



DATA COMPARISON

Main findings

February 2014



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2. INTRODUCTION

Regions for Recycling (R4R) aims at identifying effective local instruments that could help local and regional authorities to optimize municipal waste recycling. One of the first topics that was tackled by the partnership was to draft a common method to present their data, so that a common comparison method could be established. To do so the partners of the R4R project formed 4 peer review groups. These groups changed depending on the waste streams so that every partner could discuss its data with others.

Each group was provided with their respective data of 2010 regarding different waste fractions, highlighting differences in recycling performances. They were then asked to discuss and to answer on the following questions:

1. What is the cause of the differences?
 - a. less waste is generated (because of external factors or better waste prevention) and so there is also less collected.

- b. Selective collection is not well organised yet and may be improved by introducing more local instruments.
 - c. Certain part is included in another waste stream or waste streams.
 - d. Certain part is not included because it is collected by private companies.
 - e. Other?
2. What can be done to make the data more comparable (e.g. add a part to another waste stream, ...)?
 3. When can this be done?

A data comparison was done for the following waste streams:

- Paper and cardboard
- Bio-waste
- Metals
- Glass
- WEEE (Waste Electrical and Electronic Equipment)
- Textiles
- Wood

The aim is to analyse the different results according to the separate collection of all those waste streams and to obtain more comparable data based on common definitions. The final goal is to improve the recycling rates in general.

For each waste stream a table with the results obtained per partner is made. The data reported in these tables were provided by the partners – this data was calculated according to each partner's own method, meaning that local differences limit the comparisons. One of the goals of these working groups was to identify these differences.

The data provided by the partners for paper and cardboard, bio-waste, metal, glass, waste electrical and electronic equipment (WEEE), textiles and wood was calculated by using their own methods. The data for the waste plastics was provided by the partners for the first time according to a common method.

Part 2 presents the results of data comparison for the different waste streams. Point 3 gives an overview of some general findings based on the comparison of the previous waste streams.

3. DATA COMPARISONS

3.1 Paper and cardboard (P&C)

Comparisons of the results obtained by the different partners for paper and cardboard selectively collected in 2010 expressed in kilogram per inhabitant are presented in the following graph.

Paper and cardboard - kg/inh/yr in 2010



The main findings of this comparison are:

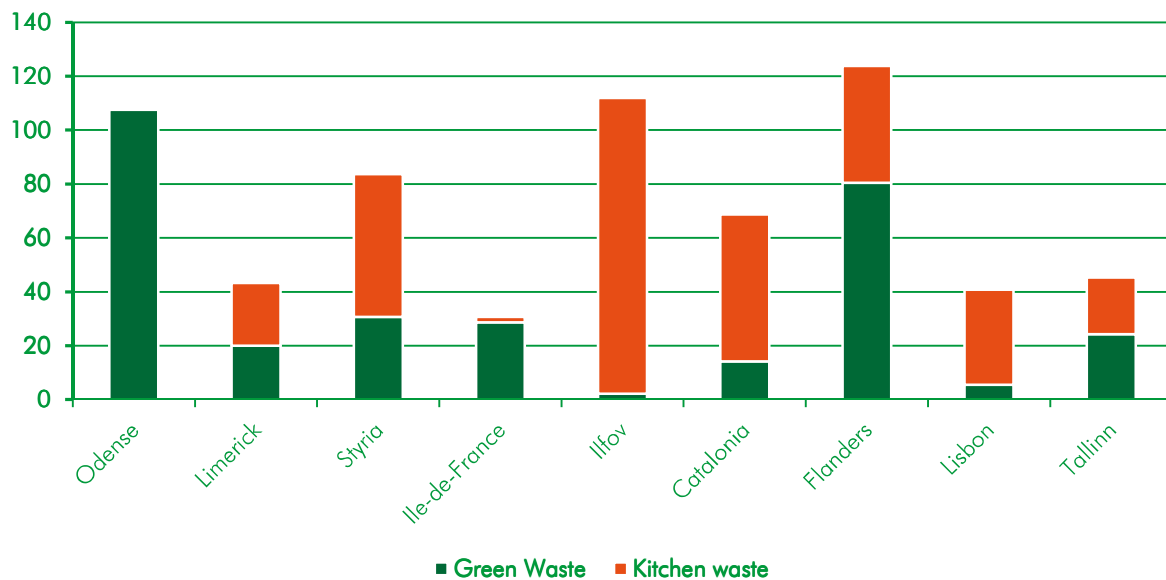
- Some regions do not make distinction between packaging and other, considering paper & card (P&C) sources, presenting all P&C as one stream, while others split up the stream into packaging/non-packaging or either more detailed (cardboard/newspaper + magazines/advertisements). It might reflect choices with the definition of waste fractions to be separated: some territories make distinction between packaging and non-packaging, while other manage paper and cardboard waste as one fraction.
- In some regions there is a significant illegal collection of P&C (Attica Region, Sofia, Lisbon) induced by the economic crisis. These amounts are not included in the collection data (these data will be provided for Attica Region).
- Paper and cardboard have a market price and are sometimes collected outside the municipal collection schemes, e.g. by private companies through their own systems. Collection data from private service providers are not always available or reported.

- The absence of mandatory obligations on the separate collection keeps the collection rates low.
- Municipal waste data generally include a share of commercial waste collected with household waste. However, this share might greatly differ from one region to another, especially for papers that are possibly generated by offices. When commercial paper and cardboard is included the quantity collected is definitely higher.
- Local instruments (e.g. landfill and incineration bans, landfill and incineration taxes, etc.) and external factors as economic crisis, floating population, have a significant impact on the collection rate of paper and cardboard.

3.2 Bio-waste

Comparisons of the results obtained by the different partners for bio-waste selectively collected in 2010 expressed in kilogram per inhabitant are presented on the graph below.

Bio-waste - kg/inh/yr in 2010



The main findings of this comparison are:

- The extent of home composting can have a great influence on the production of bio-waste (home composting is considered as prevention) and the quantities of bio-waste collected via door to door schemes.

- The presence of public green spaces and private gardens has a logical influence on the production of bio-waste.
- Consumption patterns can have an influence on the production of bio-waste; southern countries generally show a higher consumption of fresh products, entailing more bio-waste.
- The different regions do not share a common definition of bio-waste e.g. in Flanders: meat, fish, seafood, bones, etc. are legally not allowed in the bio-waste (because of hygienic reasons for the use as compost) whereas other territories do include meat in bio-waste collection.
- When bio-waste from restaurants is included in the total quantity of bio-waste collected this will result in significantly higher bio-waste collection rate.
- Besides the kilogram per inhabitant the potential of organic waste remaining in the residual waste fraction is a good indicator. However this indicator requires a composition analysis of the residual waste, which is the case for all the potential recyclable materials in the residual waste.
- Several local instruments such as legislative instruments (landfill and incineration bans) have a clear impact on the collection rate of bio-waste as well as several external factors e.g. climate, housing, consumption patterns, etc...
- A general discussion took place on the inclusion of home composting data in the waste data matrix. The conclusion was to consider home composting ratio as an "external factor" since it is considered as prevention and not recycling.

3.3 Metal

Comparisons of the results obtained by the different partners for metal scrap selectively collected in 2010 expressed in kilogram per inhabitant are presented in the graph below.

Metal - kg/inh/yr in 2010



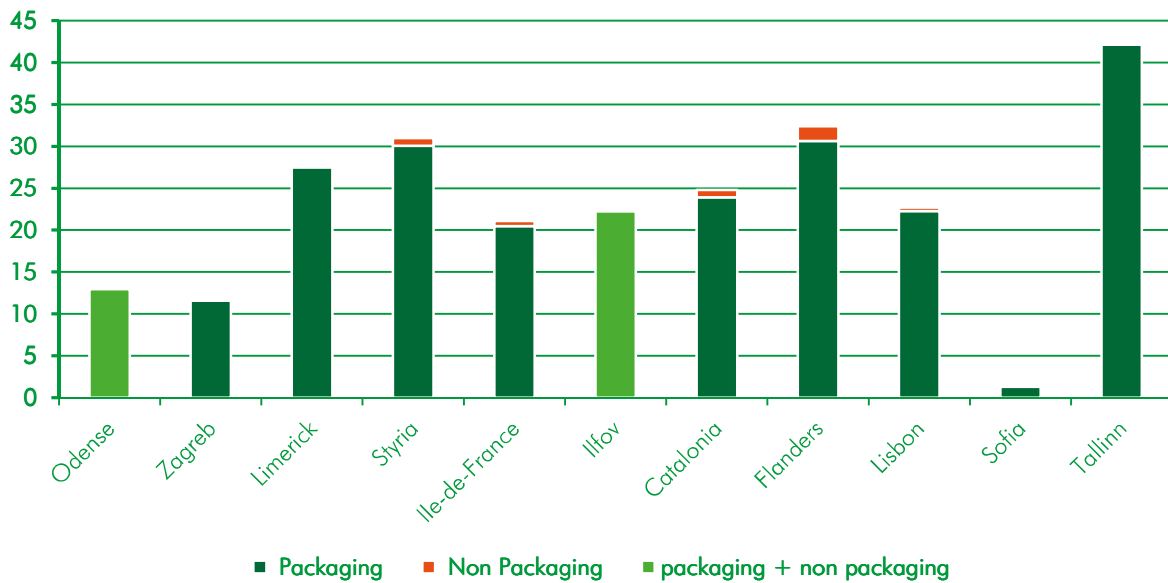
The main findings of this comparison are:

- Metal packaging is mostly collected in a mixed packaging waste fraction (e.g. with other material fractions) and sorted out afterwards in material sorting centres.
- Because of the market value of metals, scavenging of metals has become widespread in different regions, impacting on the collected quantities.
- Deposit/return scheme results in a high separate collection rate. Only cans bought from other countries ends up in the residual waste.
- In some territories, the positive value of metals can lead to the development of parallel collection schemes organised by private collection companies, which can lead to a decrease of metals collected on behalf of municipalities. The more positive the market value of the recyclable materials, the more private initiatives will arise.
- Some non-packaging metals are often included in the bulky waste which can be sorted out after collection in specific sorting centres. These quantities are not always included in the values provided by the partners, which can explain part of the differences.

3.4 Glass

Comparisons of the results obtained by the different partners for glass selectively collected in 2010 expressed in kilogram per inhabitant are presented in the graph below.

Glass - kg/inh/yr in 2010



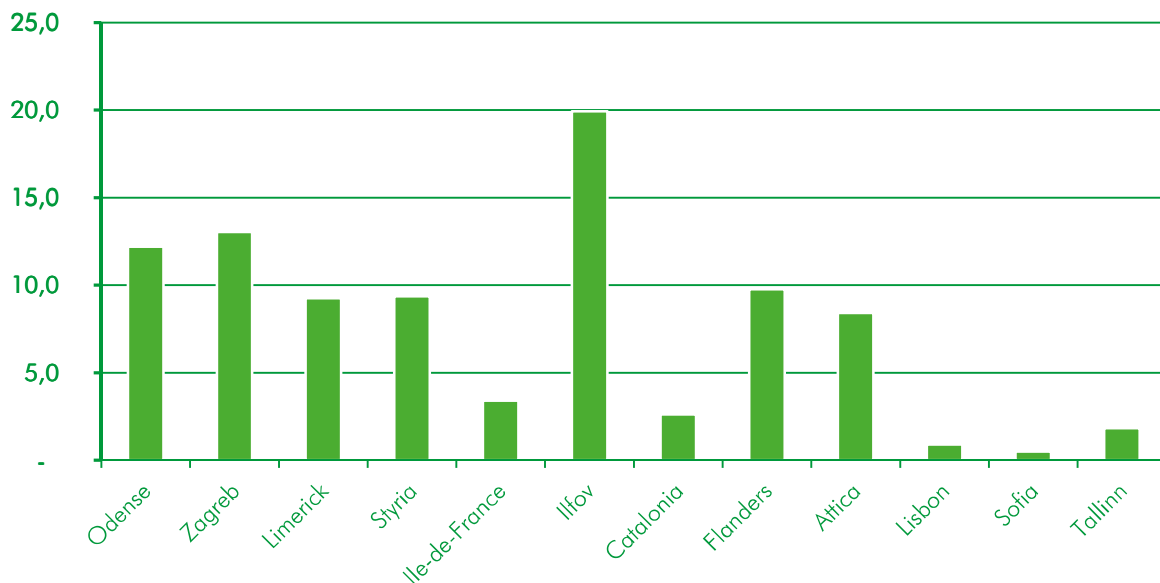
The main findings of this comparison are:

- Data about glass consist mainly of packaging glass. The non-packaging glass is often included in the bulky waste or in construction and demolition waste.
- The use of reusable bottles may lower the glass waste production because they only end up in the statistics after several uses, when they break and are re-melted.
- All glass packaging may be collected together and optically separated afterwards or collected separately (white/coloured glass).
- Non-packaging waste (flat glass) is mainly collected at the civic amenity sites.

3.5 WEEE (Waste Electrical and Electronic Equipment)

Comparisons of the results obtained by the different partners for WEEE selectively collected in 2010 expressed in kilogram per inhabitant are presented in the graph below.

WEEE - kg/inh/yr in 2010



The main findings of these comparisons are:

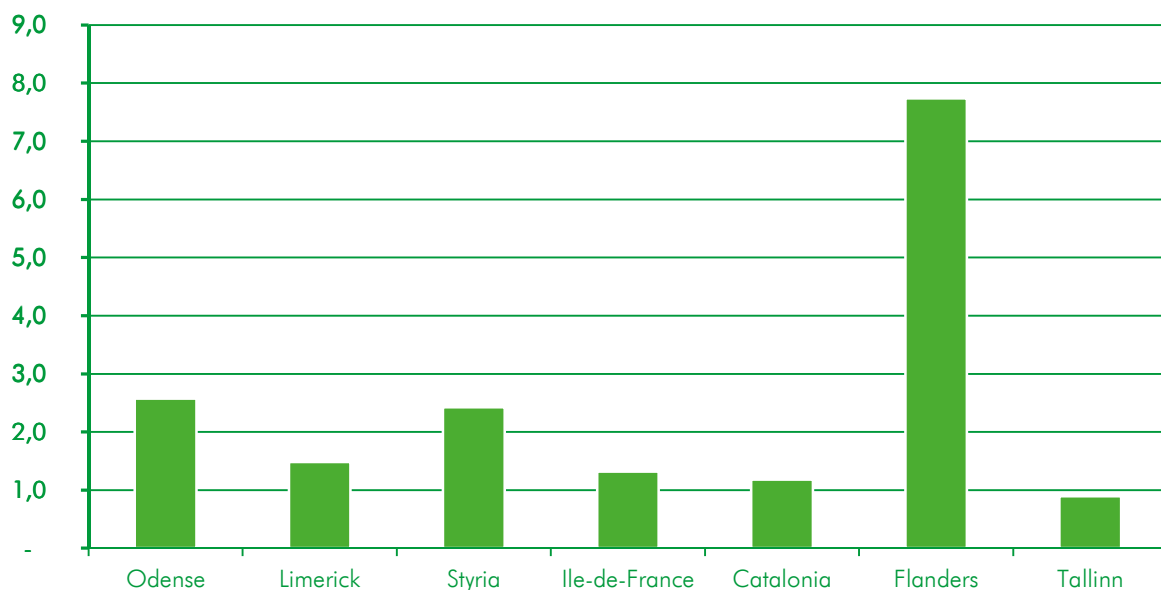
- The separate collection of WEEE is regulated mostly by the implementation of the extended producer responsibility (EPR). Because of the extended producer responsibility there are no or less costs for the municipality for the treatment of WEEE.
- In some regions there is still a big part of WEEE in the residual waste. Communication and awareness campaigns to inform citizens about a correct way of sorting of this waste stream are important.
- WEEE is sometimes collected by scavengers to be dismantled (metals) and to extract elements with high market values (e.g. critical metals). These quantities are not listed in the waste statistics.
- Part of the WEEE is collected as door-to-door bulky waste and sorted out in sorting centres. These quantities might not appear in these statistics.

- Data from EPR system include quantities of commercial waste. Commercial WEEE not similar to household waste should not be included. Annex II¹ of the WEEE directive has the following categories:
 1. Large household appliances
 2. Small household appliances
 3. IT and telecommunications equipment
 4. Consumer equipment and Photovoltaic panels
 5. Lighting equipment from
 6. Electrical and Electronic tools (with the exception of large-scale stationary tools)
 7. Toy, leisure and sport equipment
 8. Medical devices (with the exception of all implanted and infected products)
 9. Monitoring and control instruments
 10. Automatic dispensers

3.6 Textiles

Comparisons of the results obtained by the different partners for textiles selectively collected in 2010 expressed in kilogram per inhabitant are presented below.

Textiles - kg/inh/yr in 2010



¹ Directive 2012/19/EU of the European Parliament and Council of 4 July on waste electrical and electronic equipment (WEEE).

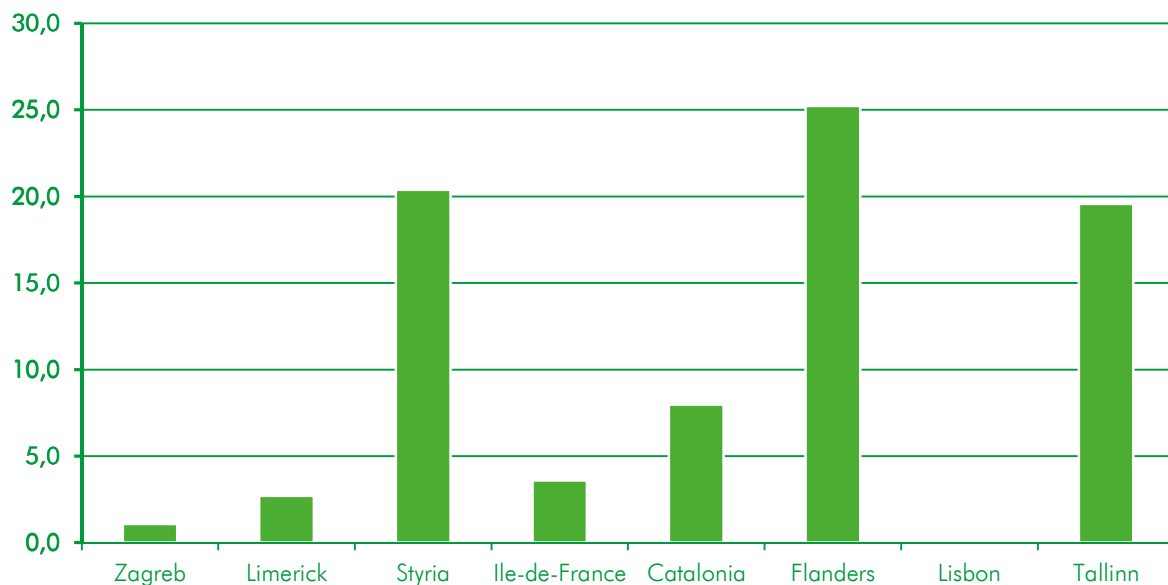
The main findings of this comparison are:

- Data about the separate collection of textiles are generally less available. Textiles are mostly collected by private organisations through containers for re-use. In other case textiles are collected separately at civic amenity centres or at re-use centres.
- In some cases textiles are collected by churches, charity organisations or social economy organisations; collection data for these flows are not always available. In some cases the data of the collected textile sent to reuse are reported as recycled.

3.7 Wood

Comparisons of the results obtained by the different partners for wood selectively collected in 2010 expressed in kilogram per inhabitant are presented below.

Wood - kg/inh/yr in 2010



The main findings of this comparison are:

- Data on wood waste as such are not always available. In some cases wood is considered as bulky waste and is included in the bulky waste data. In other cases wood waste is categorised as packaging waste. Therefore, the presented data might be underestimated.
- An estimation of the percentage of the wood waste represented in the bulky waste can be made.
- Pallets and wooden packaging are sometimes re-used many times. These types of waste can have their own collection schemes.

- In some cases wood waste is collected at the civic amenity centres. Sometimes at the civic amenity centres, there are separate containers for both hazardous wood waste and non-hazardous wood waste.
- Some confusion may arise between wood waste and pruning wood from gardening waste.
- Wood waste can be selectively collected to be then sent to energy recovery plants.

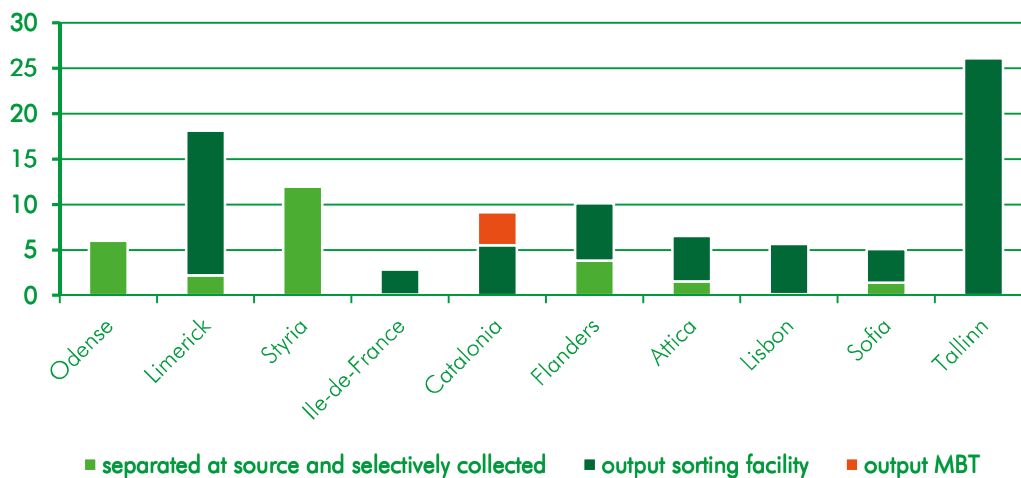
3.8 Plastics

After analysing the results of the first working group, the expert group has designed a new method clarifying both the scope and the calculation method to compare the materials sent to recycling. The new definition is published in R4R document “Municipal Solid Waste Data R4R Project Scope, August 2013” and is published on the R4R website².

As a first test, partners were asked to use this method to compare their data regarding recycling of waste plastics. The graphs below present several results that could be determined as a result of these first comparisons.

The graph below presents the quantities sent to recycling per inhabitant, split up between stages of separate collection: fractions separated at the source by the waste producers, fractions sorted in material sorting centres and fractions sorted in mechanical-biological treatment plants (MBT).

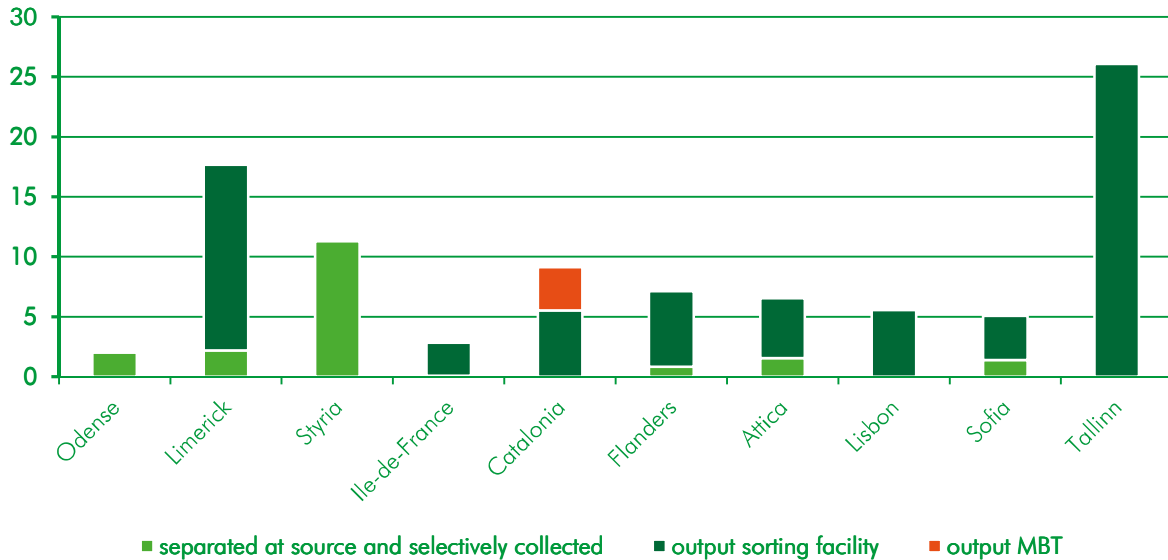
Waste plastics sent to recycling - kg/inh/yr in 2010



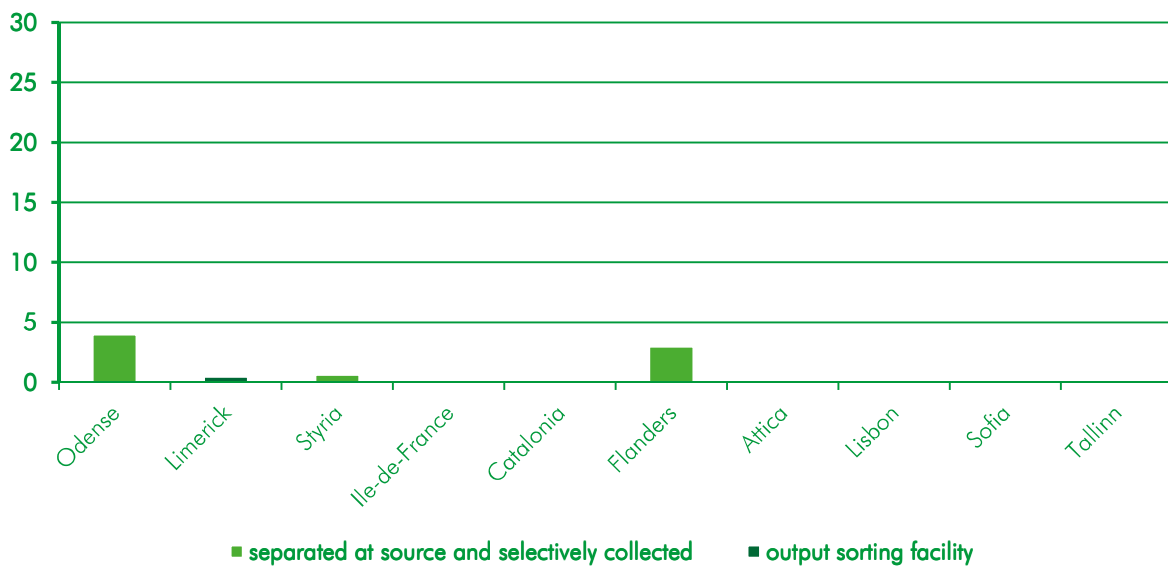
² <http://www.regions4recycling.eu>

The same graphs are presented for packaging and non-packaging fractions:

Plastic packaging sent to recycling - kg/inh/yr in 2010



Plastic non-packaging sent to recycling - kg/inh/yr in 2010



Main findings of this comparison are:

- Plastic packaging waste from household falls under the EPR schemes and is sometimes collected with other packaging waste streams (e.g. metal packaging, paper and cardboard...). Those waste streams are transported mostly to sorting facilities.
- Plastic packaging waste from commercial activities is collected separately and is mostly directly transported to recycling companies.
- Plastic packaging waste collected by deposit systems are not often reported in the waste statistics.
- Other plastic waste streams (non-packaging plastic) are mostly collected with the mixed (residual) waste or with bulky waste. The non-packaging plastic is sometimes collected separately at the civic amenity centres for recycling or for incineration in the cement kilns. The collection of non-packaging plastic waste greatly varies from one place to another.

4. GENERAL FINDINGS (NOT SPECIFIC FOR ONE STREAM)

Based on the previous comparisons of different waste streams collected separately the following general findings can be made:

- To be able to compare figures/results between region's/cities, common definitions for the different waste streams are essential, e.g. for bio-waste.
- Statistics may be distorted due to the fact that a part of the municipal waste is collected by private companies and the collection data are not included in the statistics. Import and export of waste streams between regions make comparison and data statistic more difficult. On the other hand, the share of commercial waste in municipal waste may greatly vary from one place to another.
- Local instruments (e.g. landfill and incineration bans, landfill and incineration taxes, EPR, mandatory separate collection schemes, PAYT, etc ..) and external factors (e.g. economic crisis, home composting rate or consumption patterns) have significant impact on the collection rate.
- In order to ensure that reported data are comparable and reliable, further efforts are needed to guarantee that all the recyclable waste are reported to the local authorities even when the waste is collected by private service providers. The establishment of a well-functioning data reporting system is crucial for the comparability of the data between regions/cities/countries.
- Waste streams with a positive market value can be collected by scavengers or private companies. Data is generally not available about these waste streams, while these quantities are supposed to be substantial.

- Data on the separate collection of textiles are less available due to the fact that textiles are mostly collected for charity purposes.
- A composition analysis of the residual waste gives an insight in the percentages of recyclable materials that still can be collected separately and be recycled in the future. To compare regions/cities there is a need on a common format for the composition analysis.
- Different regions may use different packaging materials for the same products. For this reason it would be useful to compare the sum of all packaging materials.
- In some regions more fresh products may be used and so less packaging is needed. Consumption patterns influence the quantities of (packaging) waste.
- Selective collection is yet not well established in all regions. During pre-treatment some streams may be sorted out from the household waste in those regions.
- Unlike the collection of plastic packaging waste that falls under the responsibility of the EPR, the separate collection of the non-plastic packaging waste vary widely and less are data available.
- Wood waste, big textile waste as carpets, non-plastic packaging waste as rigid waste are often collect together with the bulky waste. Less data is available for these streams

5. CONCLUSIONS

The discussions led by the different working groups have highlighted several factors that can explain differences of recycling performances between territories. While the effectiveness of local instruments and recycling strategies seems to play an important role, other reasons can explain differences. It is important to take into account these reasons while comparing data among territories. The main conclusions that can be made from this work are the following:

- The data used for the comparisons was not always exhaustive and representative of the real quantities sent to recycling. The common method must focus on separating waste streams really going to recycling plants. Therefore, the output of sorting centres (either for packaging waste or bulky waste) have to be identified and taken into account, while the contamination linked to mechanical sorting of mixed fractions must be excluded from the recycling rate calculations.
- The discussions have shown the importance of considering the same scope for municipal waste. For instance, in some cases household waste collected through private systems might not be included in present statistics, which limit the relevancy of comparisons. However, the share of commercial waste is generally not available for each fraction. Partners have decided to assess the share of commercial waste for municipal waste, which should be given as an indication when comparing data.
- Moreover, defining a clear, common terminology for the different fractions is essential.

- Finally, the discussions have shown that several external factors (such as the rate of home composting) can have an important impact on waste generation and waste collection rates. Comparing two territories not sharing the same local context might entails difficulties to draw conclusions.
- To assess the efficiency of the system, knowing the share of recyclable materials still present in residual waste is important.

These conclusions were taken into account while drafting the R4R methodology regarding the scope, terminology and indicators used to compare recycling performances.

R4R is an 3-year Interreg IVC project project (January 2012-December 2014), bringing together the following partners: ORDIF, ACR+, OVAM, Odense Waste Management, Lisbon City Council, Exfini Poli, Limerick/Clare/Kerry Region, Federal State Government of Styria, Tallinn City, Waste Agency of Catalonia (ARC), Municipality of Sofia, City of Zagreb, Ilfov County Council. The main objectives are to optimise data collection and benchmark recycling performances as well as to combine them with legal, technical, economical and communicative waste management tools.



REGIONS**FOR**RECYCLING