Collection, Recycling, and Recovery of paper and board

16th Report

JULY 2011

2010

comieco
Consorzio Nazionale Recupero e Riciclo degli Imballaggi a base Cellulosica

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52.2 KG

IS THE QUANTITY OF PAPER AND BOARD COLLECTED SEPARATELY ON AVERAGE BY EACH ITALYN CITIZEN IN 2010

MORE THAN

100 MILLION EUR

WERE PAID BY COMIECO TO THE ITALYN MUNICIPALITIES UNDER THE AGREEMENTS IN 2010

THE PAPER AND BOARD RECYCLED FROM 1999 TO 2010 EQUAL THE VOLUME OF

222 LANDFILLS

THAT WERE NOT BUILT IN ITALY THANKS TO SEPARATE WASTE COLLECTION

3.5 BILLION EUR

IS THE NET BENEFIT FOR THE COMMUNITY RESULTING FROM THE SEPARATE PAPER AND BOARD COLLECTION PERFORMED FROM 1999 TO 2010

20 MILLION EUR

IS THE INCREASE OF THE AMOUNTS PAID TO THE ITALYN MUNICIPALITIES VS. 2009

92.7 MILLION EUR

IS THE AMOUNT PAID FOR COLLECTION OF PAPER AND BOARD PACKAGING ALONE

+2% INCREASE OF PAPER AND BOARD QUANTITIES COLLECTED VS. 2009:

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PREFACE

Separate paper and board collection keeps growing and the production of paper, and of packaging in particular, is recovering. These are, in short, the two main facts observed in 2010 and described in the 16th Comieco Report.

Separate collection, which never stopped even in 2009, has settled to 3.07 million tons in 2010, 2% up, once again confirming its maturity. While paper production grows by 6.9%, with a 9.3% increase of recovered paper consumption, exports of recovered paper decline in parallel, even if they still account for 25.6% of apparent collection. The recovered paper market recorded continuous significant increases in value vs. a growing demand at a time – the post-crisis period – characterized by limited supply at world level. Upon closing the Report, the scenario has changed, and the price increase that characterized the early months of 2011 has stopped.

Comieco has increased collection under the agreements to 2.19 million tons, 2.7% up; as at December 2010 – based on the implementation of “flexible” agreements – the parties under such agreements, mostly in the North, yearunced they will only use Comieco partially as a guarantor for recycling in 2011, and therefore such amount declined by about 200,000 tons in 2011.

The appreciation of recovered paper in 2010 resulted into a significant increase in the considerations provided for by the agreements, which exceeded a total of 100 million EUR, 20 million more compared to 2009.

These more abundant resources, however, did not allow the increase expected in the South where, for the first time since this Report is being released, the growth of municipal separate collection stopped, while declining in some central regions. This trend is believed to be due to several factors, not too easy to measure. The first factor is the appreciation of recovered paper, which absorbed a share of collection outside the cities; the second refers to certain districts that suffered from a specific reduction of production and consumptions.

The third and last factor concerns the challenges to collection management in Campania and other southern regions, where the exacerbation of the waste emergency actually prevents using separate collection as a readily available remedy.

Results for 2010 in the South draw the attention to the need for the Consortium to continue to commit to the development of collection, considering the existence of a growth potential of household collection. Upon agreement with CONAI and the other organizations, cooperation with the Municipalities could be enhanced in order for them to offer a stable and timely service and – wherever necessary – to strengthen the recycling network. Another important feature should be the local presence of the Consortium as a reference point for the Municipalities and the collection operators. As known, in time Comieco has developed a network that reports to the Salerno Office in the south, and has promoted the sharing of experiences and good practices among the best Cities (the Club of Virtuous Cities for separate waste collection). This has turned out a useful asset for the southern administrations wishing to improve separate waste collection.

Piero Attoma
President, Comieco

INTRODUCTION

The sixteenth edition of the Annual Comieco Report provides an overview of 2010. Signs of an upturn were observed during the year, particularly in the use of recovered paper by the national paper industry, combined with the revival of production and of recovered paper pricing on domestic and foreign markets.

At the same time, separate collection seems to show some signs of slackening, particularly in the Centre and South.
This effect can be attributed to the reduction of consumptions, as well as to critical cycles in certain areas and, last but not least, to the exit of collection flows from the scope of municipal collection as related to the value of materials.

The positive balance increases in terms of environmental benefits, driven by the rising recovered paper prices. The net benefit for the community amounts to 462 million EUR in 2010 alone – the highest value since 1999, the first year considered in our cost-benefit analysis.

1. SLOW RECOVERY

While 2009 had been referred to as the "*annus horribilis*" for the paper industry, 2010 marks the start of such a revival as to restore the production levels to the values of 2008 – a very weak year anyway, at least in the last quarter. Recycling reacts more slowly, yet its upward trend is confirmed. The domestic demand for recovered paper is crucial.
Municipal separate paper and board collection exceeded 3 million tons in 2009 (according to the consortium's updated estimates), and has now settled above this value with 3.07 million tons – 2% up – and just more than 60 thousand tons of new collection. This increase is in line with the data of the previous year and can be interpreted, on one hand, as physiologically rooted in the habits of citizens and retailers and, on the other, as worthy of attention for being basically concentrated in the North of the country. In other words, there is still room for improvement considering the dual effect of slower collection and production recovery.
The processed data shown in the charts and tables on the next pages provide an even clearer overview of 2009 as a highly discontinuous year compared to the previous decade. The year 2010, the object of this Report, is again in line with the broken trend.

This limited increase of paper and board collection should anyway be seen within the framework of a broader evaluation of separate collections, estimated (with no ISPRA data available for 2009 only the data processed by Comieco are considered) as a further significant growth (+8.3/) vs. substantially unchanged urban waste production (-0.2%). In other words, recycling systems are gaining ground (36.3% total separate collection), though being still generally far from the legal targets.
Among the macro-areas, the North strengthens its leading role with over 1.8 million tons (+3.1%). All the regions show signs of increase. Special focus should be made on Friuli Venezia Giulia (+7.7%) and Liguria (+6.0%) that, with the lowest collection yields, bridge the gap with the rest of the area with a combined input of almost 10 thousand tons of new collection.
Emilia Romagna is also performing quite well and its 6.0%

increase provides a crucial input. The region earns the title of leading paper and board recycler with a per-capita yield of 87.7 kg/inhabitant per year.
Lombardy and Piedmont are growing to a lesser extent in percent terms (just above 1%), but together account for almost 30% of national collection (833 thousand tons).
Contrasting signs come from the Centre: though growing (+0.8%), it owes this total result to the Marche region, which increased its annual yield vs. 2009 by 10 thousand tons, whereas the other regions, first and foremost Tuscany (-1.1%), show a negative variation.
The South is generally at a standstill (+0.1%). In this case too, the detailed analysis shows that the negative result in Campania (10thousand tons less, which means a 5.5% decrease) due to the relative importance of this region, makes up for the overall widespread growth in other regions. A positive performance is recorded, in particular, for the regions that used to lag behind: Molise (+16.7%), Basilicata (+5.0%), Calabria (+5.6%), and Sicily (+4.0%). Sardinia, Abruzzo, and Puglia – historical benchmarks – are also growing more slowly, with per-capita yields above 30 kg per inhabitant.

2. COLLECTION SUBJECT TO AGREEMENTS

In the above-described context the Consortium maintains its role as guarantor for recycling. In 2010, just less than 2.2 million tons of paper and board were managed by the Municipalities and the delegated companies under the agreements. As at 31.12.2010, 771 operational contracts were in place, involving almost 80% of the Italyn Municipalities and almost 90% of the population.
With such coverage rates, the involvement of the Consortium accounts for 71%. This is confirmed by the data on apparent recycling, which shows that the agreements providing for application to the Consortium for “partial management” are more popular here. These mechanisms are defined by the Paper Technical Annex, which also precedes the mechanism of annual entry/exit windows. Such system offers the dual

benefit of allowing the Cities to modulate recycling by evaluating different options and, at the same time, of enabling the industrial system to plan more effectively. The share managed by Comieco is just more than one-third (34.7%) of apparent recovered paper collection in the country.

3. COLLECTION YIELD

Per-capita collection in Italy generally amounts to 52.2 kg/inhabitant per year. In 2009, the updated figure was 51.1. One additional kilogramme means that each Italyn citizen has contributed by adding to separate collection – for example – 2 cardboard boxes, 1 newspaper, 1 board case, 1 egg wrap, and 3 paper bags which he or she used to dispose of as ordinary waste.
Tuscany in the Centre (85.9 kg/inhabitant per year) and Sardinia in the South (45 kg/inhabitant per year) are confirmed as the leaders in the respective macro-areas. In the North, while collection is improving in Trentino, the leading region is Emilia Romagna, now the national benchmark with 87.7 kg/inhabitant per year.

Margins for potential improvement do exist across the entire national territory and particularly in such important regions as Lombardy, Latium, and Campania, where the main cities are located and availability is concentrated.

4. CONSIDERATIONS: IMPORTANT RESOURCES

Locally transferred resources, in terms of considerations paid by the Consortium, amount to 92.7 million EUR. This figure is just below the 2009 data (-1.1%), vs. a decrease in the amount of managed packaging, and is also attributable to other factors, such as the enforcement of the new quality brackets as of April 1, 2010.
Overall – also including compensation for similar product fractions – the Municipalities received 113.9 million EUR through the agreements, 20 million EUR of additional resources compared to 2009, to support collections and ensure higher quality.

The total account of the Consortium alone, in the period from 1998 to 2010, is now 791 million EUR, and recycled packaging is close to 9.9 million tons.

5. AUDITS AND QUALITY

The collected average data ultimately confirm the performance consolidated back in 2006. An average 2.62% was recorded for 1.01 + 1.02 in 1,302 checks performed, whereas the mean rate for 1.04 + 1.5 was 0.70% out of a sample of 1,068 checks.

In parallel with monitoring on materials, audits (a total of 118) continued with the support of specialized companies on the stakeholders in the recycling pipeline (parties under the agreements, sorting plants, and processors). The goals of such activities included:

- ensuring data transparency and reliability;
- providing guarantees on system control levels;
- ensuring appropriate system operation while minimizing litigations.

6. THE STATUS OF COLLECTION IN METROPOLITAN AREAS

Every year metropolitan areas provide an important hint to the possible status of actual collection services across the national territory.
This refers both to the possible agreement options provided for by the Paper Technical Annex (PTA) and to operational changes, as well as to service criticalities that sometimes appear quite significantly from one year to the next. The data in Table 7 refers, in particular, to the amounts managed through Comieco agreements.

One positive example is Bolzano, which is confirmed first in ranking in terms of collection yield with 84.4 kg/inhabitant per year. In addition to the capital city of Upper Adige, the development of Bologna is also interesting: here, the gradual extension of the single-material service results into more than 2 thousand tons of new collection (+16.9%); L'Aquila, with over 3,200 collected tons (+26.1%), reaches its maximum level of the past few years.

Criticalities are observed in Catanzaro and Palermo, declining even with respect to the negative trend of 2009. These phenomena cyeart be attributed to changes to the agreement options, but rather to service-related issues.

This case history can also include Perugia, which paid – at least in 2010, but with signs of recovery in 2011 – for some troubles resulting from the reorganization of collection circuits.
This observation focuses in particular on the main cities Florence, Milan, Naples, Rome, and Turin, where the analysis expands beyond the quantities managed under the agreements to include more general data on waste production and post-collection management.

One general finding points out to the gradual erosion – albeit at lower rates compared to the past few years – of the total amount of produced waste caused by separate collection. This is a total of 2.5 more percent points for collection and recovery circuits vs. non-separate waste. Overall urban waste production is slightly growing (+0.9%) after a decline (-1.3%) recorded last year.

Turin seems to be the most “virtuous” of these cities. While showing less spectacular percent rates, separate waste collection keeps growing, and total waste is declining.

While no substantial changes are recorded in Milan compared to 2009, Florence and Rome show a partial increase in the production of total and as-is waste, after a decline last year; the positive trend of separate collection is generally confirmed.
Naples, in counter trend, loses almost one-fourth (-8.3%) of the forward leap of 2009. Criticalities are well known.

7. RECOVERED PAPER AS A RAW MATERIAL

The network ensuring recycling of collection under the agreements is substantially unchanged. The provision of paper and board is ensured, within an estimated 17.1 km average distance, by a network of 328 plants (13 less than in 2009) providing for initial material processing.

The recycling of processed recovered paper is ensured by 64 paper mills referred to as terminals within the framework of the signed agreements. This means 2 plants less compared to 2009 that, if added to the 5 of 2008, confirm that the economic downturn is also affecting paper mills. The share of paper and board managed by Comieco accounts for 34.7% of the apparent collection (calculated as consumption + export – import) of recovered paper within the country.

Apparent recovered paper consumption (+8.3%) and the production of paper products (+6.9%) are recovering, but only make up in part for the decline of more than 18% recorded in the 2008/2009 period.

Overall paper product production was close to 9 million tons, 6.9% up compared to 2009, when production had fallen back to the values of the previous decade. Other items (import and export) are also improving. The packaging sector, with a total 10% increase) acts as a driver vs. other paper product types, whose recovery is slower.

The mix of used raw materials included recovered paper (49.3%), as well as new fibres (33.5%) and non-fibrous raw materials (17.2%). Production recovery brought about a higher demand for recovered paper for domestic consumption (5.2 million tons, i.e. 441 thousand more compared to 2009) to substitute amounts of recovered paper that were meant for export in 2009. Exports, however, still represent a crucial recycling channel, now still worth 1.1 million tons of recovered paper net of imports.

The high demand recorded both on the domestic and on the international market resulted into the achievement – particularly in the second quarter of 2010 – of the highest quotations of the past ten years (just below 100 EUR/t, also for less valuable recovered paper types).

8. PACKAGING MANAGEMENT

Paper and board packaging management is consistent with the general picture described in the above section for the paper sector. The amount of packaging recycled in view of energy recovery is growing again after the decline of 2009, and closes with an increase of 158thousand tons vs. the previous year. At the same time the amount of apparent paper and board packaging consumption is growing, from 4.091 to 4.338 million tons.

As expected, data points out to a recycling rate (78.7%) more than one and a half percent points below the peak recorded in 2009. Overall recovery (therefore including the share used for energy recovery) amounts to 87.1%. These results were expected vs. 2009 when, with slightly growing collection, a sharp reduction of apparent packaging consumption was observed. The 2009 values generally confirm the set recycling and recovery targets.

At the same time, a decline of the recycling index is recorded, now estimated at 78.7% but substantially homogeneous between macro-areas (78.8% in the North, 81.8% in the Centre, 76,2% in the South).

9. COSTS AND BENEFITS OF SEPARATE COLLECTION

Paper and board collection and recycling have significant positive impacts on the entire community, both in economic and in environmental and social terms. These activities create related business and employment, preserve the environment, and valorize secondary raw materials. In short, they create a number of positive impacts that reach beyond mere economic effects. The cost and benefit analysis, in fact, shows that they have allowed our country to achieve net benefits for about 3.5 billion EUR from 1999 to 2010. During this period, 26.3 million tons of paper and board were collected separately. This section contains a brief description of the national balance and of the net benefits for each region, as well as the calculation method and the main items. Moreover, the potential benefits that the regions can still achieve by improving the present collection performance are described.

METHODOLOGY

A cost benefit analysis was performed considering:

- the economic impacts, i.e. the costs (or missed benefits) and the benefits (or avoided costs) connected with paper and board collection and recycling;
- the environmental impacts, i.e. the costs (missed benefits) and the environmental benefits (avoided costs) connected with the paper and board collection/recycling system;
- the socio-economic impact, i.e. a monetary estimate of the greater or lesser related business.

The values of the different cost and benefit items were then updated to take into account their distribution in time. The analysis was founded on differential evaluations based on a comparison of two different scenarios:

- an “historical” scenario that considered the paper and board collection-recycling system adopted from 1999 to 2009;
- an alternative scenario that assumed the absence of any such system and therefore that amounts that are historically managed separately were theoretically disposed of together with urban solid waste.

The logical categories included:

- the costs of the historical scenario that could have been avoided;

- the benefits of the historical scenario that would have been lost if the alternative scenario had been in place;
- the costs of the alternative scenario that were avoided with the historical scenario in place.

The benefits of paper and board collection in Italy

From 1999 to 2010 paper and board collection brought a 3.5 billion EUR net benefit to the Country. Such figure results from an aggregation of the net benefits evaluated for each region, i.e. from the balance of costs for about 1 billion EUR and benefits for about 4.5 billion EUR. Certain items, including collection and disposal costs, reflect the specificities of the individual regions, in that each one has a peculiar morphology and waste management infrastructures. Below is a brief description of the considered cost and benefit items.

Costs

Differential cost of separate collection: this item estimates the higher cost of performing separate paper and board collection vs. the cost of non-separate collection of equivalent amounts in time. The considered costs include the specific ones for each year and for each region and are drawn from the annual waste reports of ISPRA. Such values show significant differences between regions (up to threefold between the minimum and maximum) because they reflect the peculiarities of the different geographies and the different statistical representativeness of the ISPRA sample.

Costs due to non-generated energy: this item estimates the energy that could have been generated through the incineration of the paper and board volumes collected separately every year. Based on the total rate of incinerated waste per year (source: ISPRA), it is estimated that about 3.9 million tons of paper and board were not processed in the period under consideration, with a non-generation of about 3 TWh of energy. The estimate was made at the average annual PUN price (source: GME).

BENEFITS

Environmental benefits from avoided emissions: separate collection and recycling have a positive impact on the environment in terms of reduced CO_2 emissions due to a more limited use of new raw materials in paper production and to non-disposal. Overall, net emissions for about 34.4 million tons of CO_2 were avoided in twelve years. The CO_2 unit saving (1.3 tons per ton of paper) was estimated at the mean annual market prices of emission certificates.

Economic benefits from non-disposal: 3 million tons of paper were recycled, rather than disposed of, in twelve years. The avoided costs were estimated based on the annual regional mix of waste management systems: landfill, composting, biostabilization and fuel production, incineration (sources: ISPRA, regional schemes, Comieco).

Value of generated raw materials: calculates the value of the recovered paper generated from separate collection based on the annual trend of the list price for type 1.01 (source: Chamber of Commerce of Milan).

Social benefit from generated employment: estimates the benefits of collection and recycling for the related business. This item estimates the higher number of operators theoretically required to perform separate collection and recycling compared to non-separate collection. The money value is based on the gross salary of urban hygiene operators according to the sector's national collective labour contract.

REGIONAL BENEFITS

Each region contributes differently to the achievement of the national net benefit. Socioeconomic, demographic, and infrastructural conditions vary significantly between regions. Therefore the aggregated benefits per unit for the entire period under study amount to 144 EUR/t in the North, 114 EUR/t in the

Centre, and 118 EUR/t in the South of the country respectively. Significant differences are observed in terms of amounts and benefits between regions. The highest unit benefits are recorded in the Central and Northern regions, characterized by higher separate collection volumes, competitive costs (both for separate and for non-separate collection), broader use of incineration, and higher disposal costs. The southern regions are, instead, characterized by limited separate collection and higher costs. However the analysis points out to a number of mismatches between the collected amounts and the achieved benefits.

In the same area, the comparison among comparable regions in terms of collection, such as **Veneto** (150 EUR/t) and **Emilia Romagna** (130 EUR/t), highlights a difference of more than 15%, attributable to the different post-collection waste management mix. With a comparable order of magnitude, **Latium**, which collected almost 2 million tons from 1999 to 2010, obtains a much lower unit benefit (82 EUR/t). A crucial factor is the predominant use of landfills that charge very low fees. Details on peculiar situations are provided below.

With higher amounts of collected paper and board (6 million tons), **Lombardy** obtains the highest net benefit in Italy over twelve years, equal to 788 million EUR. This performance results from non-disposal (the highest among all the regions: about 541 million EUR) due to the prominent use of incineration, which is much more expensive than landfill disposal. Moreover, the region is characterized by low costs both for separate paper and board collection and for non-separate urban waste collection.

On the other hand, **Latium** shows a low net benefit (approximately 160 million EUR) vs. the collected amount (just below 2 million tons). The region has the lowest unit benefits, the same as for **Molise** (82 EUR/t), as a result of the limited benefits originating from non-disposal (161 million EUR) due to the low cost of landfills, which represent the main destination for waste in **Latium**. Moreover, the costs of separate paper and board collection are very high and translate into a cost spread for separate collection (about 156 million EUR) almost equal

to **Lombardy**, which collected volumes about three times as high in the same period (about 6 million EUR).
While a number of Southern regions are improving, others still suffer from limited infrastructures and competitiveness.
Despite service-related challenges, the unit value of the achieved benefits is improving in **Campania** (130 EUR/t). This figure is growing despite the slowing down of collection, a trend that can be attributed to collection costs: the costs for separate collection are not cheap, but are anyway cheaper than the maximum national value, whereas the costs for non-separate waste collection are very high (111.1 EUR/t). The cost spread between separate collection costs and non-separate collection costs is quite limited (9.6 EUR/t) compared to the national average (35 EUR/t). **Sardinia**, for example, is characterized by a higher cost of separate paper and board collection, 172.6 EUR/t, almost three times as high as the minimum value of **Lombardy**.

Molise has the lowest collection volume, about 31 million tons in 12 years, and therefore its total benefit is only 2.5 million EUR.
Puglia also deserves consideration (net achieved benefit of 82 million EUR). This region collected higher amounts (935thousand tons, i.e. 26% more), of the same order of magnitude as **Trentino Alto Adige** (754 thousand tons) but with a much broader user base, thus achieving a unit benefit that is almost half (86 EUR/t vs. 163 EUR/t). This is a result of significant differences in terms of collection costs and disposal modes. **Puglia**, in fact, has a high separate paper and board collection cost, 147.6 EUR/t, quite similar to the maximum cost recorded in Sardinia. On the other hand, costs for collection (both separate and non separate) in **Trentino Alto Adige** are average. However, Puglia has the minimum landfill cost for disposal, 55 EUR/t vs. 104 EUR/t in Trentino, and a high rate of landfill disposal (83% vs. 63% in Trentino).

UNTAPPED BENEFITS: POTENTIALS FOR 2010

Despite regional diversities, Italy has generally achieved high separate paper and board collection levels and significant benefits. However, some potentials remain untapped in the individual regions. We therefore estimated the benefits that can still theoretically be obtained on the ground of the collection potential calculated by Comieco. The Consortium carried out an analysis to estimate potential collection as at 2010, i.e. the amount of paper and board that can still be collected separately, vs. a technical and economic threshold, taking into account the collection level achieved and the quantity that today is still finally disposed of. The regional cost-benefit balances for the year 2010 were calculated on the ground of the estimated annual potential separate collection amounts. Moreover, for some regions, a higher degree of efficiency was estimated, using Lombardy as a benchmark, being the region where separate paper and board collection costs are cheapest and non-separate collection costs are limited.

The total benefit for Italy in 2010 was just below 463 million EUR vs. an estimated potential benefit of 686 million EUR. In other words, the Country obtained about 2/3 of the benefits it could have achieved. Other regions show different results: for example, Trentino Alto Adige, vallée d'aoste, and Tuscany have already reached their optimal potential.

While the North has a margin of improvement of about 25% of its potential, the Centre has achieved about 60% of its potential, and the South is just below 56%. Italy could thus obtain additional net benefits for about 223 million EUR per year. In conclusion, the analysis shows that, despite the significant progress made in time, there is still room for further quantitative and efficiency improvements.
In the light of the performed analysis a number of actions can be taken. Guidelines can be provided to exploit the existing opportunities for improvement. These include:

1. increase efficiency in separate paper and board collection to reduce or cancel the spread between the cost of separate paper and board collection and the cost of non-separate collection;
2. review the disposal mix and reduce the costs for citizens that subtract value from the community;
3. develop the stakeholders' awareness: collection and

recycling, in fact, should be seen as strategic for the Country, in that they allow to support the national industry and avoid significant imports of secondary raw materials from foreign countries (rather, increasing imports), while providing a positive contribution to Italy's trade balance.

10. THE COLLECTION BUSINESS: STRATEGIC FRAMEWORK AND EVOLUTIONARY PERSPECTIVES

Within the framework of the paper business, throughout all steps from production to recycling, separate collection plays a strategic role, affecting both quantity and quality, as well as the costs of the collected materials. It is thus a key factor to determine the cost-benefit ratio of recycling, both for industry and for the community.

This is a peculiar step, being on one hand a fundamental part of paper industry processes, and on the other one of the typical activities of environmental services, aimed both at citizens with urban waste collection and disposal and at companies for so-called similar waste.
This brief analysis includes two sections. The first reviews the structure and operation of the separate paper and board collection business, while the second highlights a few possible future trends.

THE SECTOR'S STRUCTURE

Separate paper and board packaging collection is one step of the broader paper and board production and recycling process. This process includes, as known, four segments: paper production, packaging production, material collection, processing by recycling. Being a so-called closed pipeline, recycling coincides with the first paper production step. Both segments are quite different: while paper industry is concentrated and made up of large-sized capital-intensive companies, the packaging sector involves lots of highly competitive small and medium manufacturing enterprises. Competition and customer-supplier relations are also different. Differences are also observed between collection and processing in view of recycling.

Separate collection is part of the public services provided by waste management companies. It is still quite a fragmented sector, being largely locally based. Therefore local entities play a crucial role, both as drivers and as managers, either directly or indirectly. This activity, in fact, is mostly carried out by local utilities, i.e. companies controlled by the local entities more or less directly. Moreover, private operators – with much smaller market shares – act as contractors for urban hygiene and/or separate waste collection for the Municipalities. The involvement of private operators is, on the other hand, more significant in the industrial collection circuit, mostly focused on secondary and tertiary packaging and on processing waste. Specialized operators work in this segment, often integrated with processing and selection platforms and with subsequent trading.

Urban waste management and separate collection are not too concentrated in Italy: these activities involve more than 250 local companies, which create local monopolies within their specific scope of action .
However, different players operate in this context. These include, first and foremost, **major local utilities**, usually based in the main cities or operating on a regional scale. Some are multi-utility groups, involved in multiple business areas, such as Hera and A2A; others are mono-utility organizations, solely focused on environmental services, such as Amiat, Ama, etc. There is then a more limited number of large **private waste management groups**. In the past few years, challenges in the sectors resulted, in fact, into the gradual disappearance or downsizing of some international players and into the concentration of the few national ones.

Most larger companies are listed on the Stock Exchange. Hera, A2A, and Biancamano are three of the four main companies by market share. Their cumulative market share is 32.8% of the total of the first 30 companies operating in the sector (source:

Althesys). The only all-public utility among the first four in ranking is Ama, in Rome, whose size is so big due to its broad collection base, but which only operates in Rome and its province. Overall, the 30 main companies cover about 39% of the whole urban waste sector in Italy (Althesys estimates).
Small and medium local utilities are anyway the most numerous and widespread, and still account for a large market share. Moreover, the concentration that has been under way for a few years now, and was reducing their number, could slow down due to the repeal of the reform of local public services (Ronchi Decree) following the recent referendum. Pending legal interventions, so-called "in house" direct management could be reintroduced, i.e. all-public companies controlled by the Municipalities.
In some cases, smaller entities have teamed up into local consortia for collection activities, in view of optimizing management and reducing costs, as well as of increasing their negotiating power vs. any private service providers.

Lastly, **local private operators** play a role on the market due to the high number and size of Italyn Cities that, in most cases, lack the critical mass to manage these services through their own companies, whatever their legal status. In this case too, waste management operators often carry out separate collection too. In others, instead, **specialized** companies collect specific materials; these mostly include recoverers already operating in other segments of secondary raw material markets.
In most cases these are also involved in processing in view of recycling, operating with dedicated platforms, and sometimes even carry out recovered paper trade. These operators are also usually involved in industrial and commercial collection.

STRATEGIC EVOLUTION

The sector went through slow but constant evolution in time, parallel to the transformation of the public utilities sector on one hand and to the growth of separate collection amounts on the other. The strategic positioning of the different operator types is summarized in figure 2, which contains, according

to two dimensions: the operating geography (from small Municipalities to metropolitan areas to regions and up to the national level) and the activity segments (urban waste collection, separate collection, processing in view of recycling, and recovered paper trading).
While small-sized local operators do not seem to be changing their strategies substantially, the strategies of major ones are developing. However, the entire sector is going through change. The extent and direction of such change, as well as the design of company strategies, depend on multiple factors, including:

- the legal driver;
- the size advantage vs. the local footprint;
- the degree of downstream diversification and integration;
- the role of secondary raw material markets.

The evolution of local utilities, both small and large, will definitely depend on the development of rules on local public services. In particular, the recent repeal via referendum reviewed duties in terms of company structure. There is uncertainty about the impact of the blocking of the expected contracts and the return to “in house” assignments on separate collection. In particular, there are doubts about how these can affect the cost and quality of separate collection. While, on one hand, recovered paper quality and prices respond to the needs of markets and are therefore independent of the management specificities of local companies, on the other striking the European targets is still crucial. Empirical evidence so far seems to highlight a higher collection performance of operators more focused on market logics, such as large listed local utilities.

However, the companies’ scale has grown in time, and despite the labour intensive character and the added value of collection activities, the growth of volumes allows to optimize processes and improve overall efficiency. However, the cost structure typical of collection, strongly unbalanced towards the Opex, is a barrier to economies of scale in collection activities.
This is one reason why larger companies tend to move

downwards in the pipeline and carry out processing in view of recycling, while integrating collection with their own sorting plants.

The size advantage, with the higher available amounts of collected recovered paper, mostly consists in an increase of the negotiating power vs. other steps of the process. Some companies, including both large local utilities and private players, are thus also turning to direct trading of the collected recovered paper.

This integration along the value chain, however, only seems to be driven by a medium-long term strategy for some larger groups, while for others it is mostly promoted by the recent economic conditions of secondary raw material markets. The trend, substantially countercyclical, of Municipal agreements and of their proxies with Comieco seems to confirm this assumption.

This trend could reduce the market share of sorting plants and traders, particularly the independent ones that do not report to paper groups. However, it may also enhance the role of Comieco as a market buffer at times of economic downturn.
In conclusion, separate paper and board collection is definitely developing and can be assumed to tend, in the long term, towards integration along the pipeline, as already observed at international level. However, the role of guarantees on the achievement of recycling targets will remain crucial to strike the national and European environmental policy targets.

Carlo Montalbetti
General Manager, Comieco

CHARTS AND TABLES

ACRONYMS

FMS frazioni merceologiche similari (similar product fractions) (non-packaging paper and board)

SC separate collection

RU urban waste

% percent rate

N number

T tons

AB inhabitants

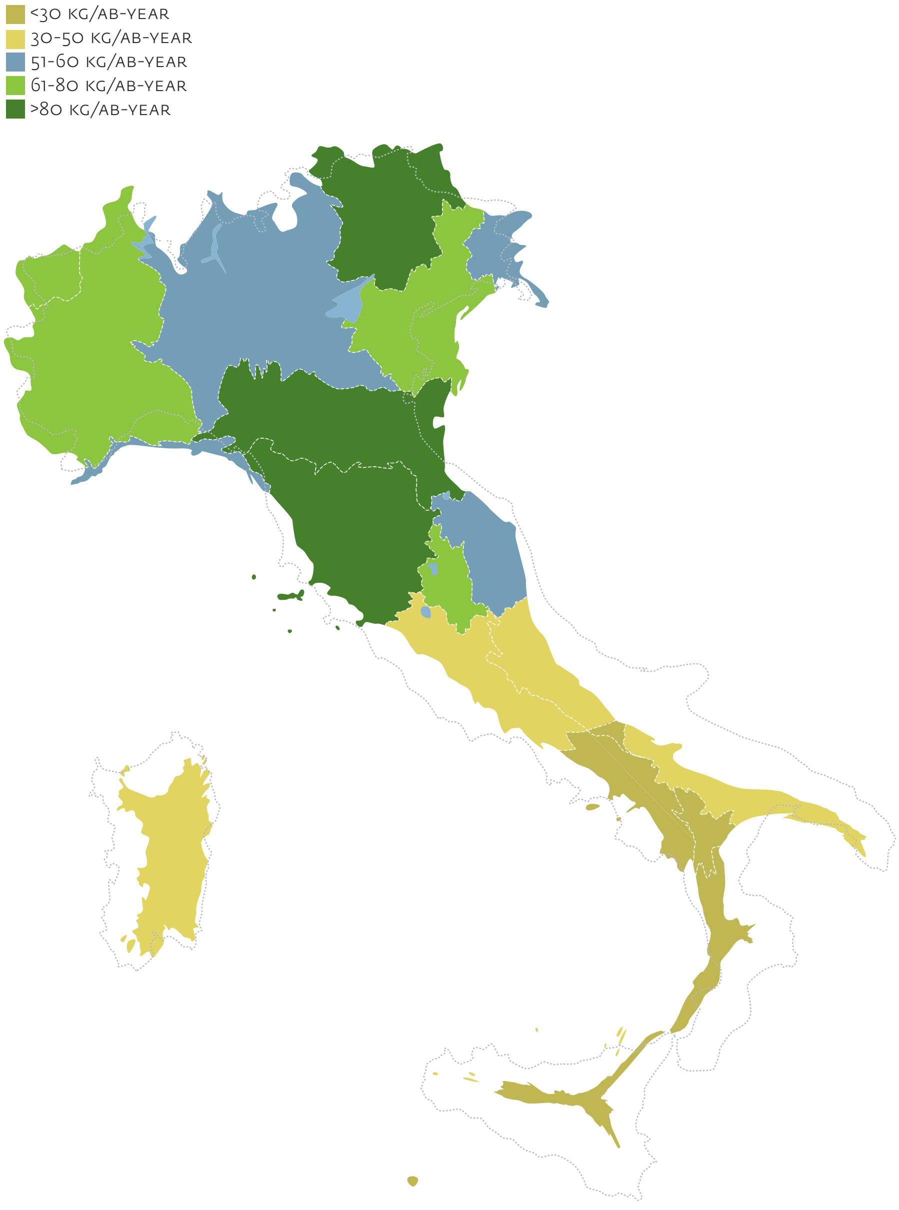
TABLE 1

Municipal per-capita separate paper and board collection by regions and by areas. Year 2010.
(Source: Comieco)

REGION	TOTAL INHABITANTS	2010	Δ 2009-10	Δ 2009-10
		t	t	%
EMILIA ROMAGNA	4,199,669	368,352.5	20,800.5	6.0
FRIULI VENEZIA GIULIA	1,209,698	68,460.4	4,887.2	7.7
LIGURIA	1,609,288	89,269.5	5,081.1	6.0
LOMBARDY	9,497,939	549,943.2	7,711.1	1.4
PIEDMONT	4,347,344	333,248.5	3,746.1	1.1
TRENTINO ALTO ADIGE	988,338	84,936.3	2,419.2	2.9
VALLÉE D'AOSTE	124,263	9,576.1	345.1	3.7
VENETO	4,749,799	302,425.0	9,773.1	3.3
NORTH	**26,726,338**	**1,806,211.6**	**54,763.5**	**3.1**
LATIUM	5,317,017	251,276.6	-423.3	-0.2
MARCHE	1,531,248	89,123.9	10,089.3	12.8
TUSCANY	3,626,558	311,466.2	-3,539.8	-1.1
UMBRIA	869,968	52,786.5	-319.1	-0.6
CENTER	**11,344,791**	**704,653.3**	**5,807.1**	**0.8**
ABRUZZO	1,306,487	50,553.1	1,550.4	3.2
BASILICATA	592,948	13,887.8	659.6	5.0
CALABRIA	1,999,791	36,579.1	1,930.7	5.6
CAMPANIA	5,788,644	171,960.6	-9,947.0	-5.5
MOLISE	320,466	6,914.6	989.5	16.7
PUGLIA	4,069,202	125,510.8	1,138.5	0.9
SARDINIA	1,656,266	74,461.5	1,234.7	1.7
SICILY	5,014,927	78,341.1	3,057.7	4.1
SOUTH	**20,748,731**	**558,208.6**	**614.0**	**0.1**
ITALY	**58,819,860**	**3,069,073.5**	**61,184.6**	**2.0**

FIGURE 1

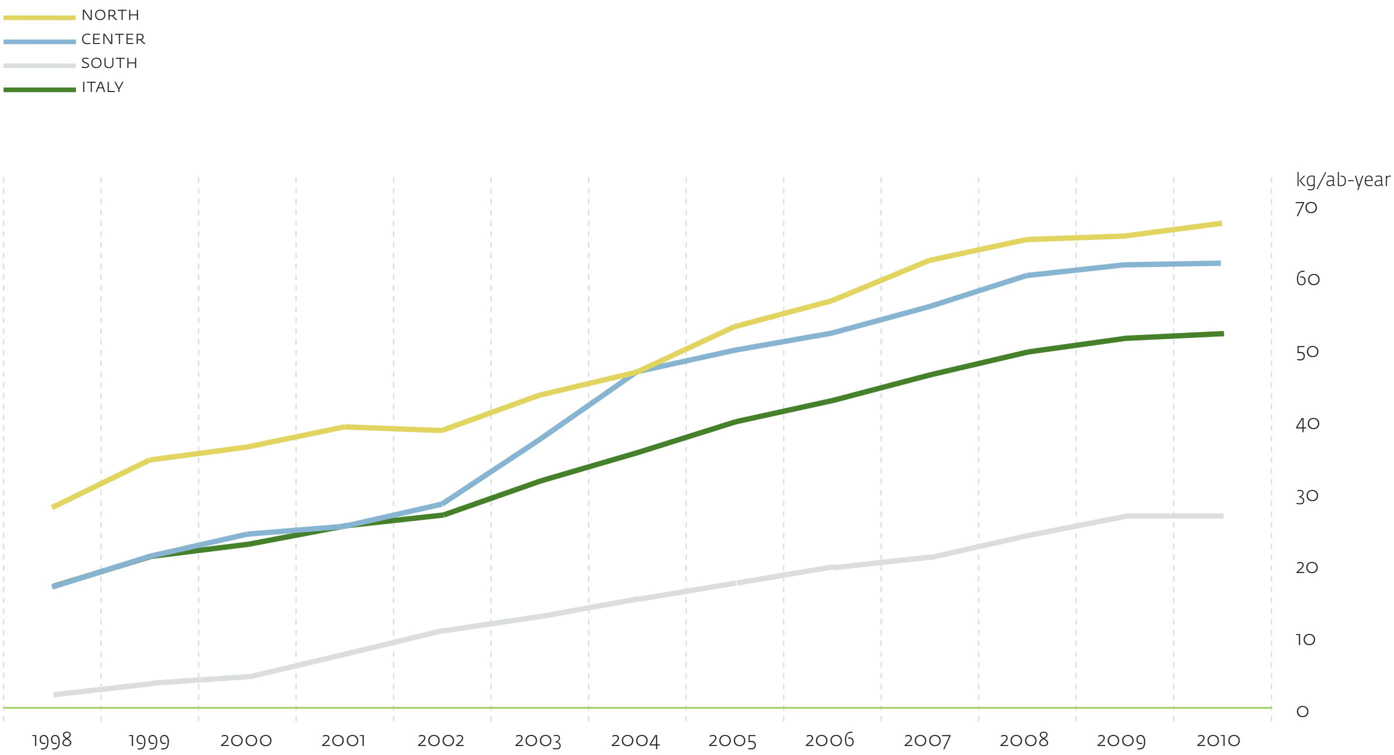
Municipal per-capita separate paper and board collection by regions and by areas. Year 2010.
(Source: Comieco)



REGIONE	kg/ab-year
EMILIA ROMAGNA	87.7
FRIULI VENEZIA GIULIA	56.6
LIGURIA	55.5
LOMBARDY	57.9
PIEDMONT	76.7
TRENTINO ALTO ADIGE	85.9
VALLÉE D'AOSTE	77.1
VENETO	63.7
NORTH	**67.6**
LATIUM	47.3
MARCHE	58.2
TUSCANY	85.9
UMBRIA	60.7
CENTER	**62.1**
ABRUZZO	38.7
BASILICATA	23.4
CALABRIA	18.3
CAMPANIA	29.7
MOLISE	21.6
PUGLIA	30.8
SARDINIA	45.0
SICILY	15.6
SOUTH	**26.9**
ITALY	**52.2**

FIGURE 2

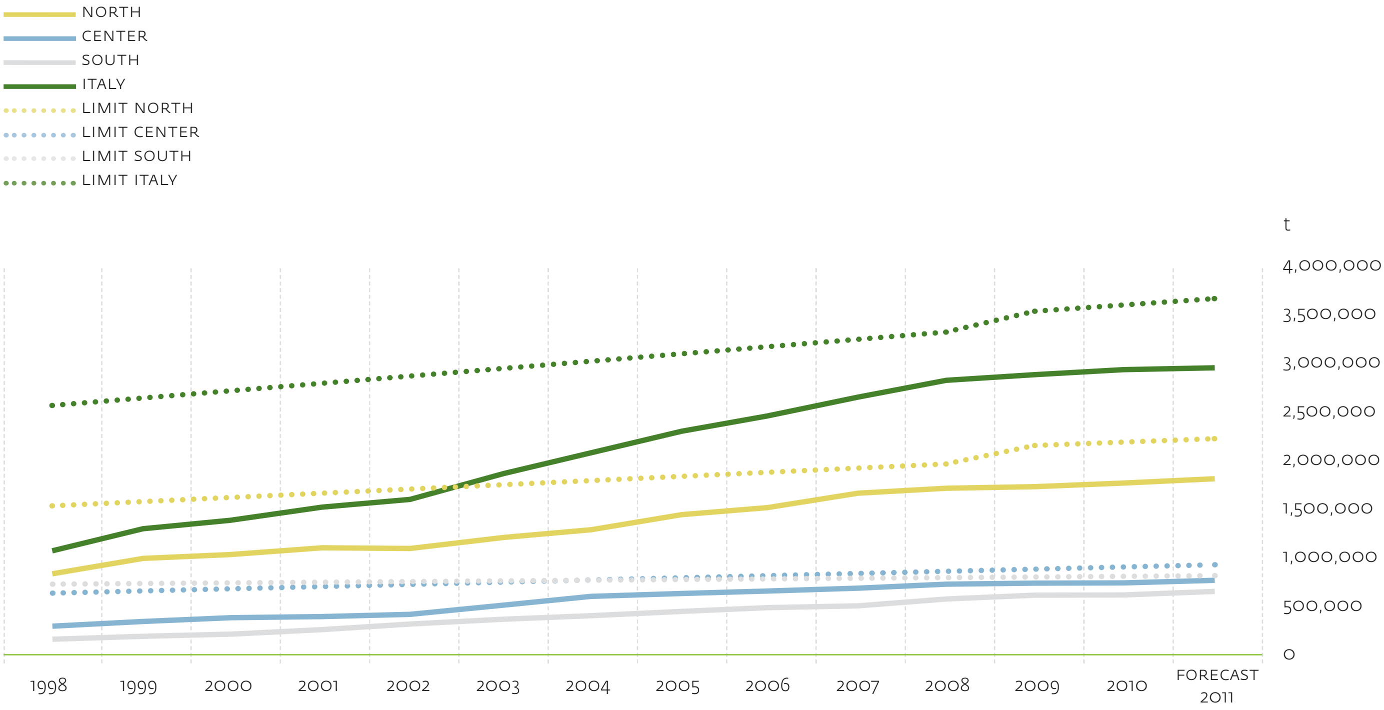
Municipal per-capita separate paper and board collection by areas. 1998-2010 historical data set.
(Source: Comieco)



	Δ kg/ab 1998/2010	Δ % 1998/2010
NORTH	39.3	138.8
CENTER	45.0	263.2
SOUTH	24.5	1,021.0
ITALY	**35.2**	**206.9**

FIGURE 3

Municipal separate paper and board collection. 1998-2010 trend and forecasts for 2011.
(Source: Comieco)



		NORTH	CENTER	SOUTH	ITALY
2010	t	1,806,212	704,653	558,209	**3,069,073**
2011 FORECAST	t	1,852,746	728,505	606,689	**3,187,940**

TABLE 3

Comparison of urban waste production, overall separate collection, and municipal separate paper and board collection in Italy. 2009-2010 period.
(Source: Comieco)

		2009	2010	2009/2010 Δ %
UW	t	32,446,092	32,386,957	-0.2
TOTAL SC	t	10,822,748	11,770,594	8.8
TOTAL PAPER AND BOARD SC	t	3,007,889	3,063,204	1.8
% TOTAL SC VS. TOTAL UW PRODUCTION	%	33.4	36.3	
% MUNICIPAL PAPER AND BOARD SC VS. TOTAL SC	%	**27.8**	**26.0**	

TABLE 4

Agreements signed in the 2001-2010 period and coverage rate of the agreements.
(Source: Comieco)

			2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
NORTH	SIGNED AGREEMENTS	n	170	215	225	224	228	211	208	201	203	199
	COVERED CITIES	%	58.5	63.7	69.9	71.8	75.4	76.5	78.1	77.4	81.0	81.0
	COVERED INHABITANTS	%	69.5	72.3	76.4	79.5	81.4	82.5	83.2	82.3	85.6	85.9
CENTER	SIGNED AGREEMENTS	n	35	59	80	88	97	103	109	109	114	122
	COVERED CITIES	%	62.5	63.7	70.3	72.2	77.4	78.4	80.1	79.1	77.9	75.3
	COVERED INHABITANTS	%	81.3	81.4	87.4	88.1	91.1	91.5	93.9	93.4	93.8	93.1
SOUTH	SIGNED AGREEMENTS	n	124	197	281	328	334	302	329	380	395	450
	COVERED CITIES	%	44.7	47.8	57.1	63.2	68.6	75.6	77.8	78.3	79.1	79.2
	COVERED INHABITANTS	%	68.9	68.8	78.8	84.4	87.1	89.2	91.7	91.8	92.1	92.0
ITALY	**SIGNED AGREEMENTS**	n	**329**	**471**	**586**	**640**	**659**	**616**	**646**	**690**	**712**	**771**
	COVERED CITIES	%	**54.6**	**58.6**	**65.9**	**69.2**	**73.5**	**76.5**	**78.2**	**77.9**	**80.0**	**79.7**
	COVERED INHABITANTS	%	**71.5**	**72.8**	**79.4**	**82.9**	**85.3**	**86.6**	**88.2**	**87.8**	**89.5**	**89.4**

TABLE 5

Local coverage by regions as at December 31, 2010.
(Source: Comieco)

	CITIES	CITIES UNDER THE AGREEMENTS		INHABITANTS	INHABITANTS UNDER THE AGREEMENTS		COLLECTION UNDER THE AGREEMENTS
	n	n	%	n	n	%	t
EMILIA ROMAGNA	341	330	96.8	4,199,669	4,145,957	98.7	249,504.17
FRIULI VENEZIA GIULIA	219	175	79.9	1,209,698	1,105,304	91.4	54,029.68
LIGURIA	235	112	47.7	1,609,288	1,243,178	77.3	41,034.75
LOMBARDY	1,548	1,091	70.5	9,497,939	7,471,034	78.7	387,500.02
PIEDMONT	1,206	1,114	92.4	4,347,344	4,028,025	92.7	239,077.79
TRENTINO ALTO ADIGE	339	332	97.9	988,338	975,200	98.7	66,130.92
VALLÉE D'AOSTE	74	74	100.0	124,263	124,263	100.0	9,772.73
VENETO	581	452	77.8	4,749,799	3,891,182	81.9	169,257.32
NORTH	**4,543**	**3,680**	**81.0**	**26,726,338**	**22,984,143**	**86.0**	**1,216,307.37**
LATIUM	378	231	61.1	5,317,017	4,858,114	91.4	139,977.57
MARCHE	246	194	78.9	1,531,248	1,356,050	88.6	61,337.77
TUSCANY	287	249	86.8	3,626,558	3,492,452	96.3	233,883.40
UMBRIA	92	81	88.0	869,968	851,849	97.9	35,471.93
CENTER	**1,003**	**755**	**75.3**	**11,344,791**	**10,558,465**	**93.1**	**470,670.66**
ABRUZZO	305	230	75.4	1,306,487	1,167,456	89.4	49,585.28
BASILICATA	131	76	58.0	592,948	436,840	73.7	11,949.31
CALABRIA	409	330	80.7	1,999,791	1,742,865	87.2	28,347.42
CAMPANIA	551	446	80.9	5,788,644	5,266,533	91.0	154,440.52
MOLISE	136	30	22.1	320,466	153,973	48.0	3,981.31
PUGLIA	258	227	88.0	4,069,202	3,815,708	93.8	113,454.93
SARDINIA	377	303	80.4	1,656,266	1,545,673	93.3	66,658.97
SICILY	390	384	98.5	5,014,927	4,961,885	98.9	77,268.03
SOUTH	**2,557**	**2,026**	**79.2**	**20,748,731**	**19,090,933**	**92.0**	**505,685.77**
ITALY	**8,103**	**6,461**	**79.7**	**58,819,860**	**52,633,541**	**89.5**	**2,192,663.81**

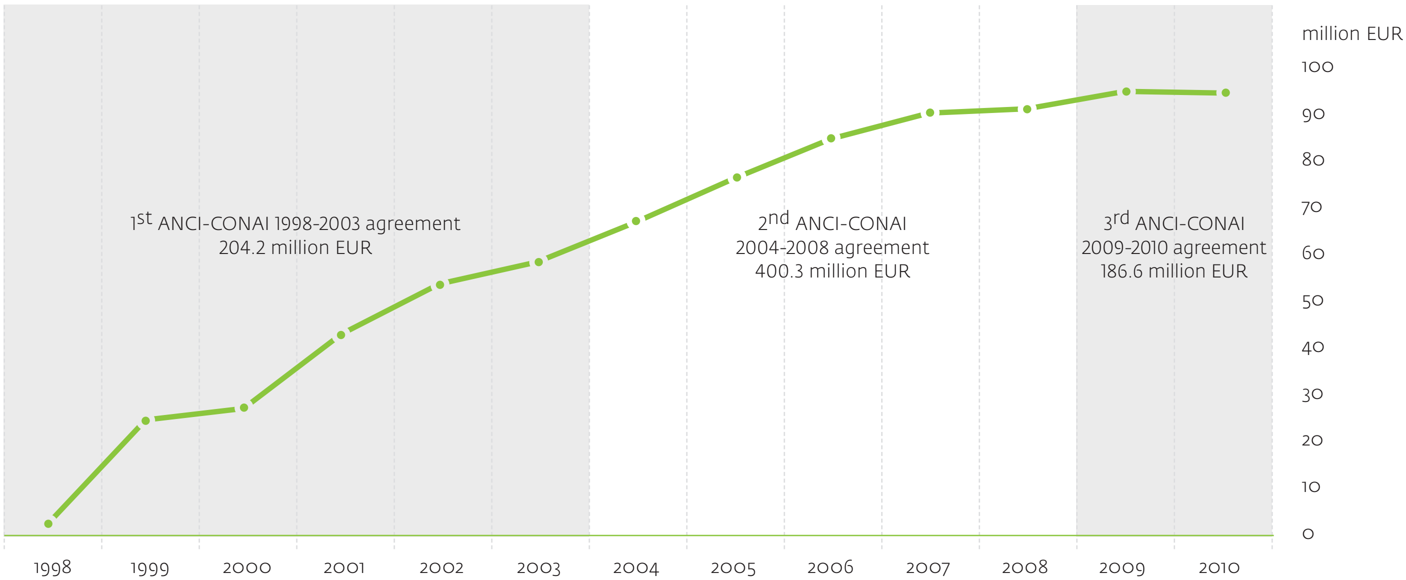
TABLE 6

Resources granted to parties under the agreements in 2010. Detail by areas.
(Source: Comieco)

AREA	INHABITANTS UNDER THE AGREEMENTS	MANAGED PACKAGING	ECONOMIC INVESTMENT OF COMIECO (PACKAGING)		ECONOMIC INVESTMENT OF RECYCLERS (SIMILAR PRODUCT FRACTIONS)	
	n	t	EUR	EUR/ab. under the agreements	EUR	EUR/ab. under the agreements
NORTH	22,984,143	579,521	49,417,062	2.15	15,923,393	0.69
CENTER	10,558,465	250,732	20,133,008	1.91	5,457,437	0.52
SOUTH	19,090,933	302,063	23,206,211	1.22	5,141,454	0.27
ITALY	**52,633,541**	**1,132,317**	**92,756,282**	**1.76**	**26,522,285**	**0.50**

FIGURE 4

Economic investment of Comieco. 1998-2010 net of consideration for FMS.
(Source: Comieco)



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	TOTAL
TRANSFERRED RESOURCES* (MILLION EUR)	2.2	24.0	26.4	42.0	52.5	57.1	65.4	74.5	82.9	88.3	89.2	93.8	92.8	**791.1**

* Including 31 million EUR for energy recovery, 1999-2002 period

TABLE 7

2007-2010 trend of separate paper and board collection under the agreements in the regional capitals.
(Source: Comieco)

CITY	AREA	INHABITANTS	2004	2005	2007	2008	2009	2010	Δ 2009-2010	2010
		n	t	t	t	t	t	t	%	kg/ab-year
ANCONA	CENTER	101,687	4,469	4,547	5,396	5,389	6,082	6,792	11.7	66.8
AOSTA	NORTH	34,583	1,709	1,914	2,372	2,407	2,785	2,720	-2.3	78.6
BARI	SOUTH	325,929	13,639	16,284	15,740	21,452	22,122	23,299	5.3	71.5
BOLOGNA	NORTH	374,054	5,573	5,302	5,695	7,458	13,387	15,645	16.9	41.8
BOLZANO	NORTH	99,193	6,048	6,255	7,265	7,465	7,842	8,367	6.7	84.4
CAGLIARI	SOUTH	170,505	nd	1,177	4,371	6,871	8,856	9,185	3.7	53.9
CAMPOBASSO	SOUTH	51,279	nd	nd	1,026	1,287	1,281	1,252	-2.3	24.4
CATANZARO	SOUTH	94,627	1,054	1,396	1,525	2,613	1,835	1,652	-10.0	17.5
FLORENCE	**CENTER**	**367,194**	**29,439**	**29,990**	**31,435**	**33,436**	**31,994**	**30,496**	**-4.7**	**83.1**
GENOA	NORTH	618,088	16,852	19,385	19,322	7,038	14,914	21,791	46.1	35.3
L'AQUILA	SOUTH	72,099	2,692	2,581	2,510	3,097	2,570	3,240	26.1	44.9
MILAN	**NORTH**	**1,304,312**	**83,735**	**85,148**	**93,539**	**94,577**	**89,283**	**86,443**	**-3.2**	**66.3**
NAPLES	**SOUTH**	**981,267**	**14,737**	**17,492**	**28,524**	**33,599**	**34,609**	**33,192**	**-4.1**	**33.8**
PALERMO	SOUTH	669,249	12,332	15,599	9,726	7,940	7,543	5,455	-27.7	8.2
PERUGIA	CENTER	161,816	4,207	4,833	4,158	5,621	9,070	6,628	-26.9	41.0
POTENZA	SOUTH	68,471	1,892	2,011	3,546	3,982	4,166	4,458	7.0	65.1
ROME	**CENTER**	**2,548,743**	**76,525**	**91,599**	**105,408**	**114,843**	**113,346**	**96,031**	**-15.3**	**37.7**
TURIN	**NORTH**	**899,652**	**49,298**	**52,856**	**62,509**	**67,856**	**65,970**	**66,063**	**0.1**	**73.4**
TRENTO	NORTH	111,257	7,577	8,625	10,506	10,739	3,703	3,267	-11.8	29.4
TRIESTE	NORTH	205,800	6,263	6,573	7,043	7,992	7,991	7,221	-9.6	35.1
VENICE	NORTH	269,543	7,212	7,044	12,581	15,284	14,615	6,541	-55.2	24.3

Data only concerns the amounts managed under the agreements. The operator is only entitled to use the consortium's circuit to recycle the share (see e.g. Bologna, Genoa, Ancona, or Venice).

See specific focus for the highlighted cities.

FIGURE 5

Per-capita waste collection in the sample cities Turin, Milan, Florence, Rome, and Naples. 2004-2010 data. (Source: Comieco)

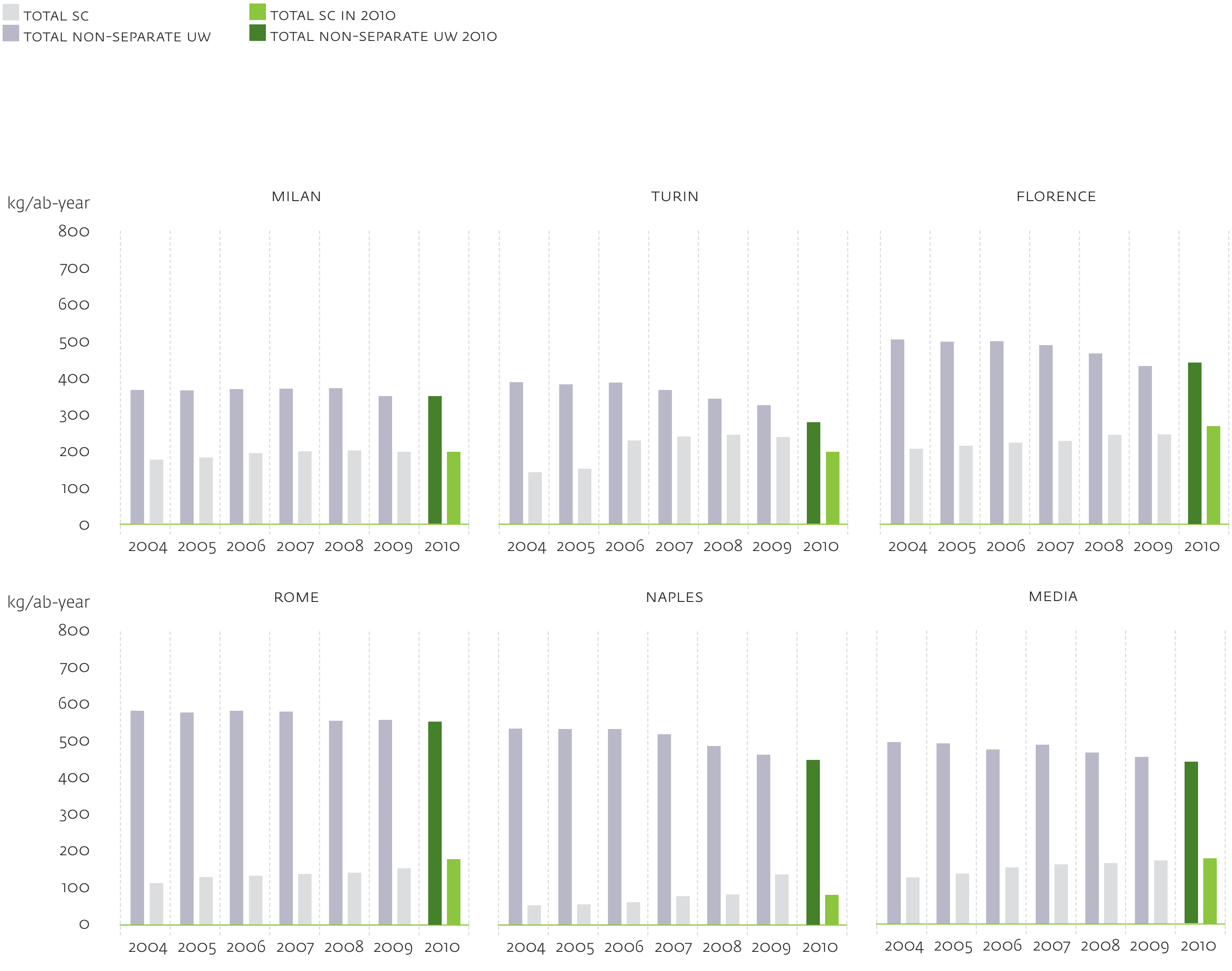
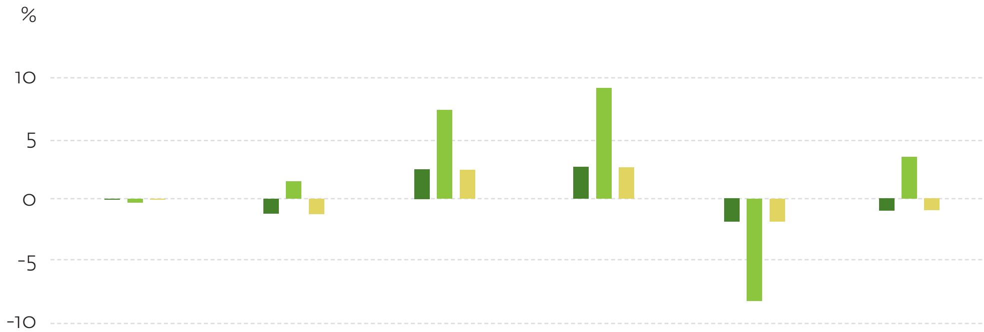


FIGURE 6

Waste collection in the sample cities Turin, Milan, Florence, Rome, and Naples. 2008-2009 variations.
(Source: Comieco)

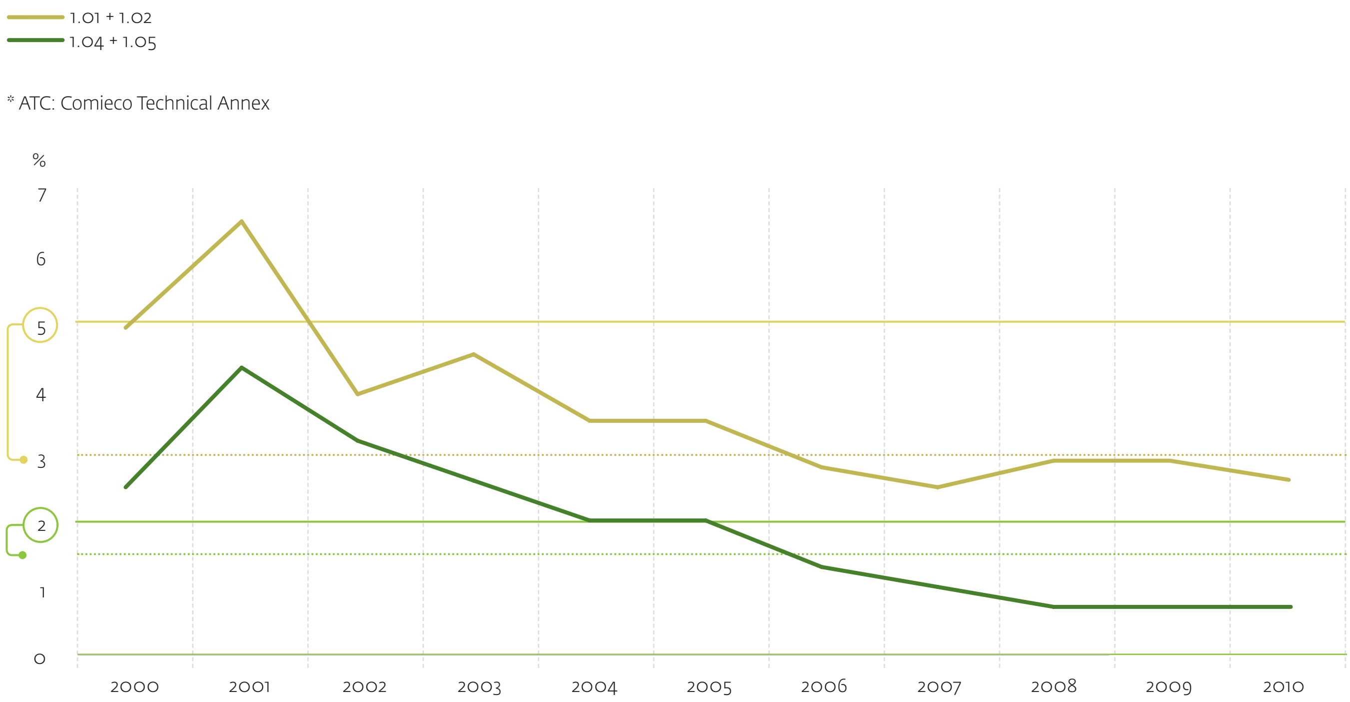


	MILAN	TURIN	FLORENCE	ROME	NAPLES	TOTAL
TOT NON-SEP. UW VAR.	0.0	-1.1	2.3	2.6	-1.9	0.9
TOT SC VAR.	-0.2	1.3	7.7	9.2	-8.3	3.4
TOT UW VAR.	0.0	-1.1	2.3	2.6	-1.9	0.9

2010		MILAN	TURIN	FLORENCE	ROME	NAPLES	TOTAL
TOT SC	t	231,335	215,157	98,191	403,598	97,155	1,045,436
TOT UW	t	711,183	497,056	255,439	1,834,278	549,887	3,847,843
SC/UW	%	32.5	43.3	38.4	22.0	17.7	-

FIGURE 7

Quality of the collected material (mean trend of foreign fractions). 2000-2010 period
(Source: Comieco)



		1ST ANCI – CONAI AGREEMENT				2ND ANCI – CONAI AGREEMENT					3RD ANCI – CONAI AGREEMENT	
COLLECTION	DATA	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1.01 + 1.02	ANALYZED AMOUNTS (kg)	n.a.	26,166	42,657	119,814	103,884	76,572	188,826	227,852	214,764	252,289	279,917
	FOREIGN FRACTIONS (%)	4.9	6.5	3.9	4.5	3.5	3.5	2.8	2.5	2.9	2.9	2.62
	PERFORMED ANALYSES (n)	27	171	275	533	443	321	772	930	990	1,174	1302
1.04 + 1.05	ANALYZED AMOUNTS (kg)	n.a.	25,455	33,181	62,104	119,124	62,936	145,873	181,758	200,085	202,555	193,863
	FOREIGN FRACTIONS (%)	2.5	4.3	3.2	2.6	2.0	2.0	1.3	1.0	0.7	0.7	0.7
	PERFORMED ANALYSES (n)	26	122	165	281	335	291	779	1,041	1,145	1,176	1068

Notes: Until 2005 an integrated collection flow was also included, then excluded from the Technical Annex.
Since 2005, data is updated vs. the report of the previous year consistently with the method to define the % rate of foreign fractions provided for by the Technical Annex.
New quality levels have been in force since April 1, 2010.

TABLE 8

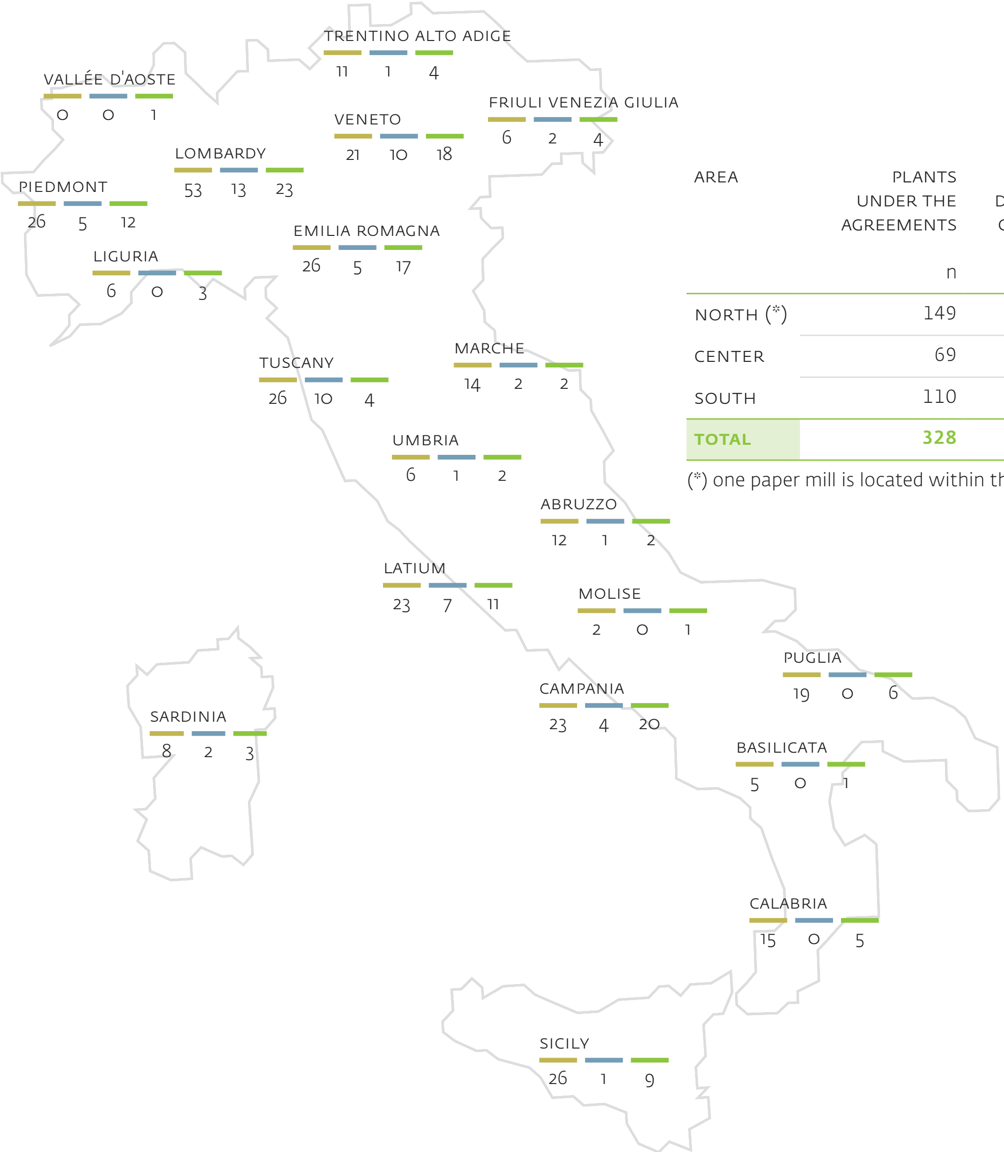
Quality of the collected material (mean trend of foreign fractions). Detail by macro-areas. 2009-2010 comparison. (Source: Comieco)

	YEAR 2009		YEAR 2010		Δ 2009-2010
	N, OF ANALYSES	FOREIGN FRACTION	N, OF ANALYSES	FOREIGN FRACTION	FOREIGN FRACTION
1,01 + 1,02					
NORTH	598	2.4%	693	1.9%	-0.5%
CENTER	268	4.4%	306	4.3%	-0.1%
SOUTH	308	2.4%	303	2.5%	0.1%
ITALY	**1,174**	**2.9%**	**1,302**	**2.6%**	**-0.3%**
1.04 + 1.05					
NORTH	532	0.7%	471	0.5%	-0.2%
CENTER	277	0.7%	246	0.7%	0.0%
SOUTH	367	0.6%	351	0.9%	0.4%
ITALY	**1,176**	**0.7%**	**1,068**	**0.7%**	**0.0%**

FIGURE 8

The recycling network in 2010.
(Source: Comieco)

PLANTS UNDER THE AGREEMENTS
PAPER MILLS UNDER THE AGREEMENTS
PLANTS FOR COLLECTION OF SECONDARY AND TERTIARY PACKAGING



AREA	PLANTS UNDER THE AGREEMENTS	MEAN DISTANCE FOR CONFERMENT	PAPER MILLS UNDER THE AGREEMENTS	II & III PLANTS
	n	km	n	n
NORTH (*)	149	16.0	36	82
CENTER	69	16.4	20	19
SOUTH	110	18.9	8	47
TOTAL	**328**	**17.1**	**64**	**148**

(*) one paper mill is located within the territory of the Republic of San Marino

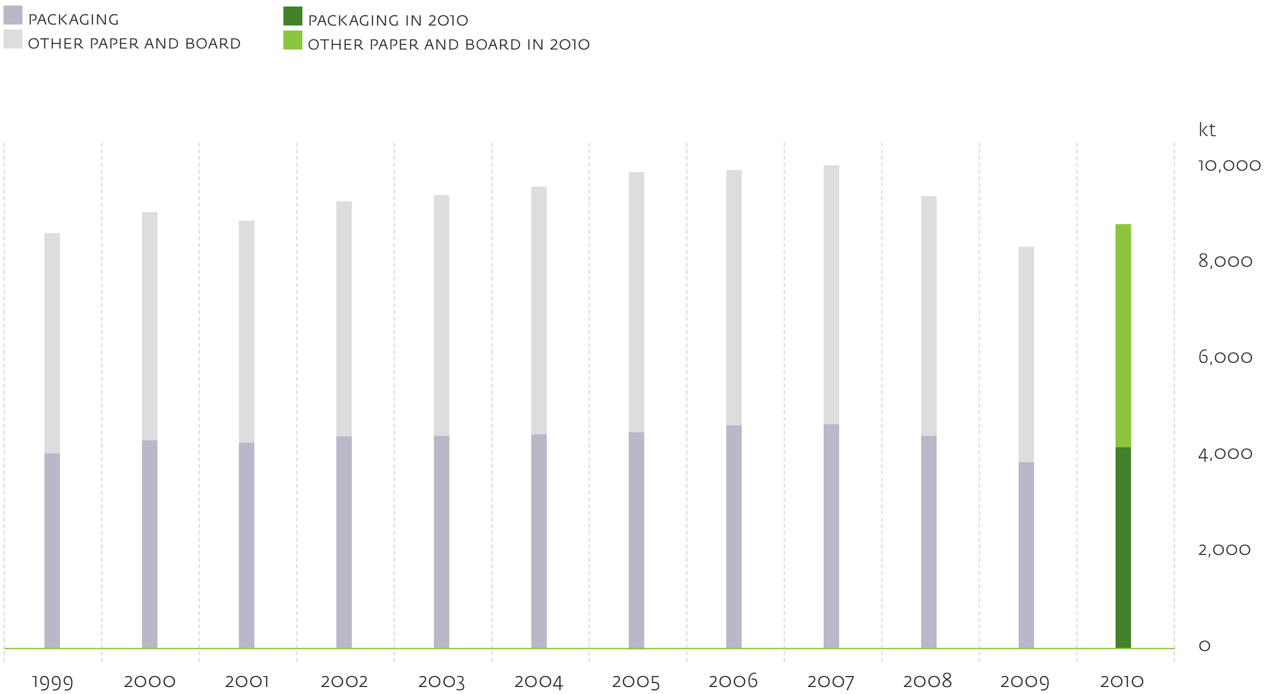
TABLE 9

Production, import, export, and apparent consumption of paper and board in 2010.
(Source: ISTAT data processed by Assocarta and Assocarta estimates)

		PRODUCTION (A)	IMPORT (B)	EXPORT (C)	APPARENT CONSUMPTION (A+B-C)
PAPER AND BOARD FOR CORRUGATED BOARD	t	2,342,291	1,466,995	153,901	3,655,384
CARDBOARD FOR CASES	t	651,839	547,992	528,148	671,683
OTHER WRAPPING AND PACKAGING PAPER AND BOARD	t	1,270,554	560,241	586,693	1,244,102
TOTAL PACKAGING	t	**4,264,684**	**2,575,228**	**1,268,742**	**5,571,169**
Δ VS. 2009	%	**10.0**	**15.5**	**15.0**	**11.4**
PAPER FOR GRAPHIC USE	t	3,033,749	2,556,048	1,552,489	4,037,308
PAPER FOR HYGIENIC-SANITARY USE	t	1,286,514	61,840	699,206	649,148
OTHER TYPES OF PAPER	t	403,080	80,790	62,299	421,571
TOTAL OTHER PAPER AND BOARD	t	**4,723,343**	**2,698,678**	**2,313,994**	**5,108,027**
Δ VS. 2009	%	**4.3**	**13.6**	**13.0**	**5.2**
TOTAL PAPER PRODUCTION	t	**8,988,027**	**5,273,906**	**3,582,737**	**10,679,196**
Δ VS. 2009	%	**6.9**	**14.5**	**13.7**	**8.3**

FIGURE 9

Paper production in Italy. 1999-2010 historical data set.
(Source: ISTAT data processed by Assocarta and Assocarta estimates)



PAPER PRODUCTION (kt)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
PACKAGING	4,071	4,347	4,287	4,429	4,440	4,471	4,541	4,661	4,681	4,434	3,877	4,265
OTHER PAPER AND BOARD	4,615	4,784	4,669	4,927	5,051	5,196	5,458	5,347	5,431	5,033	4,527	4,723
TOTAL PAPER PRODUCTION	**8,686**	**9,131**	**8,956**	**9,356**	**9,491**	**9,667**	**9,999**	**10,008**	**10,112**	**9,467**	**8,404**	**8,988**

FIGURE 10

Consumption, import, export of recovered paper and apparent collection*. 1995-2010 period.
(Source: Assocarta data processed by Comieco)

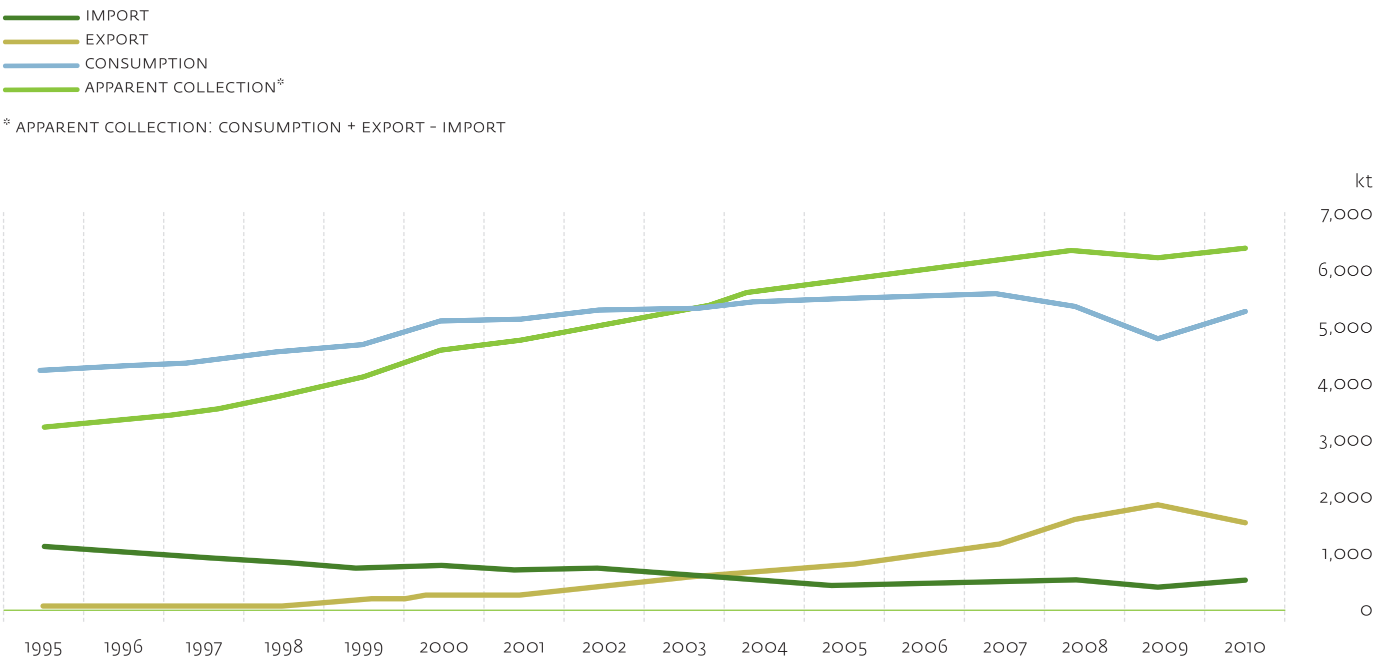


FIGURE 11

Raw materials of the paper industry in 2010.
(Source: Assocarta and Comieco)

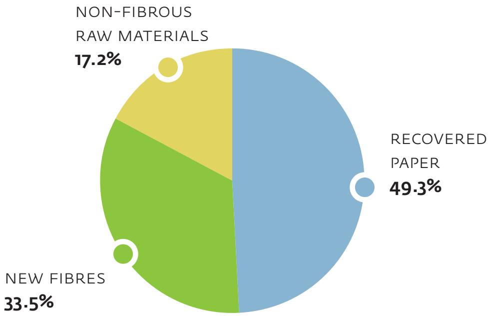
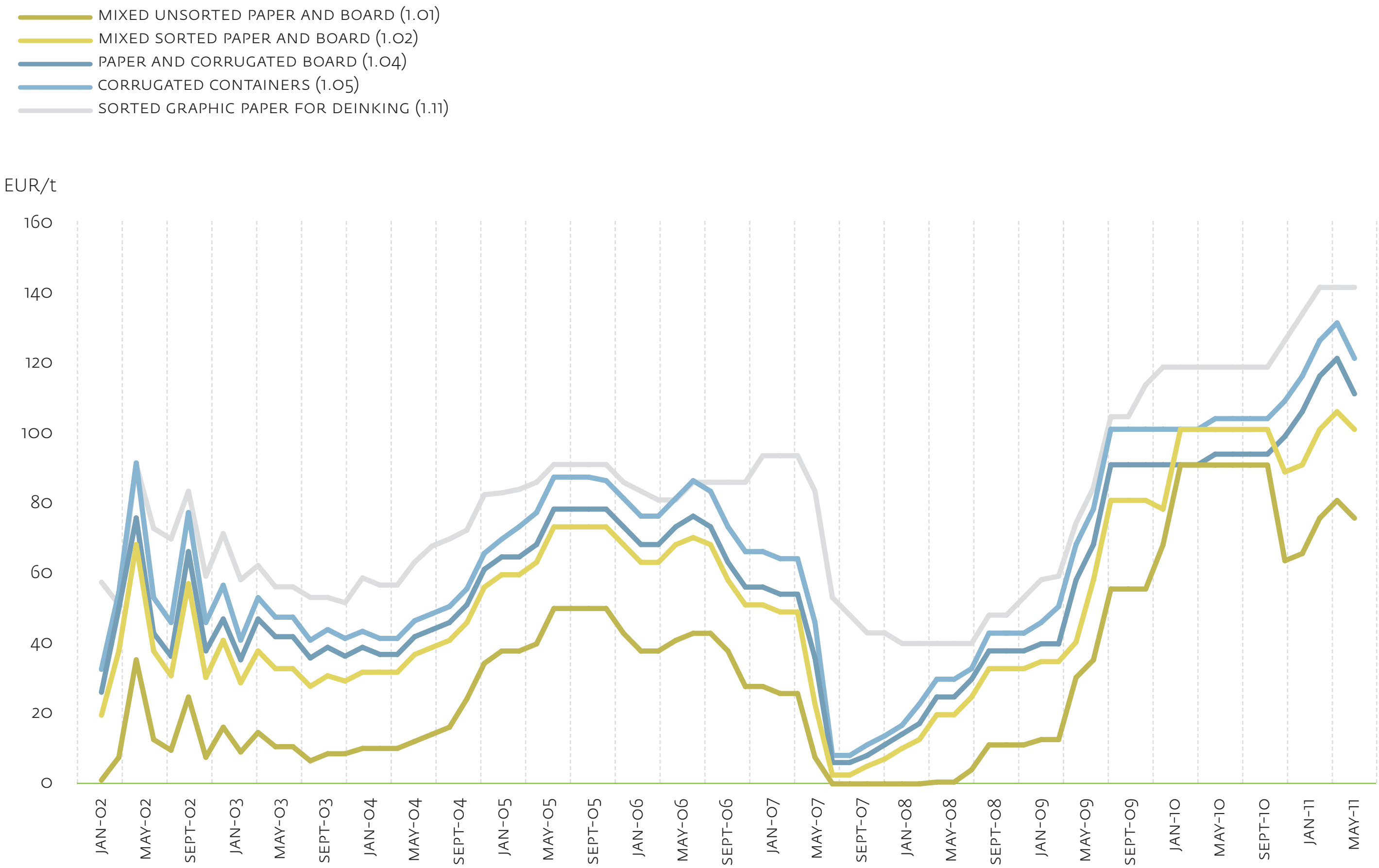


FIGURE 12

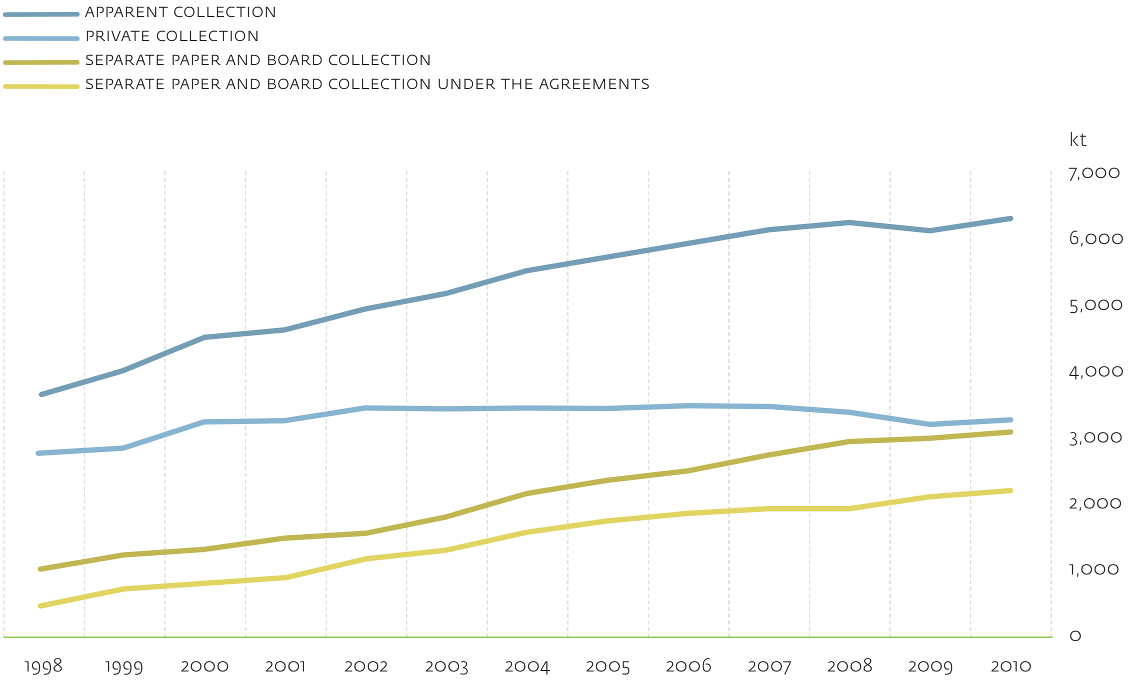
Monthly collections of mean recovered paper values* (EUR/t). January 2002-May 2011 period.
(Source: Milan Chamber of Commerce)



* for sorted materials, packed in bales without foreign substances, from recoverer to user ex departure, VAT and transport, except recovered paper relevant to types referred to the materials recovered through separate urban and similar waste collection

FIGURE 13

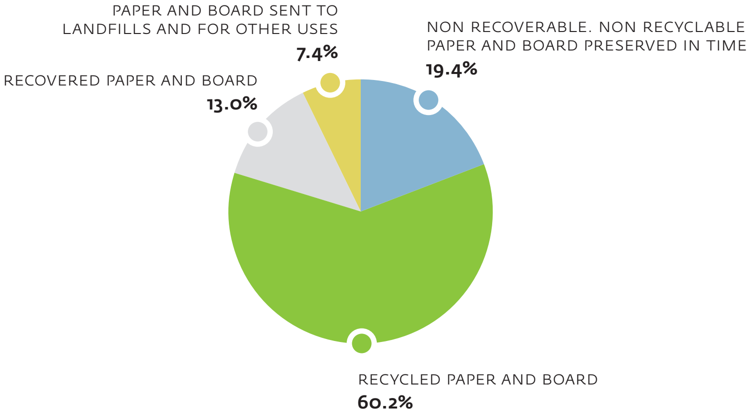
Overall and municipal paper and board collection in Italy. 1998-2010 historical data set. (Source: Comieco)



		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Δ T '98/2010	Δ % '98/2010
APPARENT COLLECTION	t	3,749	4,084	4,565	4,730	5,011	5,227	5,578	5,792	6,001	6,187	6,316	6,199	6,318	2,569	68.5
MUNICIPAL PAPER AND BOARD SC	t	1,001	1,247	1,349	1,501	1,589	1,810	2,154	2,358	2,532	2,750	2,945	3,008	3,069	2,068	206.6
MUNICIPAL PAPER AND BOARD SC UNDER THE AGREEMENTS	t	485	706	811	959	1,202	1,362	1,584	1,747	1,879	1,950	1,928	2,134	2,193	1,708	352.1
PRIVATE COLLECTION	t	2,748	2,837	3,216	3,229	3,422	3,417	3,424	3,434	3,469	3,437	3,371	3,191	3,249	443	16.1
% MUNICIPAL PAPER AND BOARD SC UNDER THE AGREEMENTS VS. APPARENT COLLECTION	%	**12.9**	**17.3**	**17.8**	**20.3**	**24.0**	**26.1**	**28.4**	**30.2**	**31.3**	**31.5**	**30.5**	**34.4**	**34.7**		

FIGURE 14

Destination of consumed paper and board in Italy in 2010.
(Source: Assocarta data processed by Comieco)



	kt
NON RECOVERABLE, NON RECYCLABLE PAPER AND BOARD PRESERVED IN TIME	1,600
RECYCLED PAPER AND BOARD	4,958
RECOVERED PAPER AND BOARD	1,070
PAPER AND BOARD SENT TO LANDFILLS AND FOR OTHER USES	607
TOTAL CONSUMPTION OF PAPER AND BOARD PRODUCTS	**8,235**

FIGURE 15

Paper and board packaging recovery and recycling targets. 1998-2010 period (kt and %).
(Source: Comieco)

Note: energy recovery before 2003 only monitored for the share managed under the agreements. Total data not available.

TABLE 10

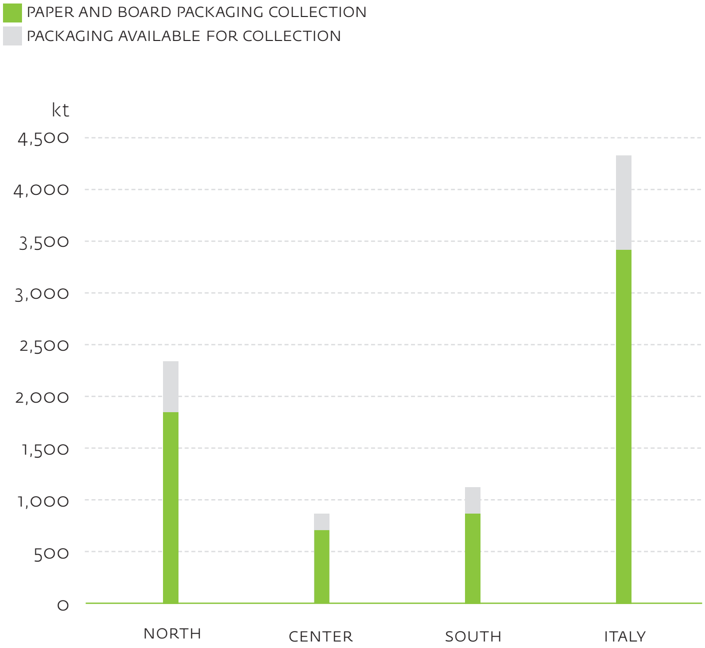
Paper and board packaging recovery and recycling targets achieved in 2010.
(Source: Comieco)

CALCULATION OF RECYCLING AND RECOVERY RATES	YEAR 2010
APPARENT CONSUMPTION OF PAPER AND BOARD PACKAGING	4,338,420
PAPER AND BOARD PACKAGING FROM SEPARATE 1.01+1.02 (PAPER AND PACKAGING) RECYCLED IN ITALY	350,807
PAPER AND BOARD PACKAGING FROM SEPARATE 1.04+1.05 (PACKAGING ONLY) RECYCLED IN ITALY	2,254,294
RECOVERED PAPER ORIGINATING FROM PACKAGING RECYCLED ABROAD	811,199
TOTAL RECYCLED PAPER AND BOARD PACKAGING	**3,416,300**
PAPER AND BOARD PACKAGING RECOVERED AS ENERGY OR WASTE-BASED FUEL	**361,440**
TOTAL RECOVERED PAPER AND BOARD PACKAGING	**3,777,740**

RECYCLING	**78.75%**
ENERGY RECOVERY	**8.33%**
RECOVERY	**87.08%**

FIGURE 16

Paper and board packaging collection indexes achieved in 2010 by macro-areas.
(Source: Comieco)



		NORTH	CENTER	SOUTH	ITALY
PAPER AND BOARD PACKAGING COLLECTION	kt	1.844	711	861	3.416
COLLECTION INDEX	%	78,8	81,8	76,2	78,7

Note: The "collection index" estimates the collection level in public and private areas, with reference to the apparent consumption of paper and board packaging available for collection.

TABLE 11

Balance of benefits from paper and board collection and recycling in Italy. 1999-2010 period.
(Source: Althesys)

	migliaia di EUR
COSTS	
DIFFERENTIAL COST OF SEPARATE COLLECTION	-811,278
COST DUE TO NON-GENERATED ENERGY	-198,637
TOTAL COSTS	**-1,009,914**
BENEFITS	
ENVIRONMENTAL BENEFITS FROM AVOIDED EMISSIONS	772,071
ENVIRONMENTAL BENEFITS FROM NON DISPOSAL	2,320,265
VALUE OF GENERATED RAW MATERIALS	648,786
SOCIAL BENEFIT FROM GENERATED EMPLOYMENT	719,979
TOTAL BENEFITS	**4,461,101**
NET BENEFIT (BENEFITS - COSTS)	**3,451,186**

TABLE 12

Annual balance of paper and board collection and recycling in Italy. 1999-2010 data set.
(Source: Althesys)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	TOTAL
	million EUR												
COSTS													
DIFFERENTIAL COST OF SEPARATE COLLECTION	-35.9	-40.4	-56.3	-62.1	-73.5	-72.3	-74.1	-74.8	-78.7	-79.6	-82.6	-81.1	-811.4
COST DUE TO NON-GENERATED ENERGY	-7.3	-6.6	-8.4	-9.4	-12.7	-14.5	-19.6	-23.0	-23.7	-30.5	-22.1	-20.9	-198.7
TOTAL COSTS	**-43.2**	**-47.0**	**-64.7**	**-71.5**	**-86.2**	**-86.8**	**-93.6**	**-97.8**	**-102.4**	**-110.0**	**-104.7**	**-102.0**	**-1,009.9**
BENEFITS													
ENVIRONMENTAL BENEFITS FROM AVOIDED EMISSIONS	50.9	54.2	63.9	67.3	75.7	63.5	50.4	72.9	75.7	89.0	52.8	55.8	772.1
ECONOMIC BENEFITS FROM NON-DISPOSAL	106.1	115.0	139.1	149.3	171.2	189.7	204.5	220.6	234.6	257.3	266.5	266.4	2,320.3
VALUE OF GENERATED RAW MATERIALS	68.7	69.2	4.9	29.8	28.6	27.1	25.7	32.2	109.7	79.3	16.2	157.6	649.0
SOCIAL BENEFIT FROM GENERATED EMPLOYMENT	34.9	37.7	43.5	48.1	51.5	50.6	63.2	68.6	72.3	81.5	83.3	84.7	719.9
TOTAL BENEFITS	**260.6**	**276.1**	**251.4**	**294.5**	**326.9**	**330.9**	**343.8**	**394.2**	**492.3**	**507.1**	**418.8**	**564.6**	**4,461.2**
NET BENEFIT (BENEFITS - COSTS)	**217.4**	**229.1**	**186.7**	**223.0**	**240.8**	**244.1**	**250.2**	**296.3**	**389.8**	**397.0**	**314.1**	**462.6**	**3,451.2**

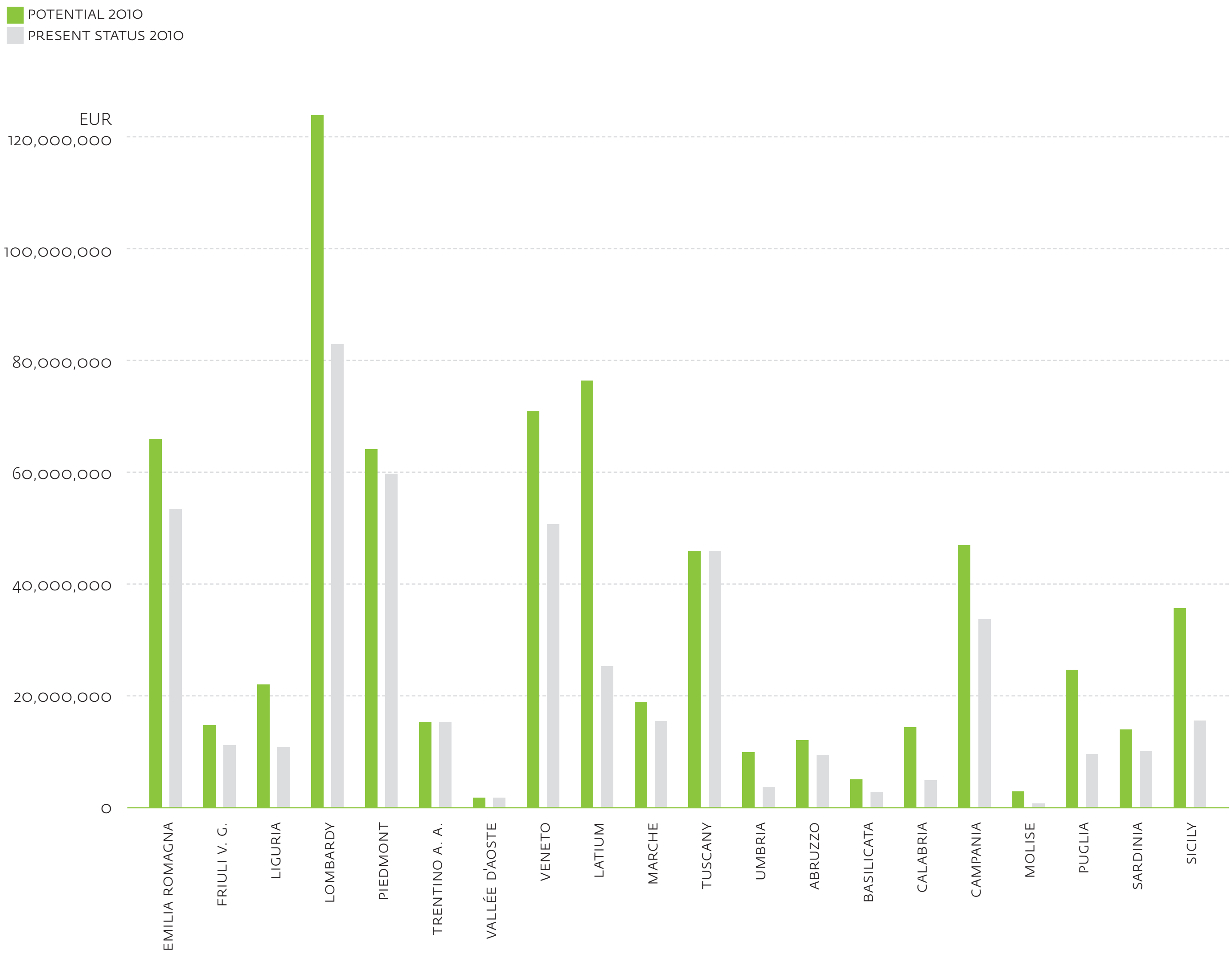
TABLE 13

Benefits from regional paper and board collection. 1999-2010 period.
(Source: Althesys)

	PAPER AND BOARD SC	NET BENEFIT	UNIT BENEFIT
	kt	,000 EUR	EUR/t
EMILIA ROMAGNA	2,771	360,362	130
FRIULI VENEZIA GIULIA	583	93,137	160
LIGURIA	680	91,912	135
LOMBARDY	6,008	788,355	131
PIEDMONT	2,996	450,901	151
TRENTINO ALTO ADIGE	754	123,058	163
VALLÉE D'AOSTE	74	9,723	132
VENETO	2,667	401,080	150
NORTH	**16,533**	**2,318,527**	**144**
LATIUM	1,959	160,105	82
MARCHE	621	96,148	155
TUSCANY	3,013	389,909	129
UMBRIA	409	39,457	96
CENTER	**6,002**	**685,620**	**116**
ABRUZZO	331	48,766	147
BASILICATA	97	18,541	190
CALABRIA	325	31,299	96
CAMPANIA	1,052	136,646	130
MOLISE	31	2,540	82
PUGLIA	953	82,431	86
SARDINIA	341	40,470	119
SICILY	643	86,347	134
SOUTH	**3,774**	**447,039**	**123**
ITALY	**26,309**	**3,451,186**	**131**

FIGURE 17

Potential benefits and gap by regions in 2010. Values in EUR.
(Source: Comieco data processed by Althesys)



	NORTH	CENTER	SOUTH	ITALY
POTENTIAL	75.5%	59.4%	55.7%	**67.4%**

FIGURE 18

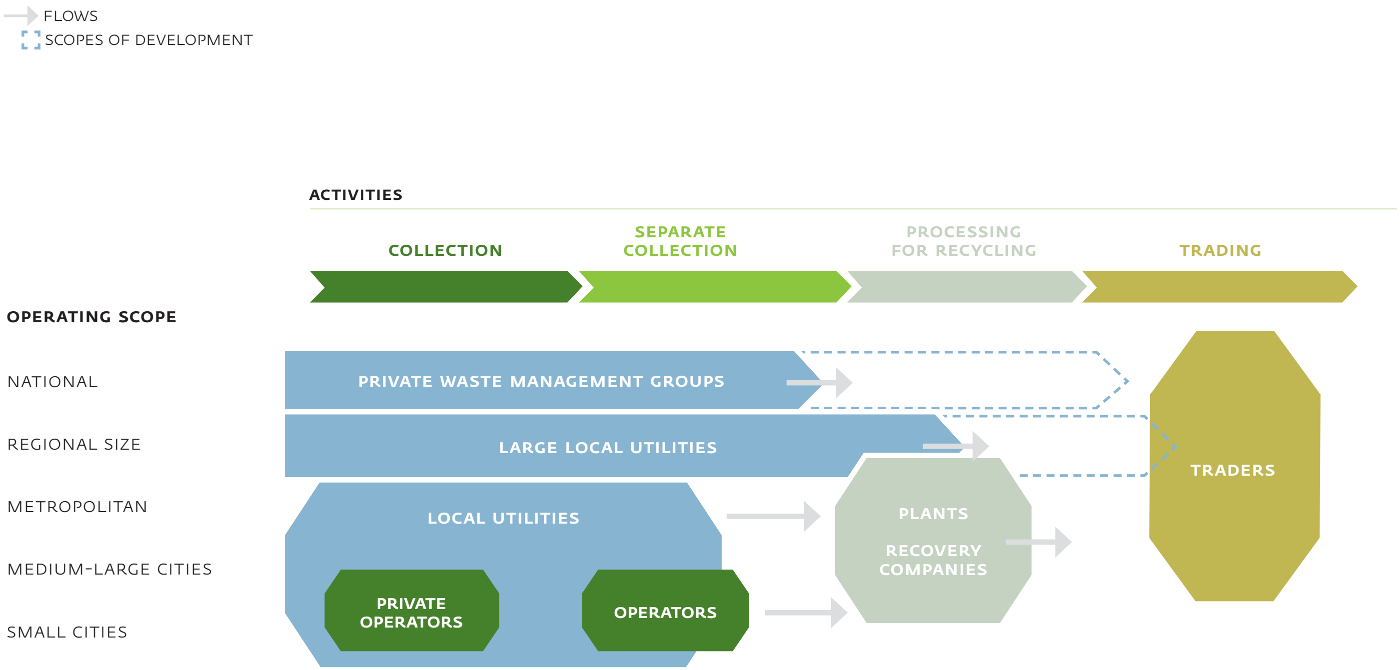
The paper production-recycling pipeline.
(Source: Althesys)

	PAPER PRODUCTION (RECYCLING)	PACKAGING PRODUCTION	COLLECTION	PROCESSING FOR RECYCLING
SEGMENT/FEATURES	**PAPER**	**PACKAGING**	**ENV. SERV./ INDUSTRY**	**OPERATORS AND PLANTS**
NO. OF COMPANIES	>140	≈ 3,000	>250	≈ 700
AVERAGE COMPANY SIZE	medium-large	smes	medium	small
CONCENTRATION	high	low	medium	medium-low
CAPEX/OPEX*	capital intensive	manufacturing	medium	low
DOWNSTREAM SECTOR INCIDENCE (DEMAND CONCENTRATION)	medium-low	low	non-significant	national-international average
UPSTREAM SECTOR INCIDENCE (SUPPLIER CONCENTRATION)	high, international	medium-high, national-international	low	medium

* CAPEX (Capital Expenditures) refers to capital investments; OPEX (Operating Expenditures) include operating costs.

FIGURE 19

Strategic dynamics in the separate paper collection business.
(Source: Althesys)



NOTE ON THE METHOD

For a few years now, the definition of the separate paper and board collection share not managed by the Consortium has been based on the input of the Institutions and Organizations that monitor or manage local waste flows (ISPRA, Regions, Local Agencies, Provinces, Work Groups, Cities, operators, plants, etc.). The goal is to obtain local data, as detailed as possible, for comparison against those resulting from management by the Consortium. When no official data is available, Comieco estimates collection at provincial level.

With reference to this report – 2010 evaluations – 71.4% of the collected data originates from official sources, and overlaps with the data already available to Comieco; 24,3% refers to amounts managed directly by the Consortium or provided by the parties to the agreements in accordance with the Technical Annex (with no other official sources), and 4.3 % is based on amounts estimated as described below.

In order to estimate the amounts not managed by Comieco, and not available from the above-mentioned official sources, 3 groups of provinces were considered:

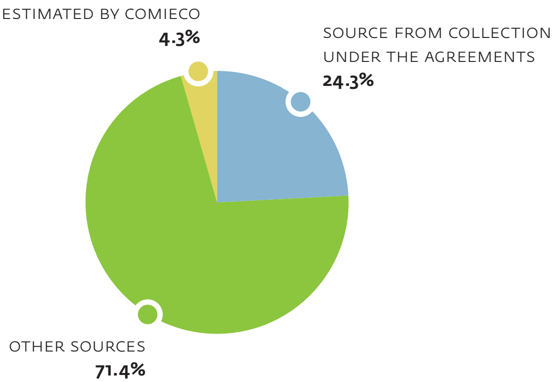
- group A, i.e. the provinces where Comieco covers more than 85% of the inhabitants through the agreements;
- group B, i.e. the provinces where Comieco covers 51 to 85% of the inhabitants through the agreements;
- group C, i.e. the provinces where Comieco covers 20 to 50% of the inhabitants through the agreements.

A direct survey was then carried out on the Cities and service providers, aimed at understanding how many of the Cities not involved in the agreements have introduced the separate paper and board collection service.
If the surveyed City provided information on the introduction, if any, of the collection service, as well as data on collection, such data was included among the official sources.
On the other hand, if no data on the amounts was available, attempts were made to identify the rate of inhabitants not subject to the agreements, but performing separate paper and board collection: for these, the same per-capita value

recorded for the inhabitants under the agreements in that province was assumed.
Based on the above, the collection data was calculated and added to the data referring to the share managed by Comieco, so as to estimate total collection in the region under consideration.

FIGURE 20

Sources and methodology.
(Source: Comieco)



GROUP	% INHABITANTS UNDER THE AGREEMENTS	% OF INHABITANTS NOT SUBJECT TO THE AGREEMENTS ON WHOM SC PERFORMANCE SHOULD BE CHECKED
A	AB > 85%	MINIMUM 25 %
B	51% < AB < 85%	MINIMUM 50 %
C	20% < AB < 50%	MINIMUM 75 %

Note
Certain values (quantitative, in particular) taken from last year's report were updated to ensure a homogeneous comparison for the past two years.

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