2008

Paper and Board Collection,
Recycling, and Recovery

14th Report

July 2009

comieco

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Consorzio Nazionale Recupero e Riciclo degli Imballaggi a base Cellulosica

2.6 billion EUR

is the net balance of the benefits produced through separate paper and board collection from 1999 to 2008

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President, Comieco

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Increase in the quantities of paper and board collected in 2008:

+7.1%

Preface

It is a good practice to introduce the reading of the abundant data which I trust will arouse your interest in this 14th Report with some highlights on the year's events.

As it happened, I guess, to other commentators, this task poses a particular challenge this year. Separate collection, paper and board recycling, and packaging production were also affected by the economic crisis and only the existence of the guarantee system represented by CONAI and by the Pipeline Consortia and a well-organized national production sector have allowed to avoid downsizing separate collection.

With reference to paper and board, the balance vs. 2007 is widely positive: collection grew by 7.1%, i.e. by almost 200thousand tons, with a 70thousand ton increase, equal to 16%, in the South.

On the other hand, the corresponding economic picture of 2008 affected the paper and board quantities managed by the Consortium, which declined to 1.93 million tons, i.e. 1.1% less than in 2007.
Implementing the principle of subsidiarity on the market in the first part of the year, characterized by high-value recovered paper, a significant withdrawal of joint paper and packaging collection volumes from the agreements was recorded.

A look at the last months of 2008 and at the first half of 2009 shows that, parallel to a sharp decline of consumptions, separate collection achieved positive results, and is even growing significantly in the South. At this economic stage, the Consortium plays a crucial role in continuing to ensure collection and recycling.

In a year that saw a collapse of the value of most tangible and intangible goods, I wish to stress in particular the economic and environmental value of collection and recycling.

The 2008 balance of the benefit produced for the Country through separate paper and board collection amounted to 376.5 million EUR, equal to 2.94 million tons; the cumulated benefit in the past 10 years is close to 2.7 billion EUR, with over 20 million tons of collected materials.

These consolidated values provide a starting point to face the challenges tied to the new General Agreement between ANCI and CONAI and to the relevant Comieco Technical Attachment for 2009-2013.

Such challenges can be summarized as follows: maintain a guaranteed recycling of packaging and, on the Cities' request, of paper throughout the national territory, based on an annual schedule taking into account the coordination role played by the Consortium; further develop separate collection in the South; continue to improve the quality of collection via a control system shared with the parties to the agreements.

In short, a more competitive separate collection in terms of volumes, quality, and costs, which is crucial for more competitive packaging to build the society of recycling.

Piero Attoma
President, Comieco

Paper and board recycling
from 1998 to 2008 equals the volume
of 170 landfills
that were not built in the country
thanks to separate collection

Introduction

The 10 sections that follow provide a virtual overview of Italy, described through separate paper and board collection and recycling.
This scenario shows that paper and board collection is by now a consolidated practice in the North, and gradually improving in the Centre and South.

For this 14th edition, we have fine-tuned our cost-benefit analysis, presented in the last two years at a national level, detailing it to the regional level. The work supervised by Prof. A. Marangoni with Althesys updates the environmental balance and the maintenance of the national paper system and assesses the economic impact of paper and board collection, as well as the value of its non- or inefficient implementation.

1.
The growth of separate paper and board collection

The upward trend of separate paper and board collection, in place for over ten years now, is confirmed in 2008.
This trend goes hand in hand with the other fractions collected separately; significantly, the expected "erosion" of the undifferentiated waste doomed to be disposed of in landfills seems to be effective. In fact, separate collection as a whole is estimated to grow by 8% vs. a virtually unchanged overall production of urban waste.
With specific reference to paper and board, the national growth is close to 200thousand tons, with a 7.1% percent variation in relative value, below the overall rate of national collections. This is due to a by-now achieved maturity of paper and board collection systems – at least in a significant part of the country – whereas other flows still need to improve their integrated waste management cycles.
Paper and board still account for 30% of the total waste collected separately. As to details on paper and board collection, last year the variation was broken down at macro-area level as follows: North 82,841 tons (+4.9%), Centre 42,874 tons (+6.7%), South 70,024 tons (+16.0%)
Special focus should be made on the South, where the threshold of 500thousand tons of collection is exceeded. This is an important achievement, which highlights the effort and the investments made in the area. The individual regions provide varying inputs. The double-digit performance of Abruzzo (+27.7%), Campania (+28.1%), and Sardinia (+28.9%) turns out crucial, as in 2007. Molise finally shows signs of recovery too, albeit starting from very low levels. In Puglia, after a static 2007, 2008 brings 10thousand tons of new collection, not least as a result of such activities as "Cartoniadi", which are expected to provide positive results in 2009 as well. Critical situations that deserve mentioning include Sicily (+0.7%) and Calabria (+5.9%), where the crisis of the management companies/ATO has a significant impact on the provision of collection services.
In the Centre, regional growth in Latium is limited to a rate below 4%, despite an 8.1% positive variation recorded in Rome. While interesting signs come from Marche and Umbria, Tuscany is still the main reference point.

In the North, Lombardy (593thousand tons) is confirmed as the main "gold vein" of collection, but an acceleration is also recorded in the two regions – Liguria (+24.7%) and Friuli Venezia Giulia (+17.8%) – that were most seriously lagging behind compared to the overall scenario in the area; in 2008, they provided close to 26thousand tons more together, corresponding to one-third of the overall variation in the North.
Piedmont deserves special consideration. Data seems to point out to a decline of about 3 percent points compared to 2007, a figure that should be carefully studied. While, in fact, it may point out to the current recession, even more than in other areas of the country, it draws more attention on such issues as the definition mode of waste collection flows, the assimilation/ assimilability of special waste, the permeability of the consortium system with reference to the national and international recovered paper market. To this end, a summary was introduced for the first time in this year's report, showing the regional data (ISPRA 2007 data) on the production of urban waste, divided between separate collection and residual undifferentiated share.
With respect to 2009, in a context of economic and consumption decline, overall collection is estimated to grow above 3 million tons, albeit at lower rates compared to the past few years.

2. The role of Comieco

The positive economic situation of the recovered paper market in the best part of 2008 resulted into a reduction of the share of municipal Separate Collection managed by Comieco according to the principle of the Consortium's subsidiarity vs. the market.
In the final months of the year, such variation was confronted with the burst of the financial crisis first and of the economic crisis later, which brought about a strong demand by the parties to the agreements (both old and new) for the economic and recycling guarantees offered by the consortium system. In this context, the Consortium had to establish a true "crisis committee" to manage higher quantities at a time of sharp and significant decline of production and of subsequent use of recovered paper by the paper industry. Thus the industrial system, despite the economic challenge, did not shirk its

* ISPRA: Environmental Research and Protection Superior High Institute (ex-APAT)

legal duties and allowed the regular operation of collection services all over the country.
In 2008, the share managed under the agreements vs. the total municipal separate paper and board collection was reduced. While the most significant decrease in references to Comieco was recorded in the North, a slight growth occurred in the Centre and a decline was recorded in the South, although Comieco still remains the cornerstone of recycling.
Overall, the quantities of paper and board that the parties under the agreements have decided to recycle outside their relation with Comieco amount to almost 320thousand tons (+47% vs. 2007). Ninety percent of these quantities originate from joint collection of paper and packaging flows.
The early months of 2009 have seen an increase of separate collection, albeit at limited rates.

The number of agreements entered into in 2008 with the Cities/Operators at a national level grew from 646 in 2007 to 690 in 2008. The variation occurred in the south (+61), where the highest number of agreements is also in place (380 out of a total of 690); this is a sign that the integrated and supramunicipal organization of the services is still far from full implementation.
The Cities and the population subject to the agreements are decreasing: the former account for 77.9% of the total (6,314 vs. 6,339 in 2007), and the latter amounts to 85.8% (vs. 88.2% in the previous year). The detailed data by macro-areas – decrease in the Centre and North, increase in the South – confirm the above-stated number of agreements in place.

3. Collection yields

The national average per-capita collection yield is 50.1 kg per inhabitant.
In the north, the average yield per inhabitant was 65.7 kg, vs. 60.0 kg in the Centre, and 24.4 kg in the South.
On average, each Italyn citizen increased his or her collection volume by 3.4 kg during 2008, a homogenous figure for the three macro-areas of the country. In relative terms, municipal separate collection in Italy increased threefold in ten years, while it increased ten-fold in the South alone.
The best performing regions in each area are, again, Trentino in the North (81.0 kg per inhabitant), Tuscany in the Centre (85.4 kg per inhabitant), and Sardinia in the South

(36.1 kg per inhabitant).
Any assessment of the above data must consider the different and non-homogeneous local distribution of paper and board consumption and the assimilation criteria implemented by the Cities and the operators in each area.
The collection mix managed by the Consortium includes packaging flows from business concerns subject to dedicated collection practices (1.04 + 1.05) and the paper basically originating from "household" circuits (1.01 + 1.02). The breakdown between channels remained substantially stable in 2008 (from household 68.3% - only packaging 31.7%, with a 0.1% distribution variation in favour of household collection vs. 2007). Such figure is net of about 290thousand tons of household collection managed outside Comieco. Focusing on the South, where household collection services show the best opportunities to improve and a marginal use of "extra-agreement" activities, local interventions resulted into an increase of the joint collection share from 43.4 to 47.8%.

4.
Quality: a goal to achieve

"Italy, a parochial country": a saying that clearly reflects an operation of municipal separate collection services that varies over few kilometres from the door-to-door approach to traditional road-based systems. At the same time, certain Cities are served on the ground of recent contracts, providing for the integrated operation of urban hygiene services, while in others separate collection services are a mere addition to undifferentiated collection services, based on outdated design assumptions.
In such complex circumstances the Consortium implements the supervisory activities provided for by the agreements and monitors a growing number of cases, including in particular the Cities where structured services are in place. The information provided by the analysis campaigns provide clear hints to the development of the quality of paper and board collected separately.
In 2008, 2,135 samples were taken (+164 compared to 2007) for a total quantity of 415 tons of analyzed material. The analysis performed on selective collection flows confirms

a by-now consolidated improvement; the mean value of foreign fractions is now 0.5%. On the other hand, the average data emerging from the monitoring of household collection points out to a reversed trend that needs to be considered. The 3.4% mean value is, in fact, the highest recorded since 2005.
The first two rounds of the ANCI-CONAI agreement (1999/2003 and 2004/2008) led the country to increase the collected volumes significantly and to hit the targets set by the Italyn and European legislation in due time.
Now that collection and recycling have become a consolidated practice in Italy and that such targets have been widely achieved, the quality of the collected material and the competitiveness of the service become the new goals. This is even more the case at a time of low-value raw materials as a strategic factor to optimize the processing phase and the subsequent recycling process in the paper mills.
The qualitative analyses fall within the framework of a broader audit and control schedule aimed at ensuring the appropriate implementation of the procedures provided for by the agreements and by the connected contract relations by all the parties involved (Cities, operators, plants, paper mills, and processors).
In 2008 such audits involved 189 parties, including 58 subject to the agreements (out of 690 – sample of 17.3% of the managed quantities), 57 plants (out of 322 – sample of 22.8% of the managed quantities), 44 paper mills (out of 71 – sample of 44.1% of the managed quantities), and 30 processors.
Monitoring services, checking flows, improving quality means ensuring high-quality recovered paper, capable to satisfy market needs and thus close the loop, while promoting the purchase and use of products made of recycled materials.

5.
Considerations: significant resources

One of the factors promoting separate paper and board collection year by year is the recycling, guaranteed by Comieco, of the material subject to the agreements, combined with the economic investment in favour of the Cities, in excess of 604 million EUR in eleven years.
The considerations paid by Comieco to the parties under the agreements in 2008 alone amounted to more than 89 million EUR, equal to 1.73 EUR on average per inhabitant

subject to the agreements.
These resources add up to the recycling operators' contribution to collection (4.3 million EUR in 2008) for the management of the similar product fractions collected jointly, as well as to the amounts paid to the sorting plants for recovered paper incineration.

6.
The Anci-Conai agreement: towards a new round

While 2007 had been defined as a year of awareness and maturity of collection operators with respect to the opportunities offered by the Comieco system, 2008 sees the end of a five-year process, whose final balance can be deemed widely positive.
While the first general agreement (1999-2003) governed the management of 5.5 million tons of paper and board vs. an investment by the Consortium of 204 million EUR, with the 2004-2008 agreement such values have grown to 9.1 million tons and 400 million EUR respectively, transferred locally.
The packaging recycling rate – except the share used for energy recovery, which should anyway be considered for the purpose of the EU targets – grew from 57.8% in 2003 to 73.8% in 2008.
Management during 2008 provided basic elements to define the third ANCI-CONAI General Agreement – signed in December 2008 – and the Comieco Technical Attachment, recently defined. According to the new draft, in force until 2013, important principles are confirmed, including a focus on household collection and the goal of intercepting the packaging flows that are still disposed of in landfills. At the same time, more attention is given to such strategic issues as the mapping of collection services, their efficiency in terms of collected quantities, as well as the size of the incoming flows in sorting plants, as a basic requirement for downstream recycling.

7.
An overview of city flows

The analysis of the collection trend in the cities starts from a partly different viewpoint this year. Following, in particular, a full operation phase of collection achieved in the city of Cagliari, the focus is on the regional capitals (the autonomous provinces in the case of Trentino Alto Adige).
The analysis, limited to the quantities subject to the agreements, confirms the leadership of Trento in terms of per-capita paper and board yield, with 95.6 kg per year.
In the South, Bari has been the main reference point for years now. With 65.8 kg per inhabitant and a 36.3% increase compared to the previous year, it benefits from service reorganization interventions, including door-to-door collection in some parts of the city and specific communication initiatives, such as the regional “Cartoniadi” in Puglia. Important steps were made in Cagliari, whose yield is now significantly above 40 kg per inhabitant. Palermo is lagging behind, but in the North too data like those of Trieste (38.8 kg per inhabitant) deserve specific attention, being still far from the yields of the reference area.

The overall management data of five major Italyn cities have been monitored for some years now, in close co-operation with the local operators. The cities under study (Florence, Milan, Naples, Rome, Turin) make up a base of about 6.1 million inhabitants (approx. 10.3% in terms of covered user base) and offer a privileged overview of general dynamics in the country.
With reference to the overall national data (2008 data processed by Comieco), the concerned Cities have produced 11.8% of total urban waste, while their share of total separate collection amounted to 10.1%. This data confirms the priority of interventions on such cities as Rome and Naples, which showed encouraging trends during the year also following the activities carried out upon agreement with the Administrations and operators on specific projects or at CONAI level. In Rome, the increase of paper and board collection exceeds 15thousand tons (+8.1%), including 11thousand tons recycled through the Consortium. The increase in Naples is just below 11thousand tons (+25.8%). Overall, a 4.2% decline (124,600 tons) of undifferentiated waste production is recorded in the five cities, vs. an overall increase by almost

61thousand tons of separate collection.
In general, the total urban waste production decreased by 1.6%. On one hand this is an effect, already visible in early 2008, of a decline in consumptions and, on the other, of improved collection skills. A somewhat opposite trend is recorded in Milan, where total urban waste production has grown by 8,500 tons (+1.2%), almost fully collected separately (+7,600 tons).

8.
Recovered paper as a raw material

The paper and board recycling process coordinated by Comieco is carried out by a consolidated nation-wide network, which includes operators (322 processing plants and 71 paper mills, plus 151 secondary and tertiary packaging collection units) that ensure short-distance provision (on average 17.3 km vs. 30 km provided for by the Technical Attachment) and the necessary processing for subsequent use in production cycles.
As described above, a share just above 30% of apparent paper and board collection (calculated as recovered paper consumption + export – import) has been recycled through the consortium in Italy.
In 2008, the Italyn paper industry produced over 11 million tons of paper and board products, almost 7% less than in the previous year.
The mix of used raw materials included recovered paper (49.2%), as well as new fibres (33.8%) and non-fibrous raw materials (17.0%), with a slight increase of recovered paper compared to 2007.
With reference to the economic value of recovered paper – in particular for the types included in paper and board flows from urban separate collection – the strong strain on the quotations recorded at the Chamber of Commerce of Milan during 2008 is worth noting. After the peak in 2007 and in the first part of the year, due to the world market crisis that started in the summer months, a sharp declining trend was observed until November-December, when the lowest prices of the last eight years were recorded.
In the first months of 2009, the quotations are gradually but slowly increasing (more quickly for recovered paper of more precious kinds). The latest available data (May 2009) points out to prices that are still 15 to 25% lower than those recorded throughout the 2004-2006 period.

9.
Packaging management

An analysis of results starting from 1998 – when the Packaging Directive 94/62 was implemented – shows that the recycling rate has doubled in just more than a decade, from 37% in 1998 to approximately 73.8% in 2008. In particular, the variation of the recycling rate was above 4% between 2007 and last year. This figure originates from a combination of two factors, namely the gradual development of separate paper and paper and board packaging collection and the abovementioned decline of production.
The recycled packaging rate adds up to a significant fraction that ends up into energy recovery plants. If such volume is included, the total recovery rate reaches 81.7%. Energy recovery is a channel that absorbs about 356thousand tons of packaging, however gradually declining in the last four years. This is a sign that the increase of packaging to be used for recovery as materials concerns the flows that are now still meant for landfills or other forms of recovery.
Besides ensuring early and significant compliance with the targets set by the European and national rules, this aspect is consistent with the priority of recycled materials as secondary raw materials vs. other recovery channels.
The packaging recycling index, meant as the recycled quantity vs. the quantity available for collection, is substantially homogeneous, and amounts to more than 70% in the three macro-areas (73% in the north, 78% in the centre, 72% in the south).

10.
The benefits of national and regional collection
The benefits of a decade of separate paper and board collection

Paper collection and recycling produce significant environmental, economic, and social benefits. The cost-benefit balance presented here, in fact, shows that these activities have allowed our country to achieve net benefits for over 2.6 billion EUR in the 1999-2008 period. In this decade 20.1 million tons of paper and board were collected separately, vs. 17.2 million tons in 2007.
Below is a brief summary of the national balance, with details on the calculation method and on the most significant items.

Moreover the regional distribution of these benefits is presented and the calculation of the potential benefits that are still to be achieved through an increase of collection is provided.

Methodology

The performed analysis is based on the cost-benefit analysis criteria. Therefore the balance considers:

- the economic aspects, i.e. the costs (or missed benefits) and the benefits (or avoided costs) connected with the implementation of the paper and board collection-recycling system;
- the environmental effects, through the calculation of the money value of the costs (missed benefits) and environmental benefits (avoided costs) tied to the paper and board collection-recycling system;
- the socio-economic impact, through a monetary estimate of the greater or lesser business related to paper and board collection-recycling.

The values of the different cost and benefit items were then updated to take into account their distribution in time.

The analysis is founded on differential evaluations based on a variety of assumed scenarios:

- an "historical" scenario of the paper and board collection-recycling system implemented in time following the establishment of the Comieco consortium, between 1999 and 2008;
- an alternative scenario, assuming the absence of any separate paper and board collection system; the volumes that are historically managed in a separate way are theoretically disposed of together with solid urban waste

Relevant effects concern the following logical categories:

- the costs of the historical scenario that could have been avoided;
- the benefits of the historical scenario that could 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 balance of Italy in the 1999-2008 period

While the cost-benefit analysis method adopted so far remained unchanged, the national balance was calculated more punctually this

year, considering local details and drafting the balance of the individual Italyn regions. The national analysis is thus the result of an aggregation of data of all the twenty Italyn regions.
This implied the adoption of specific and different values of certain balance items, including collection and disposal costs, as well as the recalculation, in view of homogeneity, of the balances of all the years considered.
This activity allowed to perform a more accurate and comprehensive evaluation, as well as to gain a better perception of the diversities characterizing the different parts of our Country, and thus provide a more truthful overview of the national position.
The balance for Italy as a whole highlights net benefits for over 2.6 billion EUR. This result originates from a comparison of costs for approximately 780 million EUR and benefits for approximately 3,453 million EUR. The fair value falls within the range of 1.7 to 3.5 billion EUR.

Below is a brief review of the items considered.

Costs

Differential cost of separate collection:
this item shows the higher cost of performing separate paper and board collection vs. the cost of non-separate collection of equivalent volumes in time.
The data source includes the annual reports of ISPRA. The considered costs include the specific ones for each year and for each region. Such values show significant differences between regions (up to threefold between the minimum and maximum) and reflect the local and operational peculiarities of the different geographies. Moreover the make-up of the sample analyzed by ISPRA may not be representative of the regional universe considered.

Costs due to non-generated energy:
this item represents the money value of the energy that could have been generated through the incineration of the paper and board volumes collected separately every year. Based on the total quantity of incinerated waste per year (ISPRA data), it is estimated that about 3 million tons of paper and board were not processed from 1999 to 2008, with a

non-generation of about 2.3 TWh of energy. The evaluation was made at the average annual PUN price (source: AEEG).

Benefits

Environmental benefits from avoided emissions: this item highlights the benefits of separate collection on the environment resulting from a reduction of CO2 emissions due to a more limited use of new raw materials and to non-disposal, however net of the emissions due to separate collection.
Overall, emissions for about 26.5 million tons were avoided.
The unit saving of CO2 (estimated at 1.3 tons per ton of paper) was estimated at the mean annual market prices of emission certificates.

Economic benefits from non-disposal:
represent the costs avoided for the 20.3 million tons of paper that were recycled and not disposed of from 1999 to 2008.
The avoided costs were estimated based on the annual waste management system mix: landfill, composting, biostabilization, waste-based fuel production, incineration. The data sources include the annual ISPRA reports (for the disposal and treatment mix), certain regional schemes, and Comieco (for disposal costs).
The used data sets are specific for each region. This is a cautionary approach, because any estimates based on disposal costs sourced from ISPRA would have resulted into higher evaluations.

Value of generated raw materials:
calculates the money 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:
the performance of separate collection generates new activities, related business, and employment.
This item is calculated with reference to the number of operators theoretically required to perform separate collection in time, based on mean technical and operational parameters and on a subsequent comparison with the actual trend of employment in the sector.
The money value is based on the gross salary of urban hygiene operators according to the sector's national collective labour contract.

The local balances: benefits for the Regions in the 1999-2008 period

The overall benefits achieved in our Country see different local inputs. For better understanding of the peculiarities of the different Italyn regions, the cost-benefit balances were calculated for each region.
The picture of Italy emerging from the regional analysis shows a few contrasts. While some regions, particularly in the Centre and North, record high collection levels and, thus, significant benefits, others do not seem to take profit from the performed collection, and others yet still show low levels of separate collection. The regional analysis, in fact, shows mismatches between the collected volumes and the achieved benefits.
This depends on the differences typical of each region in terms of non-separate and separate paper and board collection costs, on the status of systems (the different use of landfills or incineration), and on subsequent disposal costs.

Below is a description, by way of example, of a few peculiar situations of the different regions.

Lombardy, for example, shows a consistent situation, with the maximum paper and board collection value (approximately 4.8 million tons) and the maximum net benefit (approximately 628 million EUR). As is well known, this region is characterized by low costs both for non-separate urban waste collection and for separate paper and board collection (the regional balance differential is a mere 109 million EUR). Lombardy also draws huge benefits from non-disposal (433 million EUR), due to the high disposal costs and to the broader use of incineration vs. landfills.
On the other hand, **Latium** shows a low net benefit (approximately 102 million EUR) vs. a collected volume of about 1.5 million tons. In facts, benefits from non-disposal (99 million EUR) are limited, due to the low cost of landfills, which represent the main destination in Latium (75%). However, the costs of separate paper and board collection are very high and result into a value of the differential separate collection cost (about 110 million EUR) almost equal to Lombardy, which collects volumes about three times as high instead.
Campania shows one of the lowest net benefits among the different regions. The net balance (about 59 million EUR vs. 706thousand

tons of collected paper) suffers from the peculiar situation of the region. This region, in fact, has high non-separate urban waste collection costs and even higher separate collection costs. Similarly, the waste management costs are very high, due to the well-known critical system conditions and to the absence of incineration. It should be noted that the balance, in view of homogeneity of criteria with the other regions, did not consider certain additional/anomalous costs that are peculiar to this region, including the storage of the so-called eco-bales, transport and disposal abroad, etc. If such items, typically tied to the emergency status of the region, had been considered, the net benefit would have been higher than the calculated one.

Untapped benefits: potentials vs. 2008

Notwithstanding the regional differences, Italy generally achieved high levels of separate paper and board collection, which resulted into significant benefits.

However some potentials remain untapped. We therefore tried to estimate the benefits that can still theoretically be obtained on the ground of the collection potential calculated by Comieco. The Consortium, in fact, has carried out an analysis to determine the collection potential in 2008, meant as the quantity of paper and board that can still be collected separately, vs. a technical and economic limit, taking into account the collection level achieved and the quantity that today is still finally disposed of, whatever the adopted methods. Thus the regional cost-benefit balances for the year 2008 were calculated on the ground of the estimated potential annual separate collection quantities vs. the actual quantities collected during the year. Moreover, the greater potential efficiency of the system was estimated, taking Lombardy as a national reference model, considered as a realistic and not just theoretic target. The paper and board disposal and separate and non-separate collection costs were then considered for this region.

For Italy as a whole, the net benefit in 2008 would grow from 376 million EUR to 598 million EUR, with an increase of about 59%. In this case too, the regional situation appears quite diversified, with variable gaps between regions.

While the North generally shows a gap of about 34%, the Centre is around 97%, and the South still shows a potential untapped benefit of 112%.

In other words, the full achievement of the separate paper and board collection potential would provide additional net benefits to Italy for about 221 million EUR a year.
In the light of the performed analysis, a few directions emerge, which would allow to further improve the benefits that can be obtained from separate paper and board collection.
First, more efficiency in separate paper and board collection would reduce or cancel the cost differential vs. non-separate collection. In some regions, like Trentino Alto Adige, Basilicata, Sicily, and Umbria, separate collection costs are even lower than non-separate collection costs.
Second, the disposal mode mix needs to be modified along with a reduction of its costs that, whatever the benefits of paper collection and recycling, generate an environmental and economic burden that society can hardly bear.

Carlo Montalbetti
General Manager, Comieco

89.1 million EUR

were paid by Comieco
to the Italian Municipalities in 2008

Charts and tables

Acronyms

SPF
similar product fractions
(non-packaging paper and board)
SC
separate collection
UW
urban waste
%
percent rate

n
number
t
tons
inh
inhabitants
1.01-1.02-1.04-1.05
classification of recovered paper
according to UNI EN 643

Table 1
Trend of total separate paper and board collection by regions. 2007-2008 period. (Source: Comieco)

Region	Total inhabitants	2007	2008	∆ 2007-2008	∆ 2007-2008
		t	t	%	t
Emilia Romagna	4,199,669	297,814.5	325,411.4	9.3	27,596.9
Friuli Venezia Giulia	1,209,698	60,958.7	71,818.6	17.8	10,859.9
Liguria	1,609,288	60,689.0	75,650.7	24.7	14,961.8
Lombardia	9,497,939	576,058.3	592,682.6	2.9	16,624.3
Piemonte	4,347,344	330,104.9	319,484.1	-3.2	-10,620.8
Trentino Alto Adige	988,338	78,841.9	80,043.2	1.5	1,201.3
Valle d'Aosta	124,263	8,522.9	9,069.9	6.4	547.0
Veneto	4,749,799	261,306.3	282,977.5	8.3	21,671.2
North	**26,726,338**	**1,674,296.5**	**1,757,138.0**	**4.9**	**82,841.5**
Lazio	5,317,017	238,024.8	247,048.7	3.8	9,023.9
Marche	1,531,248	62,578.3	73,860.9	18.0	11,282.6
Toscana	3,626,558	297,148.8	309,825.4	4.3	12,676.6
Umbria	869,968	40,471.0	50,362.3	24.4	9,891.3
Center	**11,344,791**	**638,222.9**	**681,097.3**	**6.7**	**42,874.4**
Abruzzo	1,306,487	36,675.5	46,840.2	27.7	10,164.7
Basilicata	592,948	12,337.1	12,503.8	1.4	166.7
Calabria	1,999,791	36,436.5	38,590.0	5.9	2,153.5
Campania	5,788,644	118,065.6	151,200.1	28.1	33,134.5
Molise	320,466	3,600.5	4,524.9	25.7	924.4
Puglia	4,069,202	102,920.6	112,418.8	9.2	9,498.2
Sardegna	1,656,266	46,440.0	59,851.3	28.9	13,411.3
Sicilia	5,014,927	80,733.6	81,304.7	0.7	571.1
South	**20,748,731**	**437,209.4**	**507,233.7**	**16.0**	**70,024.3**
Italy	**58,819,860**	**2,749,728.8**	**2,945,469.0**	**7.1**	**195,740.3**

Figure 1
Municipal per-capita separate paper and board collection by regions and by areas. Year 2008. (Source: Comieco)

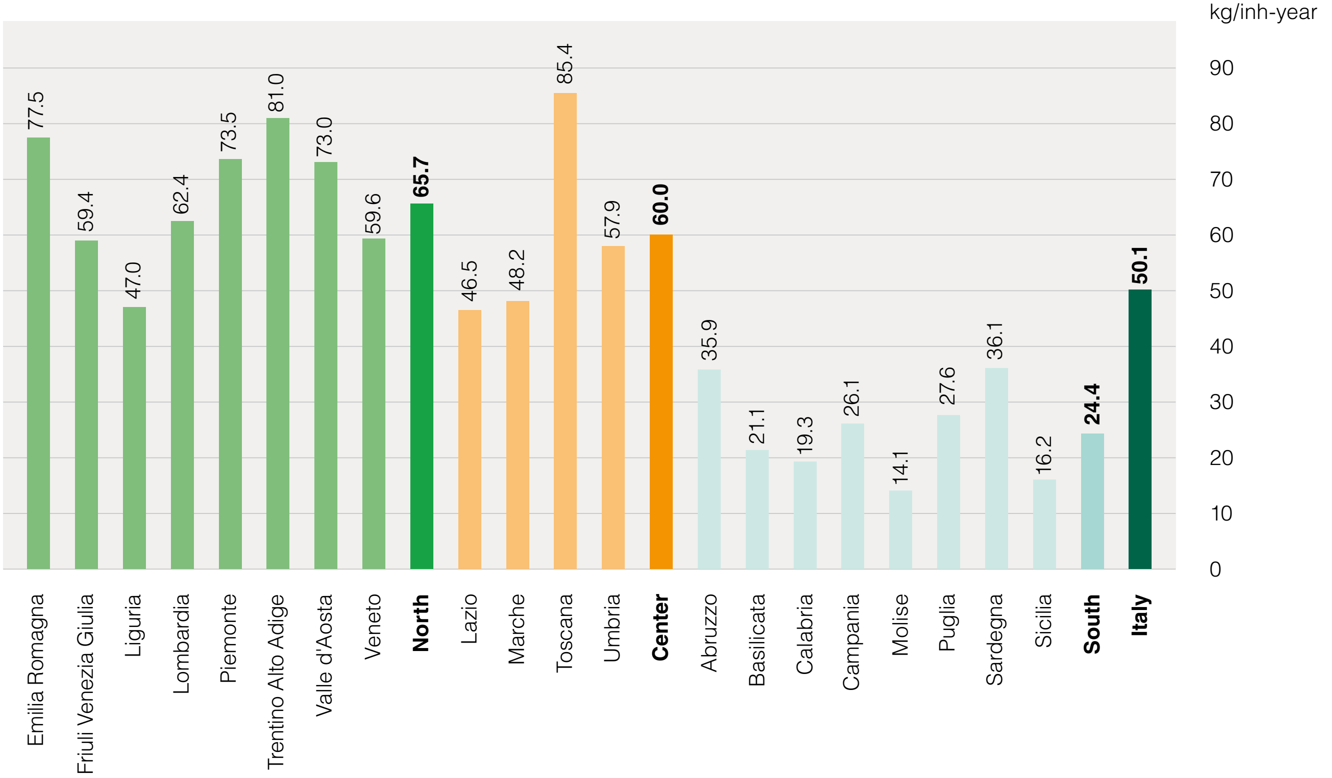


Figure 2
Comparison of separate paper and board collection between macro-areas. 2007-2008 period.

2007
2008

(Source: Comieco)

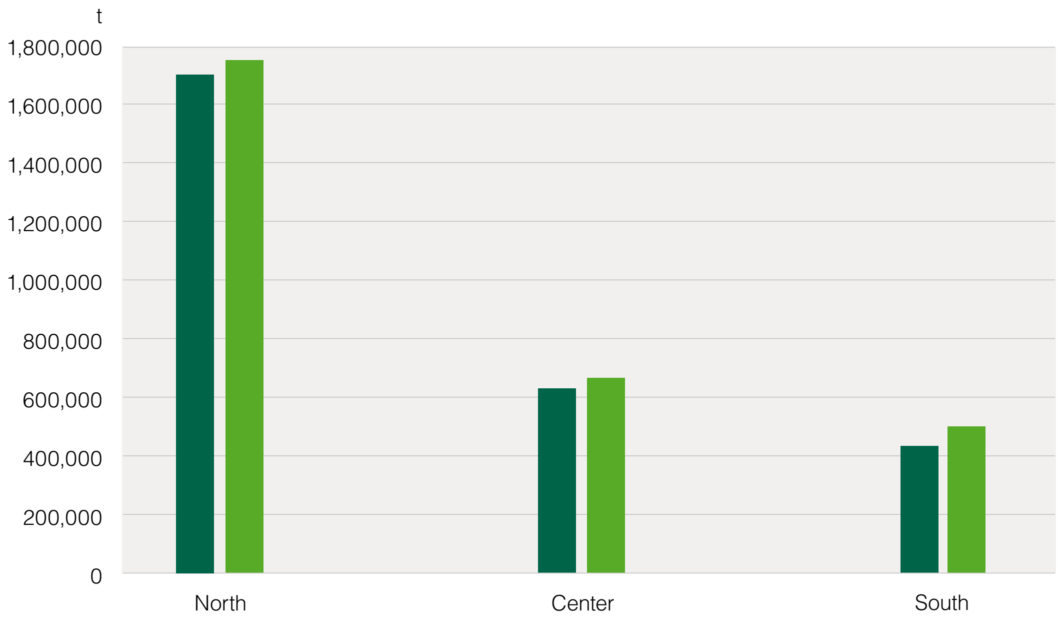


Figure 3
Comparison of separate paper and board collection by regions.
2007-2008 period.

2007
2008

(Source: Comieco)

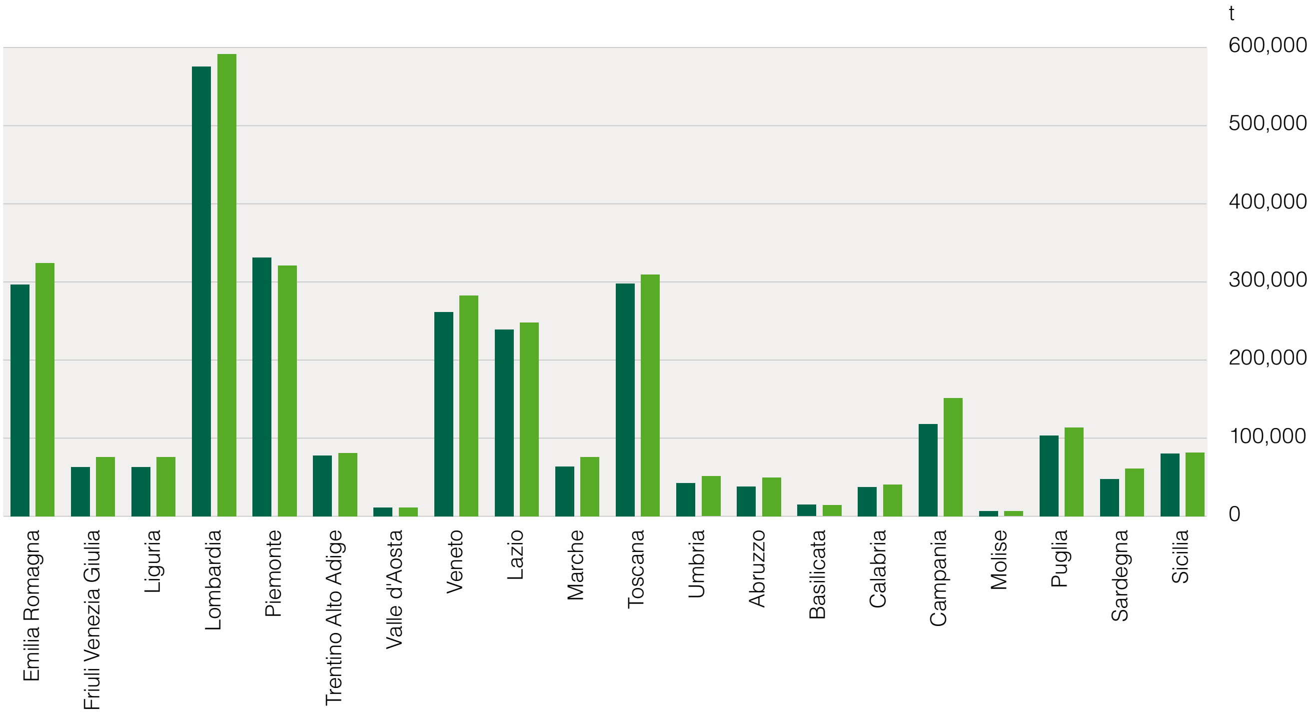
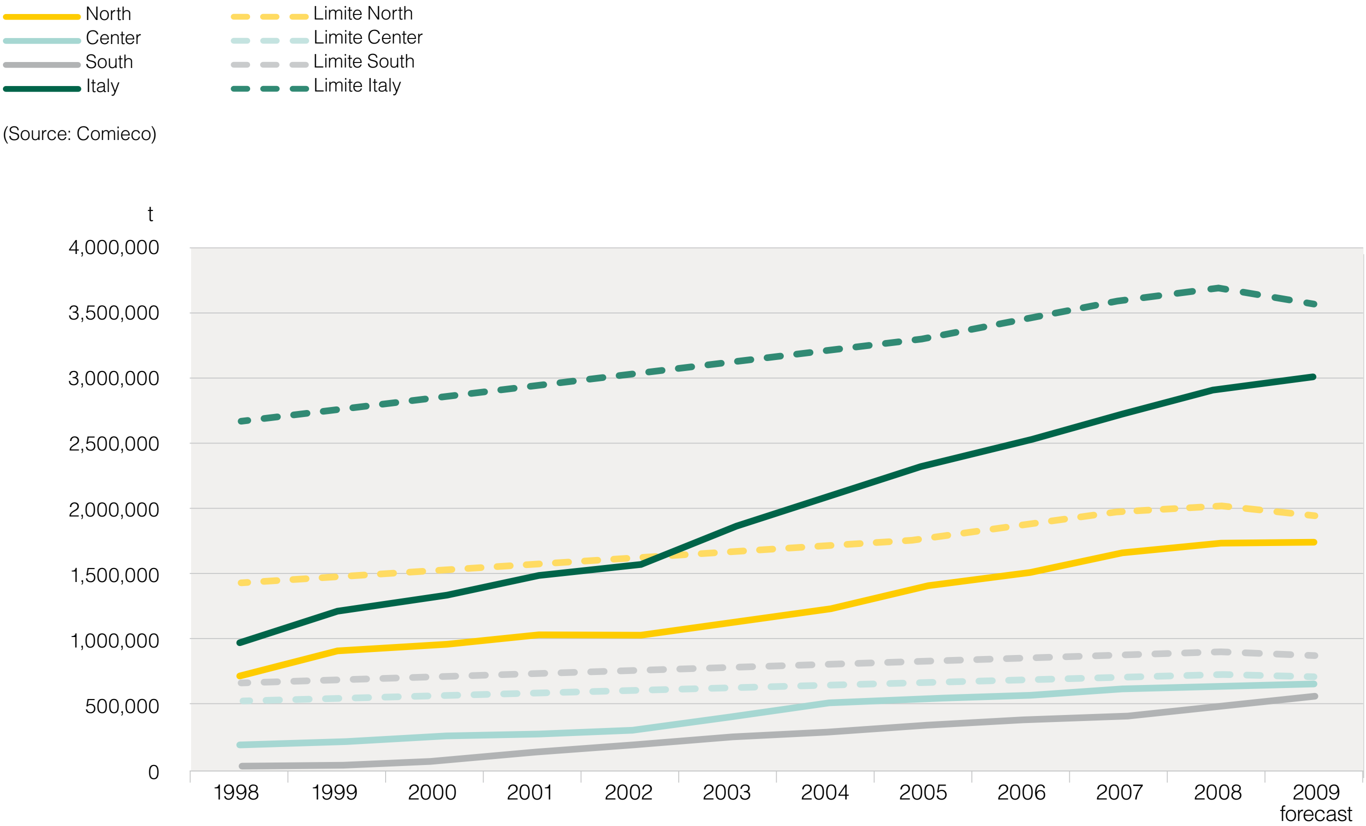


Figure 4
Municipal separate paper and board collection. 1998-2008 trend and forecasts for 2009.



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009 forecast
North	756,813	933,687	981,687	1,056,582	1,041,535	1,174,418	1,258,786	1,427,627	1,522,643	1,674,296	1,757,138	1,766,668
Center	193,958	242,497	278,472	290,074	325,625	427,490	535,827	569,772	596,573	638,223	681,097	682,125
South	50,222	70,587	88,794	153,985	222,390	268,729	312,979	360,695	413,663	437,209	507,234	586,483
Italy	**1,000,993**	**1,246,771**	**1,348,953**	**1,500,641**	**1,589,550**	**1,870,637**	**2,107,592**	**2,358,094**	**2,532,879**	**2,749,729**	**2,945,469**	**3,035,277**

Table 2
Comparison of the production of urban waste, overall separate collection, and separate paper and board collection in Italy. 2007-2008 period.
(Source: Comieco)

		Year 2007 (data processed by Comieco)	Year 2007 (ISPRA data)	Year 2008 (data processed by Comieco)	Δ % '07-'08 (Comieco data)	Δ % '07-'08 (ISPRA 07 /Comieco 08)
UW	t	32,695,015	32,547,543	32,764,770	0.2	0.7
Total SC	t	9,168,700	8,958,206	9,889,170	7.9	10.4
Municipal paper & board SC	t	2,749,729	2,697,032	2,945,469	7.1	9.2
Total SC vs. total generated UW	%	28.0	27.5	30.2		
Paper and board SC vs. total SC	%	30.0	30.1	29.8		

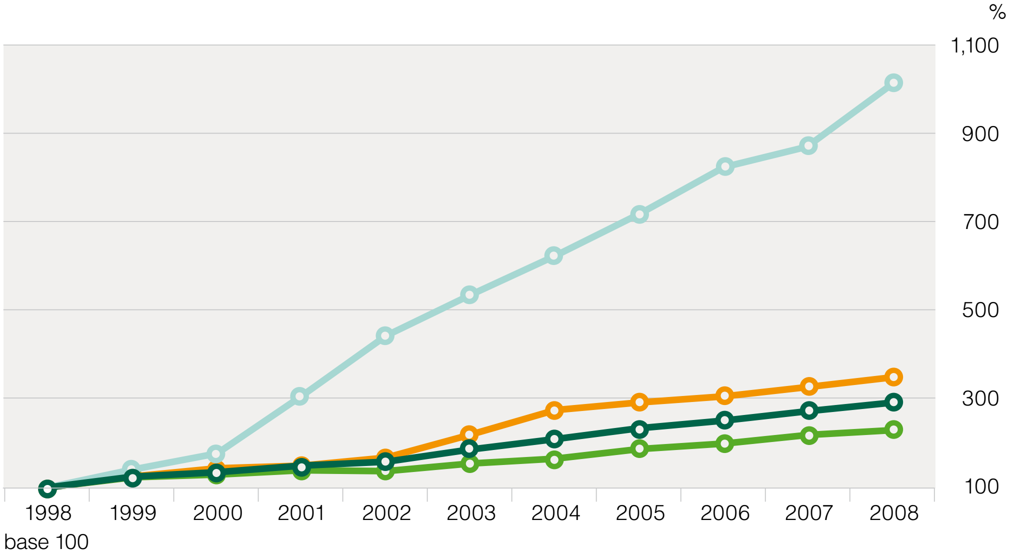


Figure 5
Percent variation and average per-capita municipal separate paper and board collection by macro-areas.

(Source: Comieco)

Total per-capite (kg/inh-year)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
North	28.3	34.9	36.7	39.5	39.0	43.9	47.1	53.4	57.0	62.6	65.7
Center	17.1	21.4	24.5	25.6	28.7	37.7	47.2	50.2	52.6	56.3	60.0
South	2.4	3.4	4.3	7.4	10.7	13.0	15.1	17.4	19.9	21.1	24.4
Italy	**17.0**	**21.2**	**22.9**	**25.5**	**27.0**	**31.8**	**35.8**	**40.1**	**43.1**	**46.7**	**50.1**

Table 3
Analysis of the national waste management situation.

- regions with total per-capita UW above area average
- regions with non-separate per-capita UW above area average
- regions with per-capita SC below area average
- regions with SC % below area average

(Source: ISPRA dati 2007)

Region	Inhabitants	Paper and board SC		total UW	non-sep. UW + bulky waste.	SC		paper share of SC
		t	kg/inh	kg/inh	kg/inh	kg/inh	%	%
Emilia Romagna	4,199,669	287,021.4	68.3	672.8	424.0	248.7	37.0	27.5
Friuli Venezia Giulia	1,209,698	57,437.0	47.5	506.2	315.2	191.0	37.7	24.9
Liguria	1,609,288	60,802.9	37.8	609.6	494.1	115.6	19.0	32.7
Lombardia	9,497,939	576,058.3	60.7	511.5	283.8	227.7	44.5	26.6
Piemonte	4,347,344	333,793.6	76.8	515.7	284.9	230.9	44.8	33.3
Trentino Alto Adige	988,338	78,629.8	79.6	486.5	226.7	259.8	53.4	30.6
Valle d'Aosta	124,263	8,065.9	64.9	601.3	384.3	217.1	36.1	29.9
Veneto	4,749,799	261,312.8	55.0	490.9	238.3	252.5	51.4	21.8
North	**26,726,338**	**1,663,121.7**	**62.2**	**539.0**	**310.2**	**228.8**	**42.4**	**27.2**
Lazio	5,317,017	226,147.2	42.5	604.1	531.2	72.9	12.1	58.3
Marche	1,531,248	67,606.5	44.2	563.5	445.5	118.1	21.0	37.4
Toscana	3,626,558	292,439.9	80.6	694.2	476.7	217.5	31.3	37.1
Umbria	869,968	42,958.7	49.4	638.9	479.1	159.8	25.0	30.9
Center	**11,344,791**	**629,152.3**	**55.5**	**629.7**	**498.7**	**131.0**	**20.8**	**42.3**
Abruzzo	1,306,487	36,407.7	27.9	526.5	428.5	98.1	18.6	28.4
Basilicata	592,948	9,107.7	15.4	414.0	380.4	33.6	8.1	45.7
Calabria	1,999,791	32,012.2	16.0	469.8	426.9	43.0	9.2	37.2
Campania	5,788,644	112,613.2	19.5	490.9	424.4	66.3	13.5	29.3
Molise	320,466	2,514.4	7.8	415.5	395.8	19.8	4.8	39.6
Puglia	4,069,202	103,689.1	25.5	527.0	480.1	46.9	8.9	54.3
Sardegna	1,656,266	44,046.4	26.6	518.8	374.4	144.4	27.8	18.4
Sicilia	5,014,927	64,367.1	12.8	535.9	503.1	32.8	6.1	39.1
South	**20,748,731**	**404,757.8**	**19.5**	**507.9**	**449.2**	**58.8**	**11.6**	**33.2**
Italy	**58,819,860**	**2,697,031.8**	**45.9**	**545.9**	**395.7**	**150.3**	**27.5**	**30.5**

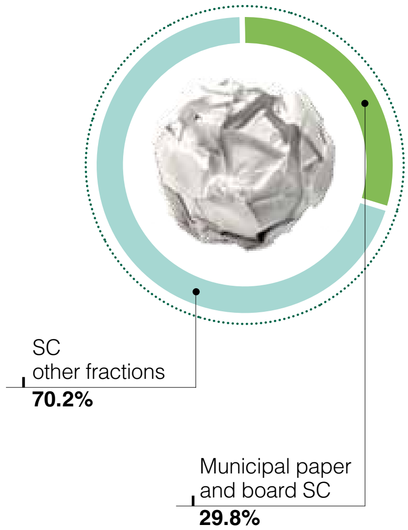


Figure 6
Rate of municipal separate paper and board collection vs. the overall separate collection estimated for 2008.
(Source: Comieco)

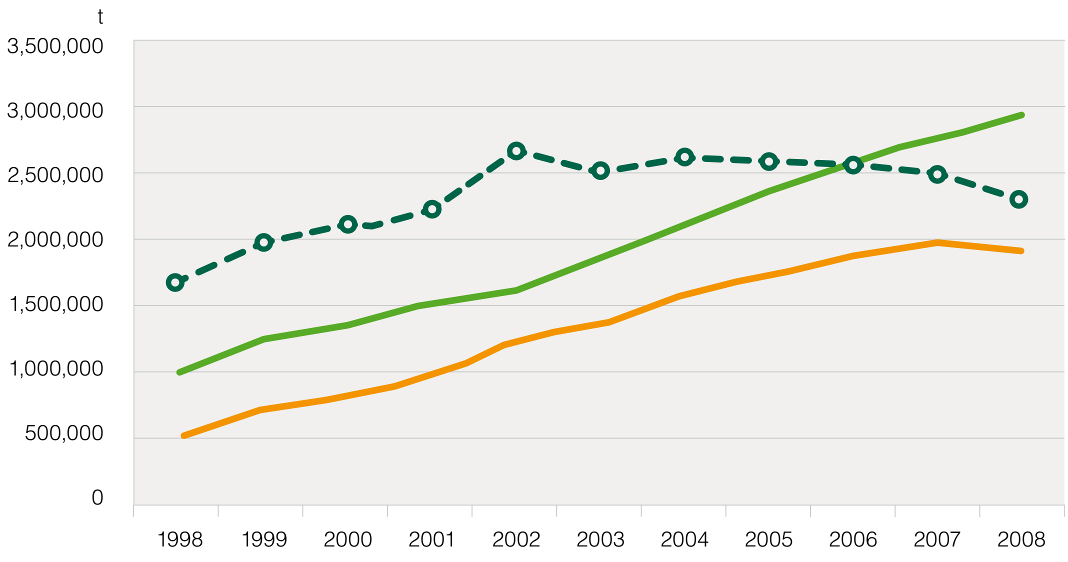


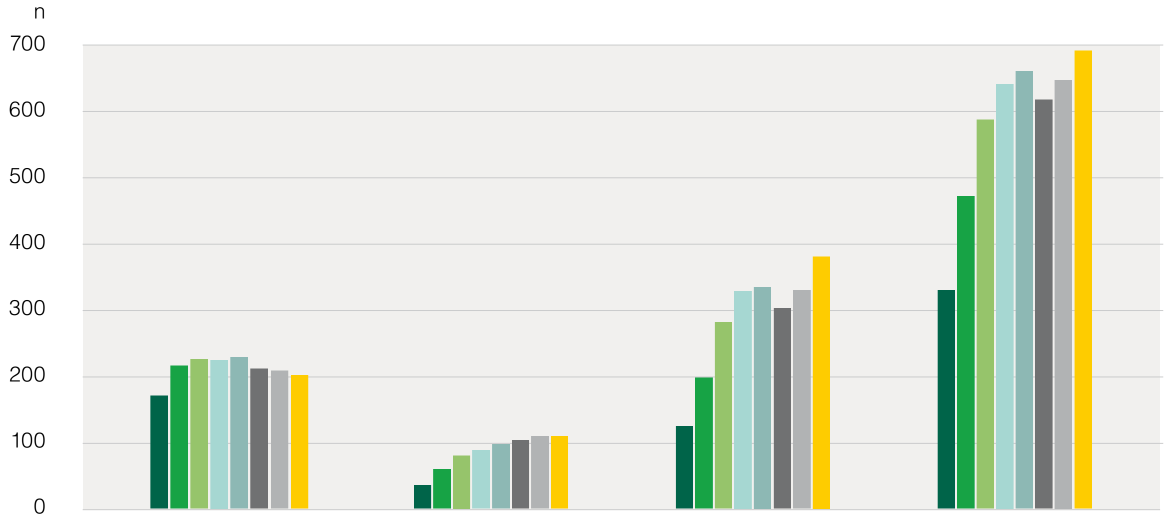
Figure 7
Share managed by the Consortium vs. total municipal separate paper and board collection.

Municipal separate collection (t)

Collection under the agreeements (t)

Share under the agreements (%)

(Source: Comieco)



	North	Center	South	Italy
2001	170	35	124	329
2002	215	59	197	471
2003	225	80	281	586
2004	224	88	328	640
2005	228	97	334	659
2006	211	103	302	616
2007	208	109	329	646
2008	201	109	380	690

Figure 8
Agreements signed in the 2001-2008 period.
(Source: Comieco)

Table 4
Local coverage by regions as at December 31, 2008 (Source: Comieco)

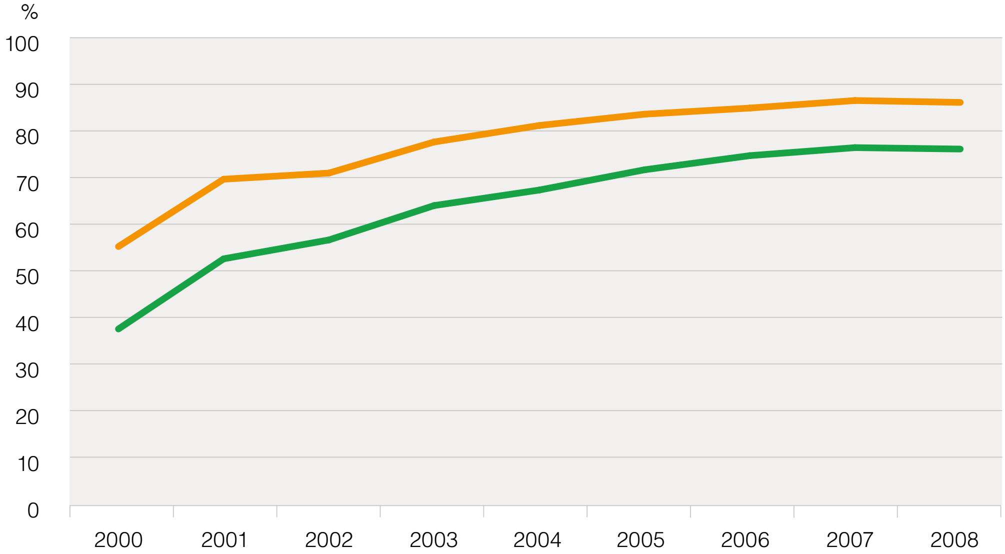
Region	Cities	Cities under the agreements		Inhabitants	Inhabitants under the agreements		Total collection under the agreements
	n	n	%	n	n	%	t
Emilia Romagna	341	331	97.1	4,199,669	4,118,762	98.1	145,487
Friuli Venezia Giulia	219	153	69.9	1,209,698	948,608	78.4	41,081
Liguria	235	116	49.4	1,609,288	1,272,892	79.1	26,630
Lombardia	1,548	1,015	65.6	9,497,939	6,809,164	71.7	341,946
Piemonte	1,206	1,087	90.1	4,347,344	4,077,172	93.8	238,805
Trentino Alto Adige	339	317	93.5	988,338	928,153	93.9	62,626
Valle d'Aosta	74	74	100.0	124,263	124,263	100.0	9,070
Veneto	581	425	73.1	4,749,799	3,716,086	78.2	143,297
North	**4,543**	**3,518**	**77.4**	**26,726,338**	**21,995,100**	**82.3**	**1,008,944**
Lazio	378	252	66.7	5,317,017	4,867,195	91.5	148,057
Marche	246	208	84.6	1,531,248	1,393,934	91.0	52,497
Toscana	287	258	89.9	3,626,558	3,487,559	96.2	229,545
Umbria	92	75	81.5	869,968	847,125	97.4	30,388
Center	**1,003**	**793**	**79.1**	**11,344,791**	**10,595,813**	**93.4**	**460,486**
Abruzzo	305	206	67.5	1,306,487	1,159,632	88.8	40,784
Basilicata	131	66	50.4	592,948	420,411	70.9	8,865
Calabria	409	357	87.3	1,999,791	1,818,336	90.9	36,478
Campania	551	499	90.6	5,788,644	5,251,618	90.7	140,756
Molise	136	27	19.9	320,466	136,403	42.6	2,375
Puglia	258	202	78.3	4,069,202	3,798,404	93.3	103,927
Sardegna	377	259	68.7	1,656,266	1,461,412	88.2	56,459
Sicilia	390	387	99.2	5,014,927	4,996,384	99.6	68,989
South	**2,557**	**2,003**	**78.3**	**20,748,731**	**19,042,600**	**91.8**	**458,633**
Italy	**8,103**	**6,314**	**77.9**	**58,819,860**	**51,633,513**	**87.8**	**1,928,063**

Figure 9
Coverage rates
of the agreements.

City coverage

Inhabitant coverage

(Source: Comieco)

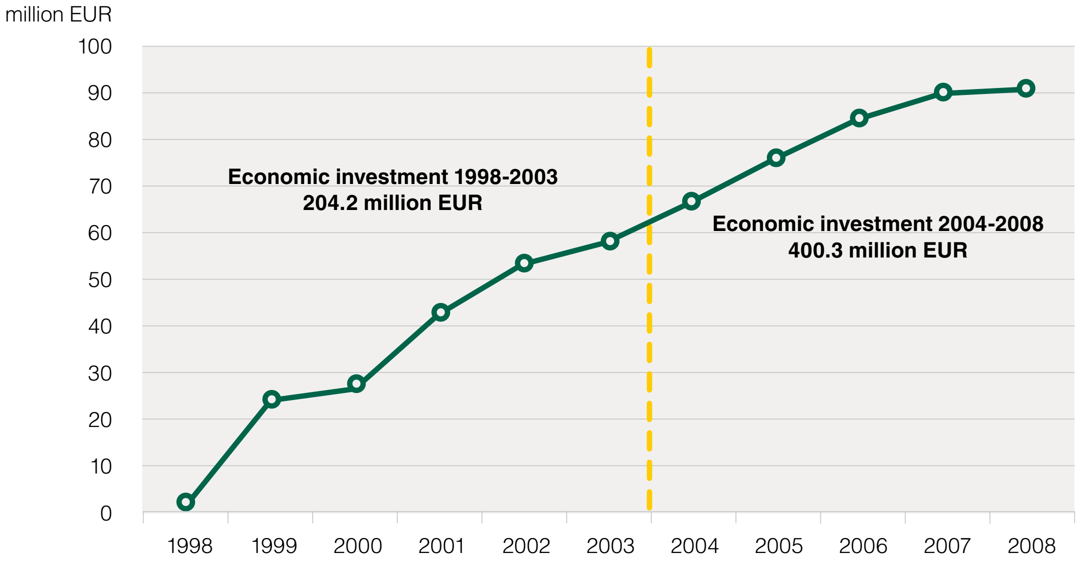


		2000	2001	2002	2003	2004	2005	2006	2007	2008
City coverage	%	39.7	54.6	58.6	65.9	69.2	73.5	76.5	78.2	77.9
Inhabitant coverage	%	57.2	71.5	72.8	79.4	82.9	85.3	86.6	88.2	87.8

Region	Inhabitants under the agreements	Packaging	Comieco's economic investment (packaging)		Recycling operator's economic investment (similar product fractions)	
	n	t	EUR	EUR/inh under agreement	EUR	EUR/inh under agreement
Emilia R.	4,118,762	98,557.7	7,827,392.34	1.90	234,646.68	0.06
Friuli V. G.	948,608	25,734.0	2,323,559.55	2.45	76,736.18	0.08
Liguria	1,272,892	19,515.7	1,711,781.08	1.34	35,573.58	0.03
Lombardia	6,809,164	150,089.1	13,242,043.34	1.94	959,286.20	0.14
Piemonte	4,077,172	95,462.7	8,287,221.72	2.03	716,713.57	0.18
Trentino A. A.	928,153	37,219.0	3,215,246.91	3.46	127,036.80	0.14
Valle d'Aosta	124,263	5,769.3	389,169.80	3.13	16,503.08	0.13
Veneto	3,716,086	84,322.5	6,845,040.59	1.84	294,871.52	0.08
North	**21,995,100**	**516,670.1**	**43,841,455.33**	**1.99**	**2,461,367.59**	**0.11**
Lazio	4,867,195	74,010.3	6,282,986.89	1.29	370,231.00	0.08
Marche	1,393,934	31,262.6	2,533,848.63	1.82	106,170.00	0.08
Toscana	3,487,559	133,264.3	11,588,534.06	3.32	481,402.74	0.14
Umbria	847,125	15,089.6	1,227,223.79	1.45	76,492.64	0.09
Center	**10,595,813**	**253,626.9**	**21,632,593.37**	**2.04**	**1,034,296.38**	**0.10**
Abruzzo	1,159,632	22,455.5	1,972,451.26	1.70	91,644.11	0.08
Basilicata	420,411	6,122.5	513,058.94	1.22	13,714.79	0.03
Calabria	1,818,336	25,622.7	1,941,578.22	1.07	54,278.12	0.03
Campania	5,251,618	87,201.5	6,880,121.48	1.31	267,769.97	0.05
Molise	136,403	1,159.8	98,159.94	0.72	6,074.78	0.04
Puglia	3,798,404	72,861.1	6,101,582.29	1.61	155,329.90	0.04
Sardegna	1,484,809	27,035.8	2,121,165.25	1.43	147,116.46	0.10
Sicilia	4,996,384	51,901.5	4,049,574.97	0.81	85,437.09	0.02
South	**19,065,997**	**294,360.3**	**23,677,692.35**	**1.24**	**821,365.23**	**0.04**
Italy	**51,656,910**	**1,064,657.3**	**89,151,741.05**	**1.73**	**4,317,029.20**	**0.08**

Table 5
Resources granted to parties under the agreements in the year 2008 – Detail by regions. (Source: Comieco)

Figure 10
Economic investment
of Comieco 1998-2008
(Source: Comieco)



		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	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	**604.5**

* including 31 million EUR for energy recovery in the 1999-2002 period

Area	Collection under the agreements	Packaging under the agreements	Mean packaging recycling level	Transferred resources	Resources transferred to recyclers for SPF
	million t	million t	%	million EUR	million EUR
1998-2003	5.52	2.65	48.1	204.20	1.40
2004-2008	9.09	4.93	67.8	400.30	16.80
Total	**14.61**	**7.58**		**604.50**	**18.20**

Table 6
ANCI-CONAI: comparison of first and second General Agreement operation.
(Source: Comieco)

Cities	Area	Inhabitants	2006	2007	2008	Δ '07-'08	2008
		n	t	t	t	%	kg/inh-year
Ancona	Center	101,687	4,509	5,396	4,845	-10.2	47.6
Aosta	North	34,583	2,238	2,372	2,407	1.5	69.6
Bari	South	325,929	21,572	15,740	21,452	36.3	65.8
Bologna	North	374,054	6,294	5,695	6,896	21.1	18.4
Bolzano	North	99,193	6,769	7,265	7,465	2.7	75.3
Cagliari	South	170,505	3,701	4,371	6,871	57.2	40.3
Campobasso	South	51,279	934	1,026	1,287	25.5	25.1
Catanzaro	South	94,627	1,525	1,525	2,234	46.5	23.6
Firenze	Center	367,194	31,145	31,435	33,436	6.4	91.1
Genova	North	618,088	15,907	19,322	7,038	-63.6	11.4
L'Aquila	South	72,099	2,550	2,510	3,097	23.4	43.0
Milano	North	1,304,312	89,737	93,539	94,575	1.1	72.5
Napoli	South	981,267	20,707	28,524	33,599	17.8	34.2
Palermo	South	669,249	16,485	9,726	7,940	-18.4	11.9
Perugia	Center	161,816	4,054	4,158	5,621	35.2	34.7
Potenza	South	68,471	2,710	3,546	3,982	12.3	58.2
Roma	Center	2,548,743	99,011	105,408	114,843	9.0	45.1
Torino	North	899,652	59,187	62,509	67,856	8.6	75.4
Trento	North	111,257	10,166	10,506	10,739	2.2	96.5
Trieste	North	205,800	7,138	7,043	7,992	13.5	38.8
Venezia	North	269,543	10,897	12,581	15,284	21.5	56.7

Table 7
2006-2008 trend of separate paper and board collection under the agreements in the regional capitals.
(Source: Comieco)

note Table 7:
Data only concerns the quantities managed under the agreements. The operator is entitled to use the consortium's circuit to recycle the share only (see e.g. Bologna, Genoa, or Ancona).
See specific focus for the highlighted cities

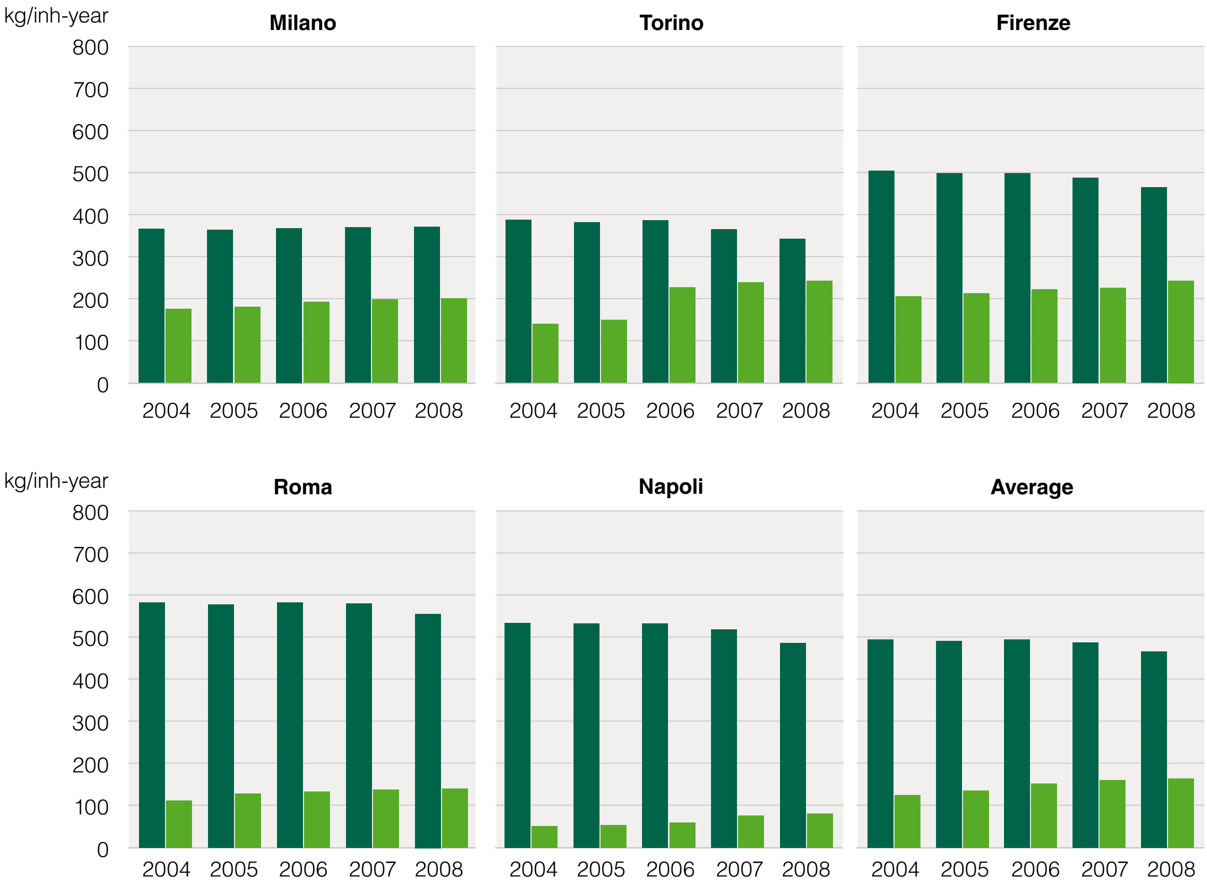
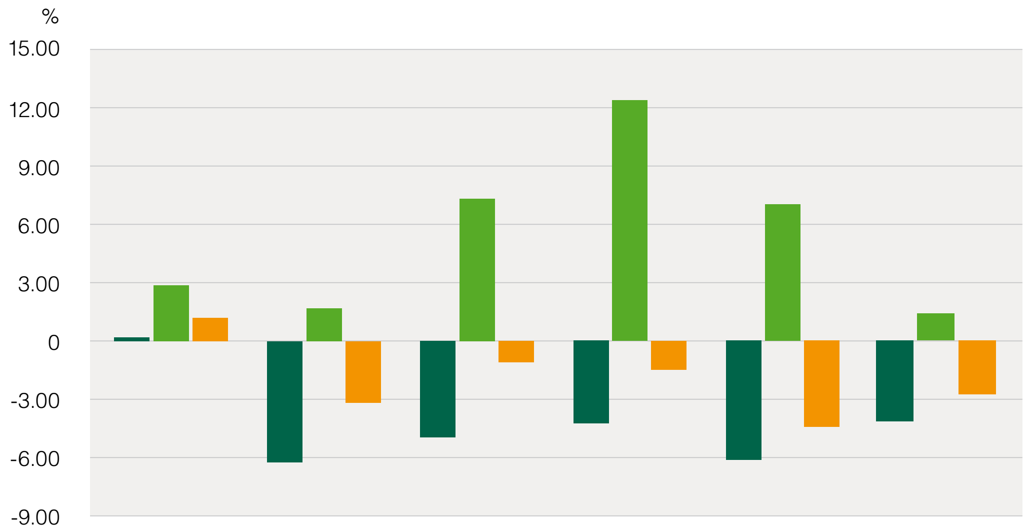


Figure 11
Per-capita waste collection in the sample cities Turin, Milan, Florence, Rome, and Naples.
2004-2008 data.

SC tot
UW

(Source: Comieco)



	Milano	Torino	Firenze	Roma	Napoli	Total
TOT UW + SC	0.2	-6.3	-5.0	-4.3	-6.2	**-4.2**
TOT SC	2.9	1.7	7.4	12.5	7.1	**1.4**
TOT UW	1.2	-3.2	-1.1	-1.5	-4.5	**-2.8**

Figure 12
Waste collection in the sample cities Turin, Milan, Florence, Rome, and Naples. 2007-2008 variations. (Source: Comieco)

Absolute Value		Milano	Torino	Firenze	Roma	Napoli	Total
TOT SC	t	265,353	218,039	89,154	343,493	80,837	**996,876**
TOT UW	t	747,838	525,881	259,349	1,760,731	558,949	**3,852,749**
SC/UW	%	35.5	41.5	34.4	19.5	14.5	**-**

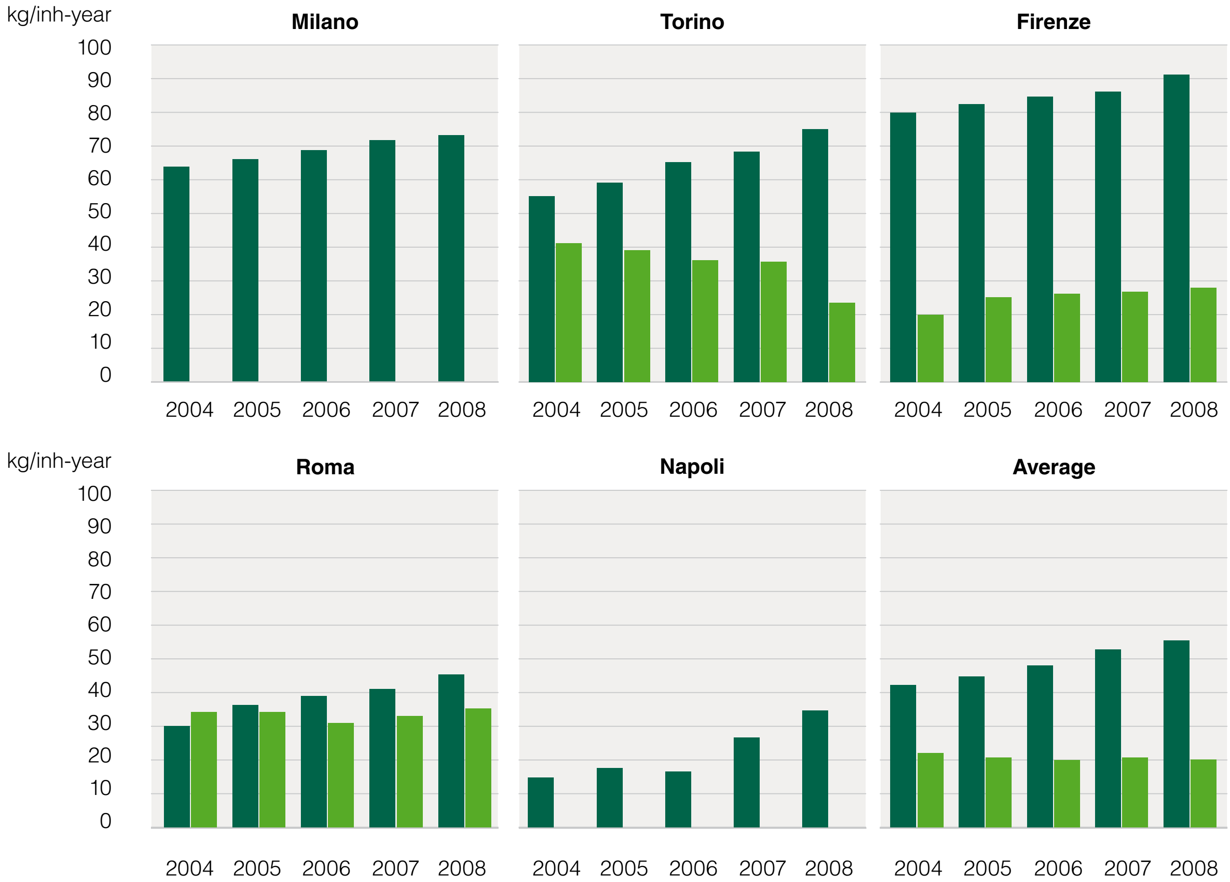


Figure 13
Paper and board collection management – 2004-2008 per-capita trend (values in kg/inh-year).

outside agreement
under agreement

(Source: Comieco)

Total quantities

year	Milano	Torino	Firenze	Roma	Napoli	Mean
2004	64	96	100	64	15	63
2005	66	98	106	70	18	67
2006	69	101	110	70	16	68
2007	71	105	114	74	27	73
2008	72	99	119	80	34	76

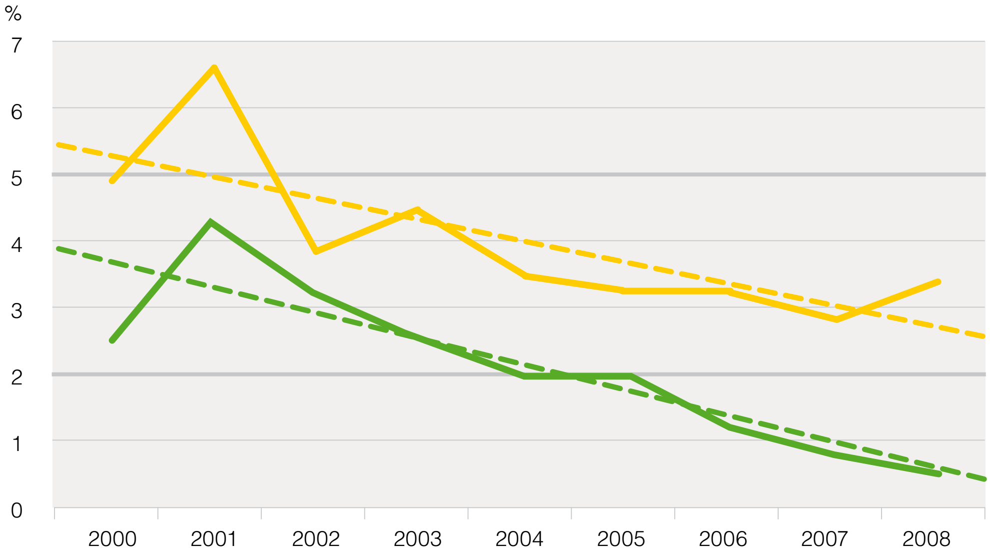
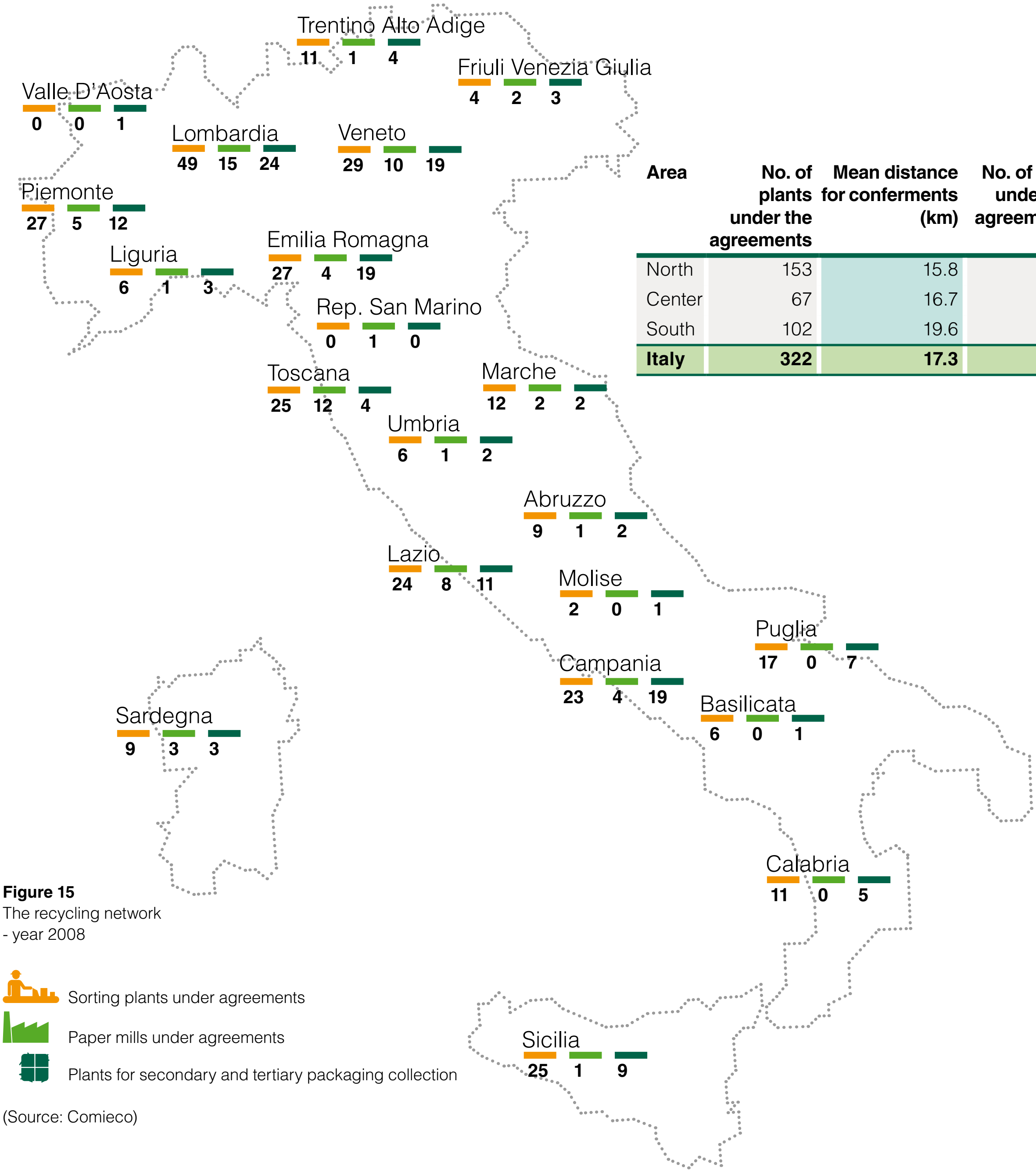


Figure 14
Quality of the collected material (mean trend of foreign fractions) – 2000-2008 period

1.01 + 1.02
1.04 + 1.05
1.01 + 1.02 trend
1.04 + 1.05 trend

(Source: Comieco)

Collection	Dati	2000	2001	2002	2003	2004	2005	2006	2007	2008
1.01 + 1.02	Analyzed quantities (kg)	n.d.	26,166	42,657	119,814	103,884	76,609	188,826	227,852	214,764
	Foreign fractions (%)	4.9	6.5	3.9	4.5	3.5	3.3	3.3	2.9	3.4
	Performed analyses (n)	27	171	275	533	443	321	772	930	990
1.04 + 1.05	Analyzed quantities (kg)	n.d.	25,455	33,181	62,104	119,124	62,936	145,873	183,162	200,085
	Foreign fractions (%)	2.5	4.3	3.2	2.6	2.0	2.0	1.2	0.8	0.5
	Performed analyses (n)	26	122	165	281	335	291	779	1.041	1.145



Area	No. of plants under the agreements	Mean distance for conferments (km)	No. of mills under the agreements	No. of II & III plants
North	153	15.8	39	85
Center	67	16.7	23	19
South	102	19.6	9	47
Italy	**322**	**17.3**	**71**	**151**

Figure 15
The recycling network
- year 2008

Sorting plants under agreements

Paper mills under agreements

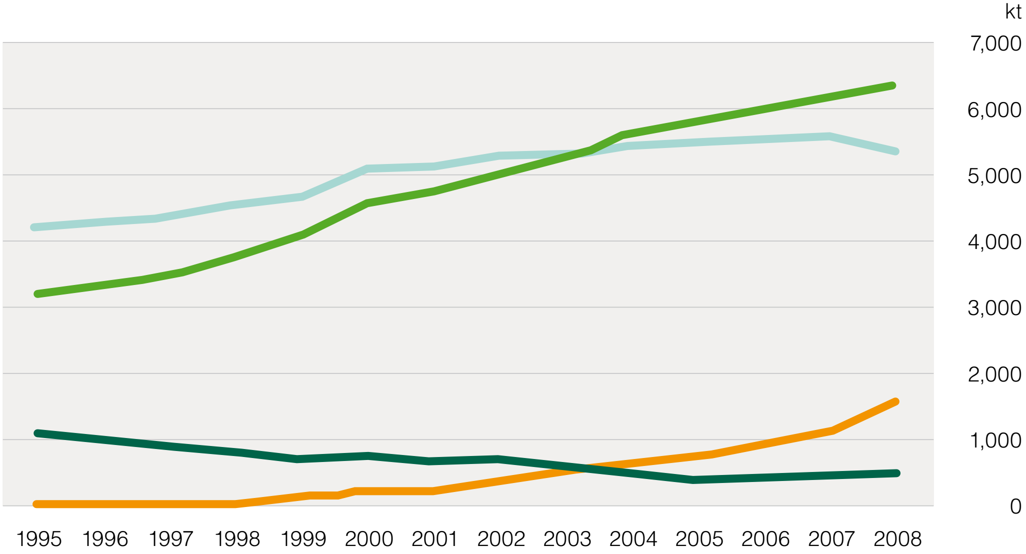
Plants for secondary and tertiary packaging collection

(Source: Comieco)

Table 8
Production, import, export, and apparent consumption of paper and board. (Source: ISTAT data processed by Assocarta and Assocarta estimates)

(values in tons)	**Production (A)**	**Import (B)**	**Export (C)**	**Apparent Consuption (A+B-C)**
Paper and board for corrugated board	2,623,049	1,312,062	251,415	3,683,696
Cardboard for cases	585,985	486,188	422,070	650,103
Other wrapping and packaging paper and board	1,225,304	418,139	440,698	1,202,745
Total packaging	**4,434,338**	**2,216,389**	**1,114,183**	**5,536,544**
Paper for graphic use	3,227,687	2,608,113	1,533,110	4,302,690
Paper for hygienic-sanitary use	1,370,389	59,887	635,470	794,806
Other types of paper	434,605	82,671	67,641	449,635
Total other paper and board	**5,032,681**	**2,750,671**	**2,236,221**	**5,547,131**
Total paper production	**9,467,019**	**4,967,060**	**3,350,404**	**11,083,675**
% variation vs. 2007	**-6.4**	**-6.2**	**-4.7**	**-6.8**

Figure 16
Consumption, import, export of recovered paper and apparent collection* - 1995-2008 period

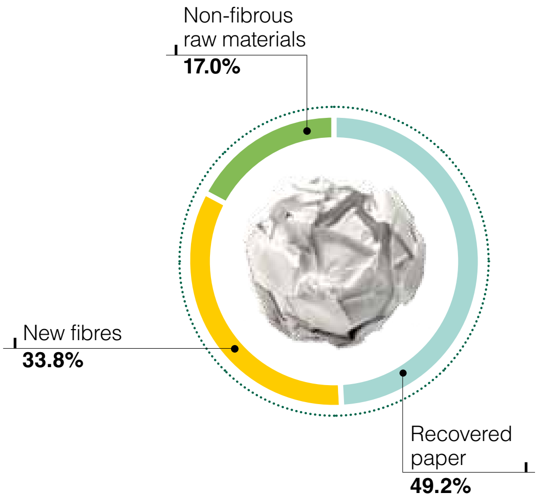


Import
Export
Consumption
Apparent collection*

(Source: Assocarta data processed by Comieco)

*Apparent collection: Consumption + Export – Import

Figure 17
Raw materials of the paper industry in 2008.
(Source: Assocarta and Comieco)



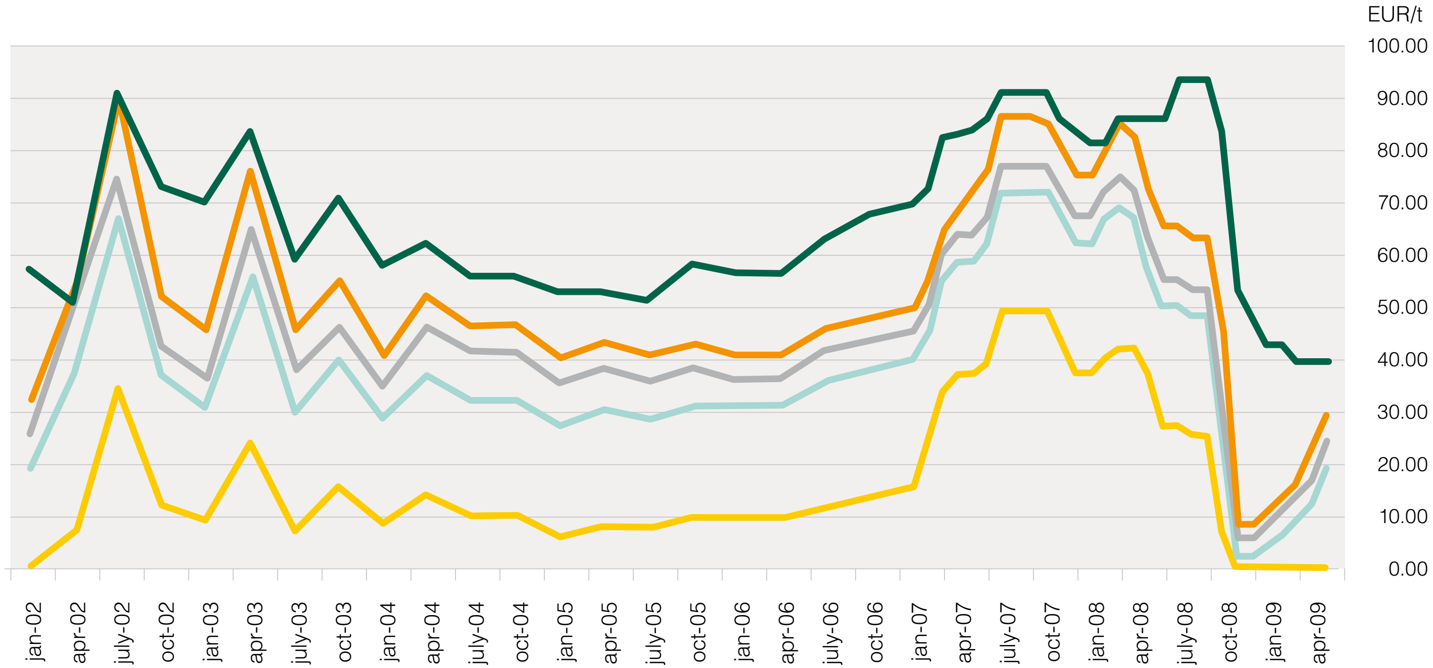
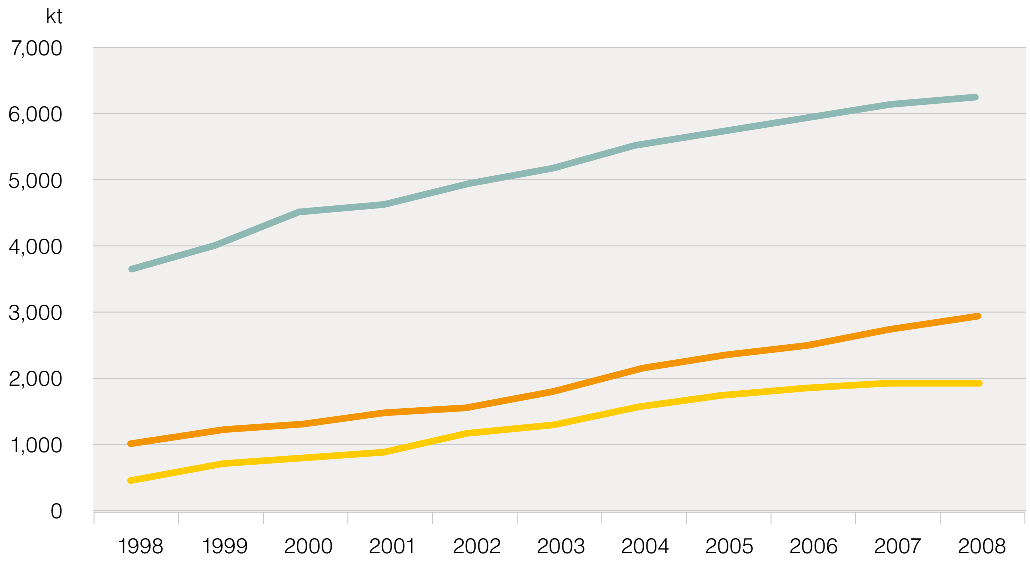


Figure 18
Monthly survey of mean recovered paper values* (EUR/t)
– January 2002-May 2009

- mixed non-selected paper and board (1.01)
- mixed selected paper and board (1.02)
- paper and corrugated board (1.04)
- corrugated containers (1.05)
- selected graphic paper for deinking (1.11)

(Source: Chamber of Commerce of Milan)

* 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



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
% 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

Figure 19
Overall and municipal paper and board collection in Italy

Apparent collection
Separate paper and board collection
Separate paper and board collection under the agreements

(Source: Comieco)

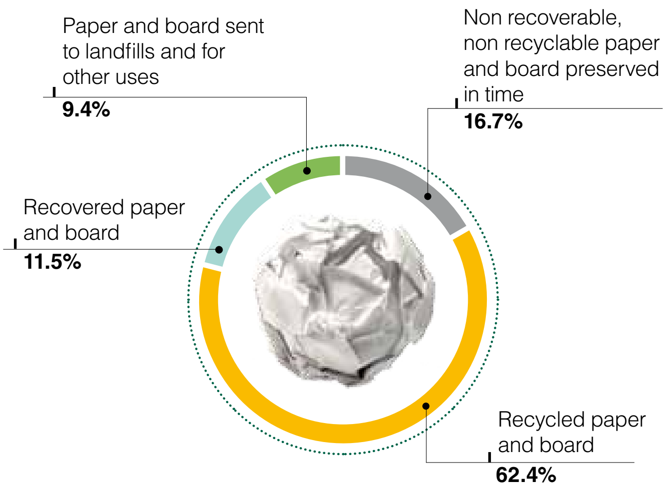


Figure 20
Destination of consumed paper and board in Italy in 2008.
(Assocarta data processed by Comieco)

	Mt
Non recoverable, non recyclable paper and board preserved in time	1,800
Recycled paper and board	4,856
Recovered paper and board	970
Paper and board sent to landfills and for other uses	790
Total consumption of paper and board products	**8,416**

Table 9
Paper and board packaging recovery and recycling targets achieved in 2008. (Source: Comieco)

Recycling and recovery rate calculation	t
Apparent consumption of paper and board packaging	4,500,850
Paper and board packaging from household separate collection (paper and board) recycled in Italy	291,774
Paper and board packaging from selective collection of packaging only, recycled in Italy	2,374,696
Recovered paper originating from packaging recycled abroad	656,292
Total recycled paper and board packaging	**3,322,762**
Paper and board packaging recovered as energy or waste-based fuel	**356,212**
Total recovered paper and board packaging	**3,678,974**
	%
Recycling	**73.8**
Energy recovery	**7.9**
Recovery	**81.7**

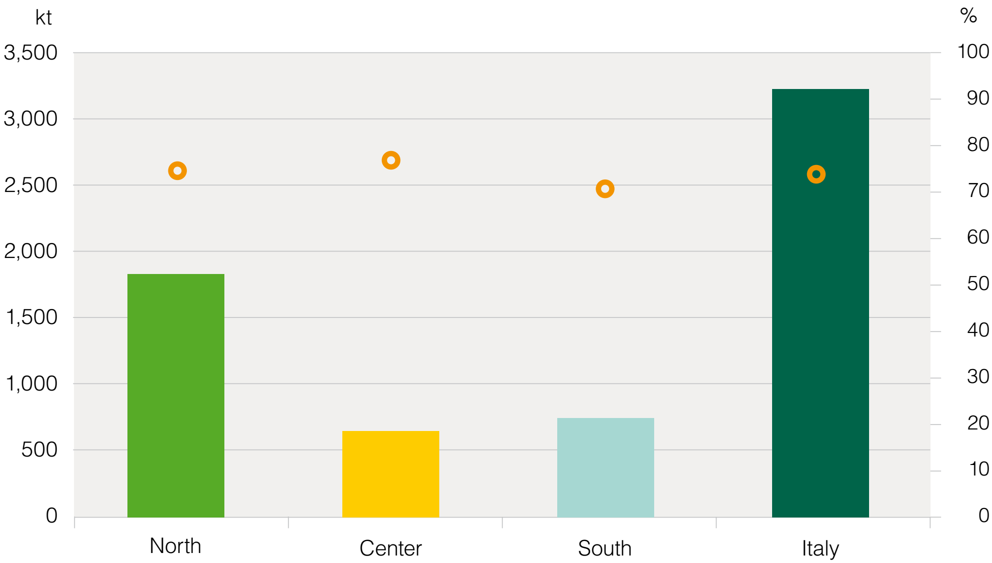


Figure 21
Paper and board packaging collection indexes achieved in 2008 by macro areas.

- Paper and board packaging collection in North Italy
- Paper and board packaging collection in Center Italy
- Paper and board packaging collection in South Italy
- Paper and board packaging collection in Italy
- Collection index

(Source:Comieco)

2008		North	Center	South	Italy
Paper and board packaging collection	kt	1,850	675	780	**3,305**
Collection index	%	73	78	72	**74**

Figure 22
Paper and board packaging recycling
and recovery targets achieved.
1998-2008 period (.000 t and %)

Total recycled paper and board packaging (t x 1000)
Paper and board packaging recovered as energy or waste-based fuel (t x 1000)
Imballaggi cellulosici recuperati come energia o CDR (kt)
Recycling rate (%)
Recovery rate (%)

(Source: Comieco)

Note: Energy recovery before 2003 only monitored for the quantities managed under the agreements.
Overall data not available.

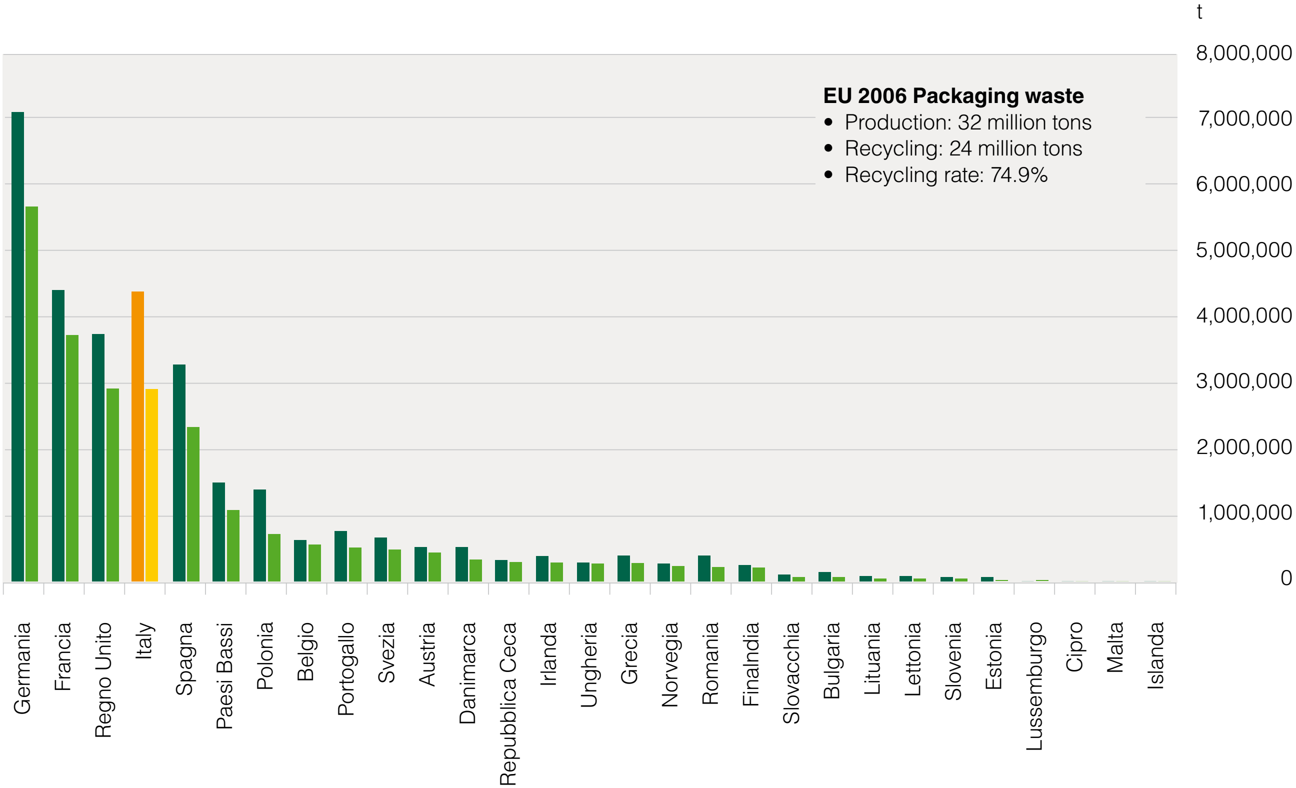


Figure 23
Quantity of paper and board packaging waste produced and recovered in member states – year 2006.

- Packaging waste produced
- Recycled material
- Packaging waste produced in Italy
- Recycled material in Italy

(Source:
European Commission)

Table 10
Balance of benefits from paper and board packaging collection and recycling in Italy.
1999-2008 period.
(Source: Althesys)

	Worst value EUR	Fair Value EUR	Best value EUR
Costs			
Differential cost of SC	-1,089,720,836	-624,370,585	-122,163,323
Cost due to non-generated energy	-152,376,910	-152,376,910	-152,376,910
Total Costs	**-1,242,097,746**	**-776,747,495**	**-274,540,233**
Benefits			
Environmental benefits from avoided emissions	472,626,647	638,582,155	785,606,563
Economic benefits from non-disposal	1,592,536,283	1,830,068,062	2,009,626,097
Value of generated raw materials	405,765,485	456,894,209	512,988,848
Social benefit from generated employment	528,129,621	528,129,621	528,129,621
Total Benefits	**2,999,058,035**	**3,453,674,046**	**3,836,351,128**
Net benefit	**1,756,960,289**	**2,676,926,551**	**3,561,810,895**

Table 11
Benefits from regional paper and board collection. 1999-2008 period. (Source: Althesys)

Region	Paper and board SC (1999-2008)	Net benefit	Unit benefit
	t	EUR	EUR/t
Piemonte	2,361,601	356,718,003	151.0
Valle d'Aosta	55,332	5,651,343	102.1
Lombardia	4,866,143	628,226,270	129.1
Trentino Alto Adige	596,548	85,847,395	143.9
Veneto	2,086,000	431,602,083	206.9
Friuli Venezia Giulia	454,184	74,806,901	164.7
Liguria	510,898	95,354,025	186.6
Emilia Romagna	2,061,415	233,916,833	113.5
North	**12,992,121**	**1,912,122,853**	**147.2**
Toscana	2,405,185	301,270,904	125.3
Umbria	311,020	37,409,810	120.3
Marche	457,517	50,364,318	110.1
Lazio	1,459,641	102,350,002	70.1
Center	**4,633,363**	**491,395,034**	**106.1**
Abruzzo	237,464	28,448,258	119.8
Molise	18,624	913,664	49.1
Campania	706,915	58,826,822	83.2
Puglia	707,144	69,230,621	97.9
Basilicata	70,899	15,084,087	212.8
Calabria	251,903	15,367,623	61.0
Sicilia	493,128	63,985,034	129.8
Sardegna	193,677	21,552,554	111.3
South	**2,679,754**	**273,408,663**	**102.0**
Italy	**20,305,238**	**2,676,926,551**	**131.8**

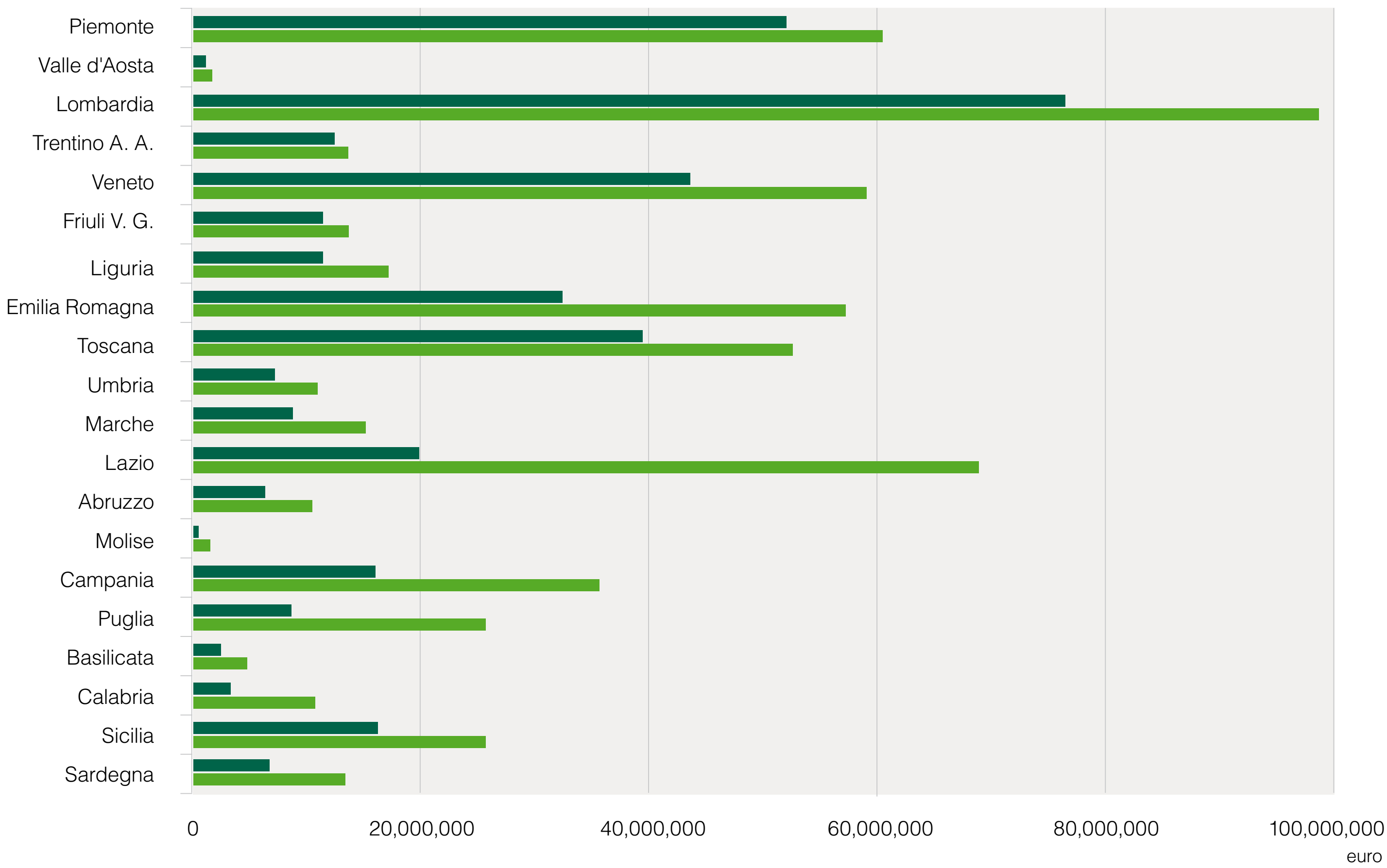


Figure 24
Potential benefits and gap per regions.

Current status 2008
2008 Potential

(Source: Comieco)

50.1 kg

of paper and board were collected separately by each Italian citizen in 2008

Note on the method

The definition of the separate paper and board collection share not managed by the Consortium was, as in the past, the object of a survey aimed primarily at collecting official data. In particular Comieco, based on by-now consolidated co-operations, has established contacts locally with ISPRA, the Regions, the local Agencies, the Provinces and Work Groups, the Cities, the operators, etc. for data collection and checks on the evaluations of previous years.

Only when no official data was available, Comieco adopted the method described below. Upon completing the survey, 67.9% of the collected data came from official sources, and partly overlapped with the data already available to Comieco; 26.9% referred to quantities managed directly by the Consortium or communicated by the parties to the agreements as provided for by the Technical Attachment (without other official sources), and 5.2% was based on estimated quantities.

In order to estimate the quantities 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.

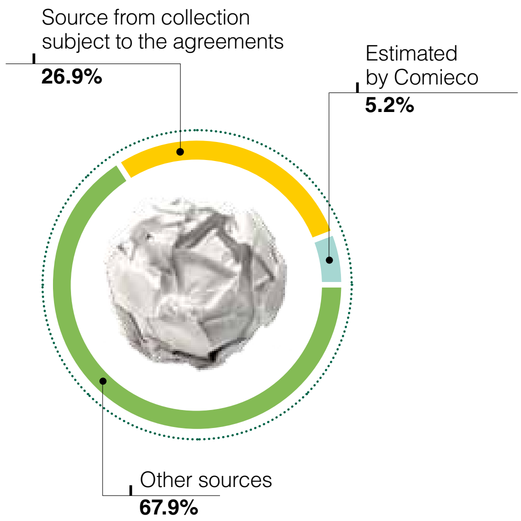
A direct survey was then carried out on the Cities and service companies, aimed at understanding how many of the Cities not involved in the agreements have introduced the separate paper and board collection service.

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 quantities 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 considered.

Figure 25
Sources and methodology.
(Fonte: Comieco)



Group	% inhabitants subject to the agreements	% inhabitants not subject to the agreements on whom SC performance should be checked
A	AB > 85%	at least il 25 %
B	51% < AB < 85%	at least il 50 %
C	20% < AB < 50%	at least il 75 %

Nota a margine
Certain values (in particular quantitative) stated in last year's report (13th edition) were updated in view of making comparisons homogeneous for the last two years.

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