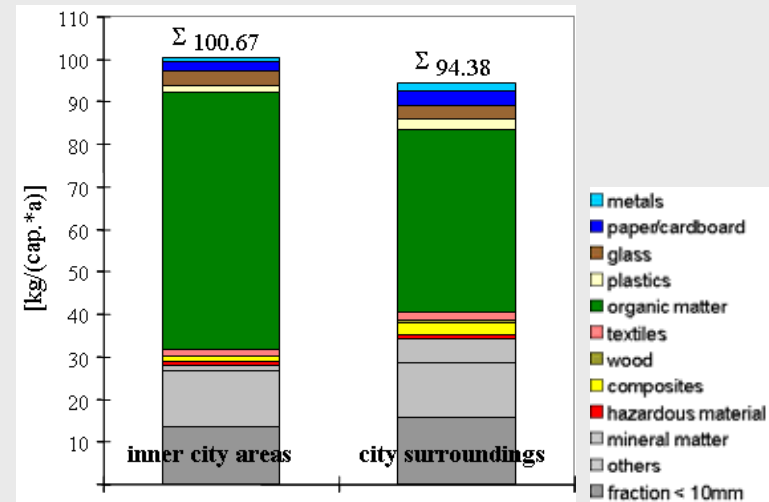


# PAYT implementation in Saxony - 2009



## Why PAYT ? – The city’s view

1. **Saving of costs**  
*i.e. reducing total waste and amount for final disposal*
2. **Award conscious performers**
3. **Harmonize collection across all spatial structures**



| Dwelling structure        | Single house areas                          | Multi family house areas open structure | Multi family house areas dense structure | Multistorey apartment buildings | Dresden total |
|---------------------------|---|---|--|---------------------------------|---------------|
| <b>Material fractions</b> | <b>Rate of separate recovery in '95/'96</b> |   |  |                                 |               |
| Packaging                 | 62%   | 56%                                     | 12%                                      | 12%*                            | 28%           |
| Graphical paper           | 96%   | 86%                                     | 72%                                      | 55%                             | 69%           |
| Mixed paper/board         | 71%   | 53%                                     | 42%                                      | 25%                             | 37%           |
| Glass                     | 80%   | 44%                                     | 33%                                      | 33%                             | 40%           |

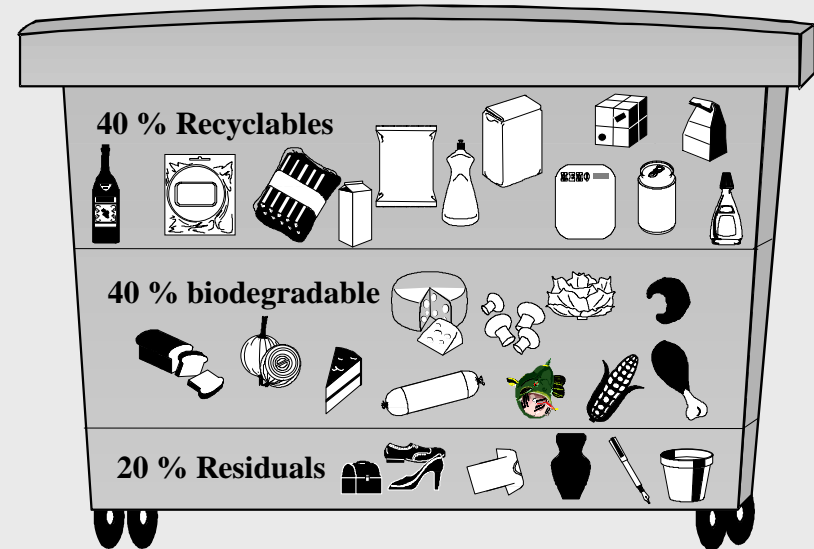
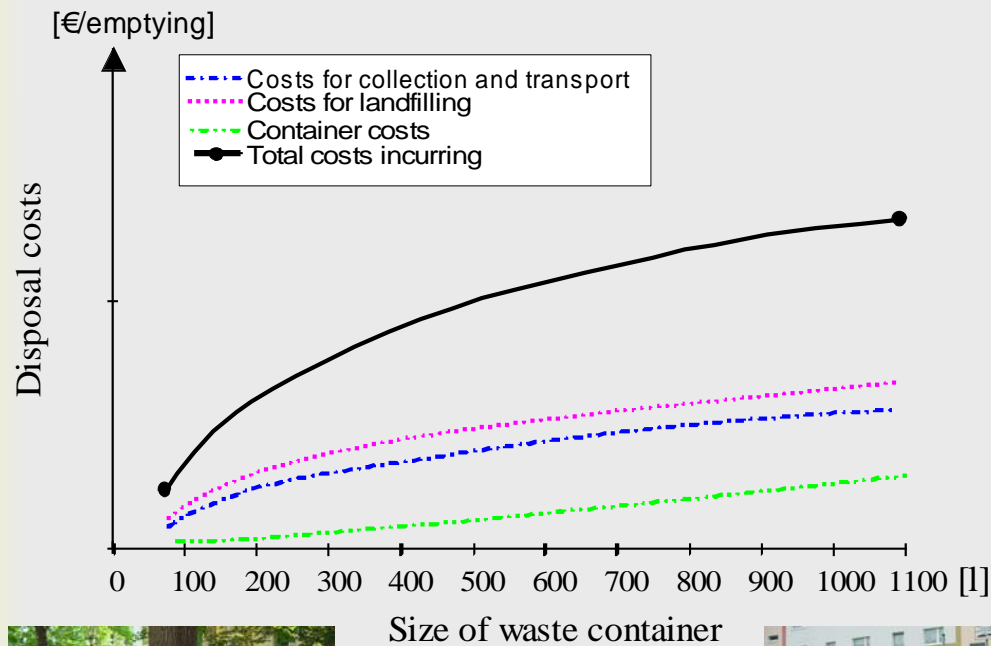
\*estimate

4. **Increase revenues**  
*i.e. making sure all households pay for received services*
5. **Today: Optimize collection**



# Why PAYT ? – The citizens view

1. Offers to reduce financial burden  
*i.e. Fair charging*



2. Equity of treatment  
*expense per unit of generated waste is not the same !*

3. Transparent billing

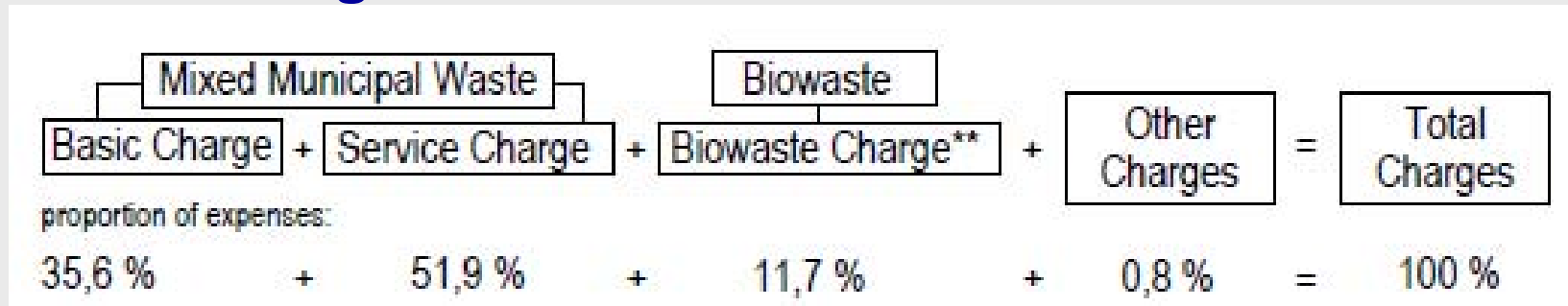
## The Dresden experience

- ~500,000 inhabitants, 85 % MURBs, 15 % single family house dwellings
- Changeover to **bin identification system** (transponder) in 1994/95
- Participation in test series of chamber systems in 1996/1997
- **Charging policy:** degressive system, i.e. price per unit emptied decreases as size of the waste bin goes up (80-ltr. bin: 0.046 EUR/ltr ; 1.100-ltr. container: 0.02EUR/ltr)
- **Charge calculation:** volume-based, two-tiered (Basic fee + Service fee on a per-litre basis, Service fee calculated over the bin size and frequency of pick-ups [*individually variable*] incl. a minimum of one pick-up per bin and quarter)





# Dresden charge model



## Charges – for what?

- mixed municipal waste (basic fee [number, size of dustbins] + service fee\* [emptying])

\*degressive rate pricing model

- biowaste (monthly charge [bin-related flat rate])
- charges for other services on request

- extra fee for longer dustbin transport distances
- bulky waste and large household appliances
- disposal of green waste

and a  
mandatory minimum of chargeable service

[one emptying per each quarter]

| dustbin size | basic charge per month | + | service charge per emptying | + | biowaste charge per month | = | total charge |
|--------------|------------------------|---|-----------------------------|---|---------------------------|---|--------------|
| 80 l         | 3,60 EUR               | + | 3,66 EUR                    | + | 7,00 EUR                  | = |              |
| 120 l        | 5,39 EUR               | + | 4,40 EUR                    | + | 10,50 EUR                 | = |              |
| 240 l        | 10,79 EUR              | + | 7,33 EUR                    | + | 21,00 EUR                 | = |              |
| 660 l        | 29,67 EUR              | + | 18,33 EUR                   | + | 57,75 EUR                 | = |              |
| 1100 l       | 49,45 EUR              | + | 22,10 EUR                   | + | ----                      | = |              |
| 2500 l       | 112,38 EUR             | + | 46,80 EUR                   | + | ----                      | = |              |

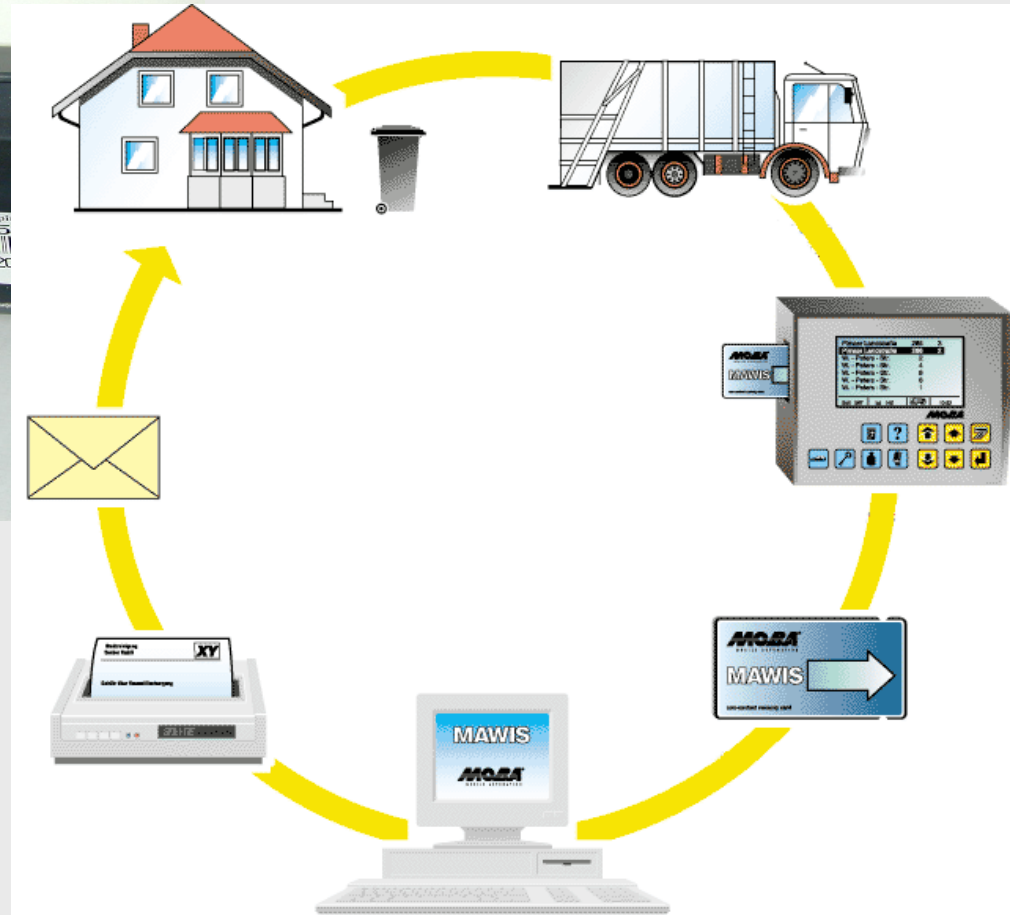
calculation example: dwelling with one 80 l dustbin for mixed municipal waste (minimal charge)

without a dustbin for biowaste:  $12 \times 3,60 \text{ EUR} + 4 \times 3,66 \text{ EUR} = 57,84 \text{ EUR}$

with a 80 l dustbin for biowaste:  $12 \times 3,60 \text{ EUR} + 4 \times 3,66 \text{ EUR} + 12 \times 7 \text{ EUR} = 141,84 \text{ EUR}$

\* emptying is required at least quarterly

# Dresden - technical realization of PAYT



Graphic source: MOBA AG, Dresden

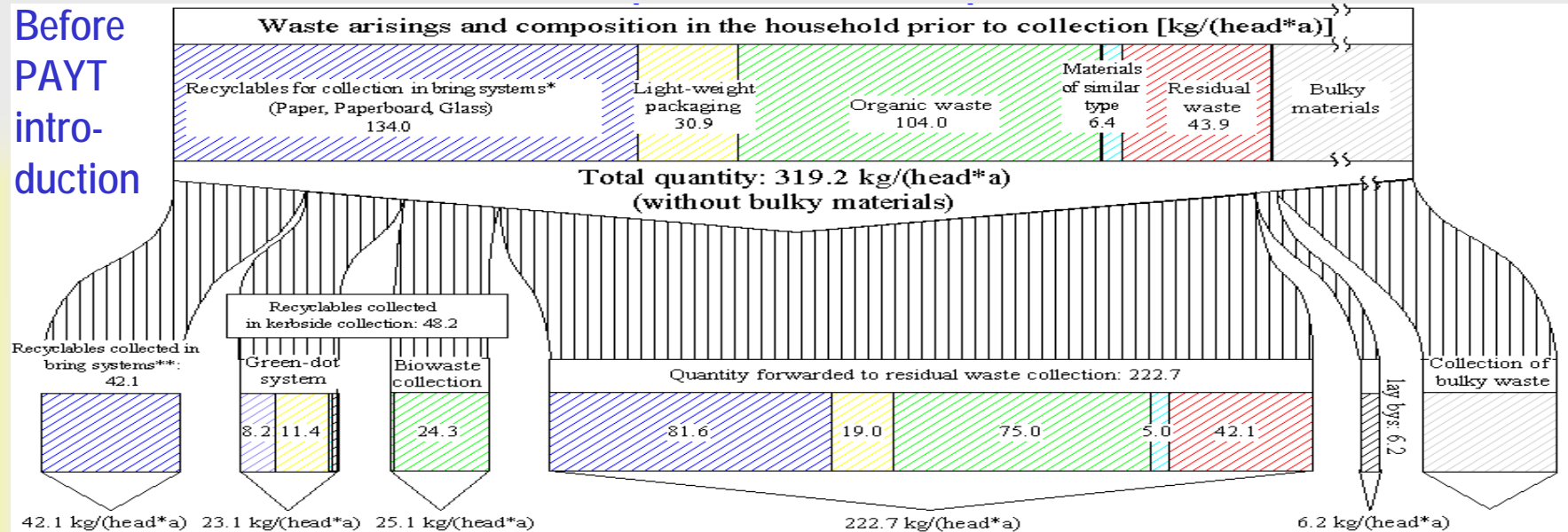


# Collection settings to achieve accountability

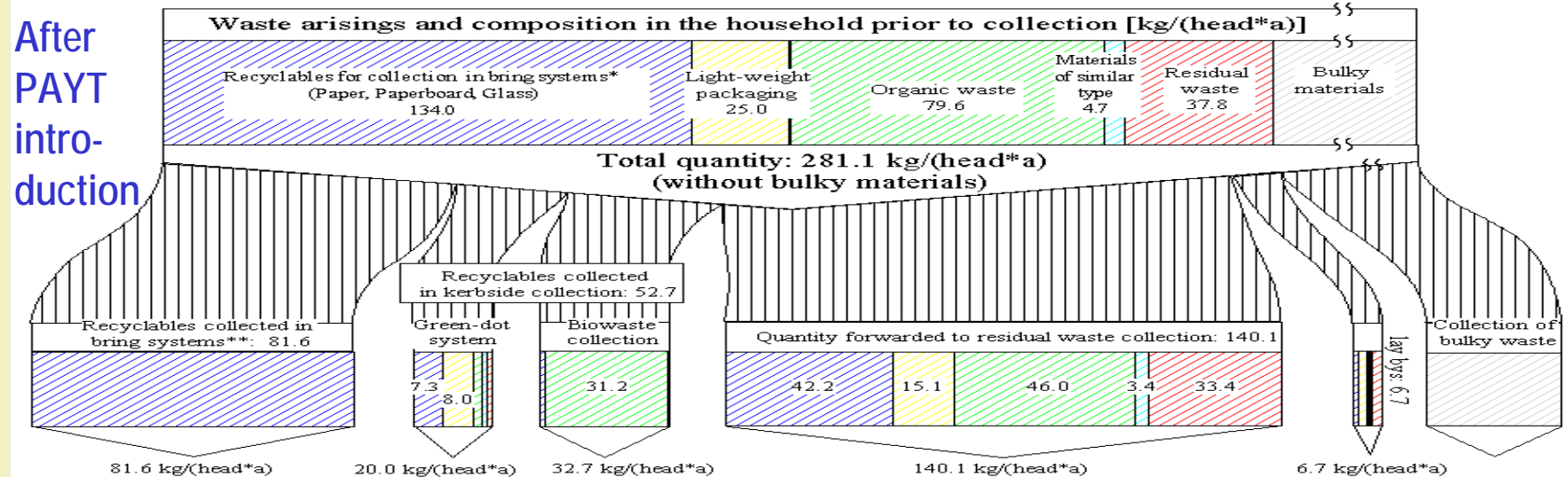


# Reactions to new charging system *(Results from pilot tests)*

Before  
PAYT  
intro-  
duction



After  
PAYT  
intro-  
duction



**Résumé: More waste diverted from conventional disposal to recycling**

## Reactions to new charging system *(Results from pilot tests)*

### Collection rates for separate recycling systems in the different city settings

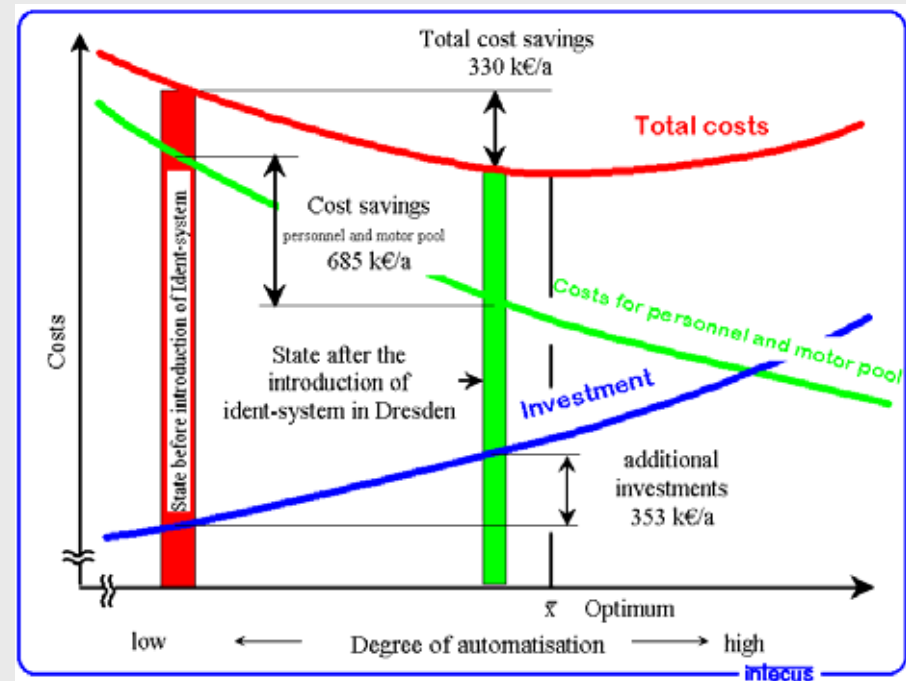
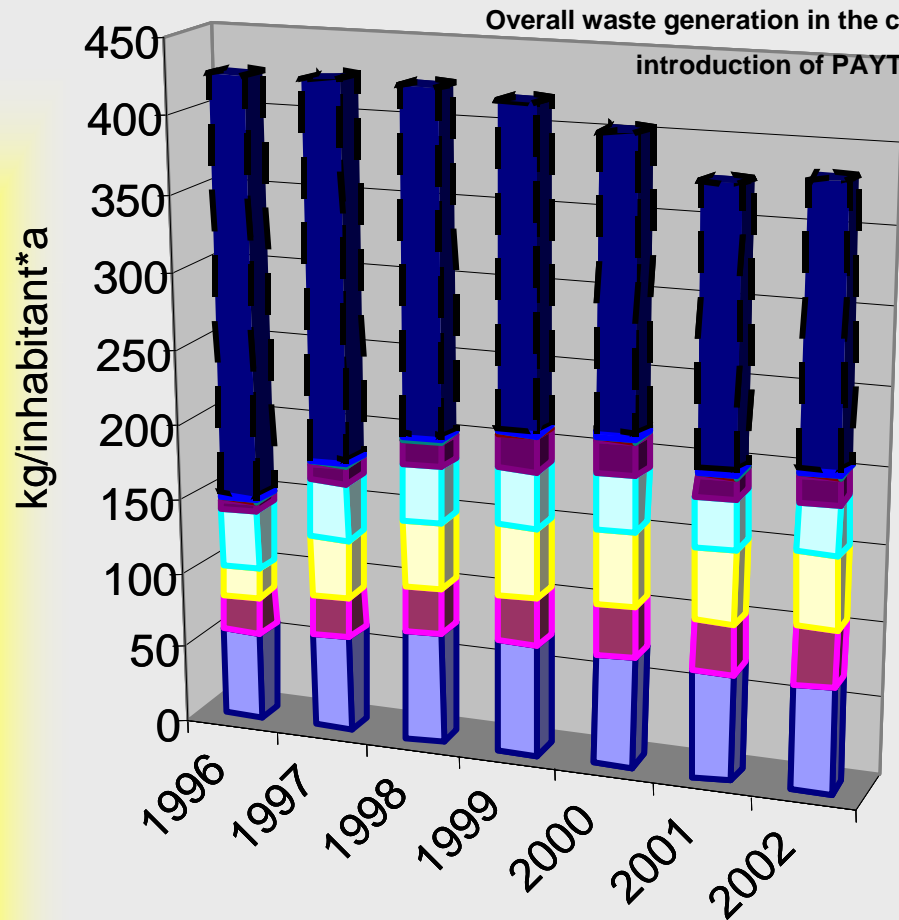
| Separate collection svstem               | multi-unit residential building                                   | attached building structure | detached buildings                        |
|--|---|-----------------------------|---|
| <i>situation before PAYT</i>             | <i>collectively used containers, flat rate</i>                    |                             | <i>individual bins, flat r</i>            |
| <b>light weigth packaging, green dot</b> | 12%   | 34%                         | 62%                                       |
| <b>waste paper</b>                       | 25%   | 48%                         | 71%                                       |
| <i>situation after PAYT introduction</i> | <i>collectively used containers, charging per solidarity unit</i> |                             | <i>individual bins, individual charge</i> |
| <b>light weigth packaging, green dot</b> | 67.5%   | 67.3%                       | 71.9%                                     |
| <b>biodegradable waste (new system)</b>  | 51.6%   | 47.8%                       | 46.4%                                     |

*Résumé: In terms of waste diversion, people start behaving in the same way regardless of the local settings*





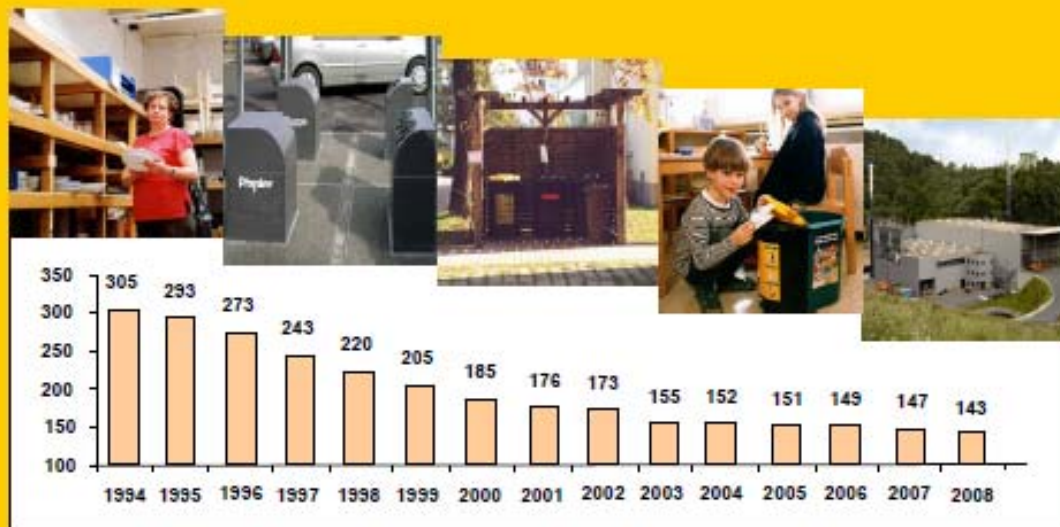
# Dresden – the system's pay-off



**Over the years adjustments in the charge structure were still necessary to eventually ensure the schemes sustainability !**

## Does the trend hold?

### Waste Management in Dresden



City of Dresden

Urban Green and Waste  
Management Office

Dresden  
Dresden



**143 kg per capita  
residual waste  
generation in  
2008  
as compared to  
305 kg per capita  
in 1994**

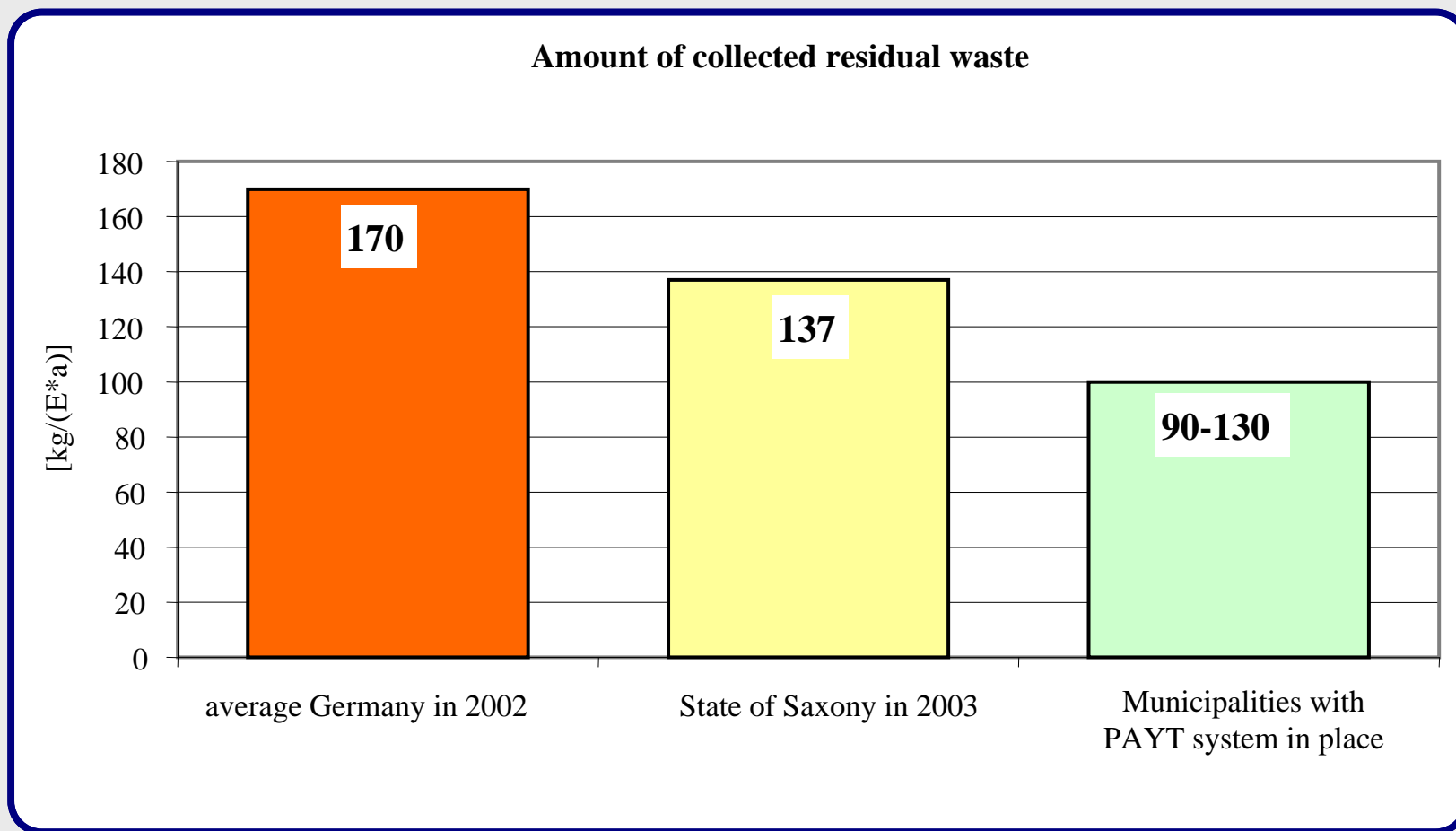
**whilst incomes  
and consumption  
are on a steady  
increase !**

Graphic source: City of Dresden

**The level of charges per bin and unit of collected residual waste has remained constant since 2003 and belongs to the lowest in Germany**

# Can waste generation indeed be linked to PAYT?

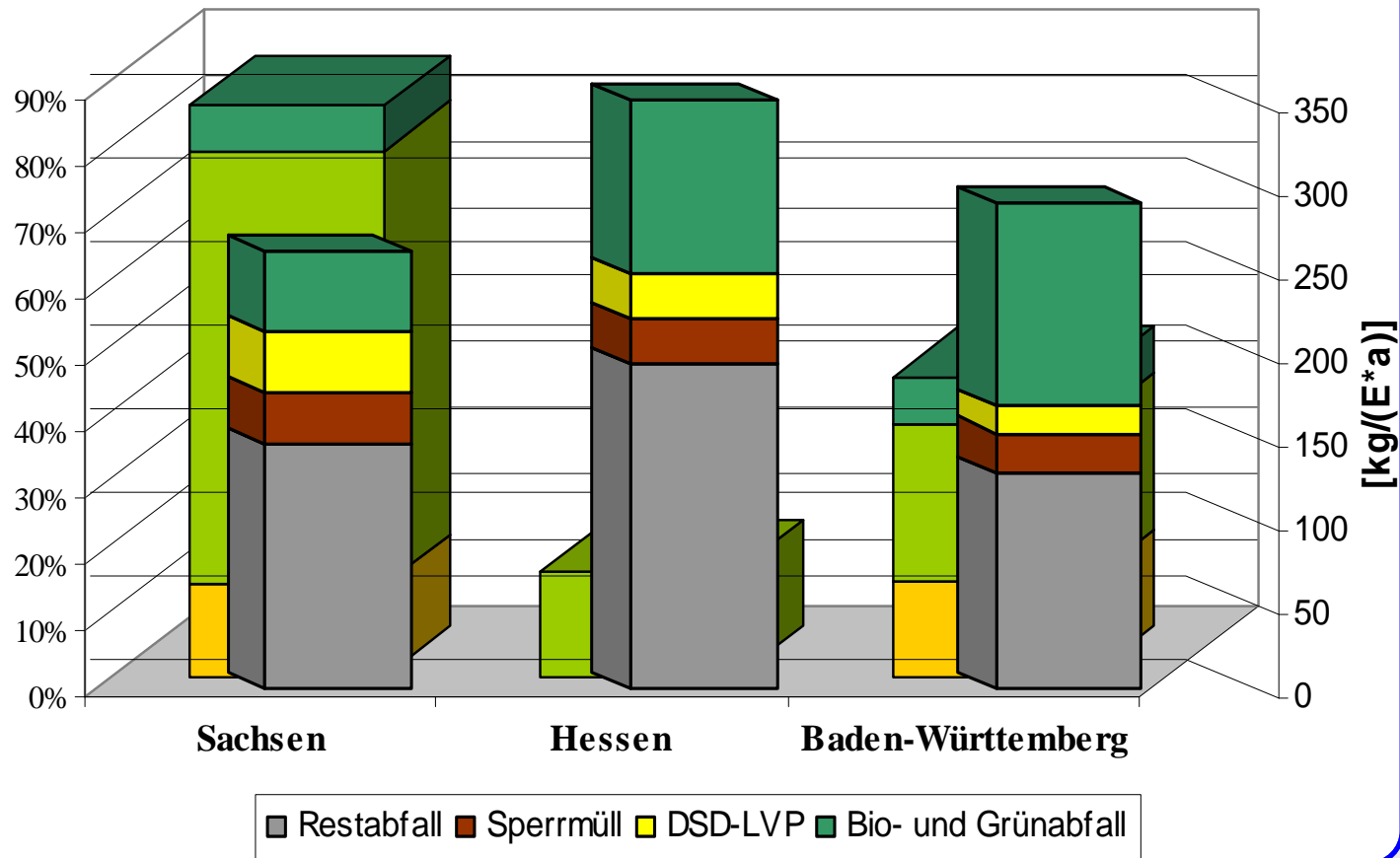
## The issue looked at from waste statistics



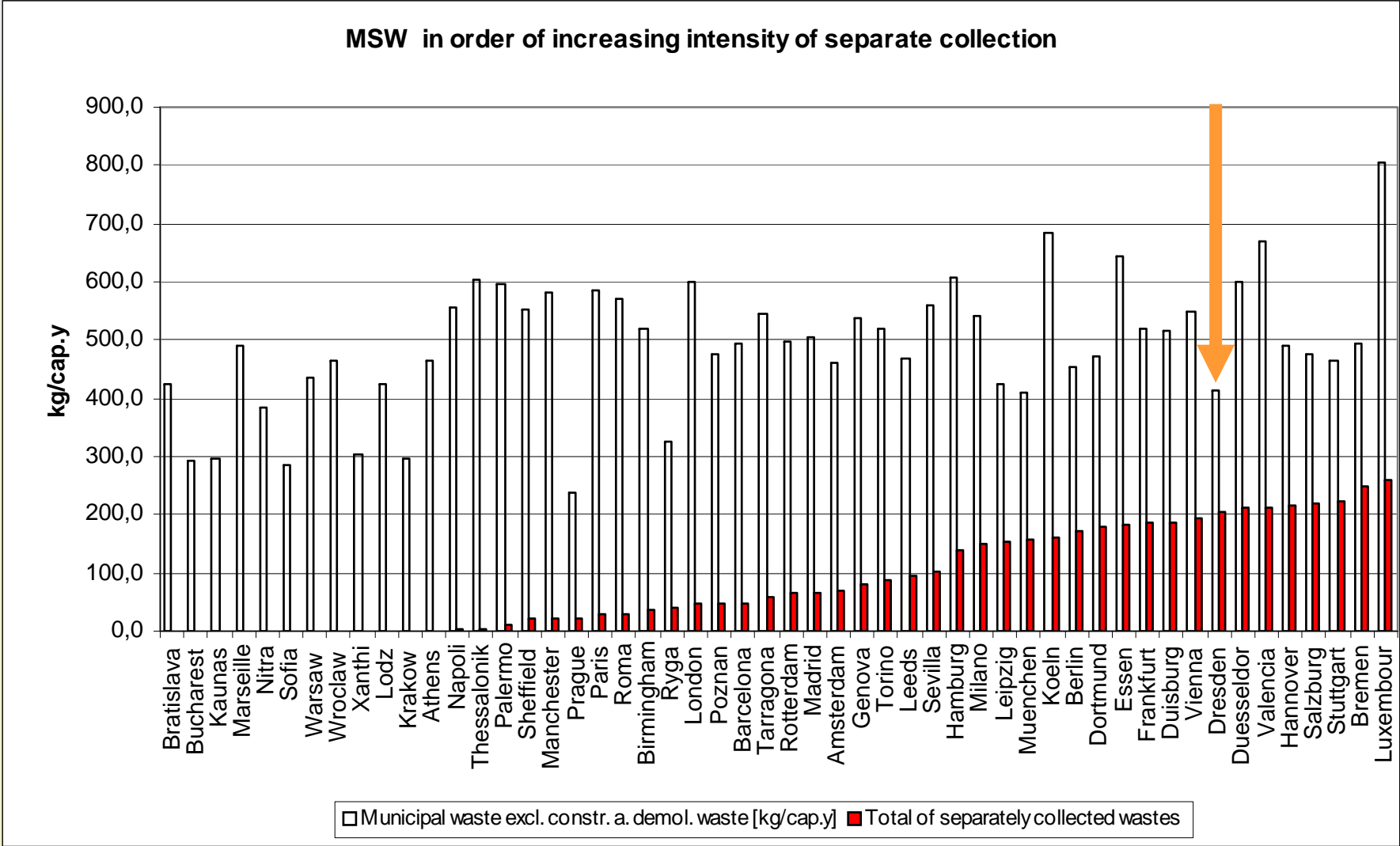


...and by linking application intensity of PAYT and waste generation

Aggregated amounts of municipal waste fractions 2002



# Dresden's SWM performance from the European perspective



Graphic source: L.Schanne; LCA-IWM Project result

# People benefit directly

- **Stable charges despite generally rising cost levels**
- **Comparatively low charges**

**Waste charge level for Germany in comparison**  
 Euro per m<sup>2</sup> (2008) **Germany** / **New federal states** / **Saxony** / **Dresden**  
 0,19 / 0,13 / 0,11 / 0,11  
 Source: © Mieterverein Dresden und Umgebung e.V. (Stand: Mai 2010)

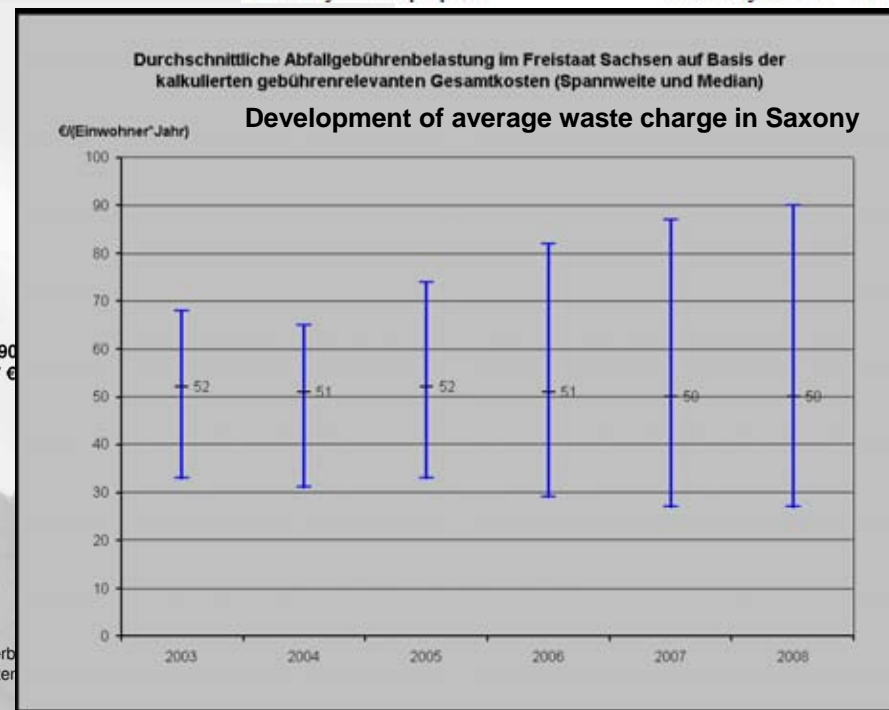
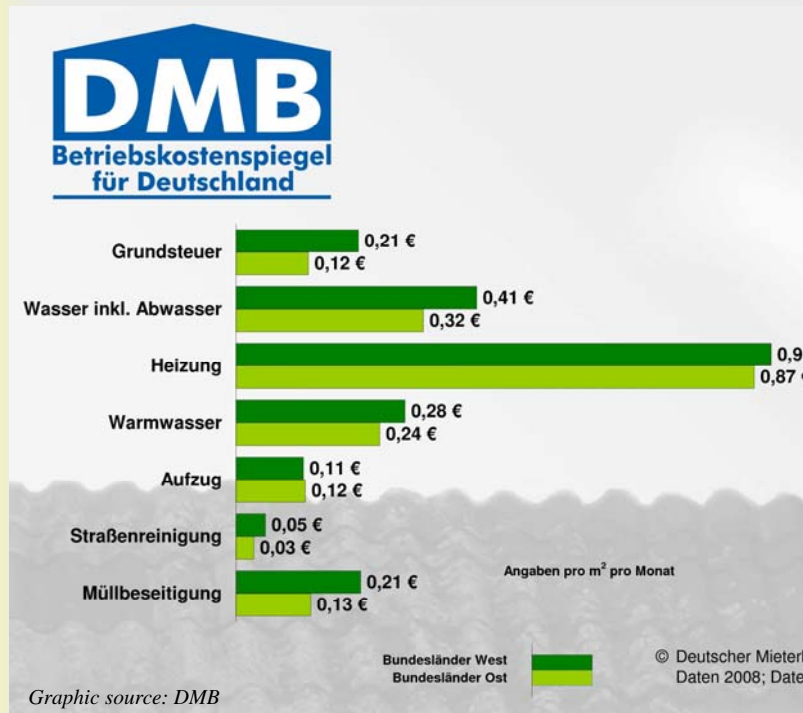
**Average Financial Load 2008** Graphic source: City of Dresden  
 (December 2008: 510,776 Inhabitants in Dresden)

### charges for all waste management services

- per inhabitant 58,80 €/year  $\triangle$  16 ct/day
- per for members family 235,20 €/year  $\triangle$  64 ct/day

### compared with:

- electric current: 380 €/a  $\triangle$  1,04 €/day
- water/waste water: 385 €/a  $\triangle$  1,06 €/day
- annual ticket for local transport: 326 €/year  $\triangle$  89 ct/day
- charges for tv and radio: 216 €/year  $\triangle$  59 ct/day
- phone and internet flatrate: 360 €/year  $\triangle$  99 ct/day
- daily newspaper: 236 €/year  $\triangle$  65 ct/day



# Résumé: PAYT helps to achieve critical SWM goals - but success lives from support!

- PAYT has to be a piece of environmental policy package
- Success comes from a bundle of measures

*e.g. education/information  
structure redesign  
social acceptance  
intensive, user-friendly separate collection offers*

## General Data of Dresden, Capital of Dresden

(as of december 2008)

|  |                        |                       |
|--|------------------------|-----------------------|
| inhabitants principal/secondary residence: | 510,776/9,214          |                       |
| area:                                      | 328.30 km <sup>2</sup> |                       |
| number of dustbin stands:                  | appr. 50,104           |                       |
| fraction:                                  | number of dustbins:    | dustbin volume:       |
| mixed municipal waste                      | 71,483                 | 18,955 m <sup>3</sup> |
| biowaste                                   | 22,541                 | 3,186 m <sup>3</sup>  |
| light packaging (dual systems)             | 44,184                 | 14,479 m <sup>3</sup> |
|  | 138,208                | 36,620 m <sup>3</sup> |
| number of depot container stands:          | 650                    |                       |
| of which underfloor systems:               | 31                     |                       |
| number of depot containers :               | 2,850                  |                       |

Graphic source: City of Dresden

**Information zur Einführung des Abfallbehälteridentifikations- und Wägesystems sowie der Papiertonne am Haus**

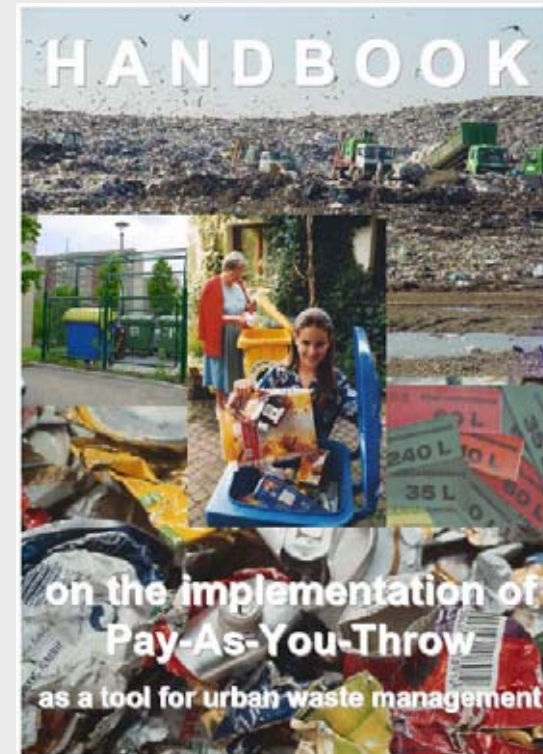
Was sind die wesentlichen Änderungen?  
Die Mülltrennung wird ab sofort noch mehr gelöst. Die Abfallbehälter werden mit einem Chip ausgestattet. Die Abrechnung erfolgt ab dem 01.01.2009 über das Abfallbehälteridentifikations- und Wägesystem (AWIS).  
Die Grundbesitzer erhalten eine neue Registerkarte.  
Wann wird das Abfallbehälteridentifikations- und Wägesystem (AWIS) eingeführt?  
Mit Einführung des AWIS fallen die üblichen Müllkosten und der damit verbundene Aufwand für Müll- und Biotonnen der Partner-Müllbehälter an. Nebenbei werden an Behälter gelassen, die vor dem 01.01.2009 noch die üblichen Müllkosten anfallen.  
Die mit dem AWIS zur Verfügung stehende Müllmenge ist begrenzt. Die Behälter können nur noch in einem bestimmten Umfang an den Standorten für Mülltrennung verwendet werden, wenn diese nicht mehr für die Mülltrennung geeignet sind. Mit der Einführung des AWIS werden die üblichen Müllkosten für eine höhere Gebührenhöhe anfallen.  
Was müssen Besitzer von eigenen Mülltonnen, Eigenanlagen, Behältern, Abfallbehältern, Biotonnen, CHA und Kühltür von Ringkühlern beachten?  
Besitzer von Behältern müssen beachten, dass diese dem höchsten Schmelztemperaturbereich (Biotonne) entsprechen und diese Behälter nicht mehr als Biotonne verwendet werden können. Die Behälter müssen mit einem Chip ausgestattet sein. Die Behälter müssen mit einem Chip ausgestattet sein. Die Behälter müssen mit einem Chip ausgestattet sein.  
Wann und wie erfolgt die Umstellung?  
Die Umstellung erfolgt ab dem 01.01.2009. Die Umstellung erfolgt ab dem 01.01.2009. Die Umstellung erfolgt ab dem 01.01.2009.  
Wie funktioniert das AWIS?  
Das AWIS besteht aus dem Abfallbehälteridentifikations- und Wägesystem (AWIS) und dem Wägesystem (AWIS).  
Das AWIS besteht aus dem Abfallbehälteridentifikations- und Wägesystem (AWIS) und dem Wägesystem (AWIS).  
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[www.payt.net](http://www.payt.net)

[www.payt.gr](http://www.payt.gr)

**Thank you for  
attention**





# Approaches for the technical realization of PAYT

