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24th Report

Collection, Recycling, and Recovery of paper and board in 2018

2018

July 2019

Paper and board packaging recycling and recovery in Italy - 2018

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4.91 million t
Apparent paper and board packaging consumption

10 t
of paper for recycling recycled every minute

81.1%
Recycling rate

88.8%
Recovery rate

+0.1%
Paper production
Δ 2017/2018

-0.1%
Net exports
Δ 2017/2018

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Municipal separate paper and board collection in Italy

Italy

3.39 million t

of municipal separate paper and board collection

Δ 2017/2018	Δ 2017/2018	Δ 1998/2018
+127thousand t	**+3.9%**	**+239%**

56.3 kg/ab-year

Emilia Romagna
90.2 kg/ab-year
best per-capita value 2018

Sicilia
+31.5%
greatest increase Δ2017/2018

Comieco Management

1.44 million t

Managed collection

42.5% of municipal collection

67.5% of Cities

81.2% of inhabitants

97.5 million EUR
considerations allocated to the Cities

Municipal separate paper and board collection: 2018 results in the three macro-areas

Domestic municipal collection

North

1.78million t	Δ 2017/2018	Δ 1998/2018
	+2.9%	+135%

64.9 kg/ab-year

Emilia Romagna
90,2 kg/ab-year

Centre

812thousand t	Δ 2017/2018	Δ 1998/2018
	+1.4%	+319%

68.3 kg/ab-year

Toscana
78.4 kg/ab-year

South

795thousand t	Δ 2017/2018	Δ 1998/2018
	+9.0%	+1,483%

38.1 kg/ab-year

Abruzzo
60.5 kg/ab-year

Municipal separate paper and board collection: 2018 results in the three macro-areas

Collection under the Comieco agreements

North

531thousand t	**29.8%** of the total for the area
64.9% of Cities	**73.5%** of inhabitants
43.7 million EUR of allocated considerations	

Centre

317thousand t	**39.1%** of the total for the area
64.0% of Cities	**85.8%** of inhabitants
20.1 million EUR of allocated considerations	

South

593thousand t	**73.5%** of the total for the area
73.6% of Cities	**88.9%** of inhabitants
33.7 million EUR of allocated considerations	

Within the framework of the CONAI System, Comieco works to ensure paper and board recycling, actually supporting the development of separate collection across Italy. Confirming its subsidiary role with respect to the market, Comieco focuses resources and investments in areasthat need more support, and lets more mature ones continue their process independently.

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Acronyms

CTA
Comieco Technical Annex

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

SC
separate collection

UW
urban waste

%
percent rate

n
number

t
tons

kt
.000 tons

ab
inhabitants

kg
kilograms

TJ
Terajoule

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La carta si ricicla e rinasce.

Garantisce Comieco.

Preface

Amelio Cecchini
Chairman, Comieco

While this 24th Report on the Recycling, and Recovery of Paper and Board may look like a statistical exercise, I believe that the data and the development of separate paper and board collection provide, as such, evidence of the excellent results of paper and board packaging recycling in Italy.

We are proud to rank among the best in Europe by volumes of recycled paper and board and by recycling rates (81%), achieved ahead of the 2025 targets set by the EU.

As far as municipal separate waste collection is concerned, approximately 3.4 million tons of paper and board were sorted out globally, and new separate amounts for a total of 127thousand tons were captured. Of all the paper and board collected separately by the Italyn Municipalities, 1.44 million tons, i.e. 42.5%, were managed by Comieco according to agreements. The economic investment in favour of Cities and operators for the separate collection service based on agreements exceeded 97.5 million EUR.

For the first time in 12 years, all the Regions recorded increases vs. 2017: this was predictable in some cases, quite a surprise in others. The South reaped the benefits of the investments made in the past few years: a 9% growth was recorded, with Sicily ranking first with +31.5%. Results are also positive for the North that, while enjoying more mature collection, still recorded a 2.9% increase. The moderate 1.4% increase in the Centre deserves some consideration, instead: in this case Rome – which is almost comparable to a whole region in terms of population and capability – had a clear impact on the result of the area.

But what happened at national level in 2018? Recycling operators faced a variety of issues and challenges last year, and had to find a way to reconcile seemingly contrasting dynamics, such as the increase of collection and the possible difficulty to allocate materials for recycling. However, a typical Italyn resource stands out in this context, namely the ability to square up and find a way to turn problems into opportunities.

The increase of the domestic consumption of paper for recycling, both at municipal and at household level, was offset and supported by the opening of new paper mills, investments in many others, and positive exports, steadily around 1.9 million tons. As opposed to a decline by more than 40% of the volumes intended for China (from 1 million tons in 2016 to less than 600thousand in 2018), new markets opened up, also in South-East Asia and first and foremost in Indonesia.

Looking at the downstream process, the analysis of the paper industry is a litmus test for the changing consumer society: for the first time in history, the production of packaging paper and board surpasses all the others, in response to the growing needs of e-commerce and of the food delivery business.

While the paper, board, and cardboard pipeline is thus confirmed as one of the pillars of the circular economy, issues related to new End-of-Waste rules and to the recovery of waste that is still unduly found in sorted materials are still pending.
Quality will not be an issue, but rather “the issue” for the next few years. Volume increases are not so much the final purpose of separate collection as a way to provide paper for recycling to the paper business to close the circular economy loop.

The data contained in this report show that the paper and board recycling industry has demonstrated, once again, its ability to grow and improve.

Executive summary

Carlo Montalbetti
General Manager,
Comieco

Municipal paper and board collection in Italy totalled close to 3.4 million tons in 2018, with a domestic annual per-capita average of 56.4 kg. This 24th Report confirms the on-going development of separate paper and board collection outlined in the past 4 years: with a total 3.9% increase, over 127thousand more tons of paper and board were collected compared to last year. Such amount was intended for recycling, thus avoiding disposal in landfills, and equals the entire amount collected by the regions Friuli-Venezia Giulia and Umbria.

The data for the macro-areas point out to a composite growth. The South continues to improve with a total of 38.1 kg per capita, 9% up vs. 2017, and accounts for 50% of additional volumes at domestic level with 65.5thousand tons. Such significant results were also achieved using the resources provided by Comieco in the past few years to buy equipment and vehicles for the development of the Cities “below average”: if the 2014-2018 period is considered, the Consortium allocated over 6.1 million EUR with the Plan for Southern Italy and the ANCI Tender. While the Centre also records moderate growth (+1.4%), the increase observed in the North is almost unprecedented, also in regions whose performance was already quite satisfactory, such as Emilia-Romegna and Vallée d’Aoste.

As a pipeline Consortium within the CONAI System, since the enforcement of the Ronchi Decree (Legislative Decree No. 22/97) Comieco has been operating as a guarantor for paper and board recycling, actually supporting the development of separate collection across Italy with over 1.6 billion EUR allocated to the Cities under the agreements (97.5 million EUR in 2018 alone) and more than 31.2 million tons of paper and board managed.

With respect to market trends – throughout 2018 – a price decline, mostly due to the Chinese crunch, was clearly observed in mixed waste collection; such poorly profitable price encouraged many Cities to enter into agreements in the early months of 2019, thus confirming the subsidiary role of the Consortium: while Comieco took charge of recycling approximately 1.5 million tons (42.5% of total municipal separate collection) in 2018 with 914 agreements in place, 600thousand tons of additional volumes, mostly from the Centre and the North, are expected to be managed under the agreements in 2019. The impact of these new volumes means higher costs for the Consortium, with the subsequent need to obtain additional economic resources from the CONAI Environmental Contribution. Also with respect to the CONAI Contribution, it should be noted that a specific contribution was introduced for paper-based polylaminate packaging fit to contain liquids; such new entry is aimed at improving collection and sorting activities to obtain a homogeneous flow of waste for dedicated recycling processes.

While this 24th report is being released, negotiations are under way for renewal of the ANCI-CONAI Framework Agreement where – as in the previous one – the main issue is quality that, as mentioned, is critical both for system-related costs and for market outlets. In 2018, the average content of contaminants slightly declined, but also non-homogeneously in the different macro-areas. While business collection is effective, “household collection” - the true target and the true challenge - is improving in the North, but not in the Centre and South. Comieco is strongly committed to quality and, alongside paper mills and sorting operators, has implemented common practices to ensure compliance with harmonized EU product standards. The Consortium and the pipeline are also working on the drafting of End-of-Waste criteria, now mandatory for the paper industry that drives the Italyn circular economy with a closer and closer focus on quality to boost recycling.

Looking at the downstream process, the analysis of the historical data set of the paper industry shows that packaging paper and board consumption has surpassed the consumption of other types of paper after almost two decades of parallel development: 6.4 million tons of packaging are produced vs. 4.2 of paper for graphic and sanitary use. This finding can be interpreted in the light of two factors that radically changed consumptions in the past few years. The decline of graphic paper suffers from the gradual “replacement” that IT technologies have brought about in the publishing and data storage business. The increase of packaging paper is impacted, on the other hand, by product e-commerce, which requires logistics and packaging: according to Netcomm, over 260 million shipments of e-commerce goods were performed last year in Italy alone. The effects of both the above factors are measured downstream in terms of change of the collection mix: the weight of packaging is growing and calls for ad hoc measures, particularly in big cities like Milan, where specific household collection services are being implemented for cardboard boxes. In parallel with changes in consumptions, investments in the industry are also important, with the opening of three new paper mills for packaging production – including one already in operation – which will increase the domestic demand for paper for recycling and the country’s recycling capacity by over one million tons.

Separate paper and board collection in Italy – The state of the art

90.2 kg

The region with the best per-capita value
Emilia Romegna

+31.5%

The region with the greatest increase
Sicily

+9%

Growth in the South

56.3 kg

Average per-capita value in Italy

3.4 million t

The volume of municipal paper and board collection

+127 thousand t

up vs. 2017

2018: growth across Italy

Over 120thousand tons more collected vs. 2017, equal to the annual volume of Umbria and Friuli-Venezia Giulia. Approximately 3.4 million tons of paper and board collected separately and recycled in 2018.
3.8% up vs. last year and 239% up since 1998.

About half of such increase is attributable to the South (+66thousand tons, i.e. +9.0%) and the remaining part to the North (+50thousand tons, i.e. +2.9%), whereas the increase is limited in the Centre (+11thousand tons, i.e. +1.4%), probably due to the poor performance of Rome.

Each citizen made an additional effort then, increasing their own per-capita collection by 2 kg, from 54.2 kg in 2017 to 56.3 kg in 2018. While this is an important reference indicator, it should be considered together with other values for proper understanding and for a description of current trends and changes.

The benefits of the investments made in the past few years were reaped in the South (as also confirmed this year). All the southern regions show a positive performance: the figure for Sicily – where most of the Consortium's actions were focused – stands out also in 2018, with a 31.5% growth rate. In countertrend, Campania is growing to a lesser extent, with a 2.5% rate.

Fifty-thousand tons come from the North, from such regions as Emilia-Romegna, Veneto, Lombardy, and Piedmont, already enjoying mature collection, where we believe the increase could be the result of three main factors:

- the shift from road-side collection to door-to-door collection;
- a gradual change of consumptions, by which people receive more and more parcels of products purchased online;
- the transfer to municipal collection of packaging that used to end up on the market.

Vallée d'Aoste deserves special mentioning, in particular, for its continuous growth: +6.1% to be interpreted as a close focus on appropriate waste management that – as in Trentino-Alto Adige – allows to implement "fine-tuned" policies and interventions in a region characterized by a strong focus on tourists.

The 1.4% increase in the Centre deserves some thinking with reference to Latium, where Rome collected approximately 3thousand tons less compared to the previous year, whereas the rest of the region increased by approximately 4thousand tons.
The best performance in terms of additional volumes in Central Italy is recorded in Marche, which grows by 5thousand tons, i.e. 5.1% up vs. 2017. Weaker results come from the other Regions. Tuscany still ranks first in terms of per-capita collection with 78.4 kg/ab.

While the South is growing, its present collection level is still just less than half compared to the rest of the Country. The South almost equals the Centre in terms of volumes, albeit with an almost double population. It is therefore justified to concentrate most efforts on the southern regions in view of capturing a potential 600thousand tons per year of paper and board that are still disposed of in landfills in these regions.

The growth of paper and board collection contributed to separate waste collection as a whole. If data is combined, while urban waste production remained substantially unchanged, the overall municipal separate collection rate increased by over 3 percent points to 58.8%. More regions hit the 65% municipal separate collection target set by the rules (a result achieved as early as last year in the North) than in 2017. At domestic level, with almost 1 million tons more of recyclable and recycled fractions, municipal separate collection exceeds 17 million tons. In terms of volumes, the organic fraction has the main impact (approximately 7 million tons), followed by paper and board accounting for 19.5% (3.4 million tons).

The ratio of the amount of collected paper and board to total urban waste is 11.0% in Italy, and still shows a significant growth potential. The performance of regions and macro-areas should, in fact, be considered on the basis of an analysis of the ratio of total waste production to total separate collection and paper collection alone: this point of view changes the whole ranking, which sees Trentino-Alto Adige outperform the other regions with over 16% of paper intercepted in urban waste. A harsh struggle is under way for the second place in ranking in terms of collected paper vs. total urban waste: Emilia-Romegna, Piedmont, Marche, and Abruzzo are all close to 13%.

If only separate paper and board collection were considered, Emilia-Romegna would be at the top (90.2 kg/ab-year), followed by Trentino-Alto Adige (83.0), and Vallée d'Aoste (79.6), second and third respectively. For the first time Tuscany is not among the three best performers (78.4).
These three regions collect on average 80 kg per capita, which means 50% more than the domestic per-capita amount. At the bottom of the ranking, Sicily outperforms Molise, which stops at 23.8 kg, albeit showing a two-digit growth.

Tab. 1

**Municipal separate paper and board collection by regions.
Years 2017-2018.**
Source: Comieco

Region	SC of paper 2017	SC of paper 2018	Δ 2017/18	Δ 2017/18
	t	t	t	%
Piedmont	265,959	277,530	11,571	4.4
Vallée d'Aoste	9,534	10,114	580	6.1
Lombardy	551,310	561,498	10,188	1.8
Trentino-Alto Adige	83,399	83,889	490	0.6
Veneto	286,786	295,830	9,044	3.2
Friuli-Venezia Giulia	69,827	70,203	375	0.5
Liguria	84,467	87,855	3,389	4.0
Emilia-Romegna	380,909	395,740	14,832	3.9
North	**1,732,190**	**1,782,659**	**50,469**	**2.9**
Tuscany	295,557	296,022	465	0.2
Umbria	56,740	58,218	1,479	2.6
Marche	100,336	105,405	5,068	5.1
Latium	348,529	352,595	4,066	1.2
Centre	**801,162**	**812,240**	**11,078**	**1.4**
Abruzzo	76,809	80,808	3,999	5.2
Molise	6,802	7,626	824	12.1
Campania	182,809	187,307	4,498	2.5
Puglia	170,338	179,660	9,321	5.5
Basilicata	21,723	24,181	2,458	11.3
Calabria	76,407	83,135	6,728	8.8
Sicily	111,051	146,028	34,977	31.5
Sardinia	83,542	86,240	2,699	3.2
South	**729,481**	**794,985**	**65,504**	**9.0**
Italy	**3,262,833**	**3,389,884**	**127,051**	**3.9**

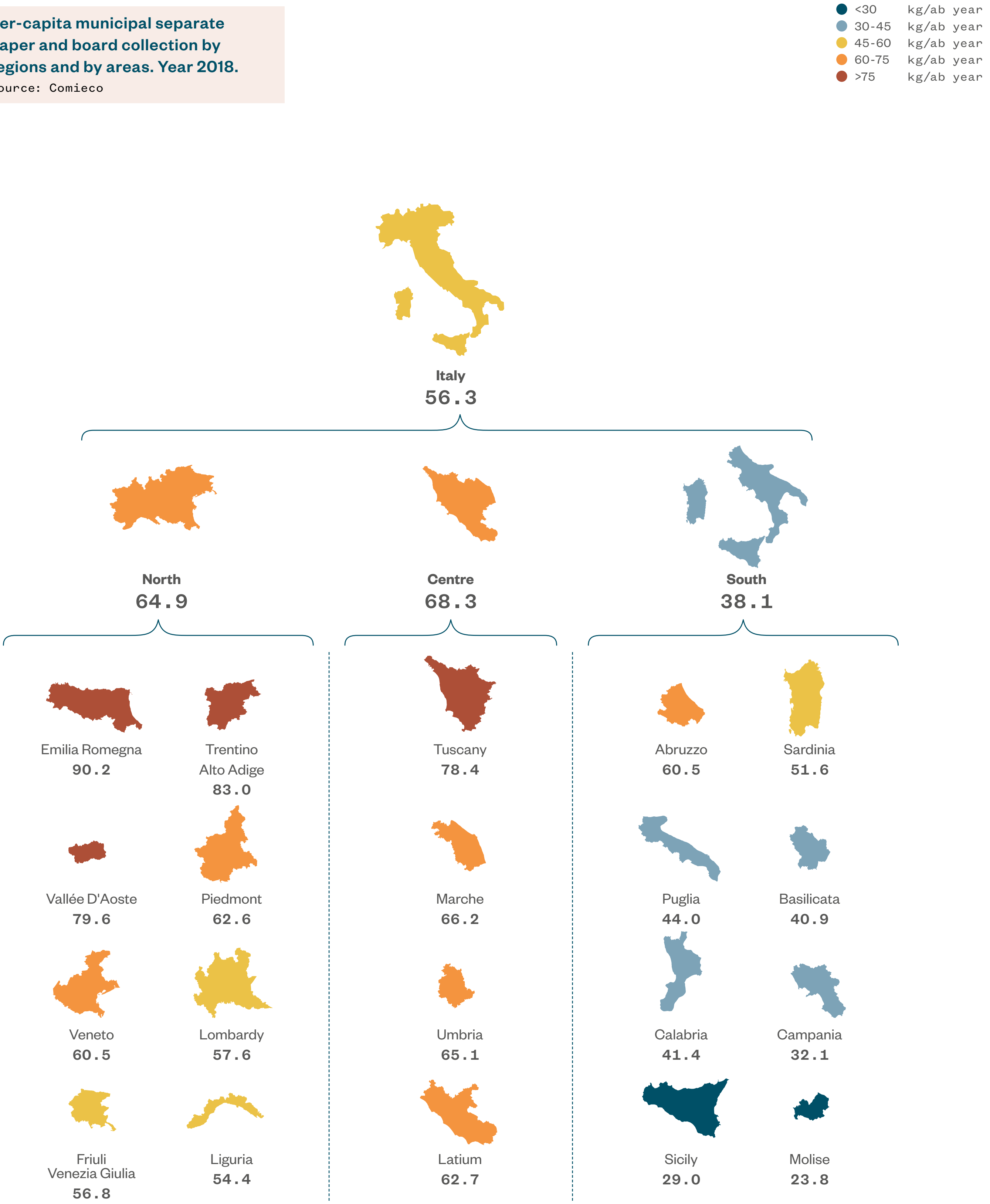
Note: 2017 data adjusted for Piedmont, Lombardy, Molise, Calabria, and the relevant macro-areas

In 2018 the macro-areas continue to follow the trend of the past 3 years. The South stands out with an increase by more than 9 percent points vs. 2017, thus accounting for half of the additional domestic volumes.

Fig. 1

Per-capita municipal separate paper and board collection by regions and by areas. Year 2018.

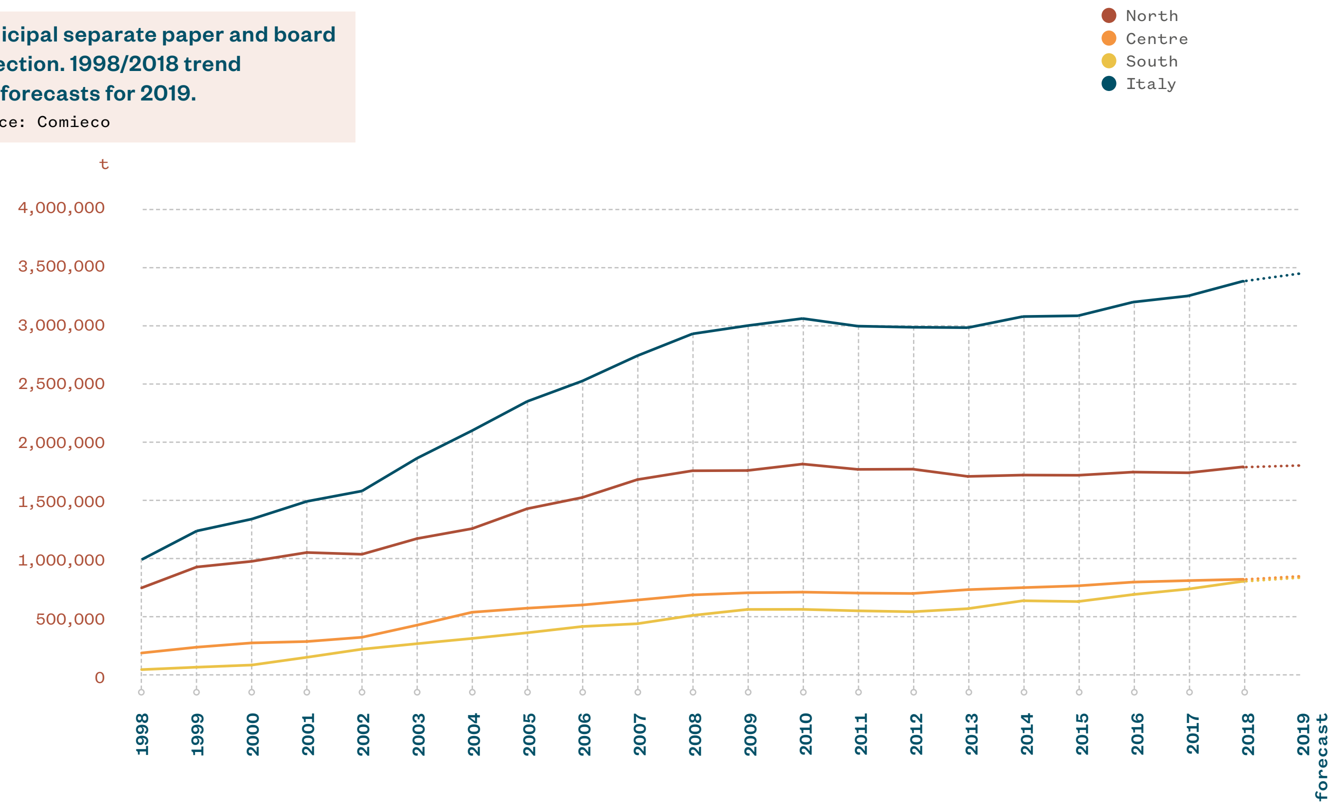
Source: Comieco



Average per-capita collection in Italy totalled 56.3 kg/ab in 2018. Emilia-Romegna, Tuscany, and Abruzzo rank first in the respective areas.

Fig. 2

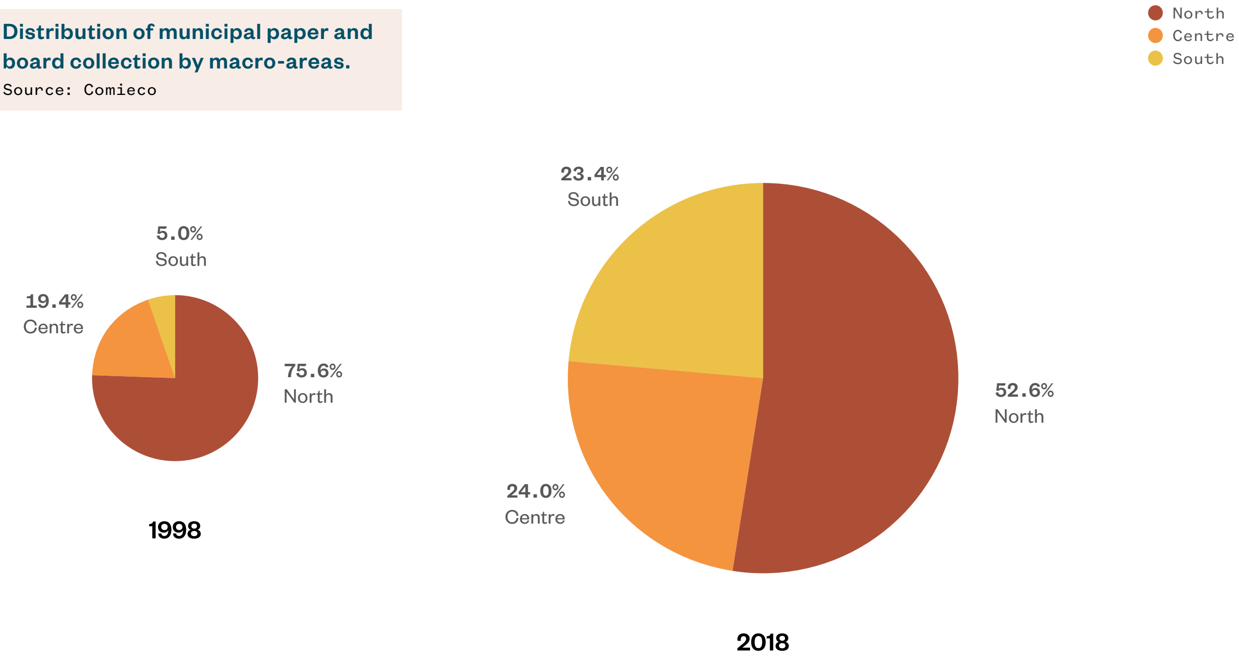
Municipal separate paper and board collection. 1998/2018 trend and forecasts for 2019.
Source: Comieco



	1998	2018	2019 forecast	Δ 2018/2019	Δ 1998/2019
	t	t	t	t	%
North	756,813	1,782,659	1,793,387	10,728	137
Centre	193,958	812,240	835,448	23,208	331
South	50,222	794,985	822,611	27,626	1,538
Italy	**1,000,993**	**3,389,884**	**3,451,446**	**61,561**	**245**

Fig. 2bis

Distribution of municipal paper and board collection by macro-areas.
Source: Comieco



Note: the ratio of cake sizes is proportional to the absolute value of collection

Tab. 2

The ratio of separate paper and board collection to total urban waste.

Source: Ispra 2017 data processed by Comieco

- less than 150
- 150-200
- 200-250
- 250-300
- more than 300

Region	Inhabitants	Total UW	Total SC	Total SC	SC of paper	SC of paper vs, total UW	Mixed UW
	n	kg/ab	kg/ab	%	kg/ab	%	kg/ab
Trentino-Alto Adige	1,067,648	486.2	348.0	71.6	78.2	16.1	138.2
Marche	1,531,753	533.4	337.3	63.3	72.8	13.6	196.0
Emilia-Romegna	4,452,629	642.3	410.0	63.8	86.5	13.5	232.3
Abruzzo	1,315,196	453.7	254.1	56.0	58.6	12.9	199.7
Piedmont	4,375,865	471.6	279.4	59.3	60.8	12.9	192.1
Vallée D'Aoste	126,202	584.2	357.1	61.1	74.4	12.7	227.0
Umbria	884,640	509.6	314.4	61.7	64.7	12.7	195.2
Tuscany	3,736,968	600.4	323.5	53.9	75.8	12.6	276.9
Veneto	4,905,037	476.0	350.6	73.7	58.5	12.3	125.5
Basilicata	567,118	346.2	156.8	45.3	40.9	11.8	189.4
Friuli-Venezia Giulia	1,215,538	484.6	317.3	65.5	56.7	11.7	167.3
Lombardy	10,036,258	466.9	325.0	69.6	54.5	11.7	141.9
Latium	5,896,693	504.0	229.6	45.6	58.8	11.7	274.4
Sardinia	1,648,176	439.0	276.8	63.1	50.4	11.5	162.2
Liguria	1,556,981	533.1	260.2	48.8	54.2	10.2	272.9
Calabria	1,956,687	395.5	156.9	39.7	39.0	9.9	238.6
Puglia	4,048,242	463.5	187.4	40.4	43.8	9.4	276.1
Campania	5,826,860	439.5	231.9	52.8	30.9	7.0	207.6
Molise	308,493	378.2	116.2	30.7	22.1	5.8	262.0
Sicily	5,026,989	457.6	99.4	21.7	24.5	5.4	358.2

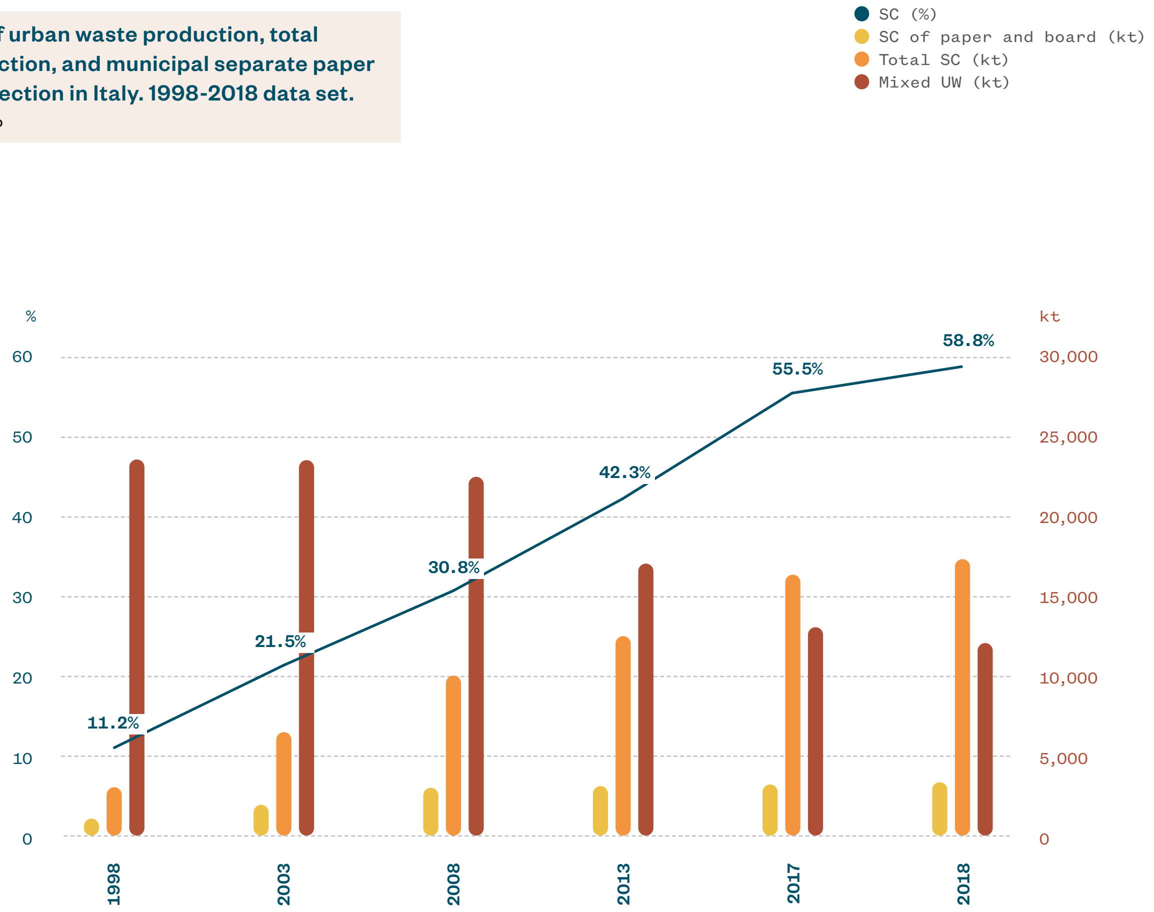
area	Inhabitants	Total UW	Total SC	Total SC	SC of paper	SC of paper vs, total UW	Mixed UW
	n	kg/ab	kg/ab	%	kg/ab	%	kg/ab
North	27,736,158	503.1	333.0	66.2	62.4	12.4	170.1
Centre	12,050,054	538.1	278.6	51.8	66.3	12.3	259.4
South	20,697,761	441.8	185.1	41.9	36.1	8.2	256.7
Italy	**60,483,973**	**489.1**	**271.6**	**55.5**	**54.2**	**11.1**	**217.5**

The ratio of paper to urban waste and the amount of the remaining waste are parameters that, alongside per-capita values, allow deeper understanding of the actual development of separate collection services.
In this table, the Regions and the macro-areas are shown in decreasing order with respect to the ratio of separate paper collection to total urban waste.

Fig. 3

Comparison of urban waste production, total separate collection, and municipal separate paper and board collection in Italy. 1998-2018 data set.

Source: Comieco

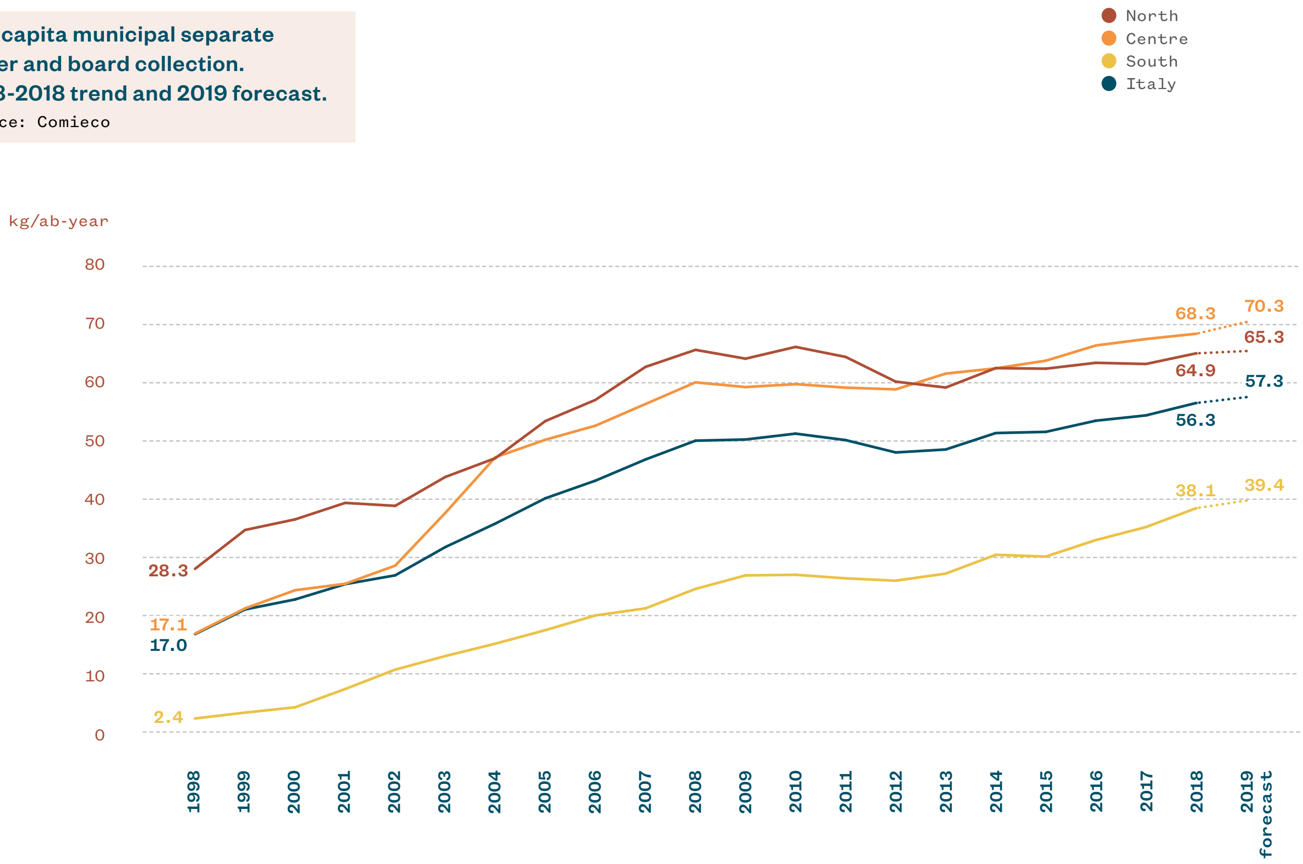


area	1998	2017	2018	Δ 2017/2018	Δ 1998/2018	Δ 1998/2018
	kg/ab-year	kg/ab-year	kg/ab-year	kg/ab-year	kg/ab-year	%
North	28.3	63.1	64.9	1.8	36.6	129.5
Centre	17.1	67.4	68.3	0.9	51.2	299.5
South	2.4	34.9	38.1	3.1	35.7	1,486.7
Italy	**17.0**	**54.2**	**56.3**	**2.1**	**39.3**	**231.1**

Fig. 4

Per-capita municipal separate paper and board collection. 1998-2018 trend and 2019 forecast.

Source: Comieco



The South and the metropolitan areas are the main targets, but all regions still have untapped potentials to a varying extent.

Big cities – complex systems

+4.0%

total separate collection

+2.2%

total waste

+0.6%

mixed waste

Metropolitan areas, and regional or provincial capitals in particular, are focus points that deserve some ad-hoc consideration. For the past few editions of the Annual Report, this monitoring has been considering six Italian cities (from North to South: Turin, Milan, Florence, Rome, Bari, and Naples) that account, together, for just less than 11% of inhabitants and almost 13% of the urban waste produced in Italy.
These cities are physiologically complex entities due to an overlap of inhabitants, types and diversity of utilities, urban textures – all factors that contribute to a more complicated organization and management of urban sanitation services. This is confirmed by the data of separate collection, which is above 50% in just two cases – Milan and Florence – vs. an Italian estimated average close to 59%.

Data for 2017 shows that overall urban waste production increased by 2.2%. Separate collection grows (+4.4%) much more than mixed waste collection (+0.6%). SC in the monitored cities is generally growing, except in Rome, whose 2017 levels are confirmed.

If these six cities are considered as a single urban entity, interesting observations can be made. This urban conglomerate has 6.4 million inhabitants producing 3.8 million tons of urban waste, including 1.8 million (42.8%) collected separately. Overall urban waste production is 20% higher compared to the average domestic figure.

Overall paper and board collection in the six cities totalled more than 482thousand tons in 2018, i.e. 14% of the domestic figure. This means that paper and board interception in urban areas is, on average, more effective as a result of a higher number of business activities and services. The average per-capita figure is 75 kg/ab, 33% above the average domestic figure. But don't be misled: the growth potential of these areas is still high – at least 20%.

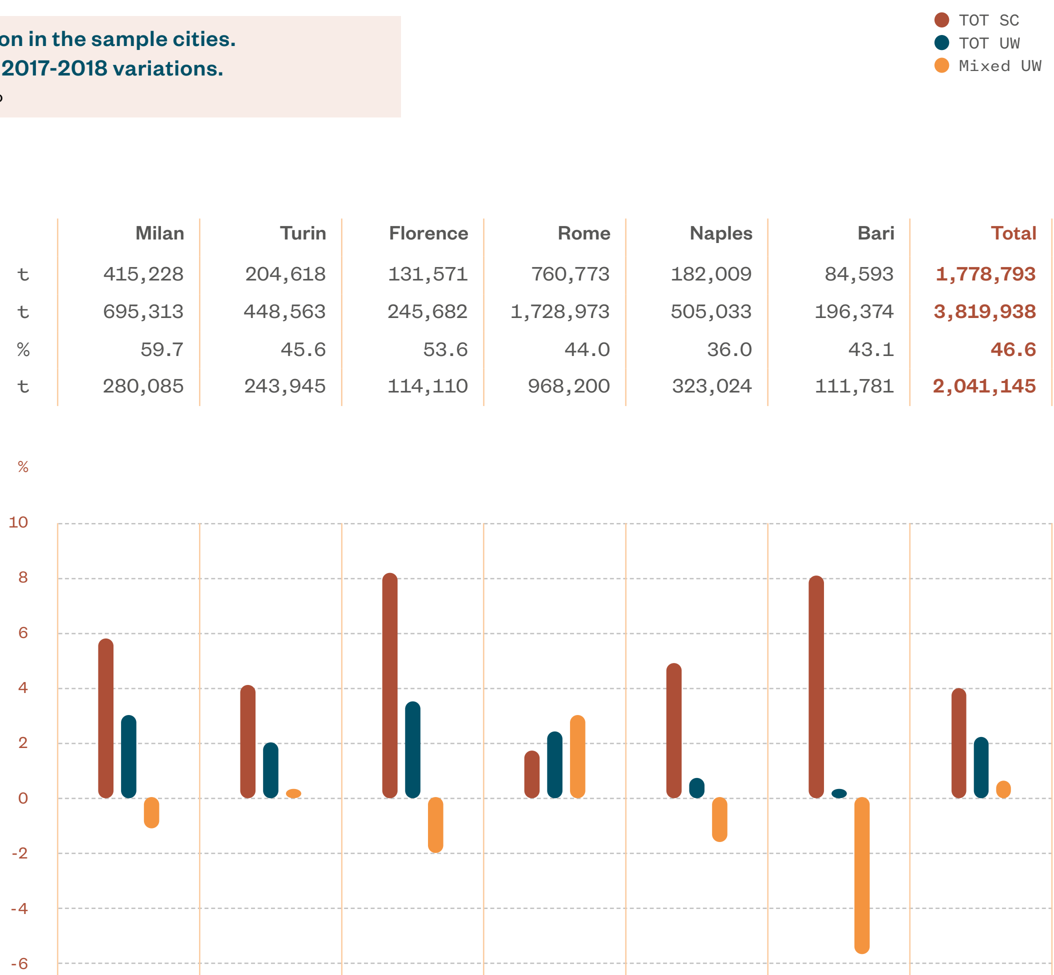
To sum up the achieved results, while cities are part of the current revolution in the management of urban waste, they have to contribute more effectively by changing their pace.

Examples like Milan demonstrate that results can be improved and that acting on big urban areas is necessary to hit domestic targets.

Fig. 5

Waste collection in the sample cities.
Year 2018 and 2017-2018 variations.
Source: Comieco

2018		Milan	Turin	Florence	Rome	Naples	Bari	Total
TOT SC	t	415,228	204,618	131,571	760,773	182,009	84,593	**1,778,793**
TOT UW	t	695,313	448,563	245,682	1,728,973	505,033	196,374	**3,819,938**
SC/UW	%	59.7	45.6	53.6	44.0	36.0	43.1	**46.6**
Mixed UW	t	280,085	243,945	114,110	968,200	323,024	111,781	**2,041,145**



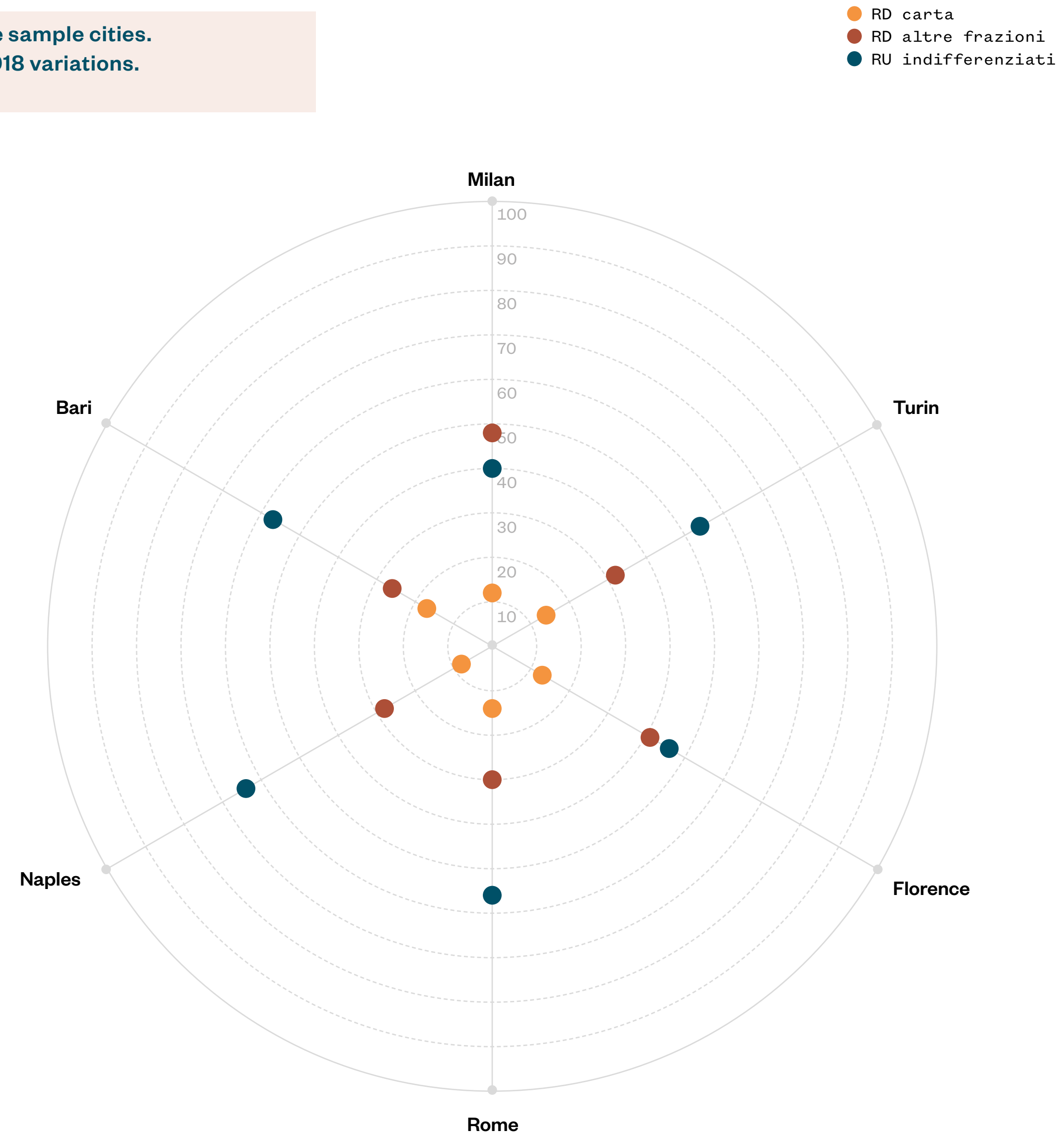
Δ 2017-2018		Milan	Turin	Florence	Rome	Naples	Bari	Average
TOT SC	%	5.8	4.1	8.2	1.7	4.9	8.1	**4.0**
TOT UW	%	3.0	2.0	3.5	2.4	0.7	0.3	**2.2**
Mixed UW	%	-1.1	0.3	-2.0	3.0	-1.6	-5.7	**0.6**

The focus on metropolitan areas confirms the national trend. While separate collections are established, mixed waste is decreasing. These areas deserve attention, in that this is where service organization is most difficult, but also where the highest volumes can be achieved.

Fig. 5bis

Waste collection in the sample cities. Year 2018 and 2017-2018 variations.

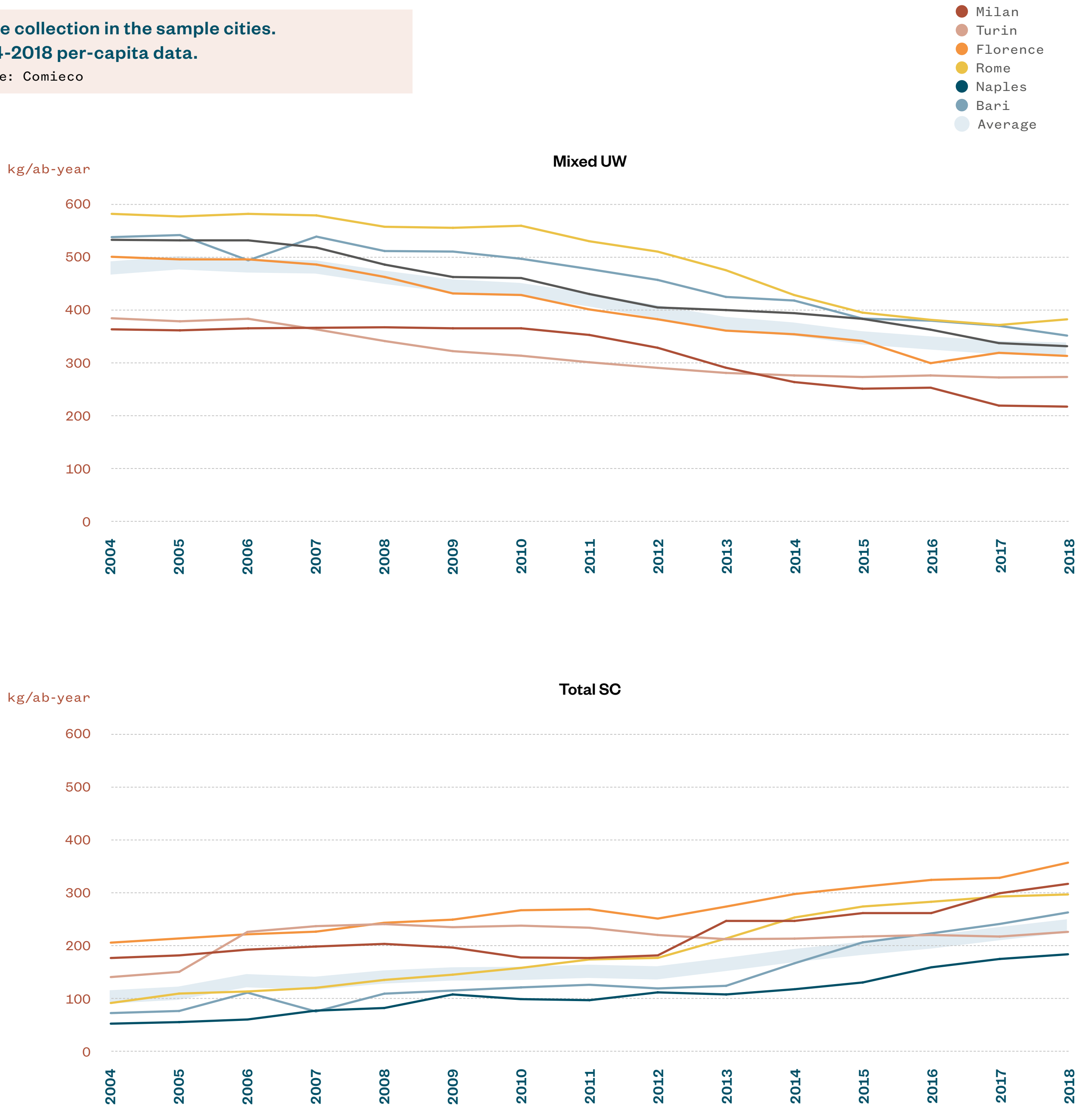
Source: Comieco



		Milan	Turin	Florence	Rome	Naples	Bari
SC of paper	%	12	14	13	14	8	17
SC of other fractions	%	48	32	41	30	28	26
Mixed UW	%	40	54	46	56	64	57

Fig. 6

Waste collection in the sample cities. 2004-2018 per-capita data.
Source: Comieco




Mixed UW
Total SC
SC of P&B
Milan
Turin
Florence
kg/ab-year
600
500
400
300
200
100
0
2004
2006
2008
2010
2012
2014
2016
2018
Rome
Naples
Bari
kg/ab-year
600
500
400
300
200
100
0
2004
2006
2008
2010
2012
2014
2016
2018

Cities under the agreements – figures and results in 2018

67.5%

Cities under the agreements

81.2%

Italian citizens covered by the agreements

1.44 million t

managed under the agreements out of 3.4 million t of paper and board collected in Italy

Collection

Nine-hundred and fourteen agreements were in force as at 31/12/2018, entered into with Comieco either directly or through proxies, representing 5,506 Cities and approximately 50 million inhabitants.

While the Centre and the North had 81 and 138 agreements in place respectively, the South had 695. This disproportion confirms how difficult it is to ensure optimal supermunicipal operation. This trend has been under way for some time and highlights poor coordination among local entities that do not leverage on "networking", investment optimization, and know-how, thus missing the benefits that may derive from scale economies, both upon collecting and upon processing and recycling.

The average amount considered in each agreement in force in Southern Italy is less than 900 t/year of paper an board – one-fifth of the amounts in the Centre and North.

In 2018 the Consortium provided for recycling of 1.44 million tons of paper and board, i.e. 42.5% of municipal collection. One peculiarity is that most of the Cities covered by the agreements only entrusted part of their collection to Comieco due to the opportunity to define modes, flows, and amounts to be managed under the agreements every year.

The Consortium has diversified peculiarities according to local requirements: in the Centre and North, where allowed by market conditions, COMIECO carries out a subsidiary role for the market, whereas it works as a factor for development and recycling assurance in the South.

The managed amounts generally declined by approximately 39thousand tons (-2.6%) compared to 2017, the arithmetic sum of -84thousand tons in the Centre and North and approximately +45thousand in the South.

More specifically, the Consortium managed 995thousand tons of packaging, almost 50thousand less compared to 2017, whereas the amount of similar product fractions (graphic paper) in the managed collection mix grew by almost 10thousand tons.

Tab. 3

Local coverage by regions as at December 31, 2018.
Source: Comieco

Region	Cities under the agreements		Citizens under the agreements		Amount managed under the agreements	
	n	%	n	%	t	% vs, SC of paper
Piedmont	1,055	87.3	4,150,694	93.7	129,080	46.5
Vallée D'Aoste	74	100.0	128,298	100.0	9,272	91.7
Lombardy	611	39.3	5,640,390	56.0	118,572	21.1
Trentino-Alto Adige	272	77.7	970,777	88.0	45,541	54.3
Veneto	330	56.6	2,998,242	60.7	59,782	20.2
Friuli-Venezia Giulia	213	96.8	1,213,491	98.1	34,412	49.0
Liguria	119	50.6	1,216,033	76.8	26,572	30.2
Emilia-Romegna	302	84.4	4,296,045	94.7	107,982	27.3
North	**2,976**	**64.9**	**20,613,970**	**73.5**	**531,213**	**29.8**
Tuscany	261	87.0	3,616,701	92.9	157,079	53.1
Umbria	51	55.4	732,526	81.9	11,105	19.1
Marche	195	80.9	1,341,793	85.4	40,663	38.6
Latium	140	37.0	4,816,506	81.7	108,492	30.8
Centre	**647**	**64.0**	**10,507,526**	**85.8**	**317,340**	**39.1**
Abruzzo	251	82.3	1,222,414	91.8	59,097	73.1
Molise	66	48.5	195,855	62.5	5,012	65.7
Campania	402	72.7	5,113,516	86.7	136,646	73.0
Puglia	233	90.3	3,839,855	93.9	152,320	84.8
Basilicata	94	71.8	487,650	84.6	15,069	62.3
Calabria	324	79.2	1,769,155	89.5	49,379	59.4
Sicily	351	90.0	4,932,692	96.9	119,634	81.9
Sardinia	162	43.0	1,048,383	63.0	56,082	65.0
South	**1,883**	**73.6**	**18,609,520**	**88.9**	**593,239**	**74.6**
Italy	**5,506**	**67.5**	**49,731,016**	**81.2**	**1,441,792**	**42.5**

Area	Agreements	Average inhabitants per agreement	Average amount managed under the agreements
	n	n	t
North	138	149,377	3,849
Centre	81	129,723	3,918
South	695	26,776	854
Italy	**914**	**54,410**	**1,577**

Fig. 7

Status of the agreements upon expiration of each framework agreement and coverage rates of the agreements. 2001/2018 historical data set.

Source: Comieco

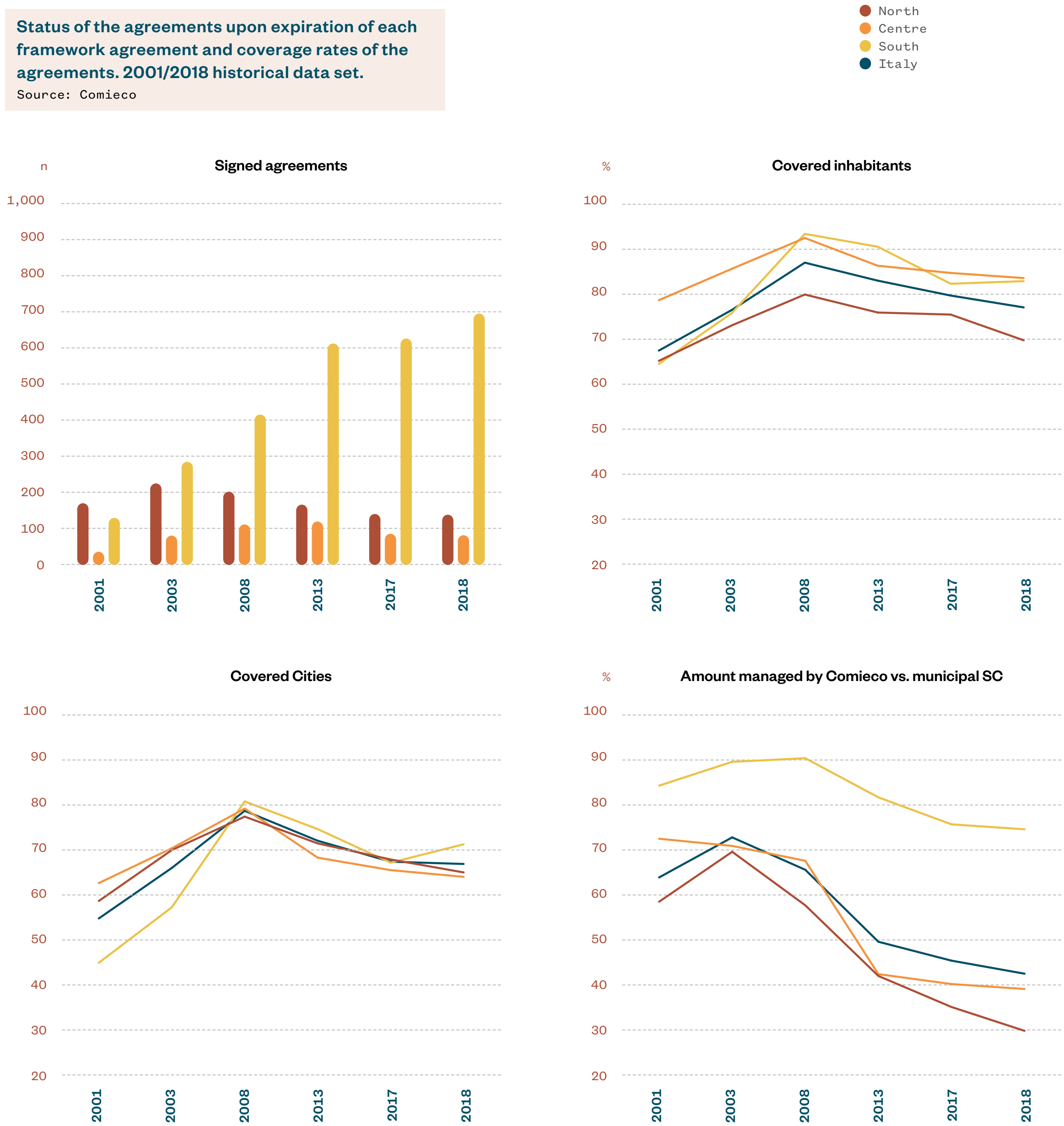
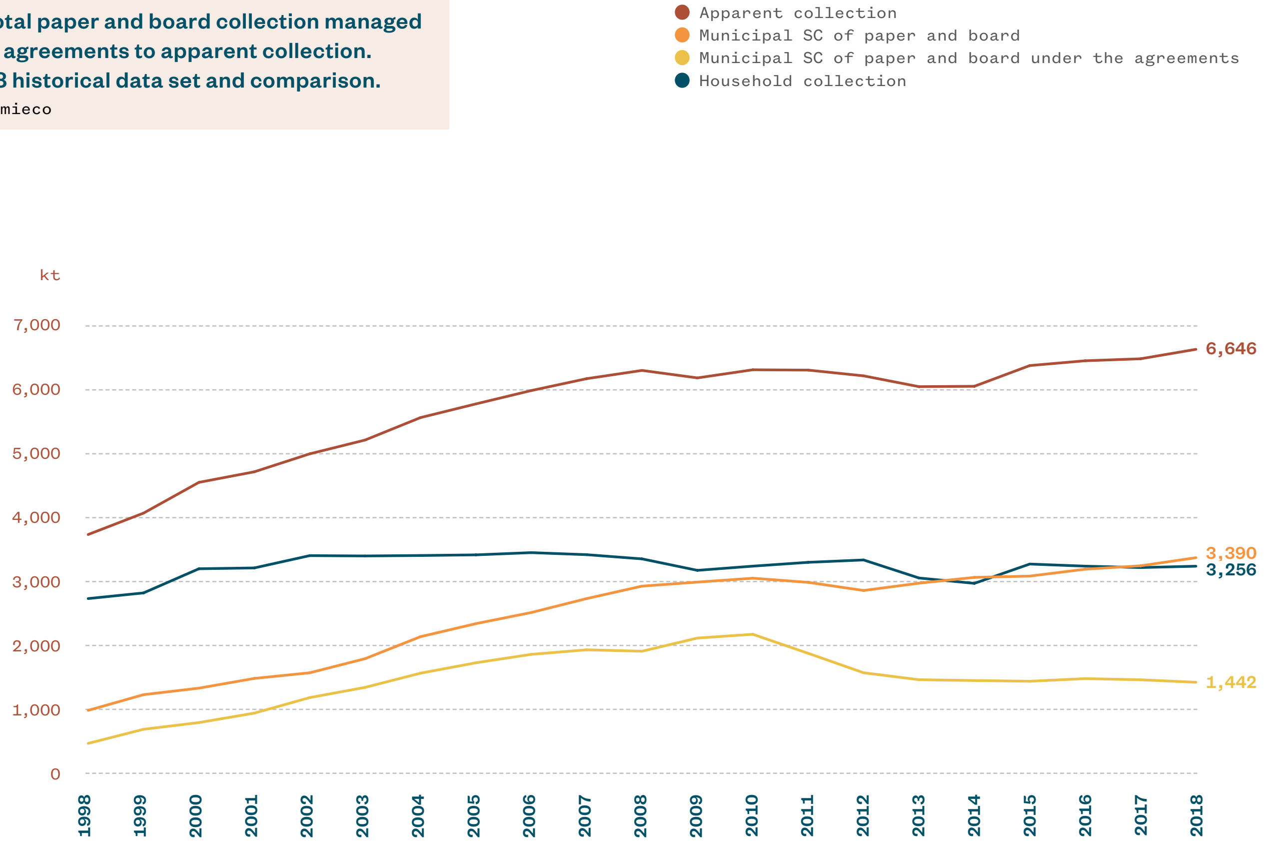


Fig. 8

Ratio of total paper and board collection managed under the agreements to apparent collection. 2016-2018 historical data set and comparison.

Source: Comieco



		1998	2003	2008	2013	2017	2018	Δ t 1998/2018	Δ % 1998/2018	Δ t 2017/2018	Δ % 2017/2018
Apparent collection	kt	3,749	5,227	6,316	6,062	6,498	6,646	2,897	77.3	148	2.3
Municipal SC of paper and board	kt	1,001	1,810	2,945	2,991	3,263	3,390	2,389	238.6	127	3.9
Municipal SC of paper and board under the agreements	kt	485	1,362	1,928	1,482	1,481	1,442	957	197.3	-39	-2.6
Household collection	kt	2,748	3,417	3,371	3,071	3,235	3,256	508	18.5	21	0.7

		1998	2003	2008	2013	2017	2018
Municipal SC of paper and board under the agreements vs. apparent collection	%	12.9	26.1	30.5	24.4	22.8	21.7
Municipal SC of paper and board under the agreements vs. municipal collection	%	48.5	75.2	65.5	49.6	45.4	42.5

Allocations to parties under the agreements

97.5

million EUR

allocated to the Cities in 2018

1,6

billion EUR

from 1998 to 2018

2

EUR/ab-year

average allocation per inhabitant

Comieco invested a total of 97.5 million EUR in 2018 to manage 1.44 million tons of paper and board collected at municipal level under the agreements, including 92 million tons of packaging and 5.5 tons of graphic paper.
This means approximately 12.8 million EUR less compared to 2017 vs. a decline of the managed amounts and of the quotations of non-packaging paper and board fractions.
In 21 years of system operation (1998/2018), over 1.6 billion EUR were allocated to support municipal collection under the agreements, vital resources that promoted a threefold increase of collection volumes over the same period of time.

Tab. 4

Resources allocated to the parties under the agreements in 2018. Detailed by Areas.

Source: Comieco

Area	Inhabitants under the agreements	Amount					
		Packaging	FMS	Total	Managed packaging	FMS	Total
	n	t	t	t	kg/ab	kg/ab	kg/ab
North	20,613,970	437,975	93,238	531,213	21.2	4.5	25.8
Centre	10,507,526	203,702	113,638	317,340	19.4	10.8	30.2
South	18,609,520	352,974	240,265	593,239	19.0	12.9	31.9
Italy	**49,731,016**	**994,651**	**447,141**	**1,441,792**	**20.0**	**9.0**	**29.0**

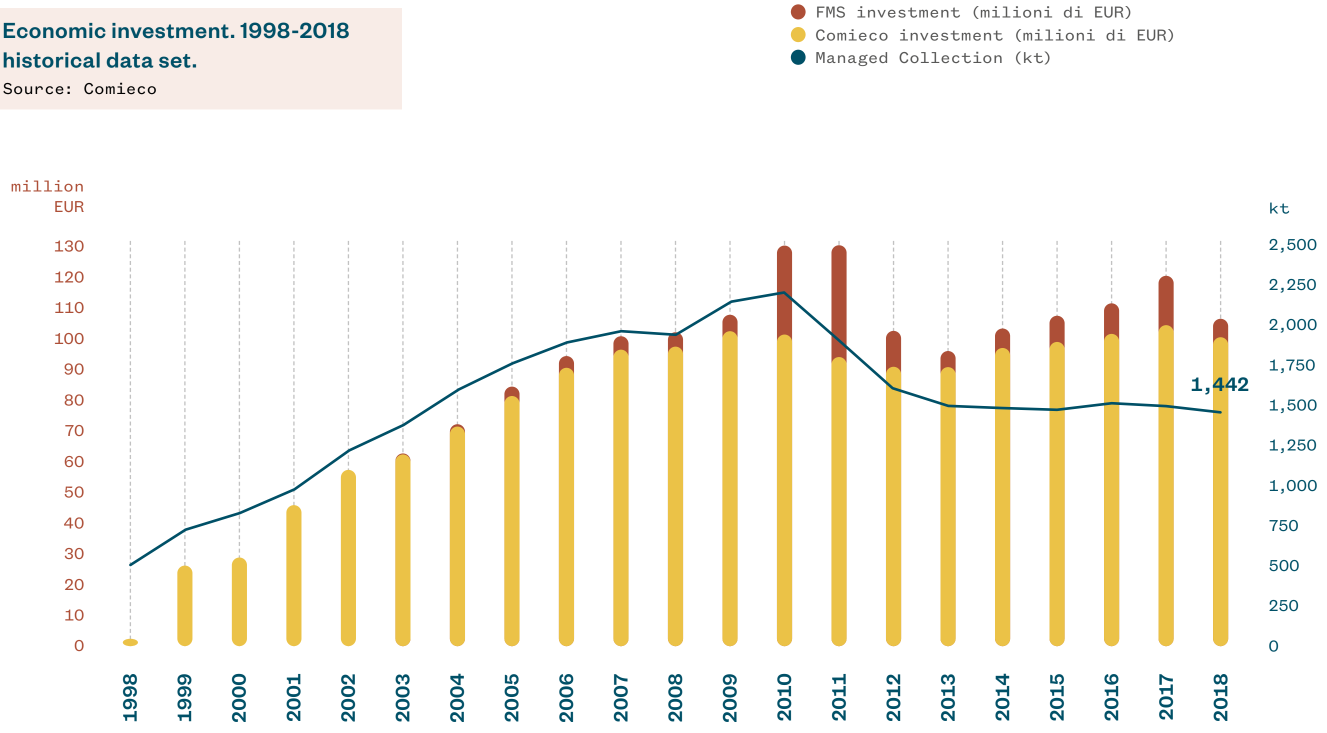
Area	Inhabitants under the agreements	Economic resources					
		Packaging	FMS	Total	Managed packaging	FMS	Total
	n	EUR	EUR	EUR	EUR/ab	EUR/ab	EUR/ab
North	20,613,970	42,502,538	1,226,793	43,729,332	2.1	0.1	2.1
Centre	10,507,526	18,732,200	1,353,138	20,085,338	1.8	0.1	1.9
South	18,609,520	30,762,625	2,969,045	33,731,671	1.7	0.2	1.9
Italy	**49,731,016**	**91,997,364**	**5,548,976**	**97,546,340**	**1.9**	**0.1**	**2.0**

The amounts managed by the Consortium slightly declined in 2018 (-2.6%). The amount of allocations to the Cities under the agreements amounts to 97.5 million EUR.

Fig. 9

Economic investment. 1998-2018 historical data set.

Source: Comieco



		I Accordo ANCI-CONAI 1998-2003	II Accordo ANCI-CONAI 2004-2008	III Accordo ANCI-CONAI 2009-2013	IV Accordo ANCI-CONAI 2014-2018	Total
Packaging	million EUR	204.2	400.3	439.0	459.9	1,503.4
FMS	million EUR	0.4	15.3	80.2	43.0	138.9
Total	million EUR	204.6	415.6	519.2	503.0	1,642.3
Managed collection	t	5,523,979	9,088,263	9,295,707	7,348,512	31,256,461

		2017	2018	Δ 2017-18
Packaging	million EUR	95.6	92.0	-3.8%
FMS	million EUR	14.7	5.5	-62.2%
Total	million EUR	110.3	97.5	-11.5%
Managed collection	t	1.480.900	1.441.792	-2.6%

Comieco managed over 31 million tons of paper and board derived from municipal collection from 1988 to 2018, and paid considerations for over 1.6 billion EUR.

Focused loans to the South

35

kg/ab-year

per-capita threshold to access loans

288

Cities involved in the plan

6.1

million EUR

invested in 5 years

Special projects for the South are confirmed for 2018. These include, in particular, the Plan for the South, sponsored by the Ministry of the Environment and of Territorial and Sea Protection for the purchase of equipment and vehicles to support separate paper and board collection in bigger cities, and the ANCI-Comieco tender in smaller ones.

In the 2014-2018 five-year period, the Consortium invested over 6.1 million EUR in medium-small Cities with the ANCI-Comieco Tender alone. These amounts are intended for the purchase of paper and board collection equipment within the framework of projects for development of collection in low-performance Cities. In time, the access threshold was gradually updated, also in the light of gradual local service development, and binding targets were set for collection, with deadlines for the achievement thereof.

A total of 288 Cities benefited from loans in the five-year period and 236 of these are in the South, 47 in the Centre, and only 5 in the North. Fund allocation was performed in the same proportion, with 101thousand EUR invested in the North, 654thousand EUR in the Centre, and 5.352thousand in the South.

Each project benefits from a basic communication package aimed at improving user information, which was, in most cases, customized and expanded as requested by the local administrations.

This support experience had both positive and negative aspects. Positive ones include the broad reach of these measures and an evident change of pace where projects were fully implemented. Aspects to be improved include, in particular, the time for measure implementation in the Cities, alongside the time for identification of operators, which was, on average, longer than expected – from submission of applications, systems start to operate in full capacity within 24 months on average.

This means that the measures implemented in the past two editions are not fully operational yet, and there is still some untapped potential. However, the monitoring data of most recent measures points out to a growth close to 10% vs. 2017.

Tab. 5

Comieco-ANCI tender for the purchase of equipment in support of paper and board collection. Years 2014-2018. Detailed by regions.

Source: Comieco

Area/Region	Cities	Inhabitants	Amount	Incidence on total
	n	n	EUR	%
Emilia-Romegna	5	43,229	101,412	
North	**5**	**43,229**	**101,412**	**1.7**
Latium	40	395,969	576,705	
Marche	5	13,200	20,115	
Tuscany	2	25,725	57,800	
Centre	**47**	**434,894**	**654,620**	**10.7**
Abruzzo	25	39,145	94,592	
Basilicata	6	65,924	101,646	
Calabria	58	367,519	1,161,242	
Campania	32	522,458	1,083,151	
Molise	3	59,290	48,372	
Puglia	35	548,762	694,468	
Sicily	77	1,079,315	2,169,032	
South	**236**	**2,682,413**	**5,352,503**	**87.6**
Total	**288**	**3,160,536**	**6,108,535**	**100.0**

The equipment tender continued for the Cities. Over 6 million EUR invested in five years. New access parameters are envisaged and specific targets are defined for the approved projects.

Quality – a primary goal across the country

1,101

tests in one year

3.31%

average content of contaminants in 1.01+1.02

0.71%

average content of contaminants in 1.04+1.05

The results of the tests performed during 2018 outline a different picture if both paper collection flows are considered, namely 1.01+1.02 (household collection) and 1.04+1.05 (business collection of packaging only).

As far as 1.01+1.02 is concerned, the average content of contaminants slightly declined compared to 2017 (3.31%), but is still such as to classify “household” collection in the second bracket with respect to the reference thresholds provided for by the Technical Annex.

In this case too, the domestic data can and should be extracted and the behaviour of the individual macro-areas should be observed: while the performance of the North (1.9% in 1.01+1.02) is slightly declining, in countertrend, a general limited improvement is recorded in the Centre (4% of contaminants) and South (3.5%).

The domestic figure confirms the trend reversal already observed in 2017 compared to the previous years.

Punctual monitoring through quality controls allows, in fact, to clearly identify critical players, such as certain big cities. Second-level controls, including on individual collection circuits, provide important information in view of improvement measures.

Tab. 6

Quality of the collected material (average content of contaminants). 2017-2018 comparison by Macro Areas.

Source: Comieco

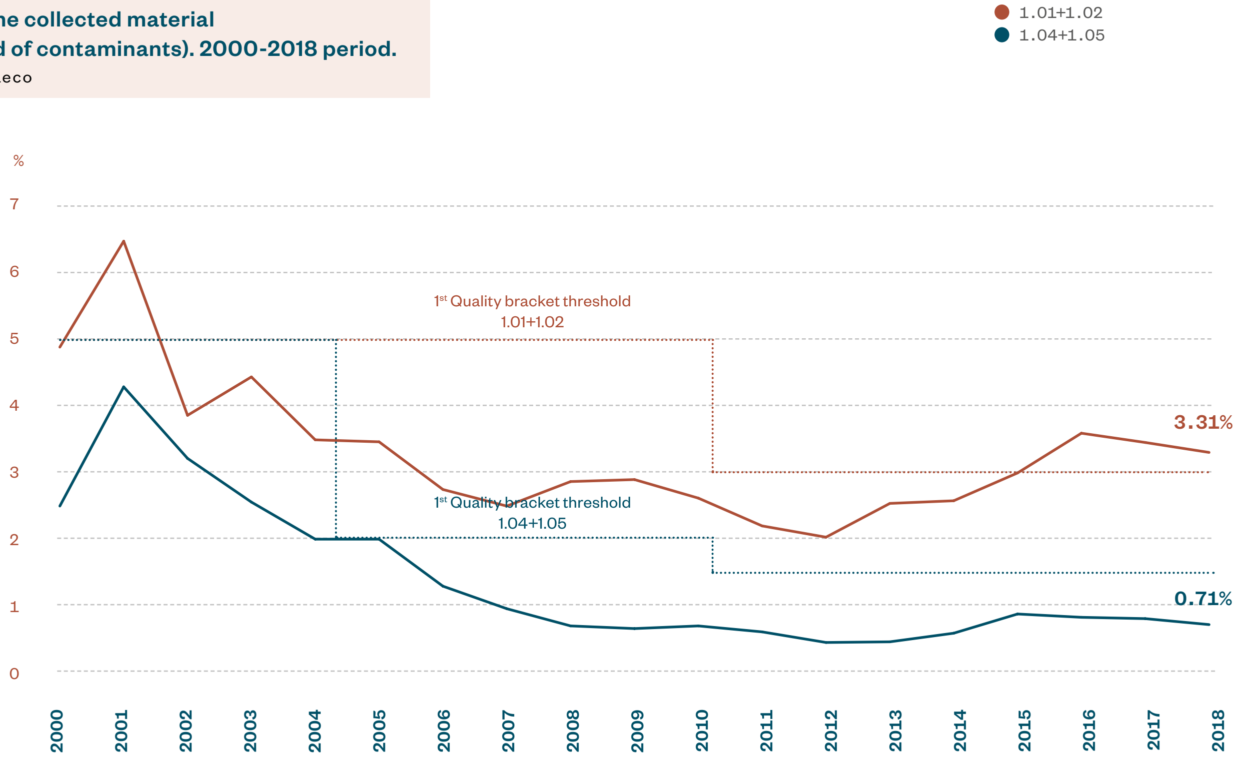
	2017		2018		Δ 2017/2018
	Tests	Contaminants	Tests	Contaminants	Contaminants
	n	%	n	%	%
1.01 + 1.02					
North	133	1.76	115	1.90	0.14
Centre	221	4.29	231	4.00	-0.29
South	358	4.03	312	3.51	-0.52
Italy	**712**	**3.46**	**658**	**3.31**	**-0.15**
1.04 + 1.05					
North	88	0.36	80	0.41	0.05
Centre	68	0.48	78	0.64	0.16
South	342	1.02	285	0.86	-0.16
Italy	**498**	**0.80**	**443**	**0.71**	**-0.09**

***The amount of contaminants in household collection flows remains above threshold.
A positive trend is recorded for business collection. Quality is a challenge to be addressed in parallel with the increase in volumes.***

Fig. 10

Quality of the collected material (mean trend of contaminants). 2000-2018 period.

Source: Comieco

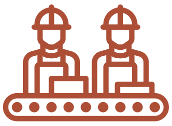


Performed tests		1st ANCI-CONAI Agreement 1998-2003	2nd ANCI-CONAI Agreement 2004-2008	3rd ANCI-CONAI Agreement 2009-2013	4th ANCI-CONAI Agreement 2014-2018	Total 1998-2018
1.01+1.02	n	1,006	3,456	4,040	3,529	12,031
1.04+1.05	n	594	3,591	4,204	2,500	10,889

Note: The above results, until June 2014, refer to the total tests performed at the sorting plants on both incoming and outgoing materials in order to determine the considerations due to the parties under the agreements. From July 2014 these results only refer to tests on incoming materials performed to determine the consideration.

The controls challenge confirms the improvement observed last year with respect to the contents of contaminants in 1.01+1.02. Business collections provide recycling-ready materials.

Recycling plants – a widespread, yet still growing network

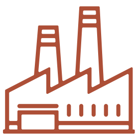


348

sorting plants

16.6km

average distance from collection points



55

paper mills recycling 98% of the paper managed by Comieco

Materials collected under the management of Comieco at national level are conferred to 348 sorting plants that receive them and provide for sorting and pressing.
This network of plants that spreads across the national territory helps cost containment by ensuring that vehicles are unloaded a short distance away from collection points (16.6 km on average). Logistic optimization, which is key to improve recycling, needs to reconcile the possibility to confer the materials at a short distance from the collection point and to create a critical mass across the plants network to achieve scale economies and investments to improve processing.

The materials processed in the sorting plants are recycled via two complementary channels. Sixty percent (just more than 850thousand tons) of the amount managed by Comieco is entrusted on a pro-quota basis to 55 plants (paper mills) that ensure recycling across the national territory.
The other 40% (approximately 587thousand tons) is awarded – by regular auctions – to parties having the necessary operational capacity to ensure recycling, either in Italy or abroad. In 2018, 30 parties were awarded at least one lot. Ninety-eight percent of this material was recycled at Italian plants.

Over 98% of the overall amount managed by the Consortium is recycled in Italy.

Fig. 11

The recycling plants network. Year 2018.
Source: Comieco

Area	Sorting plants under the agreements	Average distance for conferment	Paper mills (plants)
	n	km	n
North (*)	127	17.3	32
Centre	71	16.2	17
South	150	16.2	6
Italy	**348**	**16.6**	**55**

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

Comieco ensures that 60% of the managed materials is recycled through awarding to member paper mills, and the remaining share is awarded at auctions based on the commitments made with AGCM in 2011. In 2018, 30 awarded companies (that won at least one lot) managed approximately 587thousand tons of paper and board for recycling. Ninety-eight percent of this material was anyway recycled at Italian plants.

The circular economy of the paper pipeline

81.1%

Paper packaging recycled

88.8%

Paper and board packaging recovered

4.9 million t

Apparent consumption of paper and board packaging

+150 thousand t

Domestic consumption of paper for recycling

1.5 million t

Net exports

Paper production amounted to just less than 9.1 million tons in 2018, virtually unchanged (+0.1%) compared to 2017. For the first time, packaging production (4.6 million tons, +2.6% up vs. 2017) surpassed the volume of other paper production – 4.5 million tons – and offset its decline (-2.4%). The overall picture confirms the trends of the past few years. Apparent packaging consumption data are further improving compared to the previous year by an annual +4% average since 2013. The graphic paper segment declines by two percent points, whereas the graphic paper to packaging ratio is 45.4% in 2018 (vs. 47.6% in 2017).

This trend confirms the technological replacement process under way in the publishing and data storage sector. Graphic paper production declined in the past decade, as also confirmed by the circulation data of ADS (press circulation data monitoring service), which shows that the circulation of newspapers was substantially reduced by more than half in the same period.

If e-commerce is considered, online goods purchases recorded a 3 billion EUR increase in the last 12 months. Packaging design can significantly help reduce the environmental impact of e-commerce related activities, a constantly growing business that accounts for 10% of the retail market in the world and 6.5% in Italy. Choosing easy-to-recycle options means, in fact, making disposal easier for customers, as well as optimizing processes across the production pipeline. Approximately 260 million shipments were performed in 2018, including 56% in the North: how does Milan react as the "capital" of e-commerce, where millions of shipments are performed every month? In October 2017 AMSA, in cooperation with Comieco, launched door-to-door cardboard collection, which should be expanded to the whole city by 2019. The results of this activity confirm its usefulness and profitability: cardboard collection increased by 15.4% from 2017 to 2018 (from 23,549 to 27,173 tons).

The domestic recycling system absorbs 5 million tons of materials available from collections, 150thousand tons up (+3%) vs. 2017. The remaining share of paper for recycling is recycled abroad: the net export balance is confirmed above 1.5 million tons, virtually unchanged (.0.1%) vs. 2017. This trend shows that the fears about the difficulty to allocate paper for recycling due to the Chinese "crunch" were probably overestimated.

Paper and board packaging management consolidates the achievement of the recycling (81.1%) and recovery (88.8%) targets. Of the 4.9 million tons of apparent consumption (+0.8% vs. 2017), just less than 4.0 million (+2.4%) are recycled. On the other hand, 373thousand tons are recovered. These values show that the targets set by directive 2018/852/EC for 2025 (75% recycling) have already been met in Italy.

But what and how many benefits derive from this effort? Benefits are both direct and indirect and can be translated into economic values using specific indicators. Comieco's activity alone – 995thousand tons of packaging managed in 2018 – results into 57million EUR benefits if the value of the generated raw materials and of the avoided CO2 emissions from recycling processes is calculated.

The above numbers should not make us forget the positive impact of non-disposal, of new job generation and, more generally, of civic value in terms of territorial protection.

Tab. 7

Paper and board packaging recovery and recycling results achieved in 2018.

Source: Comieco

	2018	Δ 2017/2018
	t	%
Recycling and recovery rate calculation		
Apparent paper and board packaging consumption	4,906,054	0.8
Waste paper and board packaging (paper and packaging) from 1.01+1.02 recycled in Italy	375,557	0.5
Waste paper and board packaging (packaging only) from 1.04+1.05 recycled in Italy	2,282,335	5.2
Paper for recycling obtained from waste packaging recycled abroad	1,322,767	-1.4
Total recycled waste packaging	**3,980,659**	**2.4**
Paper and board packaging recovered as energy or waste-based fuel	**373,822**	**-2.3**
Total recovered paper and board packaging	**4,354,481**	**2.0**

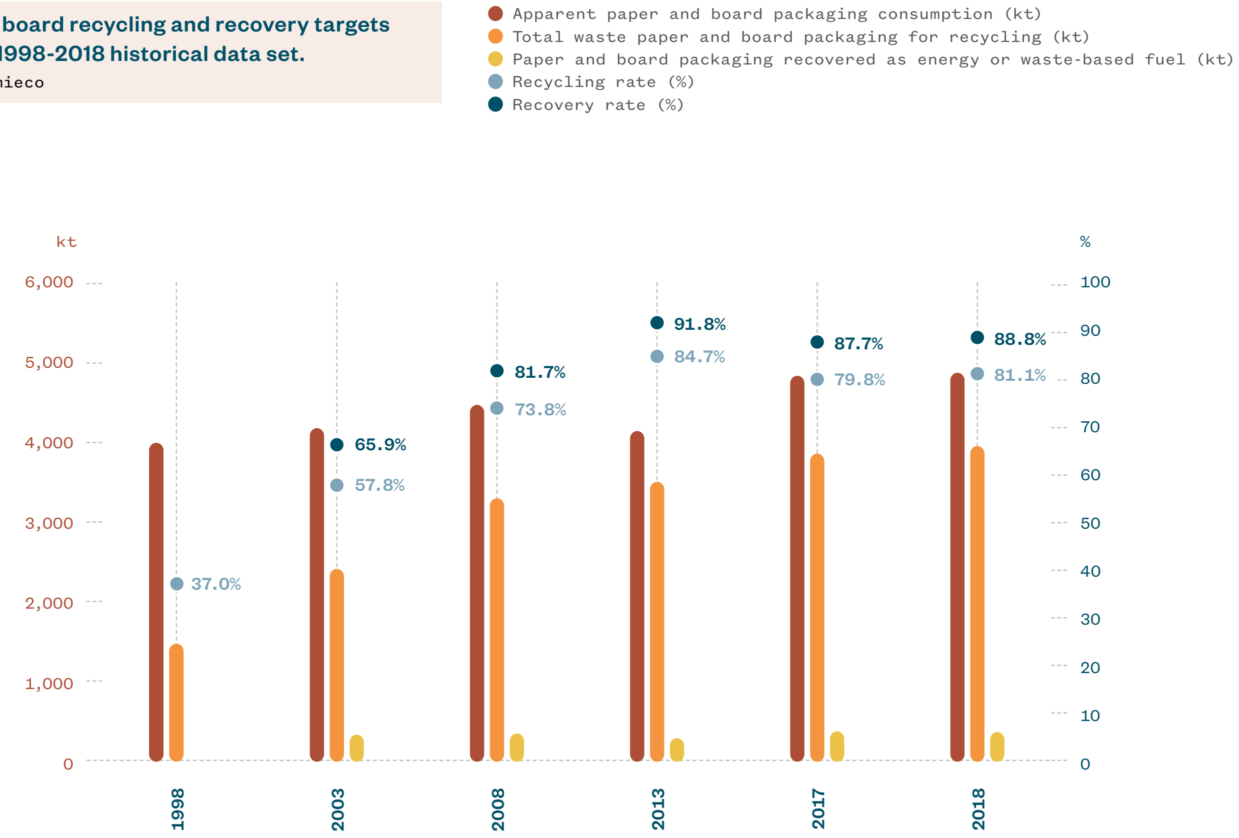
	2018
	%
Recycling	81.1
Energy recovery	7.6
Recovery	**88.8**

Nota: The apparent consumption data for 2013 was adjusted by CONAI, the apparent consumption data for 2014 also includes tubes and rolls subject to the CAC (the CONAI environmental contribution) effective from 1/1/2014

Fig. 12

Paper and board recycling and recovery targets achieved. 1998-2018 historical data set.

Source: Comieco



Notes:
- Energy recovery before 2003 only monitored for the amounts managed under the agreements. Overall data not available.
- The apparent consumption data for 2013 was adjusted by CONAI, the apparent consumption data for 2014 also includes tubes and rolls subject to the CAC (the conai environmental contribution) effective from 1/1/2014.

European recycling targets achieved and to be achieved

European Directive	Directive 94/62/EC	Directive 2004/12/CE	Directive 2018/852/CE	Directive 2018/852/CE
Target compliance deadline	June 30, 2001	December 31, 2008	December 31, 2025	December 31, 2030
EU paper and board packaging recycling targets	General (all materials) 25% to 45% with a minimum 15% threshold for each material	60%	75%	85%
Paper and board packaging recycling results in Italy	50.7%	62.4% met and exceeded as early as in 2004 (4 years ahead of time)	80.4% met and exceeded as early as in 2009 (16 years ahead of time)	The current recycling rate is 81.1%

Tab. 8

Direct and indirect benefits of managed paper and board recycling. 2018 data.

Source: CONAI data processed by Studio Fieschi for CONAI

Indicators within the CONAI boundaries (managed by Comieco)

Indicator		**2018**	**Total 2005-2018**
Amount of conferred packaging	kt	995	14,187
Fractions for recycling	kt	995	14,187
Fractions for energy recovery	kt	0	0
Fractions for other forms of disposal	kt	0	0

Environmental benefits

Indicator		**2018**	**Total 2005-2018**
Secondary raw material obtained from recycling	kt	995	14,187
Electric power produced from energy recovery	TJ	0	0
Thermal power produced from energy recovery	TJ	0	0
Primary energy saving through recycling	TJ	12,564	190,528
CO_2 production avoided through recycling	kt CO_2 eq	904	12,877
CO_2 production avoided through energy recovery	kt CO_2 eq	0	0

Economic value

Indicator			**2018**	**Total 2005-2018**
Direct benefits	Economic value of the secondary raw material obtained from recycling	million EUR	30	794
	Economic value of the energy obtained from recycling	million EUR	0	0
Indirect benefits	Economic value of the avoided CO_2 production	million EUR	27	385
Overall benefits		million EUR	**57**	**1,179**

The benefits generated through the recycling of managed packaging (just less than 1 million tons) in 2018 are worth an estimated 57 million EUR. The 2005-2018 aggregate data points out to more than 1 billion EUR benefits, calculated as the value of the raw material and of the avoided emissions.

Tab. 9

Paper and board production in 2018.
Source: ISTAT data processed by Assocarta and Assocarta estimate

		Production (A)	Import (B)	Export (C)	Apparent Cosumption (A+B-C)
Paper and board packaging (Paper, board, and cardboard)	t	4,613,623	3,358,507	1,512,380	6,459,750
Δ 2017/2018	%	2.6	6.8	-2.7	6.1
Other paper and board (Paper for graphic and hygienic-sanitary use)	t	4,467,369	2,134,500	2,368,760	4,233,109
Δ 2017/2018	%	-2.4	-0.3	-5.5	0.5
Total paper production	t	9,080,992	5,493,007	3,881,140	10,692,859
Δ 2017/2018	%	0.1	3.9	-4.4	3.8

The increase in the production of paper and board packaging is historically greater than the increase of other types of paper while offsetting its decline.

Tab. 10

Consumption, imports, exports of paper for recycling and apparent collection*. 2017-2018 variations.
Source: Assocarta data processed by Comieco

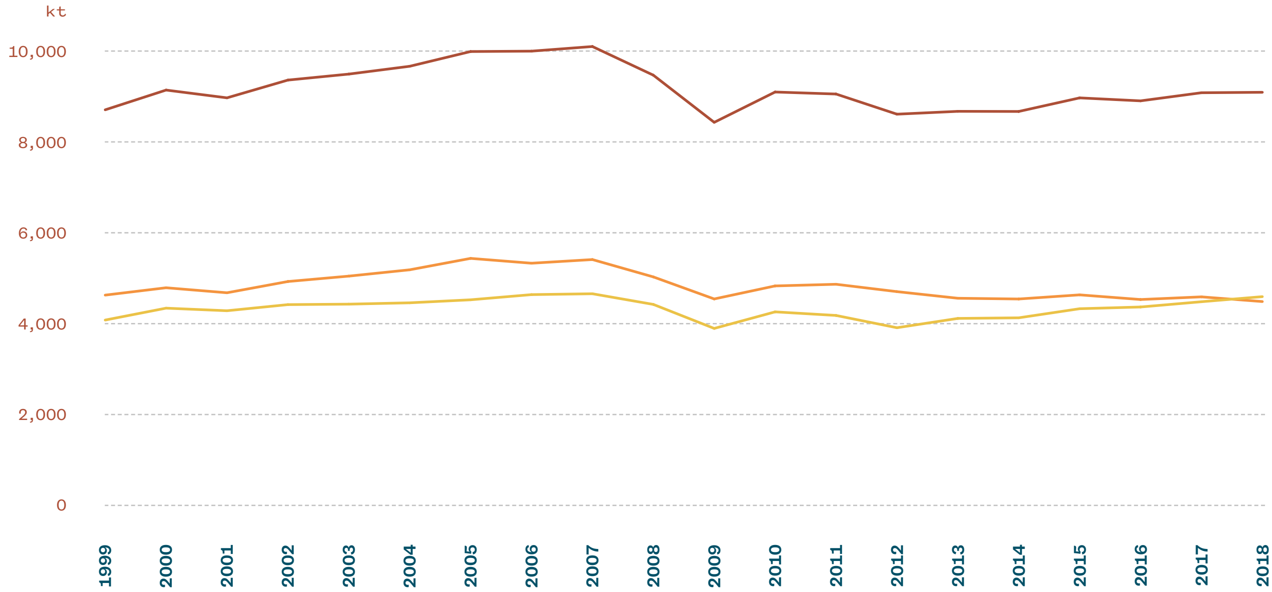
* Apparent collection: Consumption - Imports + Exports

		Import (B)	Export (C)	Cosumption (C)	Apparent collection (B+C-A)
2017	kt	365	1,869	4,994	6,498
2018	kt	401	1,903	5,144	6,646
Δ 2017 / 2018	%	9,9%	1.8%	3.0%	2.3%

Fig. 13

**Paper and board packaging.
1999-2018 historical data set.**

Source: ISTAT data processed by Assocarta and Assocarta estimates



Paper production		1999	2003	2008	2013	2017	2018	1999 / 2018 Δ t	1999 / 2018 Δ %	2017 / 2018 Δ t	2017 / 2018 Δ %
Packaging	kt	4,071	4,440	4,434	4,109	4,496	4,614	543	13.3	118	2.6
Other paper and board	kt	4,615	5,051	5,033	4,543	4,575	4,467	-147	-3.2	-108	-2.4
Total paper production	kt	**8,686**	**9,491**	**9,467**	**8,652**	**9,071**	**9,081**	**395**	**4.6**	**10**	**0.1**

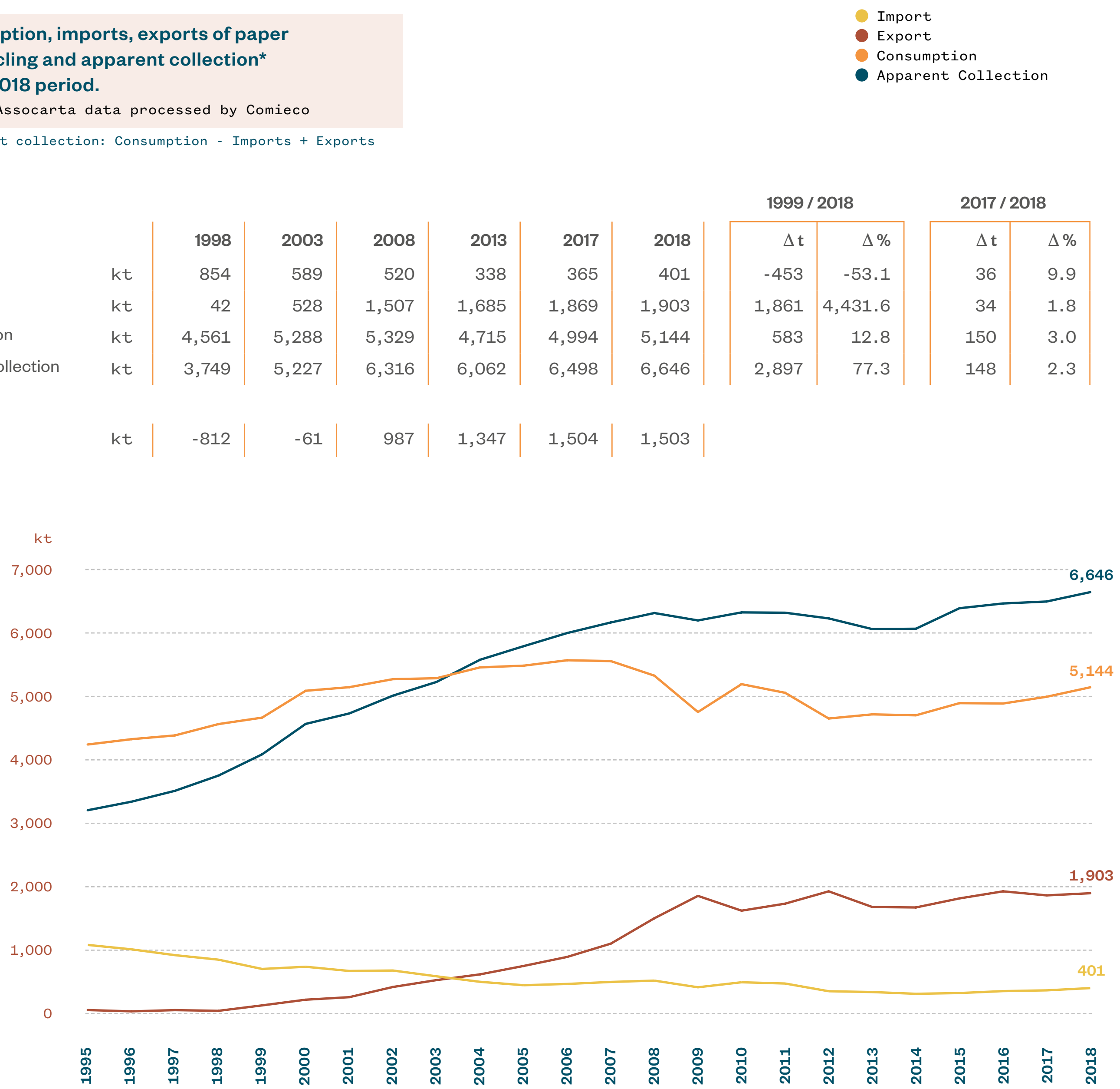
Fig. 14

Consumption, imports, exports of paper for recycling and apparent collection* - 1995-2018 period.

Source: Assocarta data processed by Comieco

(*) Apparent collection: Consumption - Imports + Exports

		1998	2003	2008	2013	2017	2018	1999 / 2018 Δt	1999 / 2018 Δ%	2017 / 2018 Δt	2017 / 2018 Δ%
Imports	kt	854	589	520	338	365	401	-453	-53.1	36	9.9
Exports	kt	42	528	1,507	1,685	1,869	1,903	1,861	4,431.6	34	1.8
Consumption	kt	4,561	5,288	5,329	4,715	4,994	5,144	583	12.8	150	3.0
Apparent collection	kt	3,749	5,227	6,316	6,062	6,498	6,646	2,897	77.3	148	2.3
Net exports	kt	-812	-61	987	1,347	1,504	1,503				

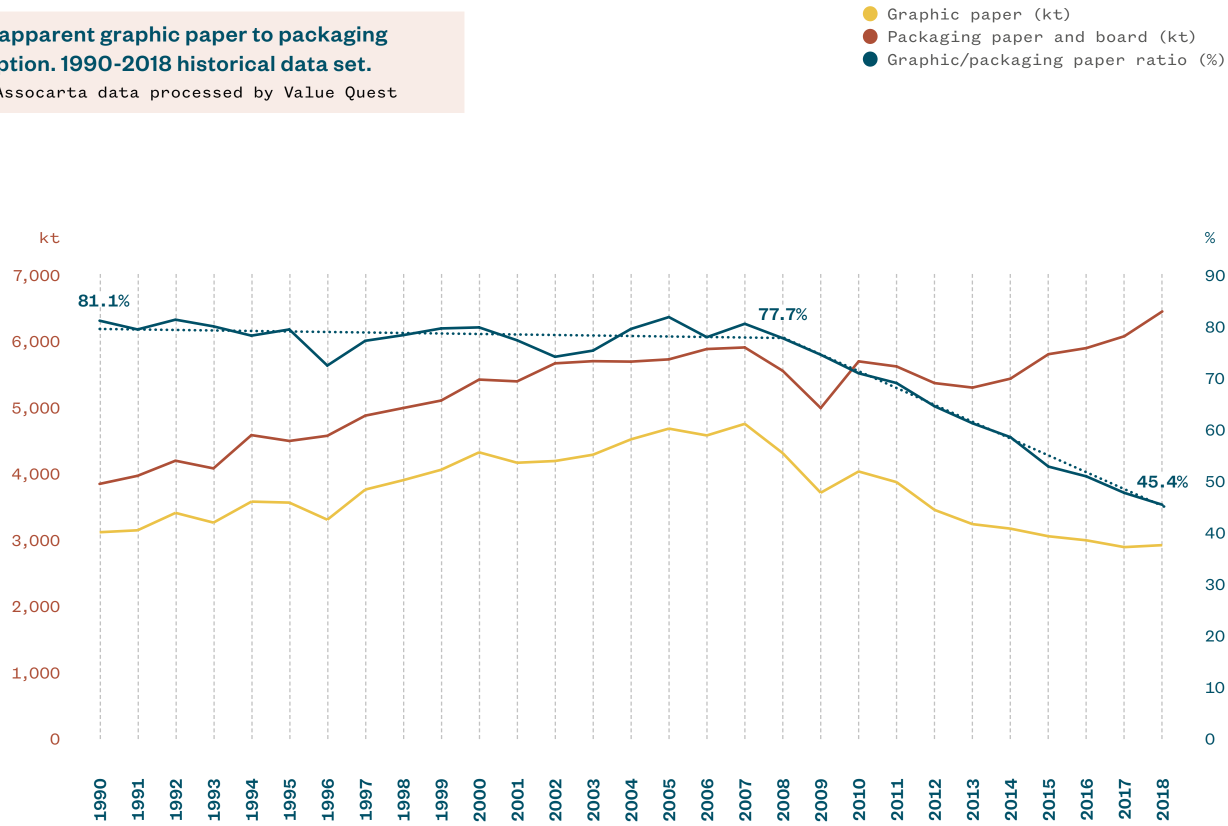


The domestic consumption of paper for recycling continued to increase to more than 5 million tons. The net export balance is confirmed at above 1.5 million tons.

Fig. 15

Ratio of apparent graphic paper to packaging consumption. 1990-2018 historical data set.

Source: Assocarta data processed by Value Quest

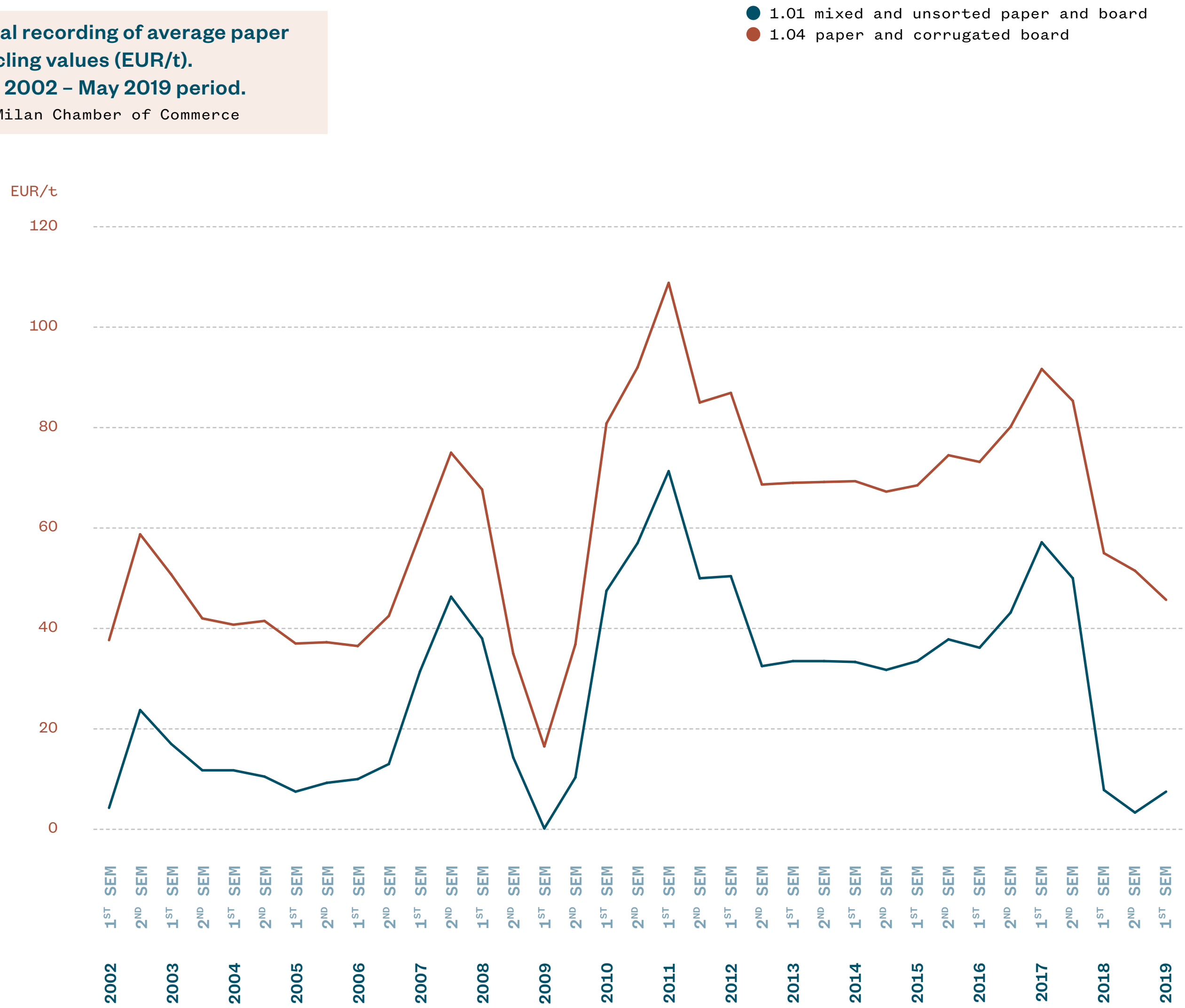


The ratio of graphic paper consumption to packaging paper consumption was gradually reversed over time. This phenomenon emerged in 2009 and developed for graphic paper in particular, until values fell below the 1990 threshold. The different composition of the consumption mix also brings about a significant change of the "quality" of the collected materials and of subsequent issues connected with the processing of paper for recycling.

Fig. 16

Periodical recording of average paper for recycling values (EUR/t). January 2002 – May 2019 period.

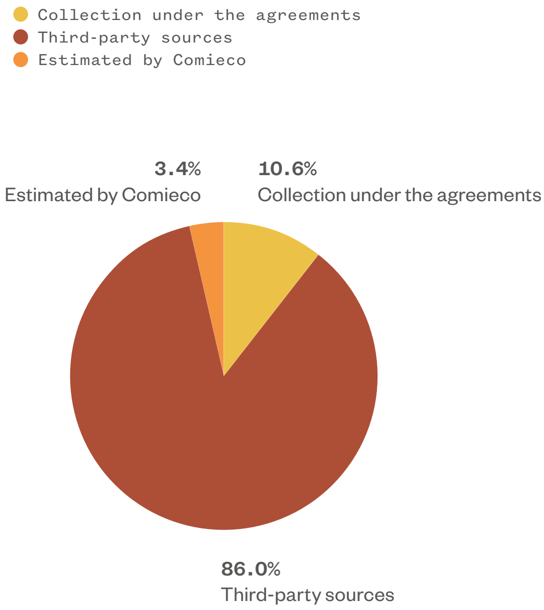
Source: Milan Chamber of Commerce



Note on the method

The processing method adopted for data on national paper and board collection is the same as in the previous years. Some of the 2017 collection data is updated, particularly for the regions of Piedmont, Lombardy, Molise, and Calabria. The related data (total area and national data, per-capita data, etc.) is updated accordingly.
Data processed by Entities and/or organizations in charge of the monitoring or management of waste flows (ISPRA, Regions, Agencies, Provinces and Work Groups, ANCI, Cities, operators, plants, etc.) was mainly used to determine separate paper and board collection levels.
The data thus acquired is overlapped and compared to the data available to Comieco within the framework of its activities (management of the agreements) to ensure consistency and, if necessary, to carry out further focused reviews. Processing is made at province level but, in specific cases, a more in-depth analysis is performed (e.g. Cities) for more punctual assessment.
Whenever "official" data is not available, Comieco estimates the provincial collection level starting from its own data base (data on collection by the parties under the agreements). Estimates consider separate paper and board collection as being actively in place across the national territory. As to 2018 evaluations, constituting the object of this Report, 86% of collection data comes from third-party sources, 10.6% refers to the amounts managed directly by the Consortium, or notified by the parties to the agreements as provided for by the Technical Annex (without any other sources), and 3.4% is based on estimated amounts.

Sources and method.
Source: Comieco



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Comieco
National Consortium for Recovery and Recycling of Paper and Board Packaging

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