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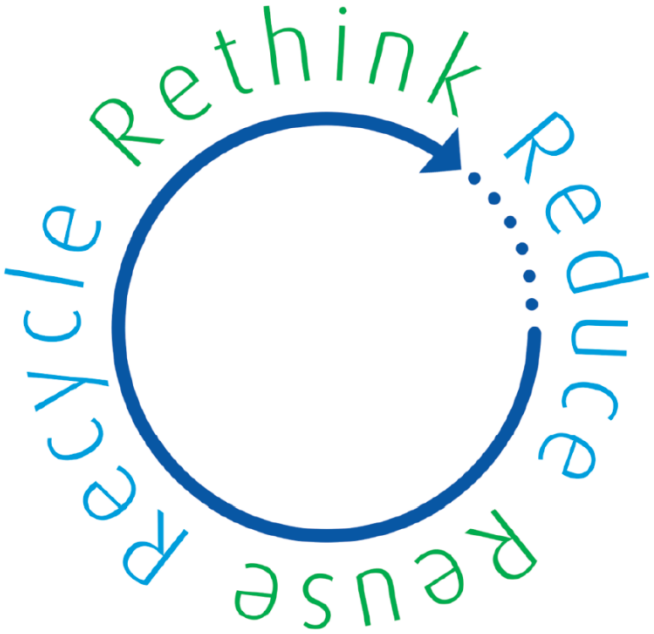
ASSOCIATION OF CITIES AND REGIONS FOR RECYCLING AND SUSTAINABLE RESOURCE MANAGEMENT

Comparison of municipal waste management in EU cities



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We would like to thank all the municipality representatives for their contribution in compiling the information for the factsheets. The views expressed in this report are those of ACR+ only.

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Abbreviations

ACR+	Association of Cities and Regions for Sustainable Resource Management
AD	Anaerobic Digestion
C&D	Construction and Demolition
Cap	Capita
CAS	Civic Amenity Site
DREC	Destination Recycling
ERP	Extended Producer Responsibility
GDP	Gross domestic product
Inh.	Inhabitants
MBT	Mechanical Biological Treatment
N.A.	Not Available
Nb.	Number
P&C	Paper and Cardboard
PAYT	Pay-as-you-throw
PET	Polyethylene terephthalate
PMC	Plastic Metal Cartons
RDF	Refuse-derived fuel
WEEE	Waste Electronic and Electrical Equipment

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Executive summary

Scope and content of the study

This study compares municipal waste management in cities and metropolitan areas. Data were collected in 17 cities across Europe, encompassing mostly dense metropolitan areas.

Figure 1: location of the cities covered by the study

To propose a consistent analysis, data were processed in the light of three parameters:

- **The scope of the data**: "municipal waste" being largely defined by the perimeter of the municipal waste service, e.g. to what extent non-household waste is included, the scope of data can greatly vary from one city to another;
- **The local context**: certain parameters can have an impact on waste generation or management, such as population density, tourism, or GDP;
- **The local waste strategy**: the modes of collection, sorting guidelines as well as financial instruments impact the performances, e.g. waste sorting and recycling rate.

The collected data are presented in factsheets allowing consistent comparisons. To ease comparisons, the study distinguishes two types of waste:

- "**Common waste**": waste that is produced by citizens on a regular basis and handled via traditional collection schemes (door-to-door, bring banks…). It is mostly composed of bio-waste, dry recyclables (paper, packaging waste) and residual waste;
- "**Other waste**": waste that is not "common waste", meaning that it is not collected with common waste for various reasons (bulkiness, hazardousness…). It includes all waste collected in civic amenity sites and within bulky waste collection schemes.

Collected quantities

The observed collected quantities vary from 300 kg/cap in Zürich to 700 kg/cap in Odense, with an average of 465 kg/cap. The collected data also show important discrepancies for the relative share of "common" and "other" waste, which is partly due to the fact that some waste can be regarded as common waste in some cities and as other waste in others (e.g. green waste that can be collected door-to-door, possibly with food waste, or in civic amenity sites).

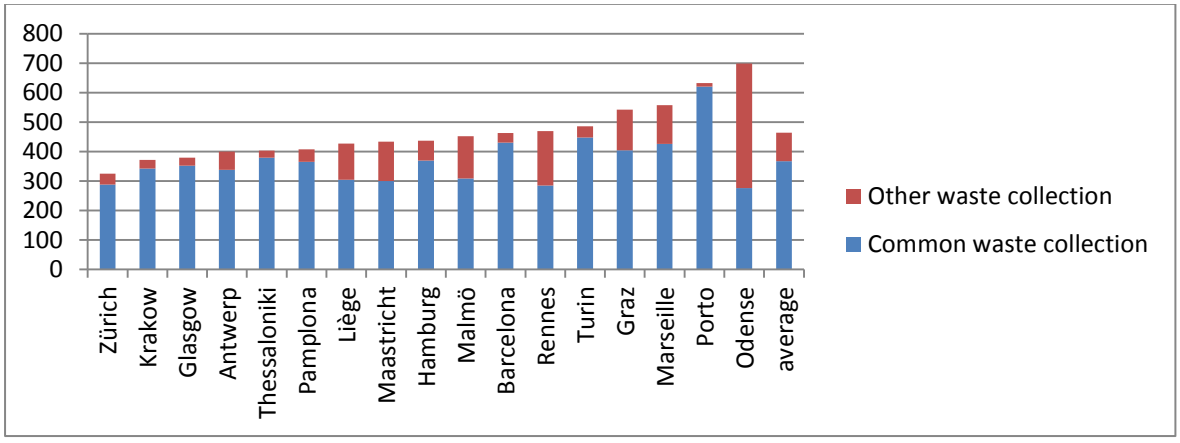

Figure 2: collected quantities of municipal waste per inhabitant (in kg/cap)

These differences among collected quantities can be explained by various factors. As explained above, the exact scope of municipal waste is not consistent among the cities: while most of the cities presenting the highest quantities per capita all include commercial waste, both Zürich and Glasgow's datasets exclude them, which can explain their relatively low quantities. Some external factors can also be linked with the collected quantities. Both Porto and Barcelona display higher figures on tourism and Porto has one of the highest figures of companies per inhabitant in the panel. However, it must be noted that no consistent correlation could be identified between the collected quantities and the various external factors for which data could be found (Tourism, GDP, living conditions…). This could be attributed to the fact that the studied panel is too small to identify consistent statistical correlation.

Common waste management

The first observation that can be made on common waste collection is that there is a great diversity in how it is organised: both on the sorted fractions (how inhabitants are invited to sort their waste) and the collection methods (door-to-door, bring banks…). The most common collection scheme for bio-waste is door-to-door collection of comingled food and garden waste. For dry recyclables, glass and paper/cardboard are generally source-separated while other packaging waste is commonly co-mingled. For most cities, paper/cardboard and bio-waste represent the most significant waste fraction when it comes to common waste.

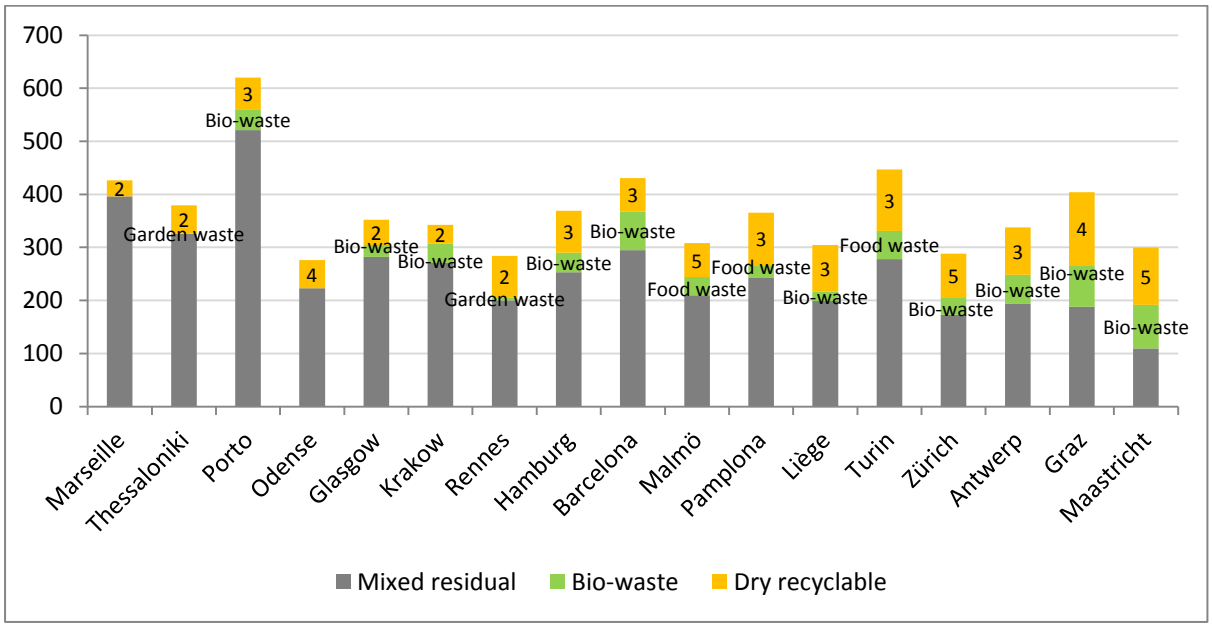

Figure 3: collected quantities of common waste (in kg/cap), with indications on the accepted bio-waste and the number of collected streams for dry recyclables

More source separation generally leads to higher sorting rates; cities co-mingling paper with packaging waste tend to present lower separated quantities. Source-separated fractions also present much lower contamination rates than co-mingled fractions. However, no clear link between the collection modes and the performances could be identified; high performances are achieved by cities resorting mainly to door-to-door collection as well as by cities using mainly bring banks.

It is also important to put in parallel the sorted quantities with the fractions that are collected within the residual waste. For instance, the sum of sorted and unsorted bio-waste ranges from 80 kg/cap to 225 kg/cap, the most significant arising being found in tourist cities. Cities presenting comparable sorted quantities can actually have very different sorting rates.

Other waste management

Data collected on other waste focused on the sorted and mixed fractions collected in civic amenity sites (CAS) and on the quantities associated with bulky waste collection schemes (on demand or at regular frequency).

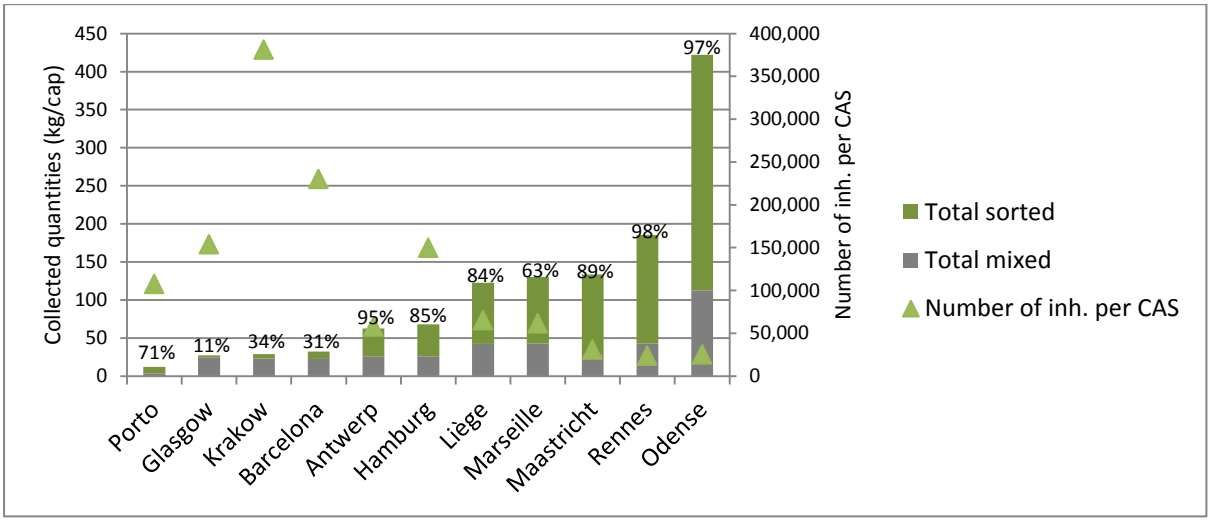

Figure 4: sorted and mixed other waste quantities (in kg/cap/yr), the number of inhabitant per CAS, and the share of other waste collected in CAS compared to the total quantities of other waste (in %)

Higher sorting rates of other waste are achieved by cities proposing a dense network of CAS and limited access to bulky waste collection (i.e. only collection on demand, possibly with a fee). Data were collected on the sorted fractions for the cities among the ones with the most significant quantities, which tend to show that the most significant fractions are construction and demolition waste as well as garden waste. In Odense, where commercial waste is accepted in CAS, both fractions amount to almost 250 kg/cap.

Best practices?

Despite the very heterogeneous practices identified in the different cities and the difficulty to ensure consistent comparisons, it is possible to find some common good practices shared by the cities with the highest recycling performances:

- **Source separation** seems to be the key to high recycling performances. The most advanced cities all rely on the following systems:
  - A selective collection of **paper and cardboard**, separated from the other fractions;
  - An effective separation of other waste in **civic amenity sites**, allowed by a dense network of CAS and a limited collection of bulky waste on demand;
  - An effective source separation of **bio-waste**.
- A Pay-As-You-Throw (PAYT) system for part or all of the waste.

On the contrary, the cities with lowest performances mostly use comingled collection for paper, cardboard and packaging, have a limited bio-waste separation system and a limited civic amenity site network, limiting the possibilities of source separation.

When it comes to common waste separation, high performances can be attributed to mainly 3 fractions: paper and cardboard, glass and bio-waste. Bio-waste is generally collected in door-to-door systems. For dry recyclables, it is interesting to note that well-performing cities resort either to door-to-door or to bring bank systems.

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