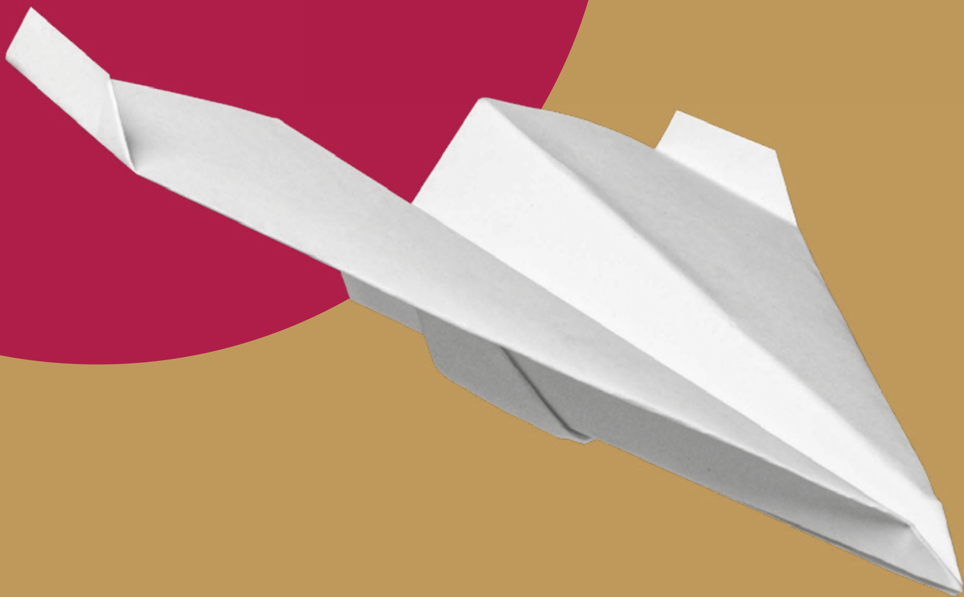
26th REPORT

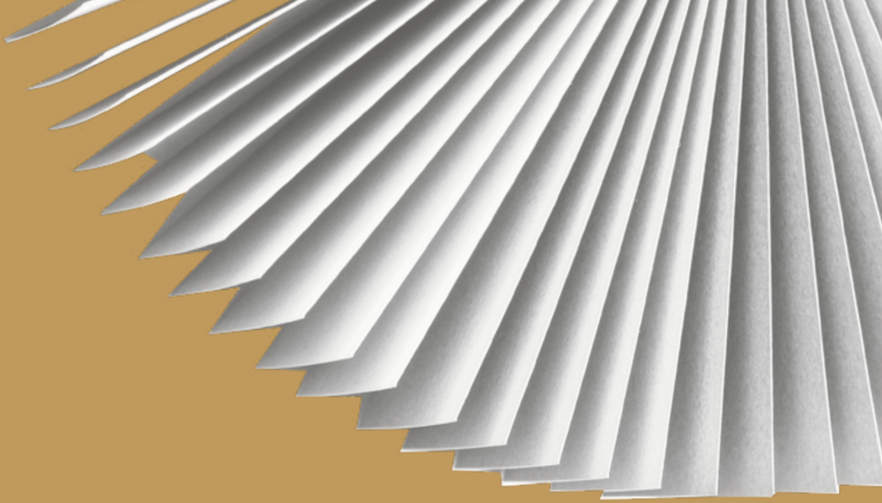
Collection, Recycling, and Recovery of Paper and Board

Data for the year
2020

July 2021



comieco
Consorzio Nazionale Recupero e Riciclo
degli Imballaggi a base Cellulosica



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 Thousands of tons

ab Inhabitants

kg Kilograms

TJ Terajoule

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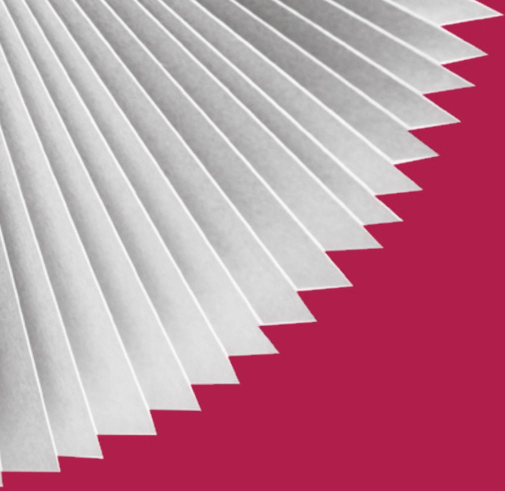

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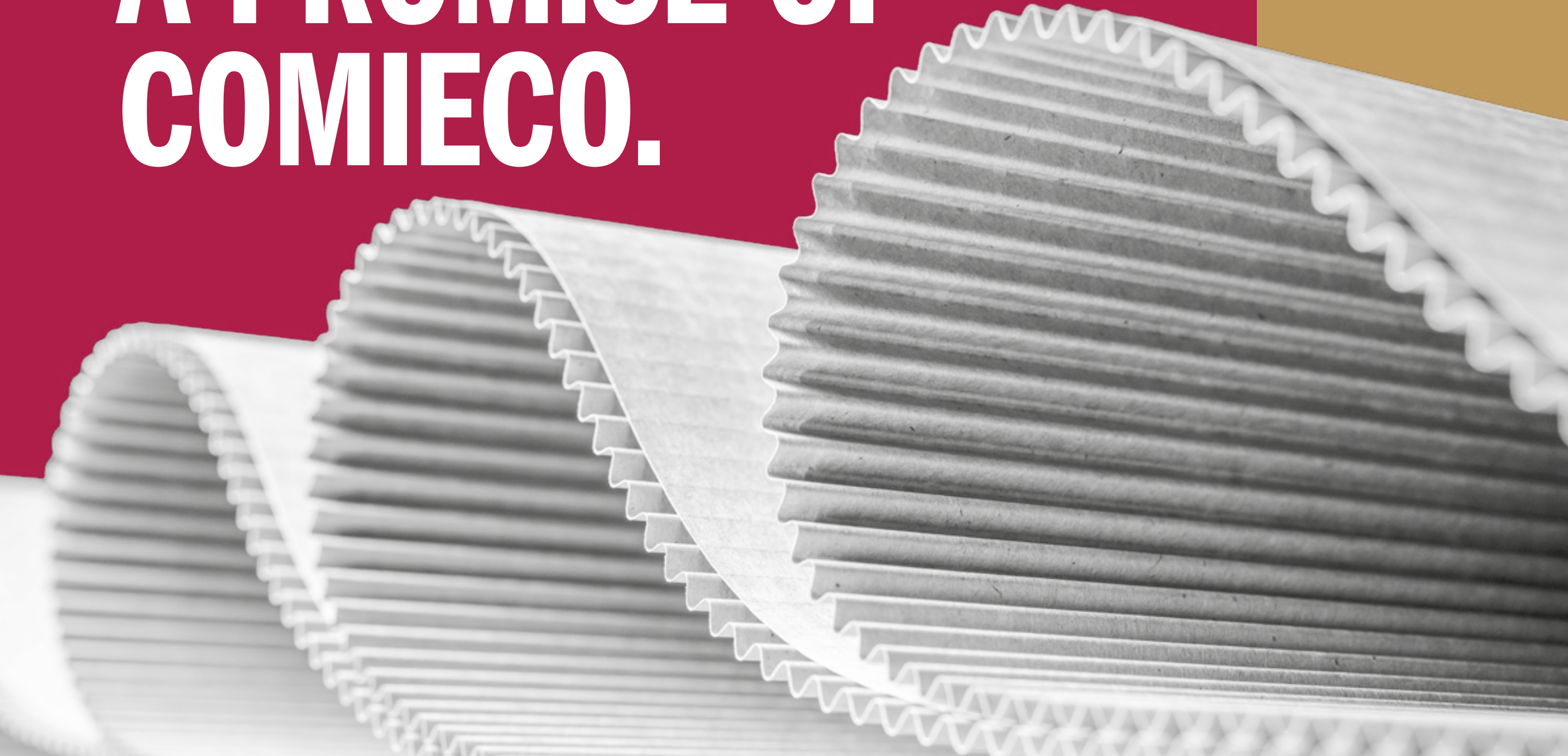
PAPER IS RECYCLED AND COMES BACK TO LIFE.

A PROMISE OF COMIECO.



PREFACE
AMELIO CECCHINI
PAST PRESIDENT

June 2021 sees the end of my mandate as President, a "short-term" office that I had the honor and the onus to cover alongside a cohesive and efficient team, coping together with three years packed with novelties and changes. We started back in 2018 with a new statute and a new composition of the Board of Directors, and lived through China's block of imports that brought about structural changes on the paper for recycling market and the acceleration of the demand for secondary raw materials, which still persists.
Comieco first took upon itself the costs due to the market downturn, then benefited from the higher revenues that were promptly "returned" to the pipeline with the reduction by half of the basic CONAI Environmental Contribution for paper and board packaging effective from July 2021. Notwithstanding this, we continued to ensure the performance of all activities and the recycling of paper and board. An important part of our activity in the past three years included the implementation, still under way, of the new IT system, which lays the foundation for a general improvement of the management process.

It also deserves mentioning that approximately half of the mandate was affected by the global Covid-19 pandemic that, however, brought to the surface the pride and the determination that are part of our Italian DNA, particularly at difficult times. This is shown by the fifth ANCI-CONAI Agreement, which came, and will stay, in force until 2024.
Paper was also the first material to define the new Technical Annex: this is a success, in consideration of the assumptions; the continuing national and local operations were also a success. With the new ANCI-CONAI agreement in place since May 1, 2020, we can now take stock of the first eight months of implementation of the new Technical Annex, which introduced a number of novelties and provided for a significant increase of considerations.

A review of the results contained in this 26th annual report highlights that almost 3.5 million tons of paper and board were sorted in 2020 globally, with a "loss" of approximately 22thousand tons vs. 2019, as well as an increase of more than 34thousand tons in the South as an effect of the engagement of Administrations and of the resources invested by the Consortium over time.
Over 2.4 million tons of all the paper and board collected separately by the Italian Cities – about 70% – was managed under agreements with Comieco, thus demonstrating the Consortium's ability to get engaged at times of trouble to guarantee separate collection.

"The investment in favor of Cities and operators amounted to more than 150 million EUR".

However, Comieco continues its journey with a focus on future engagements, including on August 23, 2021, which is the deadline for plants to apply for an update of their authorization regime to adapt to the rules provided for by the eagerly awaited End of Waste Decree. This introduces new processes and rules to manage recovery and improve the quality of recovered paper, according to the provisions of the sector's UNI technical norm. It is an important achievement, pursued by the entire paper and board recovery and recycling pipeline, which saw Comieco, Assocarta, and Unirima struggle and commit to a dialogue and to working with the reference institutional entities – the Ministry of Ecological Transition and ISPRA.

Also with respect to the future, it is worth mentioning Italy's great opportunity to access the economic resources allocated to Next Generation EU; the paper pipeline is ready to provide its skills and potentials to the Country in terms of investments and technologies, in order to develop the circular economy and promote the energy transition according to the guidelines of the National Recovery and Resilience Plan that was recently submitted to the European Commission.

Several parts of the Plan identify the business of paper – a bio-material par excellence – as one of the main sectors for the implementation of "beacon" projects for the circular economy and for gradual transition to the European Green Deal over time. The paper pipeline worked hard in the past few months to present a few opportunities for modernization and innovation to the Ministry of Ecological Transition, which could be implemented within the framework of the new national strategy for the circular economy outlined in the same Plan. These include: promoting the development of more sustainable products, including packaging, and the subsequent necessary adjustments of production and packaging plants; sharply reduce the waste produced by the paper industry that ends up in landfills by upgrading the plants and improving the capacity to use waste, for example to produce bio-methane, using the available technologies capable to support the hydrogen development process; improve the efficacy of logistic and waste tracking systems through the significant investments in digitalization provided for by the Plan.

What can we expect for the future, then?
That the economy becomes more and more circular, that the market shifts increasingly towards the use of recycled products and tests their application in new domains including, for example, polylaminates with a prevalence of paper, favored by a restored balance between demand and supply – albeit with predictable price volatility. That, in full transition to the European Green New Deal, the foundations are laid to start a new phase for collection, treatment, and industrial production, possibly improving infrastructures in southern Italy.

Data for the first months of 2021 points out to an increase of collection compared to expectations and, particularly, to constantly high recovered-paper values as a consequence of sustained industrial demand.

"Our country is proud to rank among the first in Europe by recycled paper and board volumes and by packaging recycling rate, now settled at 87.3%, which anticipates and surpasses the achievement of the European Community's targets for 2030".

All the assumptions are in place, let's go on!

EXECUTIVE SUMMARY

CARLO MONTALBETTI
GENERAL MANAGER, COMIECO

2020, a year that also impacted on separate collection. As in all Reports on the collection, recycling, and recovery of paper and board in Italy, in this 26th edition Comieco reviews and discusses the consolidated results for the previous year. In this case, however, it is worth outlining the unique historical environment in which we live. The year 2020 will be remembered as, among other things, the year of e-commerce and delivery. Due to several restrictions enforced as a consequence of the global pandemic, in fact, the number of online purchases soared (+45% vs. 2019), with an obvious impact on packaging collection and recycling.The health emergency supported the increase of e-commerce also in small Italian enterprises, which were encouraged to resort to the digital option more often than they used to and to appreciate its potentials. Over 1 million parcels circulate in Italy every day, solely due to e-commerce, a significant packaging flow that offers an opportunity to the recycling industry. Food expenses recorded the highest growth rates, and the habit to buy online persisted also after the lockdown (home delivery of meals, purchase of fresh or packaged food), recording a 70% increase vs. 2019. Growth in the food and grocery segment changed the segmentation of parcel packaging, with the introduction of new types, and the relevant market shares.

Packaging recycling: targets achieved and surpassed. We can already say we have achieved and surpassed the 2030 recycling targets set by the European directive for paper and board packaging. The 2020 figure – above 87% - is mainly due to a decline of apparent consumption, but consolidates the targets set by the EU and achieved several years ahead of time. The pipeline has the honor and the onus to consolidate these numbers in future years.

The South drives the improvement of Italy. The 26th Report highlights the positive result of the South vs. the other parts of the Country. In this respect a clear change of speed was observed in Molise (+8.2%), Calabria (+7.2%), and Basilicata (6.7%).

In short, the South continues to grow with a per-capita yield above 43 kg/inhabitant and stands out as a single positive macro-area within the country with +34thousand tons.

“The year 2020 confirmed that separate paper and board collection is by now a consolidated custom for all citizens”.

Municipal paper and board collection in Italy is stable around 3.5 million tons, with an average per-capita yield of 57.2 kg/inhabitant-year. These numbers represent an improvement vs. the estimates of June 2020, which pointed out to a much sharper decline of more than 200thousand tons.While the South continues to grow (+4%), the North (-1.8%) and the Centre (-2.8%) record a decrease of more than 56thousand tons, equal to the annual collection of the whole region of Umbria, as a direct effect of pandemic-related restrictions, especially for business collection, as well as of the lack of tourist flows.

The Cities under the agreements, the system, and the economy. As a pipeline Consortium within the CONAI System, Comieco ensures paper and board recycling and supports the development of separate collection across Italy with approximately 2 billion EUR granted to the Cities under the agreements (150 million EUR in 2020 alone) vs. almost 36 million tons managed. IN 1998 paper and board collection in Italy amounted to 1 million tons, i.e. 17 kg/inhabitant, and the industry was forced to import high amounts to obtain secondary raw materials for recycling. Over just more than 20 years, municipal collection increased more than threefold, and today our Country is an exporter of paper for recycling in all respects. The growth of household collection volumes is clearly a factor for the increase of the amounts managed under the agreements. It is worth focusing, in particular, on the trend of the paper for recycling market. The 2019 trend continued in the first quarter of 2020, with the lowest quotations ever. However, starting from April, the reduced availability of raw materials caused a reversal of the market trend, with fast growing prices particularly in the second half of the year and, again, in the early months of 2021.

The effects of this trend impact on the volumes the Consortium was asked to manage, particularly derived from household collection, through the windows provided for by the Technical Annex and the extraordinary one that followed the signing of the new agreement.

"In 2020, with 946 agreements in force, Comieco took charge of the recycling of over 2.4 million tons (70% of municipal separate collection), 400thousand tons up vs. 2019, particularly in the Centre and North".

This confirms the subsidiary role of the Consortium with respect to the market in ensuring that the collected material is picked up from the Cities across the national territory, even when the market is not too profitable. ISPRA 2019 data and local preliminary data for 2020 point out to an overall decline of urban waste production – over one million tons – particularly with respect to mixed waste – 600thousand tons. Separate collection is thus strengthened and is estimated to reach 62%. Paper and board drive this further improvement.

How much is separate collection worth?
Over 150 million EUR: this is the overall amount of the considerations paid by Comieco in 2020 for the management of just more than 2.4 million tons of paper and board from municipal collection under the agreements. This amount includes 146.2 million EUR for packaging and 4.5 million EUR for graphic paper. This investment is significantly growing (+20 million EUR vs. 2019), with new volumes that the Consortium was asked to take charge of and an increase of considerations for packaging introduced on May 1, 2020 with the enforcement of the fifth cycle of the ANCI-CONAI agreement. It is also worth mentioning the investment for treatment services provided by the Parties to the Agreements, which exceeded 45 million EUR in 2020. These numbers should not stop us doing better. An analysis of urban waste production data and of paper and board sorting rates shows there is room for further growth. The average rate of paper and board sorting from urban waste is still below 12%. Each percent point of this indicator is worth almost 300thousand tons.

An increase to 14% means surpassing 4 million tons of collection per year, and a per-capita yield of 70 kg/inhabitants vs. 57 now. In a very dynamic environment (trend of the paper for recycling market, renewal of the ANCI-CONAI Framework Agreement), the flows of materials for recycling were managed in compliance with the commitments made with AGCM as early as 10 years ago. The pro-quota collection allocation and auction system in place since July 2011 ensures that the material is allocated to paper mills, recovery plants, and waste dealers.

Higher quality in separate collection – the future challenge. Quantity is not the only important factor: quality is also crucial for the paper and board recycling pipeline. An efficient recycling system could not exist without painstaking conferment by citizens and other users, a timely and careful collection service by the operator or the City, and a monitoring system. What happens at this early stage can jeopardize or simplify subsequent ones. More specifically with respect to "household collection" (the so-called 1.01 + 1.02), 2020 sees a consolidation of the positive trend that started in 2019: for the second year in a row, the average contaminant rate (2.29%) falls within the parameters provided for the first quality bracket (3%). However, the national figure should be extracted, and the behavior of the individual macro-areas should be observed: while the North continues to grow despite starting from the best national baseline position, the Centre (improving) and the South (declining) remain above the threshold for improved quality specified in the Paper Technical Annex; the focus is on certain metropolitan areas.

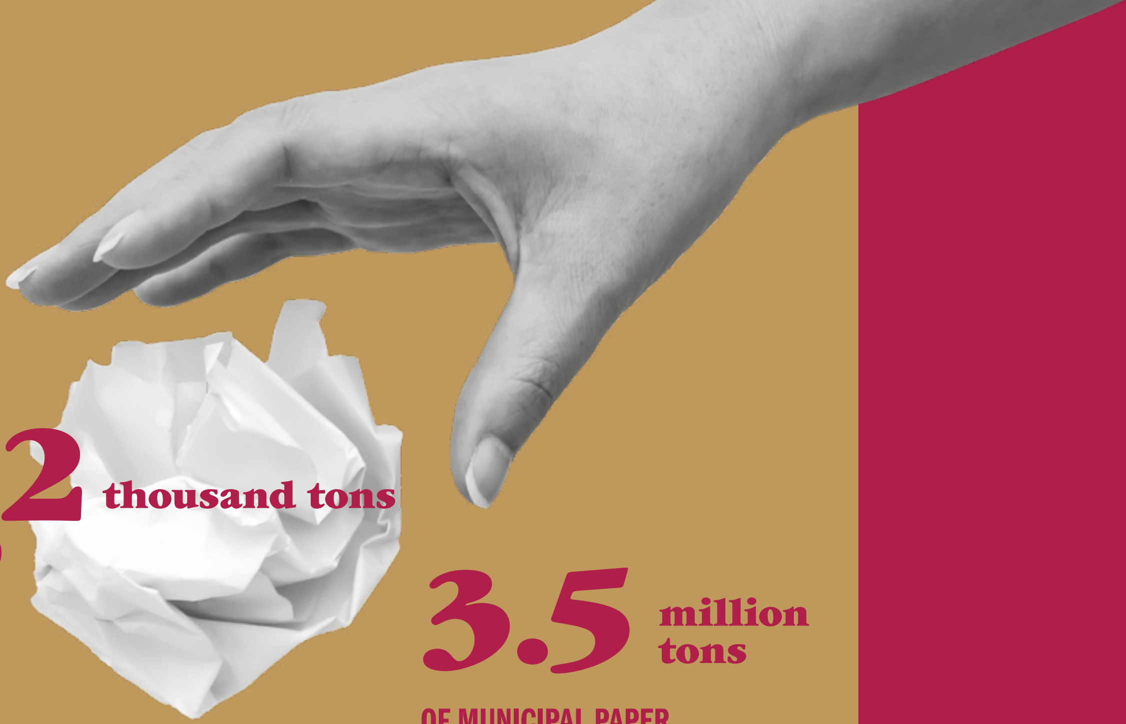
"Comieco is still strongly committed to quality. In 2020, a strict and punctual product testing and auditing plan allowed to monitor all the crucial steps along the pipeline".

The Consortium, alongside sorting operators and paper mills, designed shared procedures to promote compliance with EU harmonized product standards.

The priority of the "quality" factor takes on a different value if we consider that recycled fibers account for approximately 57% of the raw materials used in domestic paper production, and represent a driver for the Italian circular economy. High-quality raw materials ensure reduced waste, process economies, and a direct impact on the quality of end products.

The paper and board sector: a beacon in the NPRR. The paper pipeline never stops and is ready to provide its skills and potentials to the Country, in terms of investments and technologies, to develop the circular economy and to promote energy transition according to the guidelines of the National Plan for Recovery and Resilience that was recently submitted to the European Commission: paper, the bio-material par excellence, is in fact defined in several parts of the NPRR as one of the "beacon" sectors for the circular economy.

In this respect, all the players in the paper pipeline cooperated to present focused activities to the Ministry of Ecological Transition; these include contributing to the development of even more sustainable products (in particular, packaging); promoting production and packaging plant adjustments; reducing the rate of waste produced by the paper industry that ends up in landfills, and improving the efficacy of logistic and waste paper treatment systems through the significant investments in digitalization provided for by the Plan.



-22 thousand tons

VS 2019

3.5 million tons

OF MUNICIPAL PAPER AND BOARD COLLECTION

SEPARATE PAPER AND BOARD COLLECTION IN ITALY: THE STATE OF THE ART

2020: PAPER AND BOARD COLLECTION CONTINUES DESPITE THE IMPACT OF THE PANDEMIC

With just more than 22thousand tons less vs. 2019, municipal separate paper and board collection in Italy falls just below the 3.5 million tons threshold in 2020, with a slight 0.6% decrease vs. the past year as a direct effect of pandemic-related restrictions. Average national per-capita collection declined from 57.5 kg in 2019 to 57.2 kg last year.

"The effect of the lockdown of activities can be seen in the trend recorded for the three macro-areas".

The North suffered a 1.8% decline (i.e. 33thousand tons), while the decline in the Centre is estimated at 23thousand tons (-2.8%). Part of this reduction is offset by the South, where collection improved by 34thousand tons with a growth rate at +4.0% vs. 2019. These numbers have a dual interpretation. First, the decline is less severe (-3%) than estimated twelve years ago, just after the hard lockdown period in March and April.

Second, growth decreased by half, particularly in the South, vs. the average trend recorded in the past few years. In short, while a decline was expected, its intensity was lower than expected and it did not stop development in high-potential regions.

There are a few significant aspects of growth in the South. In 2020 collection surpassed 900thousand tons for the first time, and shifted its focus even more sharply towards areas that are less close to the usage ones.

82.1
kg/ab

REGION WITH BEST PER-CAPITA FIGURE EMILIA-ROMAGNA

This provides important hints with respect to logistic requirements, now and for the future, to ensure the recycling of household collection. However, the per-capita figure (43.0 kg/ab-year) remains still below the national average. With 60.0 kg/ab-year, Sardinia ranks first among the southern regions and surpasses the average national figure (57.2), alongside Abruzzo (57.3). Investments in southern regions, also supported by Comieco throughout 2019, with the special projects of the Plan for the South and the equipment Tenders, confirm their efficacy and help all the southern regions improve their collection yields. In terms of volumes, growth in the South was driven by Campania (+11thousand tons), Calabria (+6thousand tons), and Sicily (+5thousand tons). An analysis of figures in terms of performance improvement shows that Molise ranks first (+8.2%), followed by Calabria (+7.2%) and Basilicata (+6.7%).

"In a future perspective, larger regions – Campania, Puglia and, particularly, Sicily – will have to improve in the next few years to impact on domestic growth".

The Centre reverts to the level of 2018. The 23thousand ton decrease recorded (-2.8%) offsets growth in the previous two years. In a future perspective there is room for growth in this case too. Declines are recorded for Tuscany in particular (-14thousand tons, or two-thirds of volumes) that, however, remains the reference region for the area. As better detailed in the city focus, sectors like restaurants, textiles and, most of all, tourism, have the greatest impact. Latium remains stable (-0.9%), also thanks to the stability of the data for Rome despite the lack of tourists and collection service difficulties.

The North lost over 33thousand tons vs. 2019 (-1,8%); Piedmont and Trentino-Alto Adige recorded a moderate decline in percent terms, which should be seen as one of the not too significant effects of the lockdown. In an overall worsening picture, positive signs come from Liguria (+2.7%) and Vallée d'Aoste (+1.2%). The sharpest decline is recorded in Veneto

(-3.8%) and Emilia-Romagna (-3.7%), which continues to rank first at national level, with 82.1 kg/ab-year of per-capita collection, despite a decrease by over 14 thousand tons.

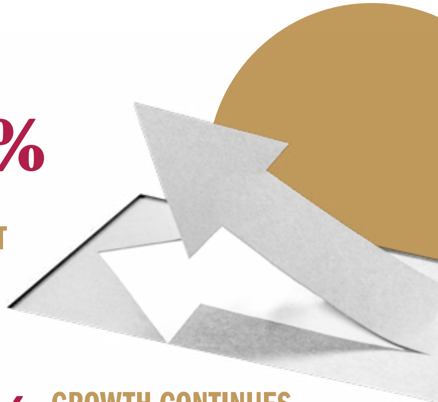
On a broader level, estimates on the available data point out to a significant decline of urban waste production, over 3%, equal to over 1million tons less. In this environment, the attitude and commitment of Italian households towards separate collection remained unabated. In fact, while total separate collection is also declining (-2.5%), the sharpest decrease concerns mixed waste flows (-5.1%, or over 600thousand tons). The combined effect of this trend is a further growth of the average national overall separate collection level, which is estimated to have reached 62% in 2020, almost one percent point above 2019. Considering the lesser percent variation vs. all the other fractions (-2.9%), paper and board (-0.6%) confirm their role as drivers in this particular respect.

Considering again the per-capita paper and board collection performance, Emilia Romagna ranks first (82.1 kg/ab), followed by Vallée d'Aoste and Tuscany at the same level (774 kg/ab), and by Trentino-Alto Adige (75.4). These four regions are above the symbolic threshold of 70 kg/ab. In the South, Sardinia (60 kg/ab) and Abruzzo (57.3) remain the models to follow.

Other information comes from the ISPRA 2019 data (the latest available upon the issuing of this report). In 2019, 8 regions (over 25 million Italians) had a separate collection rate above 65%, and 3 - Vallée d'Aoste, Piedmont e Tuscany – had already surpassed 60%. These regions show that results can indeed be achieved with efficient services and facilities, and offer a good example for regions that are still lagging behind.

+8.2%

REGION WITH THE SHARPEST INCREASE MOLISE



+4.0% **GROWTH CONTINUES IN THE SOUTH**

TABLE 1
MUNICIPAL SEPARATE PAPER AND BOARD COLLECTION BY REGIONS. YEARS 2019-2020.

SOURCE: COMIECO

"In this picture, paper and board account for 19% of total separate collections and for just less than 12% of total urban waste".

Each point of this indicator is worth 300thousand tons of new collection. A target of 14% would drive separate collection to over 4 million tons and per-capita collection to 70kg. These results are possible, as shown by reference regions like Trentino-Alto Adige, which already sorts 14% of paper from urban waste, or Tuscany, which is close to this target (13.7%).

A focus on the current year and on future ones leads to an additional observation. In fact, the decline recorded in 2020 is expected to be offset, and paper and board collection is estimated to reach 3.6 million tons, with the Centre and North switching back to positive and the South getting closer and closer to the other macro-areas.

In 2020 the South confirms the growth trend of the past few years with an increase of 4 percent points vs. 2019, and offsets the decrease in the North with an increase of more than 34thousand tons.

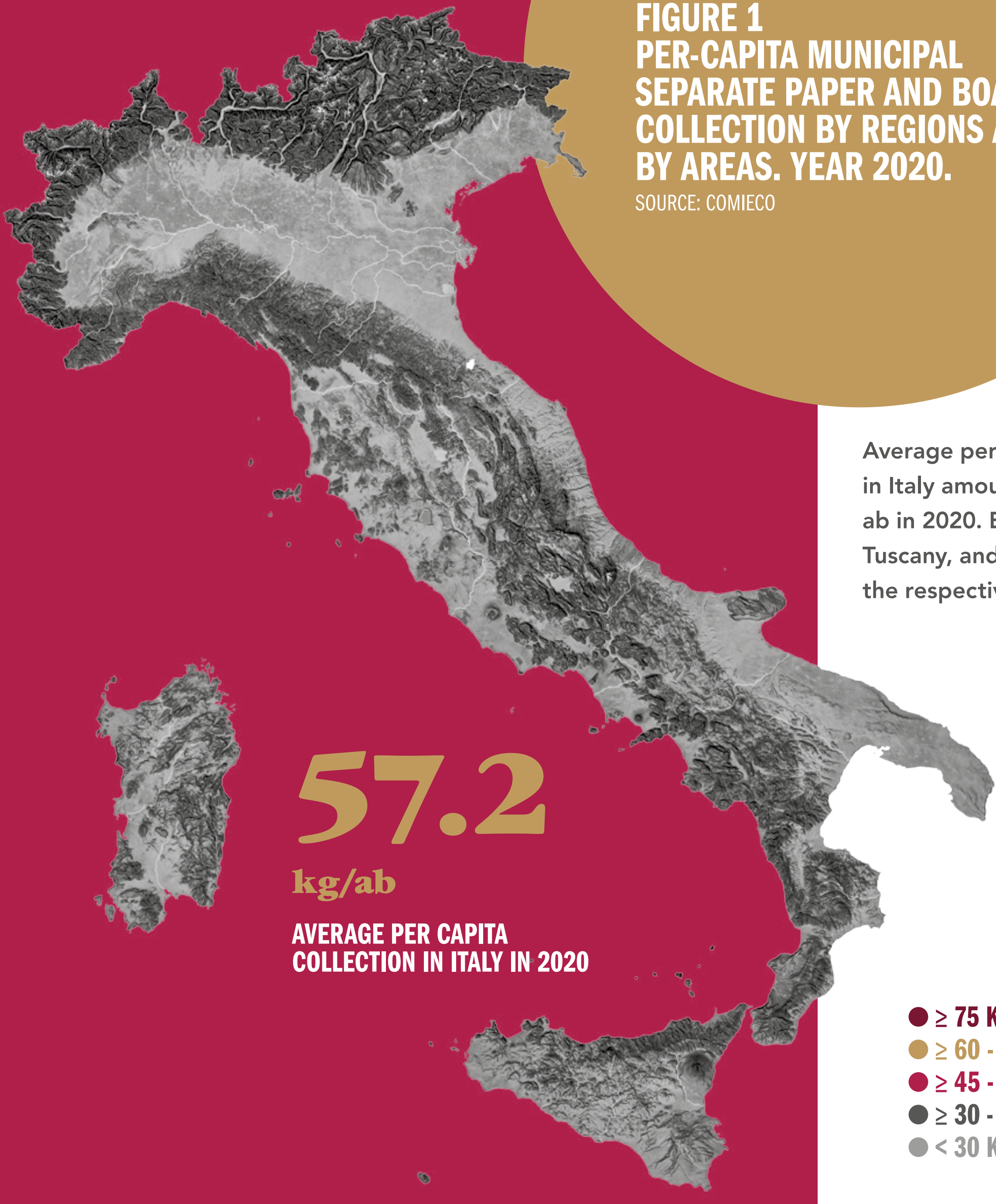
Regions	SC OF PAPER 2019 t	SC OF PAPER 2020 t	Δ 2019/2020 t	Δ 2019/2020 %
Piedmont	289,758	289,247	-511	-0.2
Vallée d'Aoste	9,813	9,931	118	1.2
Lombardy	572,454	563,930	-8,524	-1.5
Trentino-Alto Adige	83,045	82,750	-295	-0.4
Veneto	300,516	289,234	-11,282	-3.8
Friuli-Venezia Giulia	71,031	70,085	-946	-1.3
Liguria	91,934	94,454	2,521	2.7
Emilia-Romagna	386,425	372,104	-14,321	-3.7
North	**1,804,975**	**1,771,735**	**-33,240**	**-1.8**
Tuscany	310,326	296,151	-14,175	-4.6
Umbria	59,086	56,740	-2,346	-4.0
Marche	104,000	100,496	-3,504	-3.4
Latium	368,305	364,926	-3,379	-0.9
Centre	**841,717**	**818,314**	**-23,403**	**-2.8**
Abruzzo	73,299	76,321	3,022	4.1
Molise	8,117	8,785	668	8.2
Campania	208,135	218,838	10,703	5.1
Puglia	198,752	203,226	4,474	2.3
Basilicata	26,155	27,898	1,743	6.7
Calabria	86,820	93,102	6,281	7.2
Sicily	172,455	177,066	4,611	2.7
Sardinia	96,831	99,717	2,886	3.0
South	**870,563**	**904,952**	**34,390**	**4.0**
Italy	**3,517,255**	**3,495,001**	**-22,254**	**-0.6**

Note: adjusted based on the 2019 data for Liguria, Lombardy, Piedmont, Abruzzo, Molise, Campania, Puglia, Calabria, Sicily , and the relevant Macro-Areas.

FIGURE 1
PER-CAPITA MUNICIPAL SEPARATE PAPER AND BOARD COLLECTION BY REGIONS AND BY AREAS. YEAR 2020.

SOURCE: COMIECO

Average per-capita collection in Italy amounts to 57.2 kg/ab in 2020. Emilia-Romagna, Tuscany, and Sardinia drive the respective areas.



57.2

kg/ab

AVERAGE PER CAPITA COLLECTION IN ITALY IN 2020

- ≥ 75 KG/AB YEAR
- ≥ 60 - < 75 KG/AB YEAR
- ≥ 45 - < 60 KG/AB YEAR
- ≥ 30 - < 45 KG/AB YEAR
- < 30 KG/AB YEAR

NORTH
63.3 kg/ab

EMILIA-ROMAGNA
82.1

VALLÉE D'AOSTE
77.4

TRENTINO-ALTO ADIGE
75.4

PIEDMONT
65.3

LIGURIA
59.7

VENETO
58.6

FRIULI-VENEZIA GIULIA
56.6

LOMBARDY
56.2

CENTRE
67.1 kg/ab

TUSCANY
77.4

MARCHE
63.7

UMBRIA
63.4

LATIUM
61.9

SOUTH
43.2 kg/ab

SARDINIA
60.0

ABRUZZO
57.3

PUGLIA
49.7

BASILICATA
48.4

CALABRIA
47.1

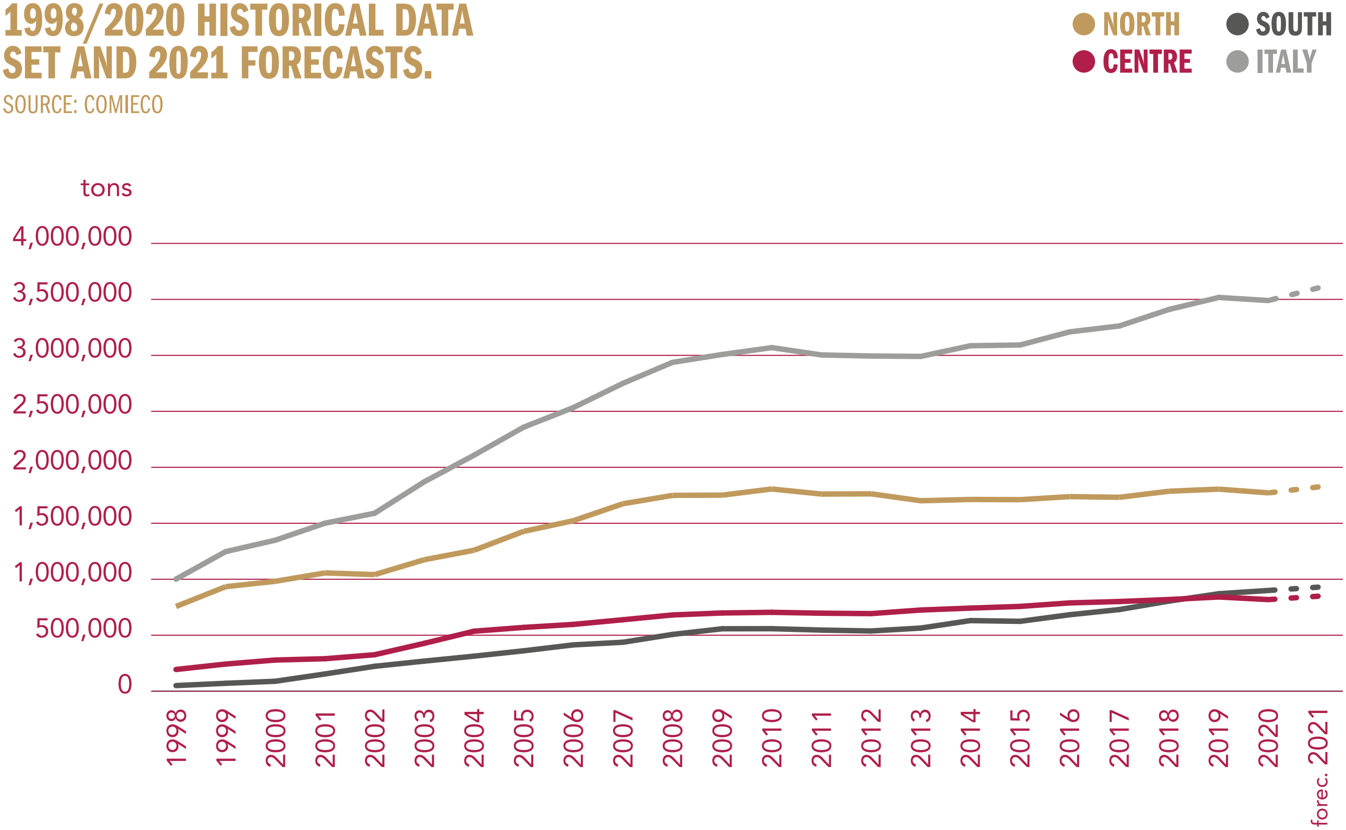
CAMPANIA
37.2

SICILY
34.8

MOLISE
28.0

FIGURE 2
MUNICIPAL SEPARATE PAPER AND BOARD COLLECTION. 1998/2020 HISTORICAL DATA SET AND 2021 FORECASTS.

SOURCE: COMIECO



	1998	2020	2021 forecast	Δ 2020-2021 forecast	Δ 1998-2021 forecast
	t	t	t	t	%
North	756,813	1,771,735	1,824,439	52,703	141%
Centre	193,958	818,314	848,458	30,144	337%
South	50,222	904,952	929,218	24,266	1,750%
Italy	**1,000,993**	**3,495,001**	**3,602,115**	**107,113**	**260%**

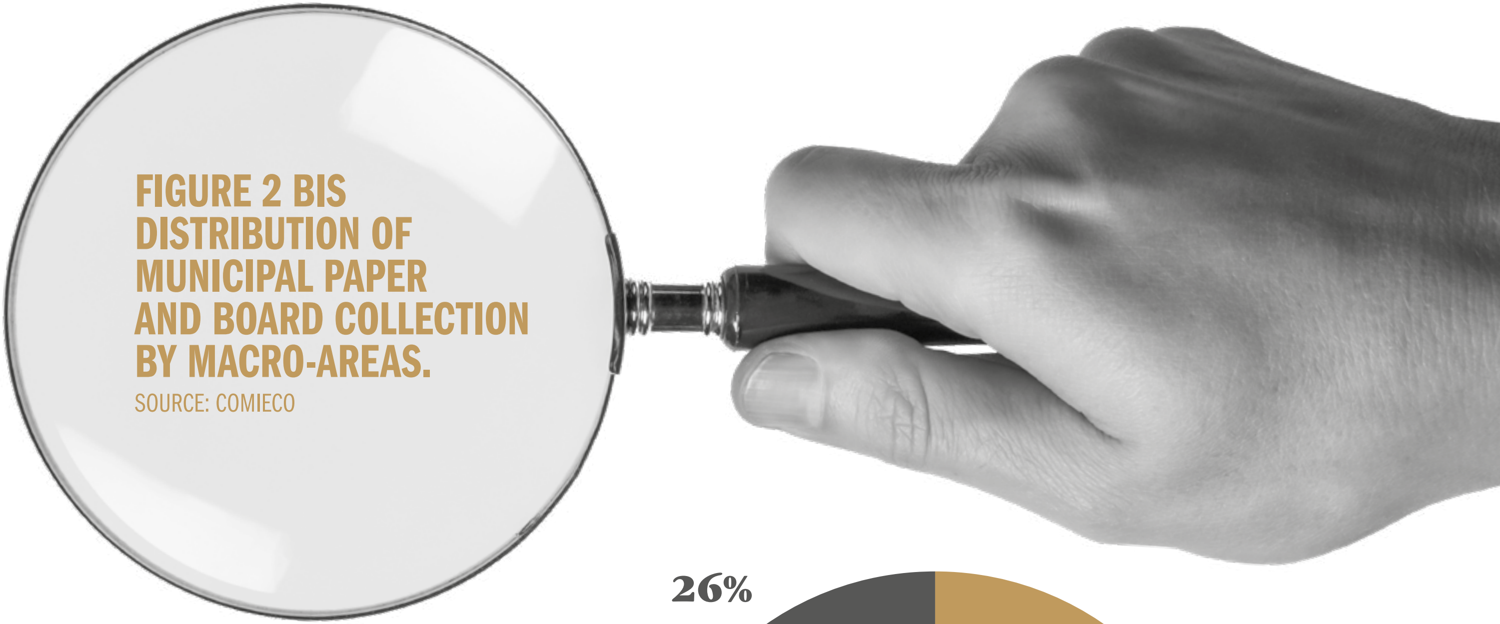
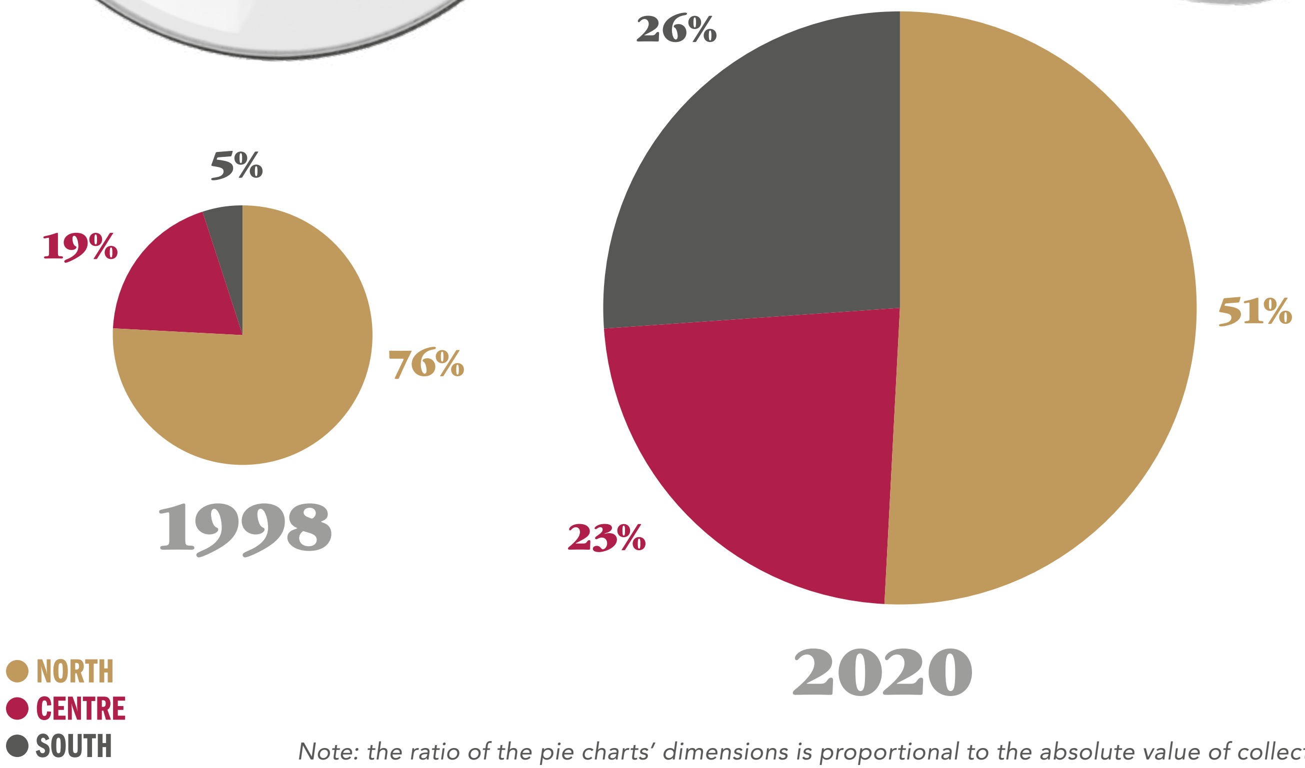


FIGURE 2 BIS DISTRIBUTION OF MUNICIPAL PAPER AND BOARD COLLECTION BY MACRO-AREAS.
SOURCE: COMIECO



Note: the ratio of the pie charts' dimensions is proportional to the absolute value of collection.

TABLE 2
THE RATIO OF SEPARATE PAPER AND BOARD COLLECTION TO TOTAL URBAN WASTE.

SOURCE: ISPRA 2019 DATA PROCESSED BY COMIECO

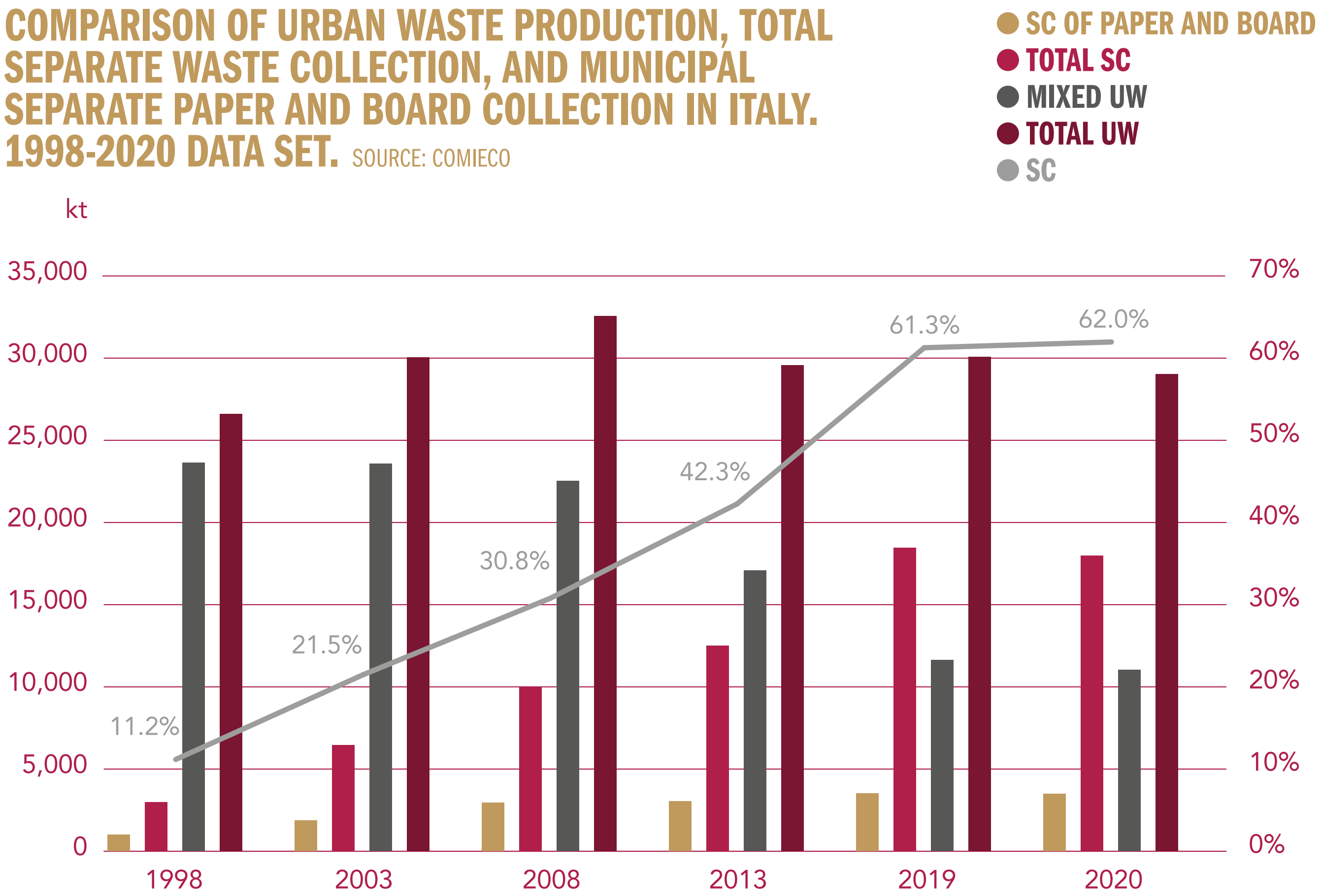
The ratio of paper to urban waste collection and the amount of the remaining waste, alongside the per-capita value, improve understanding of the actual development of the separate collection service. In this table, the Regions and the macro-areas are shown in decreasing order with respect to the ratio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

Regions	Inhabitants	Total UW	Mixed UW	Total SC	Total SC	SC of paper	SC of Paper vs. total UW
	n	kg/ab	kg/ab	kg/ab	%	kg/ab	%
North	27,774,970	518.4	157.6	360.8	69.6%	64.8	**12.5%**
Centre	11,986,958	547.8	229.4	318.4	58.1%	70.4	**12.8%**
South	20,482,711	445.0	219.7	225.3	50.6%	42.9	**9.6%**
Italy	**60,244,639**	**499.3**	**193.0**	**306.3**	**61.3%**	**58.5**	**11.7%**

- <125 KG/AB YEAR
- ≥125-<175 KG/AB YEAR
- ≥175-<225 KG/AB YEAR
- ≥225-<275 KG/AB YEAR
- ≥275 KG/AB YEAR

Regions	Inhabitants	Total UW	Mixed UW	Total SC	Total SC	SC of paper	RD of Paper vs. total UW
	n	kg/ab	kg/ab	kg/ab	%	kg/ab	%
Trentino-Alto Adige	1,074,819	508.6	136.7	371.9	73.1%	76.5	**15.1%**
Tuscany	3,722,729	611.7	243.4	368.3	60.2%	83.6	**13.7%**
Piedmont	4,341,375	493.8	181.5	312.3	63.2%	65.8	**13.3%**
Emilia-Romagna	4,467,118	662.8	195.1	467.7	70.6%	86.8	**13.1%**
Marche	1,518,400	524.4	155.9	368.5	70.3%	68.5	**13.1%**
Umbria	880,285	516.0	175.1	340.9	66.1%	67.1	**13.0%**
Basilicata	556,934	354.1	179.3	174.8	49.4%	45.9	**13.0%**
Sardinia	1,630,474	452.5	120.8	331.7	73.3%	58.2	**12.9%**
Veneto	4,907,704	489.7	123.9	365.8	74.7%	61.3	**12.5%**
Abruzzo	1,305,770	459.7	171.7	288.0	62.7%	56.1	**12.2%**
Vallée d'Aoste	125,501	604.2	214.3	389.9	64.5%	73.5	**12.2%**
Latium	5,865,544	518.0	247.5	270.4	52.2%	62.9	**12.1%**
Lombardy	10,103,969	479.4	134.1	345.3	72.0%	56.7	**11.8%**
Friuli-Venezia Giulia	1,211,357	497.9	163.5	334.4	67.2%	58.7	**11.8%**
Calabria	1,924,701	398.6	207.7	191.0	47.9%	45.1	**11.3%**
Liguria	1,543,127	532.7	248.2	284.5	53.4%	59.7	**11.2%**
Puglia	4,008,296	467.0	230.8	236.2	50.6%	49.6	**10.6%**
Molise	302,265	368.0	182.4	185.6	50.4%	30.7	**8.3%**
Sicily	4,968,410	449.5	276.3	173.2	38.5%	36.7	**8.2%**
Campania	5,785,861	448.5	211.9	236.6	52.7%	36.0	**8.0%**

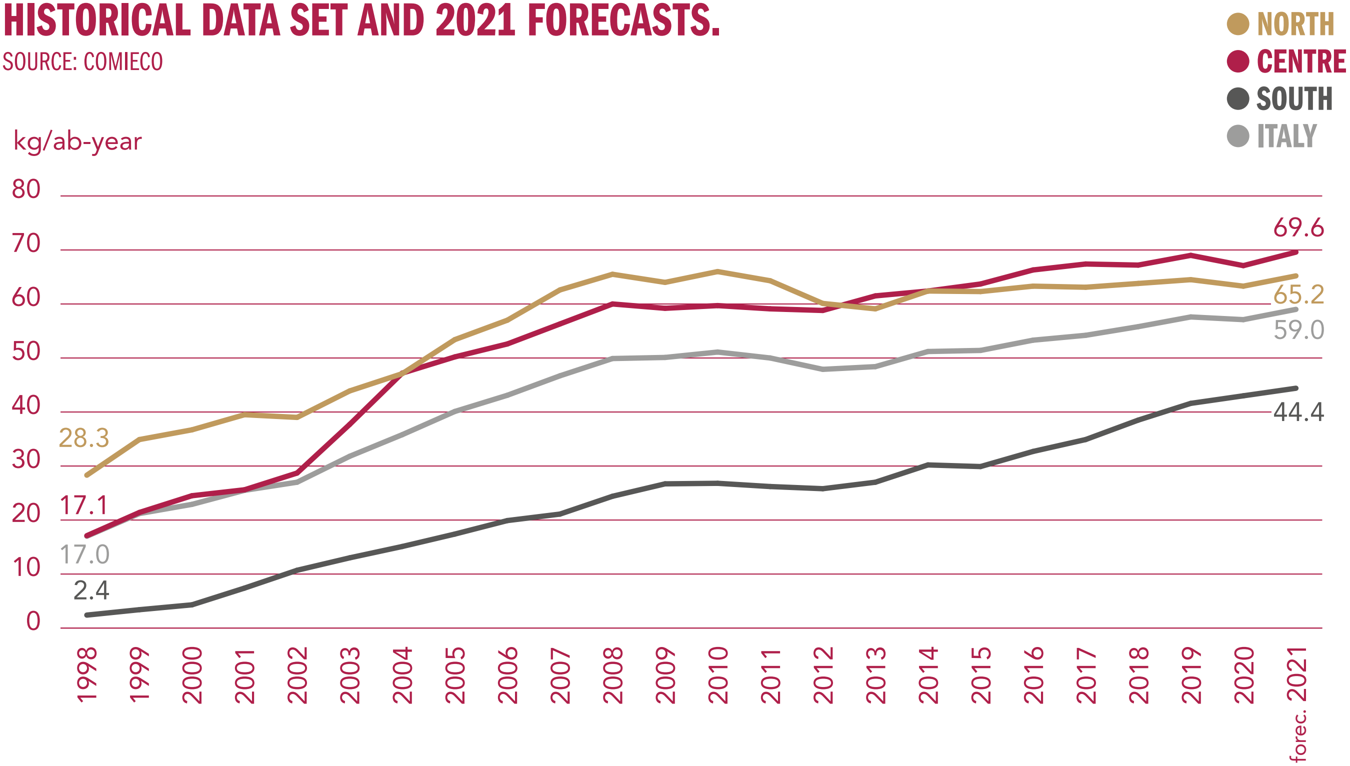
FIGURE 3
COMPARISON OF URBAN WASTE PRODUCTION, TOTAL SEPARATE WASTE COLLECTION, AND MUNICIPAL SEPARATE PAPER AND BOARD COLLECTION IN ITALY. 1998-2020 DATA SET. SOURCE: COMIECO



While the main focus is on the South and the metropolitan areas, all regions have untapped potentials to a varying extent.

FIGURE 4
PER-CAPITA MUNICIPAL SEPARATE PAPER AND BOARD COLLECTION. 1998-2020 HISTORICAL DATA SET AND 2021 FORECASTS.

SOURCE: COMIECO



	1998	2019	2020	Δ 2019/2020	Δ 1998/2020	
	kg/ab-year	kg/ab-year	kg/ab-year	kg/ab-year	kg/ab-year	%
North	28.3	64.5	63.3	-1.2	35.0	123.7
Centre	17.1	69.0	67.1	-1.9	50.0	292.5
South	2.4	41.6	43.2	1.6	40.8	1.702.1
Italy	**17.0**	**57.6**	**57.2**	**-0.4**	**40.2**	**236.5**

BIG CITIES - THE COVID-19 EFFECT

Metropolitan areas, and regional or provincial capitals in particular, are focus point that deserve some ad-hoc consideration. As in the past few editions of the Annual Report, this monitoring considers six Italian cities (from North to South: Turin, Milan, Florence, Rome, Naples, and Palermo) that account, together, for almost 12% of inhabitants and approximately 14% of the urban waste produced in Italy.

These cities are physiologically complex entities due to inhabitant density, types and diversity of utilities, the urban texture – all factors that contribute to a more complicated organization and management of urban sanitation services. If these six cities are considered as a single urban entity, several interesting observations can be made.

"This urban conglomerate of 6.8 million inhabitants produced approximately 3.6 million tons of urban waste in 2020, including 1.6 million (45.2%) collected separately".

The greatest waste reductions – as observed, in particular, in Milan, Turin, and Florence – reflect new life and consumption habits connected with more frequent working from home, the absence of tourists, and the lockdown of shops and restaurants.

Overall data for 2020 shows that waste management on average suffered from a production of waste affected by new pandemic-related consequences, in particular of non-recyclable waste, such as individual protection devices (face masks, gloves, etc.). In a context of declining overall urban waste production (-8.2%), the non-recycled share of this waste (-2.9%) decreases – in fact – to a lesser extent than overall separate collection (-8.5%).

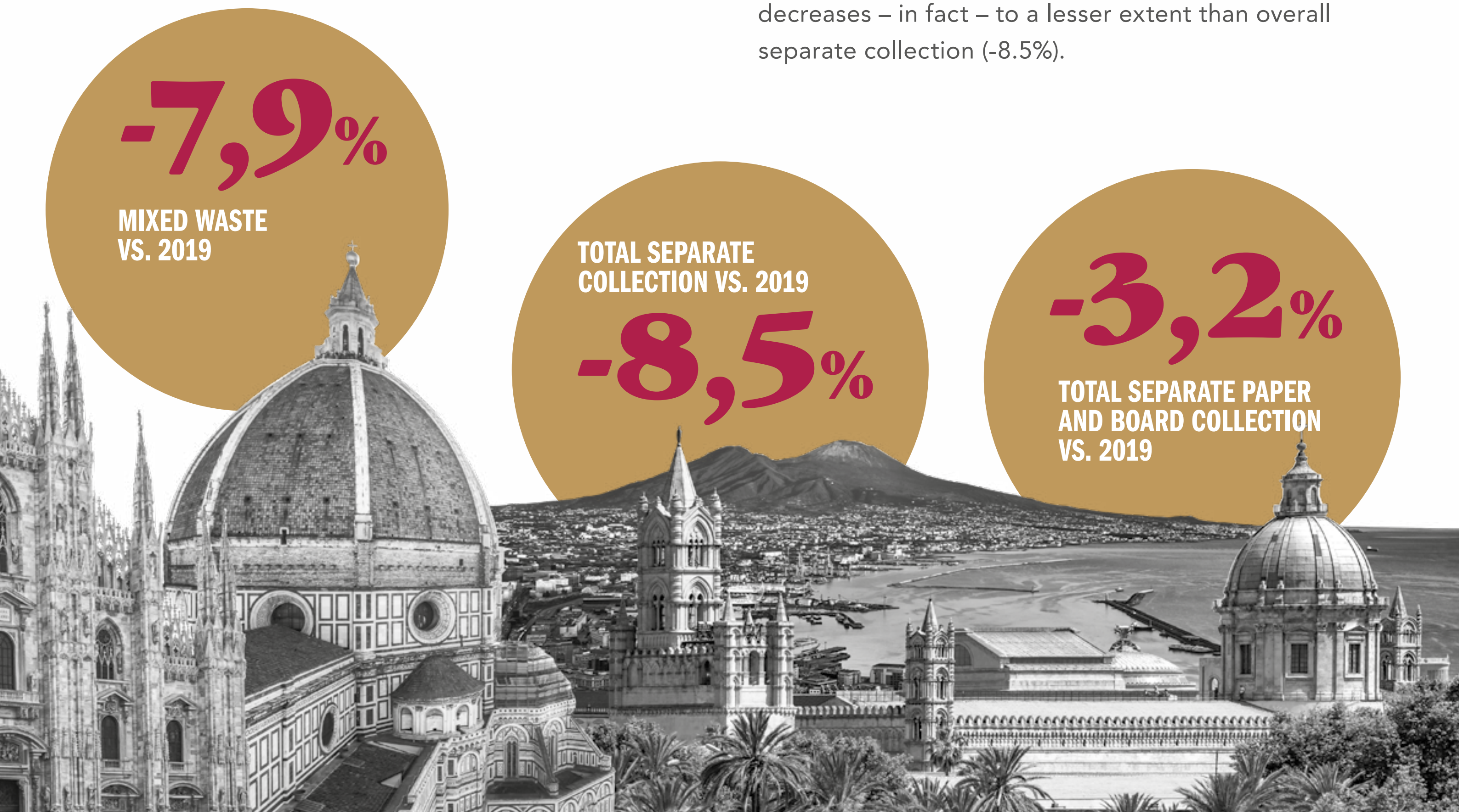


FIGURE 5
WASTE COLLECTION IN THE SAMPLE CITIES TURIN, MILAN, FLORENCE, ROME, NAPLES, AND PALERMO. YEAR 2020 AND 2019-2020 VARIATIONS.
SOURCE: COMIECO

National dynamics are amplified in big cities.Waste production decreases (-8.2%). Separate collections are suffering in these regions more than elsewhere (-8.5%). This point of view provides important hints to direct efforts and resources for recovery.

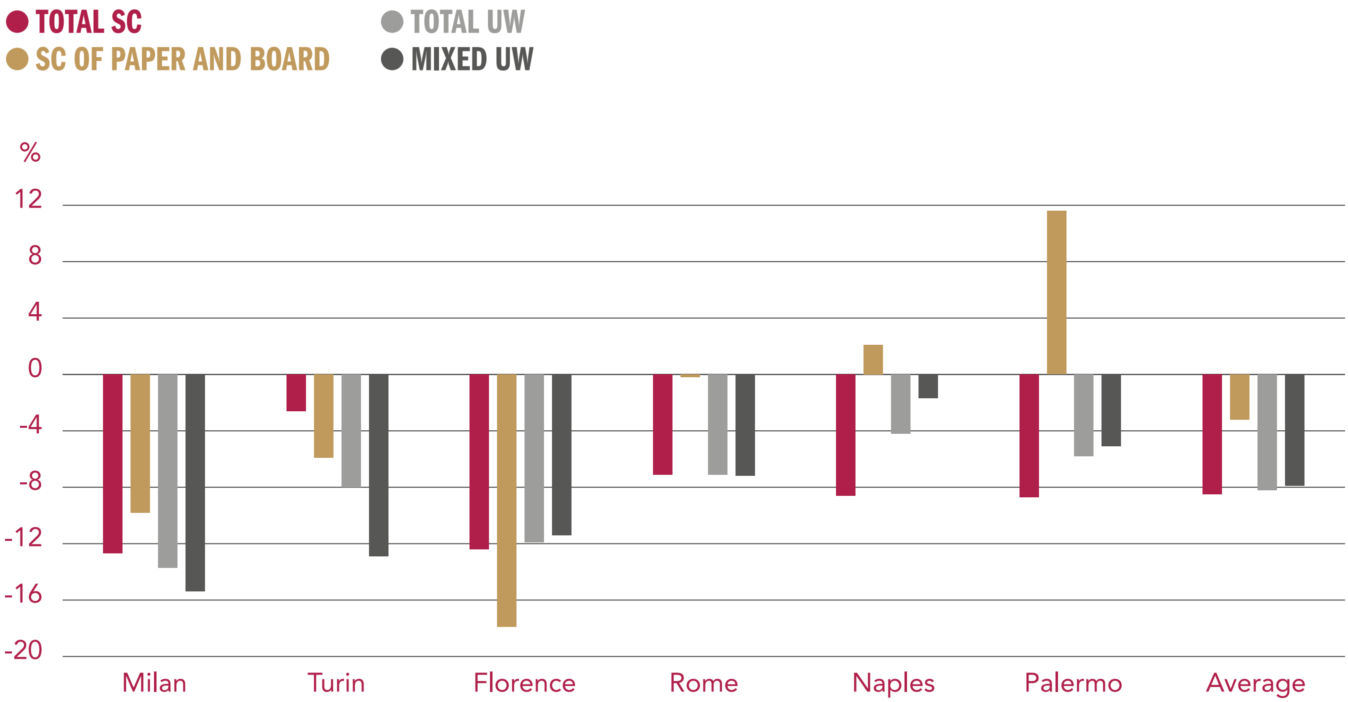
"Average urban waste production is 17% greater than national production".

which shows that big urban entities are crucial for the developments expected for the future, considering that such indicators as urban waste and separate collection are below the "Italian average". In these regions too, paper and board collection shows better indicators (-3.2%) than other flows. Material flows in work places and businesses were replaced with those connected with e-commerce and delivery.

Paper and board collection volumes in the six cities in 2020 are above 458thousand tons, equal to approximately 13% of the national amount. Average per-capita collection is 68 kg/ab, 18.5% more than the national average. But we should not be deceived by this value: these regions still have significant potentials, and collection can grow at least a further 20% compared to present values.

However an average is the result of very uneven situations, as if the "macro-city" were divided in six districts with widely different service standards and performance levels.

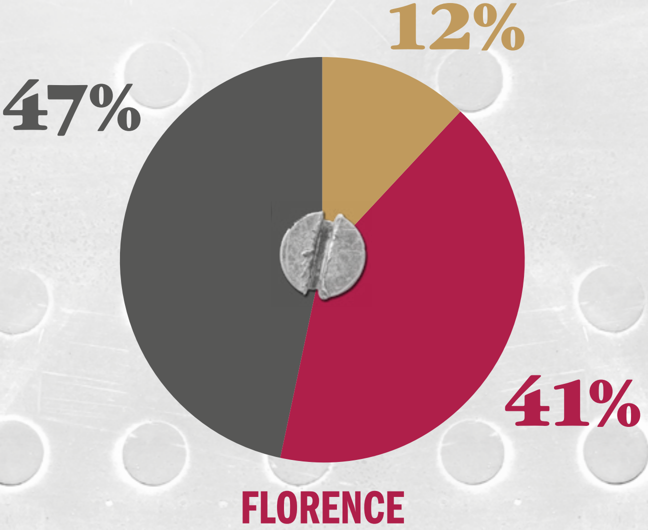
Milan and Turin improve their already high levels of 2019 with growing separate collection. In the two sample cities in the Centre – Florence and Rome – the separate collection rate is virtually unchanged, whereas in the South Naples and Palermo record an unexpected decline. Paper, at least in this case, provides guarantees also in these cities, with change rates (-3.2%) that are, all in all, "less negative" than for other flows. Separate collection is improving, except in Florence, and even growing in Palermo and Naples.

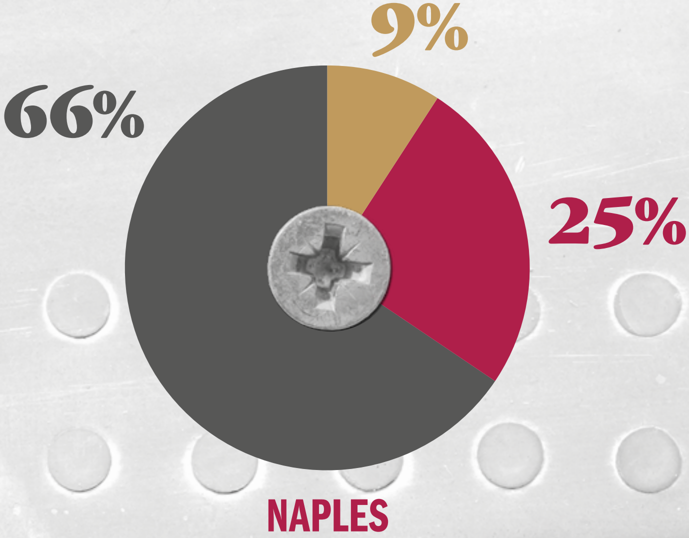


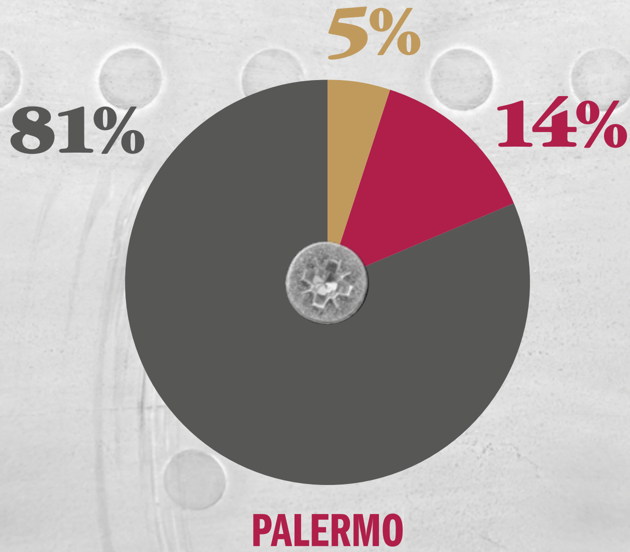
Δ 2019/2020		Milan	Turin	Florence	Rome	Naples	Palermo	Average
Total SC	%	-12.7	-2.6	-12.4	-7.1	-8.6	-8.7	-8.5
SC of paper and board	%	-9.8	-5.9	-17.9	-0.2	2.1	11.6	-3.2
Total UW	%	-13.7	-8.0	-11.9	-7.1	-4.2	-5.8	-8.2
Mixed UW	%	-15.4	-12.9	-11.4	-7.2	-1.7	-5.1	-7.9
2020								**Total**
Total SC	t	379,035	203,341	116,235	712,268	167,287	66,732	1,644,898
SC of paper and board	t	77,979	48,656	26,481	242,263	44,600	18,368	458,347
Total UW	t	605,730	402,739	217,266	1,571,097	484,947	357,984	3,639,763
Mixed UW	t	226,695	199,398	101,031	858,829	317,660	291,252	1,994,865
SC/Mixed UW	**%**	**62.57**	**50.49**	**53.50**	**45.34**	**34.50**	**18.64**	**45.19**

FIGURE 5 BIS
WASTE COLLECTION IN THE SAMPLE CITIES TURIN, MILAN, FLORENCE, ROME, NAPLES, AND PALERMO. YEAR 2020 AND 2019-2020 VARIATIONS.

SOURCE: COMIECO


12%
47%
41%
FLORENCE


9%
66%
25%
NAPLES


5%
81%
14%
PALERMO

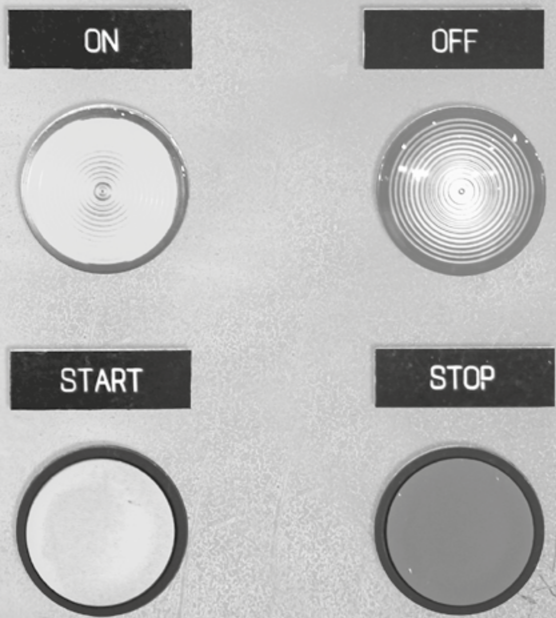
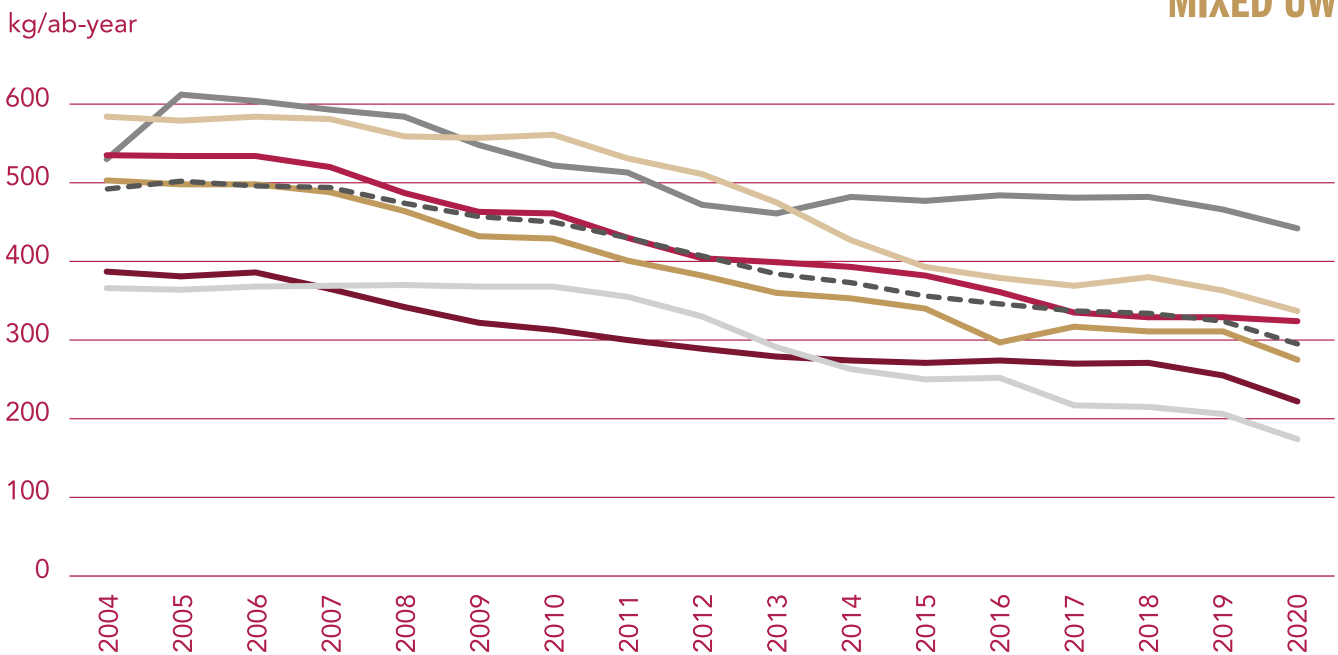
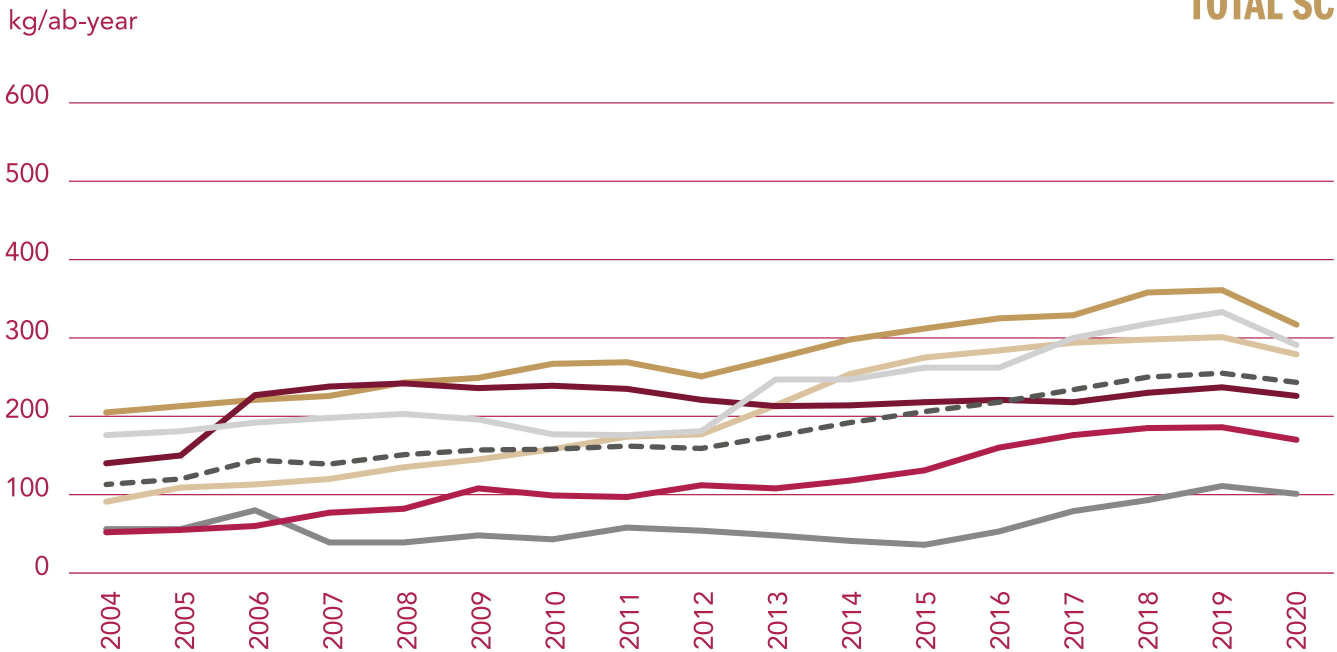

ON
OFF
START
STOP

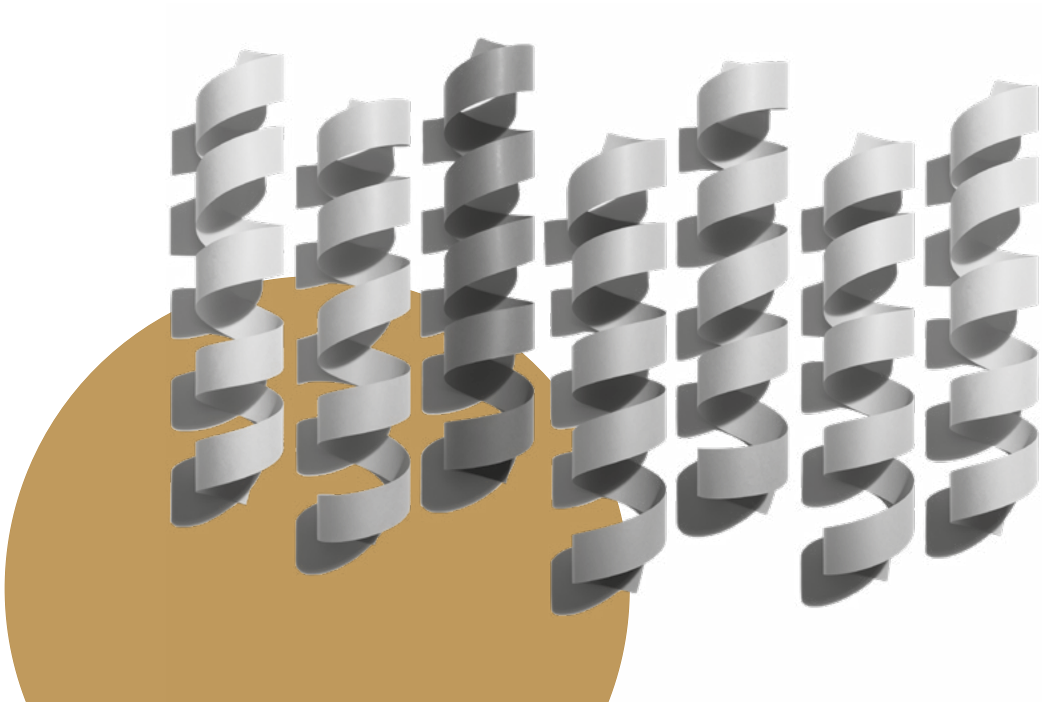
FIGURE 6
WASTE COLLECTION IN THE SAMPLE CITIES TURIN, MILAN, FLORENCE, ROME, NAPLES, AND PALERMO. 2004-2020 PER-CAPITA DATA.

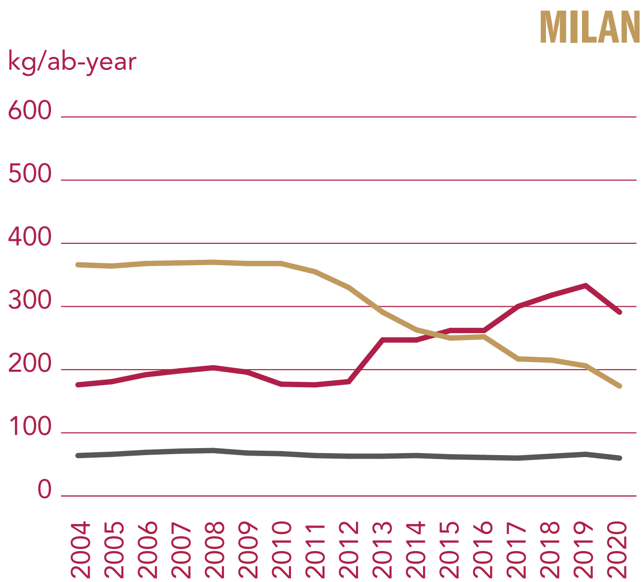
SOURCE: COMIECO

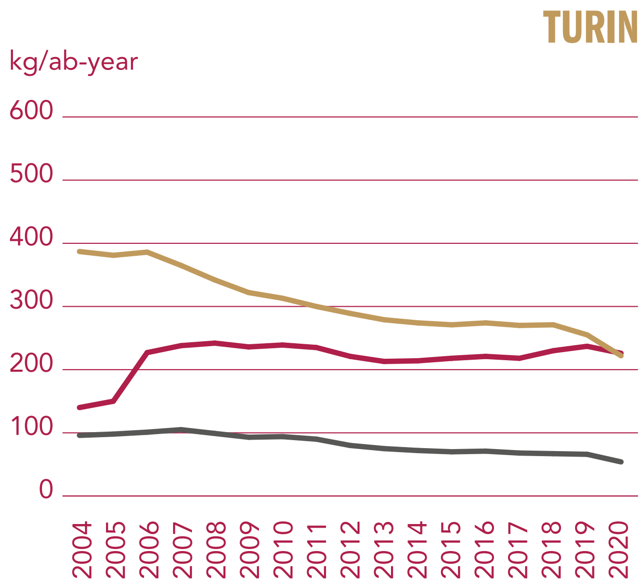


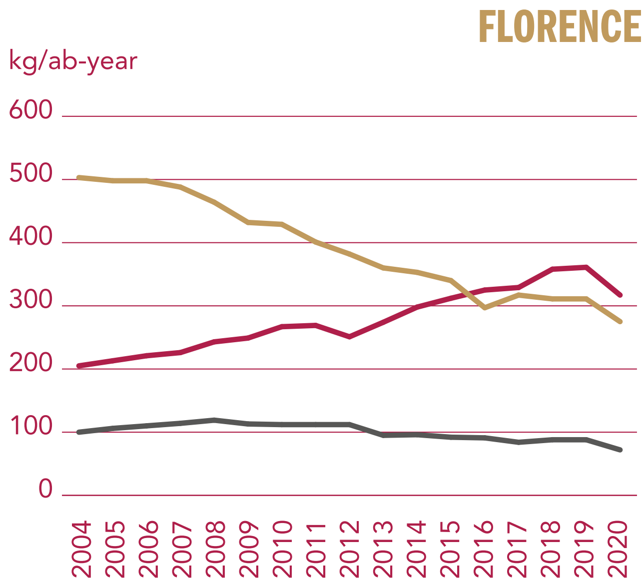
TOTAL SC

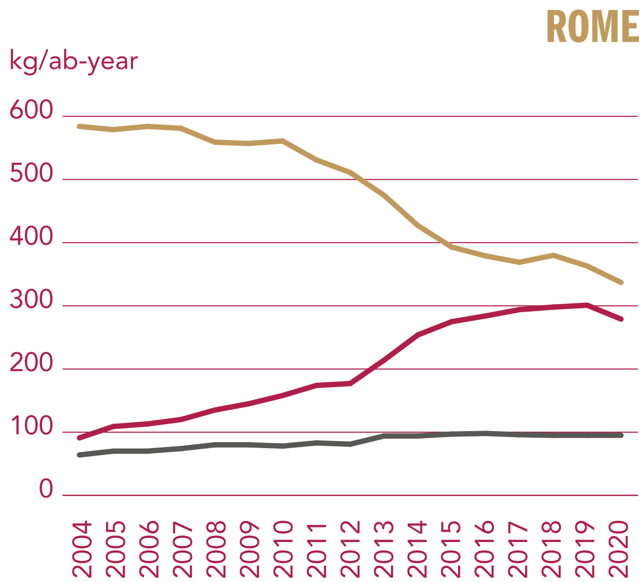

kg/ab-year
600
500
400
300
200
100
0
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
MILAN
TURIN
FLORENCE
ROME
PALERMO
NAPLES
AVERAGE




MILAN
kg/ab-year
600
500
400
300
200
100
0
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020

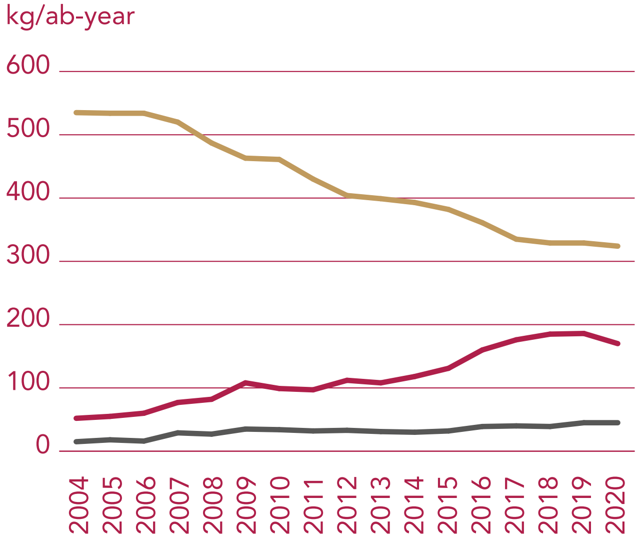

TURIN
kg/ab-year
600
500
400
300
200
100
0
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020


FLORENCE
kg/ab-year
600
500
400
300
200
100
0
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020

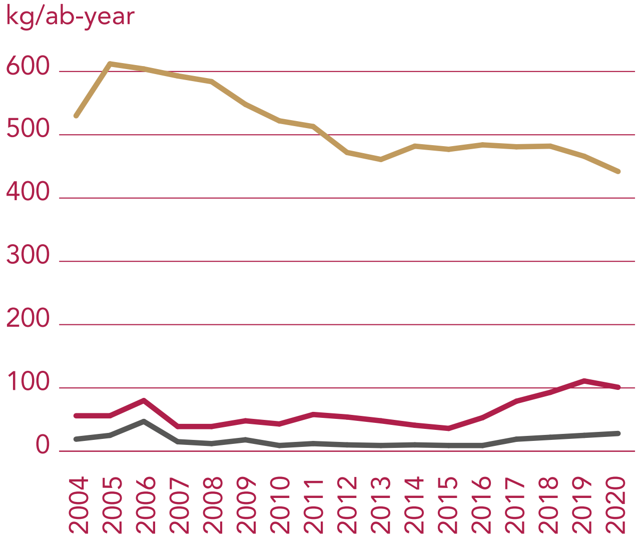

ROME
kg/ab-year
600
500
400
300
200
100
0
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020

● MIXED UW
● TOTAL SC
● SC OF P&B

NAPLES



PALERMO



84.8%

CITIES UNDER THE AGREEMENTS

93.6%

ITALIAN CITIZENS COVERED BY THE AGREEMENTS

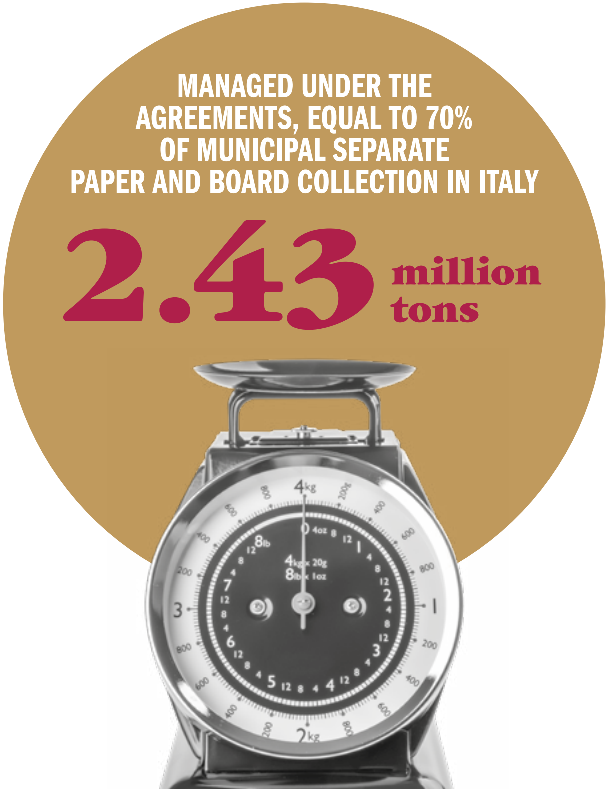
CITIES UNDER THE AGREEMENTS: FIGURES AND RESULTS IN 2020

COLLECTION

The South has 684 agreements in force, vs. the Centre and the North with 95 and 167 respectively. While being in countertrend vs. the previous years, the figure for the South is still out of scale. Greater coordination among the administrations through an organization based on supramunicipal citizen bases would imply scale economies, which bring more efficiency and cost reduction, both upon collecting and in subsequent recycling-related activities.

In 2020 the Consortium provided for the recycling of 2.43 million tons of paper and board, i.e. 69.6% of national municipal collection. The managed amounts increased by almost 400thousand tons compared to 2019 (-19.3%). This trend repeats what happened in 2018/2019 as a sum of three factors: new agreements, increased collection particularly in the South and, most of all, the decision of many parties to the agreements, which are returning amounts of materials that used to be managed outside the agreements within the scope of the contract with Comieco, by virtue of one of the options provided for by the Technical Annex, to adjust their relation with the Consortium.

In fact the "windows" were confirmed in the new Agreement with the introduction of a new six-monthly window – a provision that will allow Cities and operators to update their agreements more flexibly and to maximize revenues according to market trends.



Over 420thousand tons – including over three-quarters in the North – managed by the Consortium come from 1.01 + 1.02, vs. a decline of approximately 30thousand tons of cardboard (1.04 + 1.05). To a lesser extent, the same trend is recorded in the Centre (+66thousand tons of 1.01 + 1.02 and -4 tons of 1.04 + 1.05), whereas volumes are growing in the South (+55thousand tons globally) for both types of managed collection.

The Consortium confirms its dual role: on one hand it is a market-subsidiary party, according to local needs, particularly in the Centre and North where allowed by the environment; on the other it acts as a promoter of recycling, a factor that supports service development, particularly in the South, ensuring that the collected materials are taken charge of to a continuously growing extent, even at times of market "weakness", as it was until mid-2020.

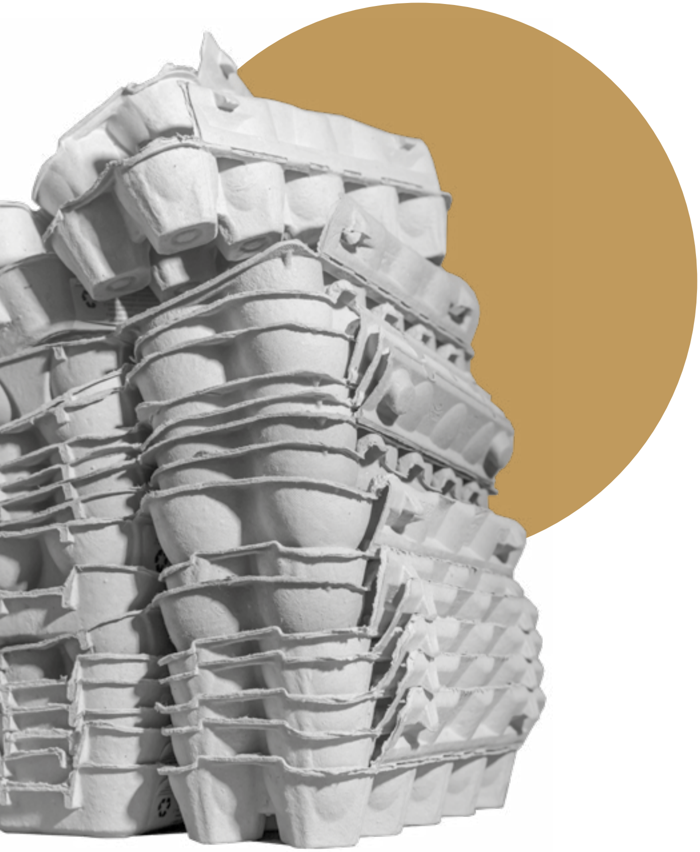
More specifically, the Consortium managed 1.45 million tons of packaging (178thousand more vs. 2019) and over 980thousand tons (+28%) of similar product fractions (graphic paper) contained in the managed collection mix.

TABLE 3 LOCAL COVERAGE BY REGIONS AS AT DECEMBER 31, 2020.

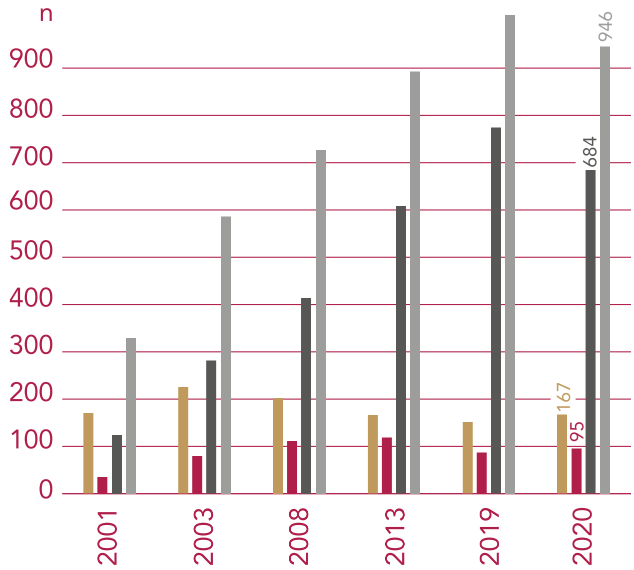
SOURCE: COMIECO

Area	Agreements	Average inhabitants per agreement	Average amount managed under the agreements
	n	n	t
North	167	155,617	7,463
Centre	95	120,962	4,909
South	684	28,848	1,052
Italy	**946**	**60,477**	**2,571**

Regions	Agreements	Cities under the agreements		Inhabitants under the agreements		Amounts managed under the agreements	
	n	n	%	n	%	t	% Vs. total SC of paper
Piedmont	25	1,113	92.1	4,327,327	97.7	181,664	62.8
Vallée D'aoste	1	74	100.0	128,298	100.0	9,658	97.2
Lombardy	65	1,129	73.1	8,547,575	85.1	400,073	70.9
Trentino-Alto Adige	20	282	81.0	1,022,200	93.1	66,540	80.4
Veneto	22	554	94.9	4,855,600	98.3	236,985	81.9
Friuli-Venezia Giulia	7	214	97.3	1,206,962	97.5	42,353	60.4
Liguria	16	189	80.4	1,487,876	94.0	69,461	73.5
Emilia-Romagna	11	317	88.8	4,412,186	97.3	239,592	64.4
North	**167**	**3,872**	**84.7**	**25,988,024**	**92.9**	**1,246,327**	**70.3**
Tuscany	15	265	90.4	3,702,074	96.8	195,134	65.9
Umbria	8	90	97.8	882,208	98.6	42,886	75.6
Marche	15	199	81.9	1,443,803	91.5	80,635	80.2
Latium	57	275	72.8	5,463,338	92.7	147,724	40.5
Centre	**95**	**829**	**82.4**	**11,491,423**	**94.3**	**466,380**	**57.0**
Abruzzo	26	274	89.8	1,271,090	95.5	65,729	86.1
Molise	8	123	90.4	300,984	96.1	8,455	96.2
Campania	109	442	80.1	5,466,824	93.0	183,136	83.7
Puglia	155	242	93.8	4,011,927	98.1	161,788	79.6
Basilicata	23	105	80.2	531,262	92.1	18,317	65.7
Calabria	62	365	89.2	1,888,469	95.5	59,449	63.9
Sicily	260	365	93.6	4,964,542	97.5	156,621	88.5
Sardinia	41	278	73.7	1,296,776	78.0	65,989	66.2
South	**684**	**2,194**	**85.8**	**19,731,874**	**94.3**	**719,484**	**79.5**
Italy	**946**	**6,895**	**84.8**	**57,211,321**	**93.6**	**2,432,191**	**69.6**



SIGNED AGREEMENTS (MU N)



COVERED CITIES (MU %)

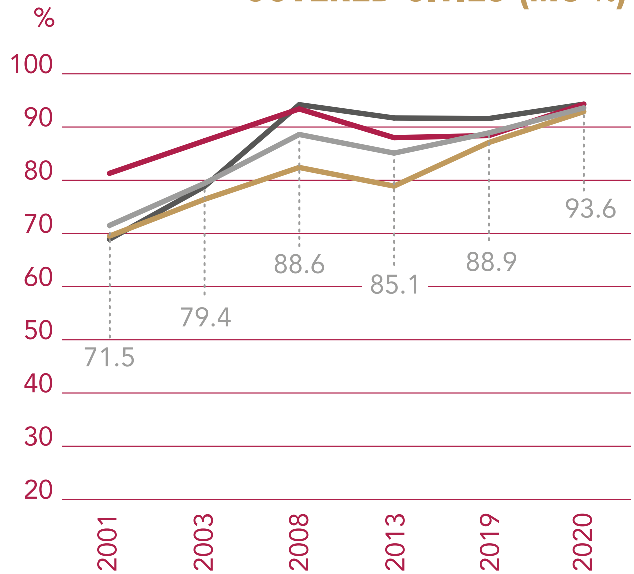
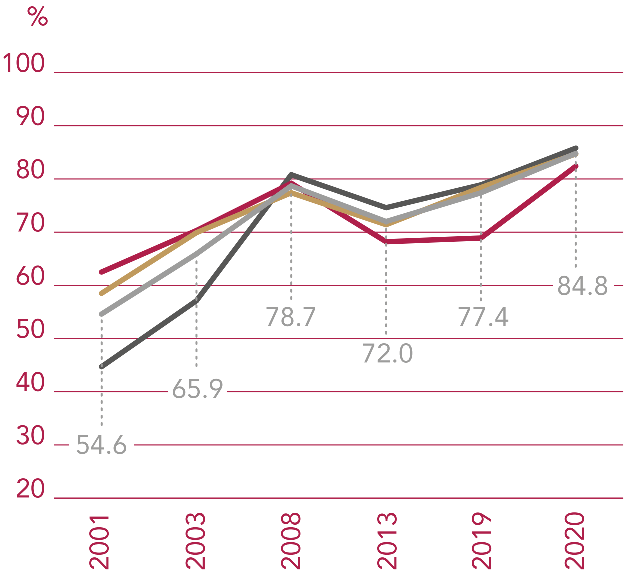


FIGURE 7
STATUS OF THE AGREEMENTS UPON EXPIRATION OF EACH FRAMEWORK AGREEMENT AND COVERAGE RATE OF THE AGREEMENTS. 2001/2020 HISTORICAL SET.
SOURCE: COMIECO

- NORTH
- CENTRE
- SOUTH
- ITALY

COVERED INHABITANTS (MU %)



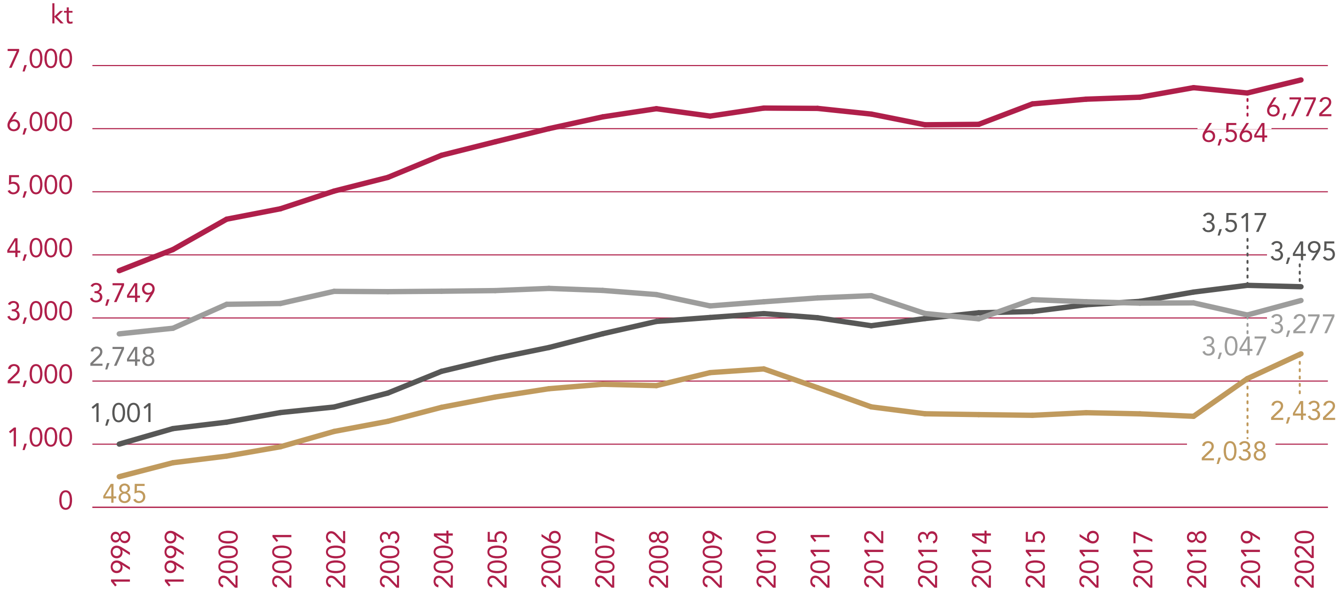
AMOUNTS MANAGED BY COMIECO VS. TOTAL MUNICIPAL SC OF PAPER (MU %)

The high fragmentation of agreements, still observed in the South, hampers synergic development. Comieco still plays a key role by mitigating market fluctuations and managing additional volumes – consistently with the principle of subsidiarity – up to close to 70% of the total. Just less than one million tons returned under the coverage of the agreements in two years (2018/2020): of these, 93% come from 1.01 + 1.02, with over 72% of volumes in the North.

FIGURE 8
RATIO OF PAPER AND BOARD COLLECTION MANAGED UNDER THE AGREEMENTS VS. APPARENT COLLECTION. 2019-2020 HISTORICAL DATA SET AND COMPARISON.

SOURCE: COMIECO

- APPARENT COLLECTION
- MUNICIPAL SC OF PAPER AND BOARD UNDER THE AGREEMENTS
- MUNICIPAL SC OF PAPER AND BOARD
- HOUSEHOLD COLLECTION



		1998	2003	2008	2013	2019	2020	Δ t 1998/ 2020	Δ % 1998/ 2020	Δ t 2019/ 2020	Δ % 2019/ 2020
Apparent collection*	kt	3,749	5,227	6,316	6,062	6,564	6,772	3,023	80.6	208	3.2
Household collection	kt	2,748	3,417	3,371	3,071	3,047	3,277	529	19.4	230	7.6
Municipal SC of paper and board	kt	1,001	1,810	2,945	2,991	3,517	3,495	2,494	249.2	-22	-0.6
Municipal SC of paper and board under the agreements	kt	485	1,362	1,928	1,482	2,038	2,432	1,947	401.5	394	19.3

		1998	2003	2008	2013	2019	2020
Municipal SC of paper and board under the agreements vs. apparent collection	%	12.9	26.1	30.5	24.4	31.1	35.9
Municipal SC of paper and board under the agreements vs. municipal collection	%	48.5	75.2	65.5	49.6	58.0	69.6

**Apparent collection: consumption of paper for recycling – import + export.*

ALLOCATIONS TO PARTIES UNDER THE AGREEMENTS

150.8

million EUR

ALLOCATED TO THE CITIES IN 2020

Comieco invested an overall amount close to 151 million EUR in 2020, against the management of just more than 2.4 million tons of paper and board from municipal collection under the agreements. This amount includes 146.2 million EUR for packaging and 4.5 million EUR for graphic paper. This investment is growing significantly (+22 million EUR vs. 2019) due to the new volumes that the Consortium was asked to take charge of and to the update of considerations for packaging introduced effective from May 1, 2020, with the enforcement of the fifth cycle of the ANCI-CONAI agreement.

"The average calculated value per inhabitant covered by the agreements also grew from 2.4 EUR in 2019 to 2.6 EUR in 2020".

+22
million EUR
VS 2019

This is substantially attributable to two factors:
1. an increase of the per-capita yield (particularly in the South);
2. an increase of the amount subject to post-sorting management under the so-called OUT agreements, which ensure compliance with first quality bracket parameters and, thus, the highest consideration.

Local resource allocation also involves other instruments. In particular, in addition to considerations for collection – in the so-called OUT agreements – Comieco invests resources in the processing and improvement of paper for recycling. These resources, which are intended for plants operating on account of the parties covered by the agreements, amounted to just less than 45 million EUR in 2020.

1.92
billion EUR
FROM 1998 TO 2020

Between 2019 and 2020, the fourth cycle of the Framework Agreement came to an end: this allows to assess the results that were also at the basis of the works for renewal and enforcement of the fifth PTA (Paper Technical Annex).

Resources for collection gradually grew and supported the volume growth recorded at national level, from 1 to 3.5 million tons a year.

"The sum of all municipal paper and board collection volumes from 1998 to 2020 is close to 56 million tons; just less than 60% (33 million) were managed by Comieco".

In 22 years of operation (1998-2020) of the ANCI-CONAI agreement, the Consortium allocated considerations to the Italian cities for almost 2 billion EUR globally to support municipal collection, and over 170 million for plant-based sorting activities.

The amounts managed by the Consortium in 2020 are increasing (+19.3%). Considerations paid to the Cities under the agreements are above 150 million EUR.
The average value per inhabitant grows by 8%.

TABLE 4
RESOURCES ALLOCATED TO THE PARTIES UNDER THE AGREEMENTS IN 2020. DETAILED BY AREAS.

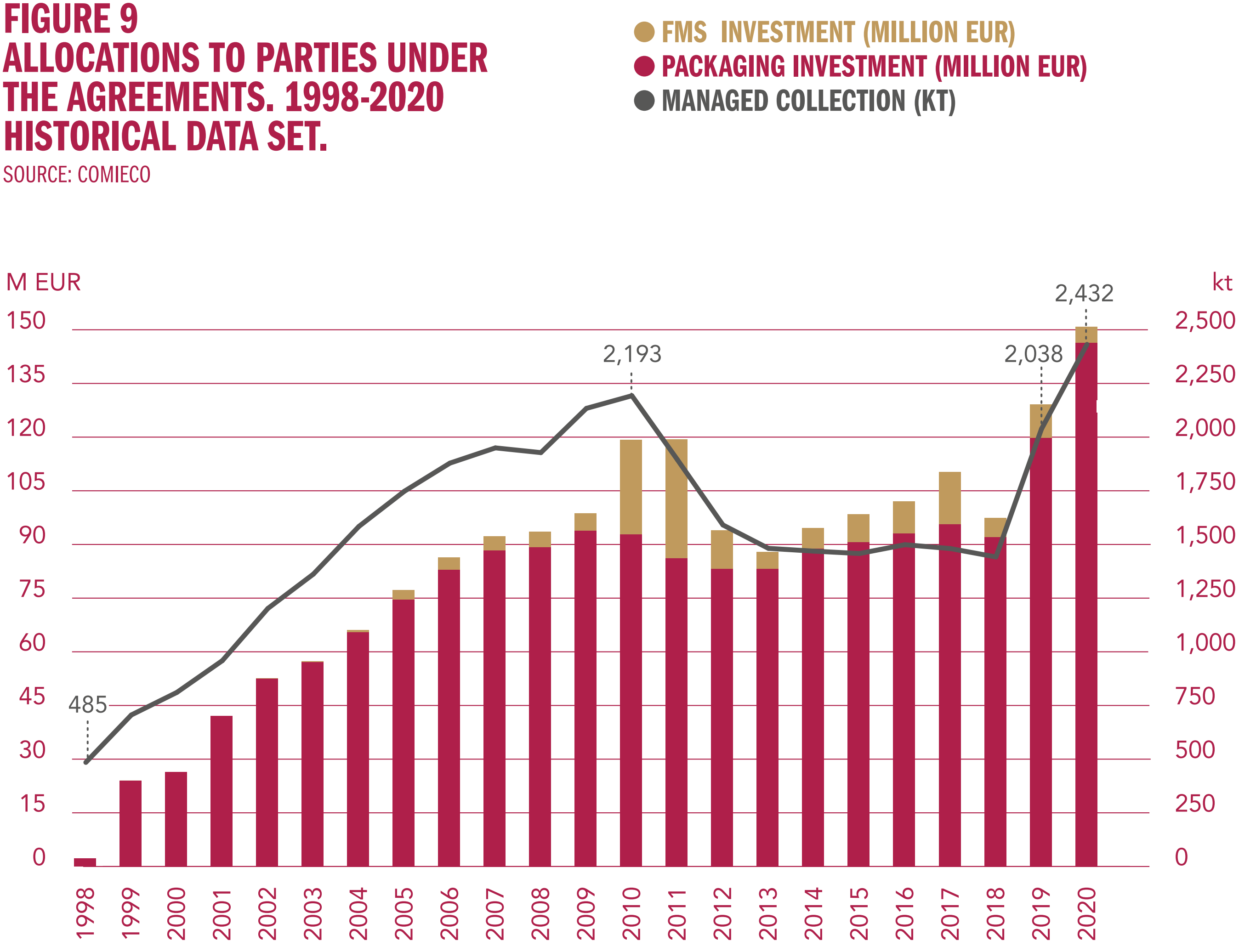
SOURCE: COMIECO

Area	Inhabitants under the agreements	Managed amounts					
		Managed packaging	FMS	Total	Managed packaging	FMS	Total
	n	t	t	t	kg/ab	kg/ab	kg/ab
North	25,988,024	734,222	512,105	1,246,327	28.3	19.7	48.0
Centre	11,491,423	276,358	190,022	466,380	24.0	16.5	40.6
South	19,731,874	439,401	280,083	719,484	22.3	14.2	36.5
Italy	**57,211,321**	**1,449,981**	**982,210**	**2,432,191**	**25.3**	**17.2**	**42.5**

Area	Inhabitants under the agreements	Collection considerations					
		Managed packaging	FMS	Total	Managed packaging	FMS	Total
	n	EUR	EUR	EUR	EUR/ab	EUR/ab	EUR/ab
North	25,988,024	75,784,718	2,441,279	78,225,998	2.9	0.1	3.0
Centre	11,491,423	27,814,975	828,438	28,643,413	2.4	0.1	2.5
South	19,731,874	42,664,196	1,263,283	43,927,479	2.2	0.1	2.2
Italy	**57,211,321**	**146,263,890**	**4,533,000**	**150,796,890**	**2.6**	**0.1**	**2.6**

FIGURE 9
ALLOCATIONS TO PARTIES UNDER THE AGREEMENTS. 1998-2020 HISTORICAL DATA SET.

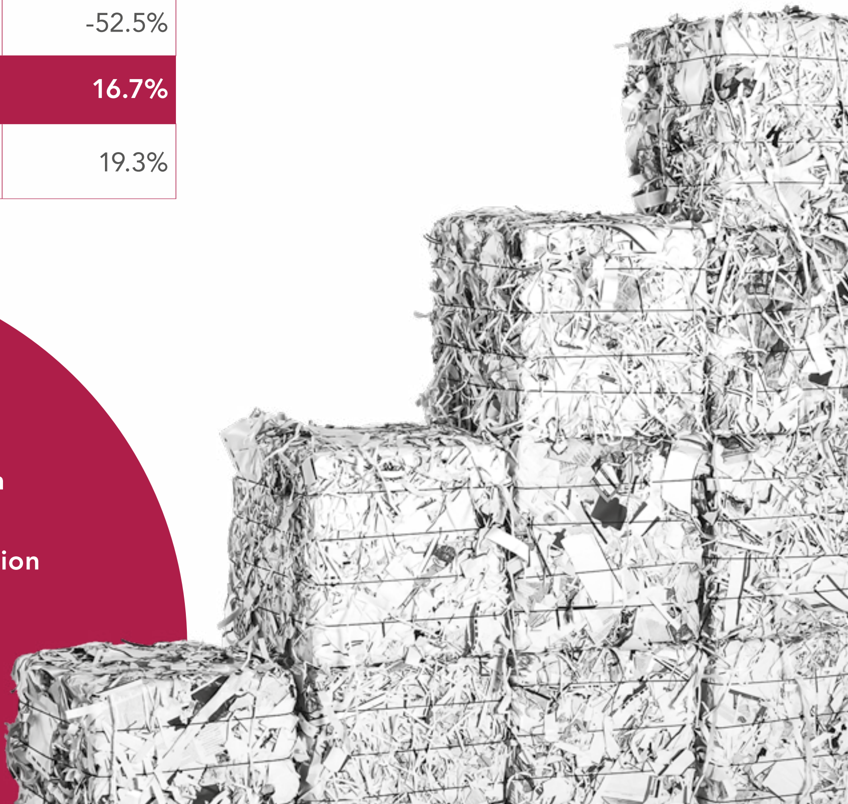
SOURCE: COMIECO



		1st ANCI-CONAI agreement 1998-2003	2nd ANCI-CONAI agreement 2004-2008	3rd ANCI-CONAI agreement 2009-2013	4th ANCI-CONAI agreement 2014-2019	5th ANCI-CONAI agreement 2020	Total
Packaging	Million EUR	204.2	400.3	439.0	579.6	146.3	1,769,3
FMS	Million EUR	0.4	15.3	80.2	52.6	4.5	153,0
Total	**Million EUR**	**204.6**	**415.6**	**519.2**	**632.2**	**44.8**	**1,922,4**
Managed collection	t	5,523,979	9,088,263	9,295,707	9,386,935	2,432,191	**35,727,075**

		2019	2020	Δ 2019-2020
Packaging	Million EUR	119.7	146.3	22.2%
FMS	Million EUR	9.5	4.5	-52.5%
Total	**Million EUR**	**129.2**	**150.8**	**16.7%**
Managed collection	t	2,038,423	2,432,191	19.3%

Comieco managed 35.7 million tons of paper and board derived from municipal collection from 1988 to 2020, and paid considerations for almost 2 billion EUR.



QUALITY: MORE TESTS FOR A MORE RELIABLE PIPELINE

The tests performed during 2020 outline a different picture if the results for the three macro-areas of the Country are considered for both flows (1.01 + 1.02 from households and 1.04 + 1.05 from business users). The number of samples collected grew from 1,200 to over 2,000.

As to 1.01. + 1.02, the national average result of 2020 sees a consolidation of the positive trend that started in 2019: after a few years (2015/2018) of average waste values above 3% upon unloading at the plant, the average rate of contaminants (2.29%) now falls within the limits set for the first quality bracket for the second year in a row.

For the 2020 performance too, the national figure should be extracted and the behavior of the different macro-areas should be observed for a more objective review: the North (1.37% in 1.01 + 1.02) continues to improve despite having the best national baseline value.
On the other hand, the Centre (improving with 3.23% of contaminants) and the South (declining with 3.22% of contaminants) remain above the first quality bracket threshold specified in the Paper Technical Annex. This data is important to direct resources for development, field monitoring, and communication, in view of acting on the origin of the flows that feed the recycling pipeline and of maximizing the recovery of raw materials.

Despite a minor decline, the very high quality of cardboard collection is confirmed; the average national figure (0.66% of contaminants) and the

specific ones for the three macro-areas fall largely within the first bracket limits (1.5%), with collected materials that, logistic issues excepted, are ready for recycling.

The goal of the entire pipeline – from citizens to final recyclers – is to keep improving starting from the very early steps, ensuring high value generation at all stages of the recycling process.

Punctual monitoring via quality controls allows prompt identification of critical players, such as certain big cities (particularly in the Centre). Second-level controls, also on individual collection circuits, provide important inputs for field improvements.

2.29% AVERAGE CONTAMINANTS IN 1.01 + 1.02

0.66% AVERAGE CONTAMINANTS IN 1.04 + 1.05

As in previous years, in 2020 Comieco, supported by specialized companies, carried out 199 audits of sorting plants (99), paper mills (70) and processing plants (30), aimed at:

- ensuring that transparent and reliable data is reported;
- providing guarantees on system control levels;
- ensuring appropriate system operation with minimized litigations.

Audits at the waste management plants were aimed at ensuring compliance with contract requirements and performing a mass check on the materials in transit from parties under the agreements, intended for paper mills.

Audits at paper mills and processing plants were aimed at ensuring the truthfulness of the statements made to Comieco with respect to packaging production (Ba.Da.Com statements).
The criticalities observed during the audits were formally addressed by the Consortium via the implementation of specific corrective actions.

	Year 2019		Year 2020		Δ 2019/2020	
	Tests	Contaminants	Tests	Contaminants	Tests	Contaminants
	n	%	n	%	n	%
1.01 + 1.02	1st quality bracket threshold: 3.0%					
North	260	1.68	719	1.37	+459	-0.31
Centre	223	3.57	441	3.23	+218	-0.34
South	274	3.07	339	3.22	+65	+0.15
Italy	**757**	**2.62**	**1.499**	**2.29**	**+742**	**-0.33**
1.04 + 1.05	1st quality bracket threshold: 1.5%					
North	98	0.42	157	0.51	+59	+0.09
Centre	92	0.74	148	0.81	+56	+0.07
South	241	0.70	235	0.68	-6	-0.02
Italy	**431**	**0.65**	**540**	**0.66**	**+109**	**+0.01**

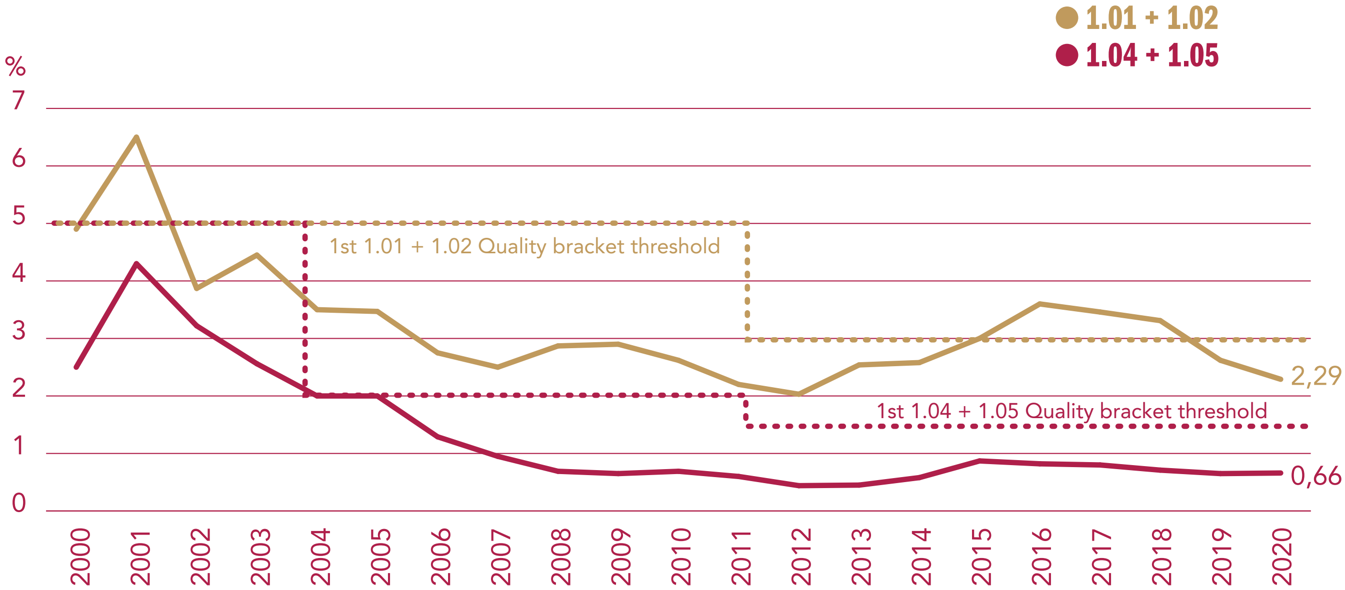
TABLE 5
QUALITY OF THE COLLECTED MATERIALS (AVERAGE RATE OF CONTAMINANTS). 2019-2020 COMPARISON BY MACRO-AREAS.

SOURCE: COMIECO

1,01 + 1.02: 2020 consolidates the positive trend that started in 2019, and the average contaminant rate (2.29%) falls within the limits set for the first quality bracket (3%) for the second year in a row. 1.04 + 1.0: business collection follows a stable trend.

FIGURE 10
QUALITY OF THE COLLECTED MATERIALS (MEAN TREND OF CONTAMINANTS). 2000-2020 PERIOD.
SOURCE: COMIECO

The tests challenge confirms the improvement observed in past years with respect to the rate of contaminants in 1.01 + 1.02. Over 2,000 tests were performed in 2020.



Tests performed		1st ANCI-CONAI Agreement 1998-2003	2nd ANCI-CONAI Agreement 2004-2008	3rd ANCI-CONAI Agreement 2009-2013	4th ANCI-CONAI Agreement 2014-2019	5th ANCI-CONAI Agreement from May 2020	Total 1998-2020
1.01 + 1.02	n	1,006	3,456	4,040	4,286	1,499	14,287
1.04 + 1.05	n	594	3,591	4,204	2,931	540	11,860

Note: Until June 2014 the above results 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 in the so-called "IN agreements" that apply for payment of the collection consideration.

RECYCLING PLANTS – A WIDESPREAD, YET STILL GROWING NETWORK

The conferment of the collected paper and board managed by Comieco was ensured across the national territory through 369 waste management plants that collected the material and performed the preliminary sorting and pressing activities for recycling at the mill.

This network of plants that spreads across the national territory helps cost containment by ensuring that vehicles are unloaded at a short distance away from collection points (16.1 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 with the creation of a critical mass to achieve scale economies and investments to improve processing.

The materials processed at the sorting plants are recycled via two complementary channels:

- Sixty percent of the amount managed by Comieco (over 1.4 million tons) is entrusted on a pro-quota basis to 55 paper mills that ensure recycling across the national territory.
- The other 40% (approximately 1 million tons) is awarded – by regular auctions – to parties having the necessary operational skills to ensure recycling, either in Italy or abroad.
  In 2020, 38 parties were awarded at least one lot.

369

RECOVERY PLANTS

55

PAPER MILLS IN ITALY RECYCLING THE PAPER MANAGED BY COMIECO

Area	Sorting plants	Average distance for conferment	Paper mills
	n	km	n
North (*)	152	15.9	31
Centre	65	16.9	17
South	152	16.1	7
Total	**369**	**16.1**	**55**

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

FIGURE 11 THE RECYCLING PLANTS NETWORK. YEAR 2020.

SOURCE: COMIECO

Comieco ensures that the paper and board from municipal collections managed under the agreements are recycled via allocations (1.4 million tons) to member paper mills, and the remaining share is awarded by auction based on the commitments made in 2011 with AGCM. Thirty-eight companies (awarded at least one lot) managed approximately 1 million tons of paper and board for recycling in 2020. Almost all of this material was recycled at Italian plants.

● PAPER MILLS
● SORTING PLANTS

AVERAGE DISTANCE FROM COLLECTION POINTS

16.1 km

THE CIRCULAR ECONOMY OF THE PAPER PIPELINE

94.8%

PAPER AND BOARD PACKAGING RECOVERY

87.3%

PAPER AND BOARD PACKAGING RECYCLING

Paper production amounted to just more 8.5 million tons in 2020, 4.1% down compared to 2019. Packaging production (4.8 million tons) is less and less aligned with other paper productions (3.7 million tons) due, in particular to an increase of the former (+4.7%) and a decrease of the latter (13.5%). This trend confirms the technological replacement process in the publishing and data storage sector and the gradual increase of online purchases that saw an acceleration, particularly in the last year – due to the effects of the Coronavirus on purchasing habits.

"The year 2020 will be remembered as, among other things, the year of e-commerce and delivery".

In fact, the number of on-line purchases soared due to the world pandemic-related restrictions. The health emergency had a dual effect on trade: on one hand it encouraged consumers to use online channels more often in all the steps of the purchasing process – pre and post-sale – and, on the other, it forced vendors to review their digital strategy and invest in the implementation and/or strengthening of their interaction and sales channels. The change brought about by the pandemic promoted the success of e-commerce also among small Italian enterprises, which were encouraged to approach the digital channel much more than they did in the past and to appreciate its potentials.

APPARENT PAPER AND BOARD PACKAGING CONSUMPTION

4.6 million tons

According to the estimates of Osservatori.net of the Milan Polytechnic university, the dynamism of the e-commerce market in 2020 is also demonstrated by the shipments of e-commerce orders that increased by 35%, or approximately 420 million parcels. This means that over 1 million parcels for e-commerce alone circulate in Italy every day – a significant packaging flow that can turn out an opportunity for the recycling industry.

"In 2020, about 369,700 tons of packaging were used to ship goods from on-line commerce in Italy".

Food expenses recorded the highest growth rates, and online purchasing habits persisted even after the lockdown, with 36% of households considering this as the most convenient option, as well as the safest one, in health terms, to avoid high-risk contacts. The growth rate recorded for the food & grocery category – which includes the home delivery of both meals and grocery, i.e. fresh or packaged food and home or personal hygiene products – was the highest recorded in 2020: +70% vs. 2019 (-2.7 million EUR). Growth in the food & grocery business changed the segmentation of shipment packing, as well as the types and the relevant market shares: the use of corrugated board, both for shipment packaging and for protection, accounted for 88% in 2020.

The national recycling system absorbs 5.2 million tons of the flows of materials available from collections, approximately 150thousand tons more (+2.9%) than in 2019. The remaining share of paper for recycling is recycled abroad: the net export balance is confirmed above 1.5 million tons.

Paper and board packaging management confirms and consolidates the achievement of the recycling and recovery targets (87.3% and 94.8% respectively). With an apparent consumption of 4.6 million tons (-6.2% vs. 2019), over 4 million tons were recycled, and 347thousand tons were recovered as energy. These values show that the targets set by directive 2018/852/EC for 2030 (85% recycling) were already met and surpassed at national level 10 years ahead of time. While the 2020 peak mostly originates from the decline of apparent consumption, it shows that the targets set by the rules can be achieved, and all efforts in the next few years should be aimed at consolidating these results.

The paper for recycling market was very weak until the spring of 2020, continuing the trend of 2019. As of the spring of 2020 the uncertainty about the availability of paper for recycling that pervaded all Europe and the sustained demand for paper and board packaging production – resulting, most of all, from the take-off of e-commerce and of food consumptions – reversed the trend. After a first flare in April /May, an exponential growth of prices started in September and is still under way.

But which and how many benefits derive from these efforts? Benefits are both direct and indirect and can be translated into economic values using specific indicators. Comieco's activity alone – 1.45 million tons of packaging managed in 2020 – results into 109 million EUR of benefits if the value of the generated raw materials and of the avoided CO_2 emissions from recycling processes is calculated.

The above figures should be seen in combination with the positive impact of non-disposal, of new job generation and, more generally, of civic value in terms of territorial protection.

TABLE 6
PAPER AND BOARD PACKAGING RECOVERY AND RECYCLING TARGETS ACHIEVED IN 2020.

SOURCE: COMIECO

Recycling and recovery rate calculation	Year 2020	Δ 2019/2020
	t	%
Apparent paper and board packaging consumption	4,633,559	-6.18
Waste paper and board packaging contained in paper and board for recycling of the 1.01 and 1.02 type, recycled in Italy	537,133	14.12
Waste paper and board packaging contained in paper and board for recycling of the 1.04 and 1.05 type, recycled in Italy	2,210,377	1.04
Waste packaging recycled abroad	1,300,007	-2.29
Total waste paper and board packaging conferred for recycling	4,047,517	1.47
Paper and board packaging recovered as energy	347,323	-7.87
Recovered paper and board packaging	4,394,840	0.66

	Year 2020
Recycling %	**87.35%**
Energy recovery %	**7.50%**
Recovery %	**94.85%**

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

TABLE 7
DIRECT AND INDIRECT BENEFITS OF MANAGED PAPER AND BOARD PACKAGING. 2020 DATA.

SOURCE: CONAI - TOOL LCC

The benefits generated by managed packaging recycling (1.2 million tons) in 2020 can be estimated at 109 million EUR. The aggregate data for 2005-2020 amounts to benefits for over 1.3 billion EUR, calculated as the value of raw materials and of the avoided emissions.

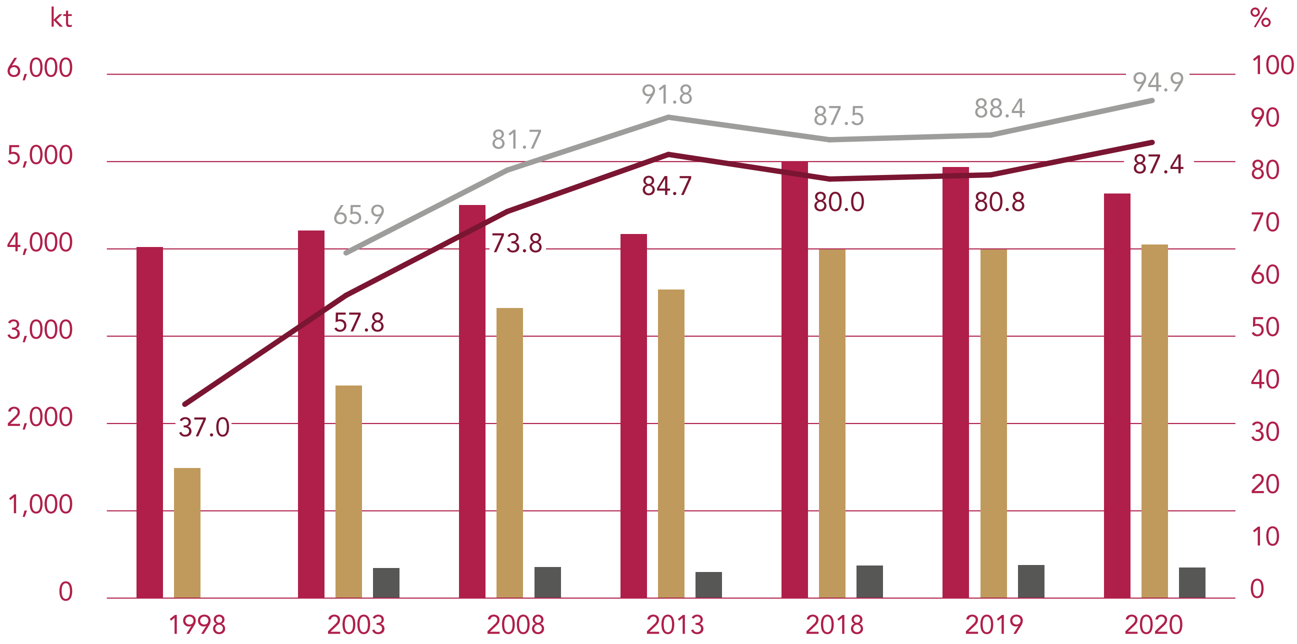
Indicators within the CONAI boundaries (managed by Comieco)			
Indicator		**2020**	**Total 2005-2020**
Amount of conferred packaging	kt	1,450	16,908
Fractions for recycling	kt	1,450	16,908
Fractions for energy recovery	kt	0	0
Fractions intended for other forms of disposal	kt	0	0

Environmental benefits			
Indicatore		**2020**	**tot. 2005-2020**
Saving of raw material, paper	kt	1,233	16,500
Electric power produced from energy recovery	TJ	0	0
Thermal power produced from energy recovery	TJ	0	0
Primary energy saving through recycling	TJ	17,721	223,960
CO_2 production avoided through recycling	kt CO_2 eq	1,227	15,196
CO_2 production avoided through energy recovery	kt CO_2 eq	0	0

Economic value				
Category			**2020**	**tot. 2005-2020**
Direct benefits	Economic value of the secondary raw material obtained from recycling	Million EUR	35	861
	Economic value of the power produced from energy recovery	Million EUR	0	0
Indirect benefits	Economic value of the avoided CO_2 emissions	Million EUR	74	492
Overall benefits		**Million EUR**	**109**	**1,353**

FIGURE 12
PAPER AND BOARD PACKAGING RECYCLING AND RECOVERY TARGETS ACHIEVED. 1998-2020 HISTORICAL DATA SET.

SOURCE: COMIECO



- **APPARENT PAPER AND BOARD PACKAGING CONSUMPTION (T X 1000)**
- **TOTAL WASTE PAPER AND BOARD PACKAGING FOR RECYCLING (T X 1000)**
- **PAPER AND BOARD PACKAGING RECOVERED AS ENERGY OR WASTE-BASED FUEL (T X 1000)**
- **RECYCLING RATE (%)**
- **RECOVERY RATE (%)**

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 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/ EC	Directive 2018/852/ EC	Directive 2018/852/ EC
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) between 25% and 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 surpassed as early as in 2004 (4 years ahead of time)	80.4% met and surpassed as early as in 2009 (16 years ahead of time)	87.4% met and surpassed in 2020 (10 years ahead of time)

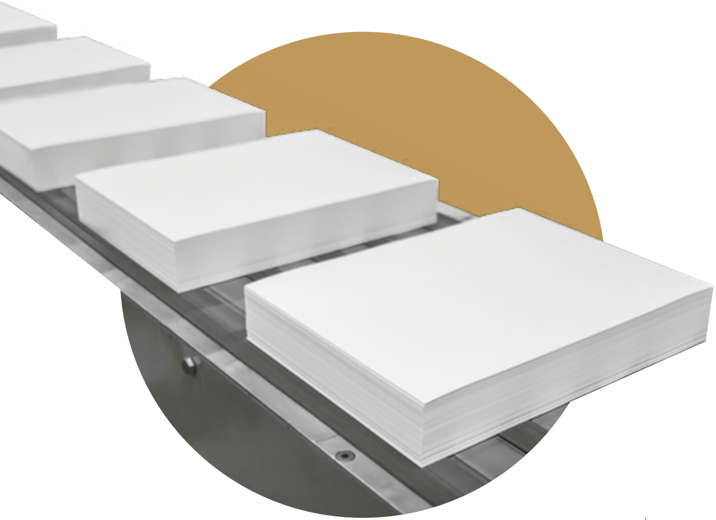


TABLE 8
PAPER AND BOARD PACKAGING PRODUCTION IN 2020.

SOURCE: ISTAT DATA PROCESSED BY ASSOCARTA AND ASSOCARTA ESTIMATES

The development of consumption patterns emerges from the data. While the increase of e-commerce supports the packaging segment, gradual digitalization is evident from graphic paper segment indicators.

		Production (A)	Import (B)	Export (C)	Apparent consumption (A+B-C)
Paper and board packaging (Paper, board, cardboard)	t	4,799,432	3,230,602	1,628,676	6,401,358
Δ 2019/2020	%	4.7	-2.6	13.5	-1.0
Other paper and board (Paper for graphic and hygienic-sanitary use)	t	3,735,977	1,633,383	1,996,105	3,373,255
Δ 2019/2020	%	-13.5	-16.6	-16.3	-13.4
Total paper production	t	8,535,409	4,863,985	3,624,781	9,774,613
Δ 2019/2020	%	-4.1	-7.8	-5.1	-5.6

TABLE 9
CONSUMPTION, IMPORT, EXPORT OF PAPER FOR RECYCLING AND APPARENT COLLECTION*. 2019-2020 VARIATIONS.

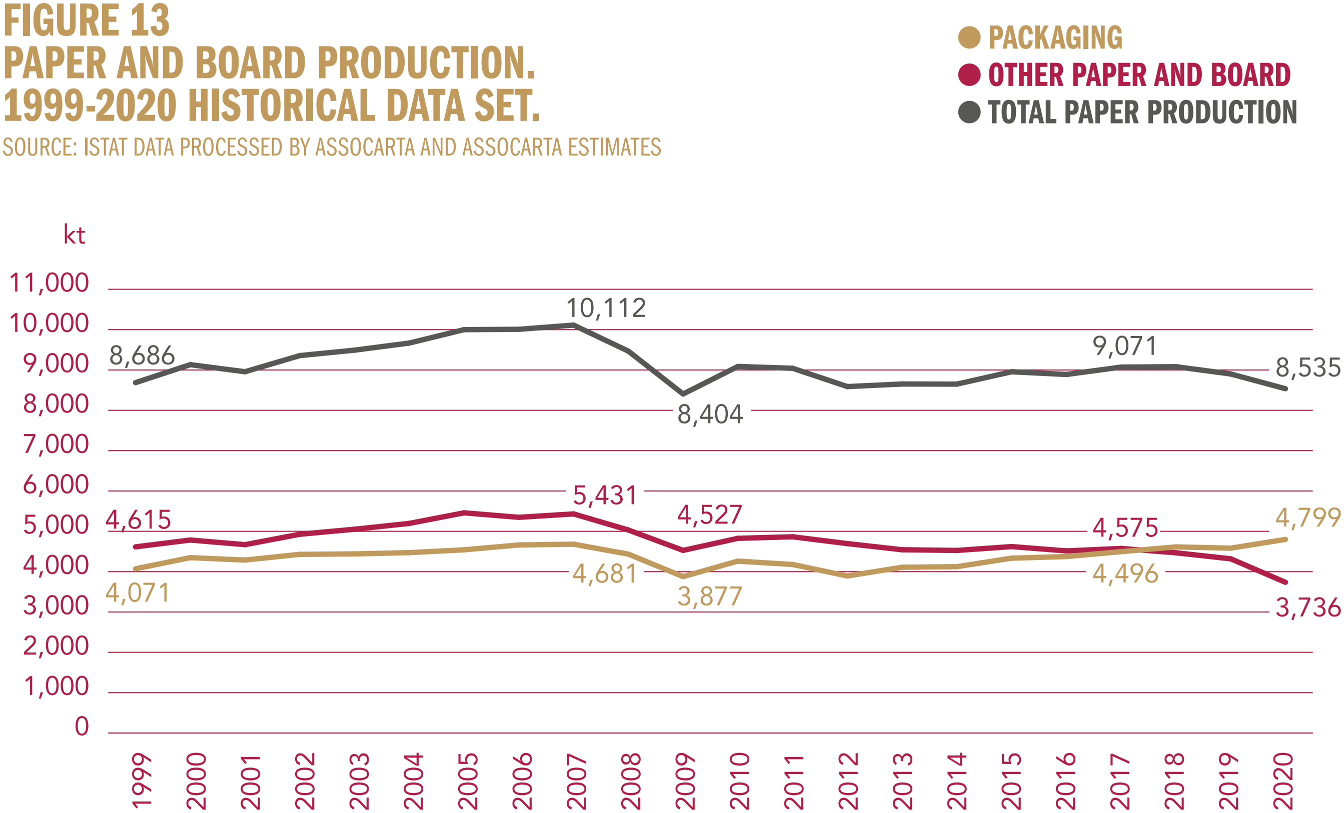
SOURCE: ASSOCARTA DATA PROCESSED BY COMIECO

		Import (A)	Export (B)	Consumption (C)	Apparent collection* (B+C-A)	Net exports (B-A)
2019	kt	311	1,816	5,060	6,565	1,505
2020	kt	247	1,812	5,207	6,772	1,565
Δ 2019/2020	%	-20.5%	-0.2%	2.9%	3.2%	4.0%

**Apparent collection: Consumption - Import + Export.*

FIGURE 13
PAPER AND BOARD PRODUCTION. 1999-2020 HISTORICAL DATA SET.

SOURCE: ISTAT DATA PROCESSED BY ASSOCARTA AND ASSOCARTA ESTIMATES



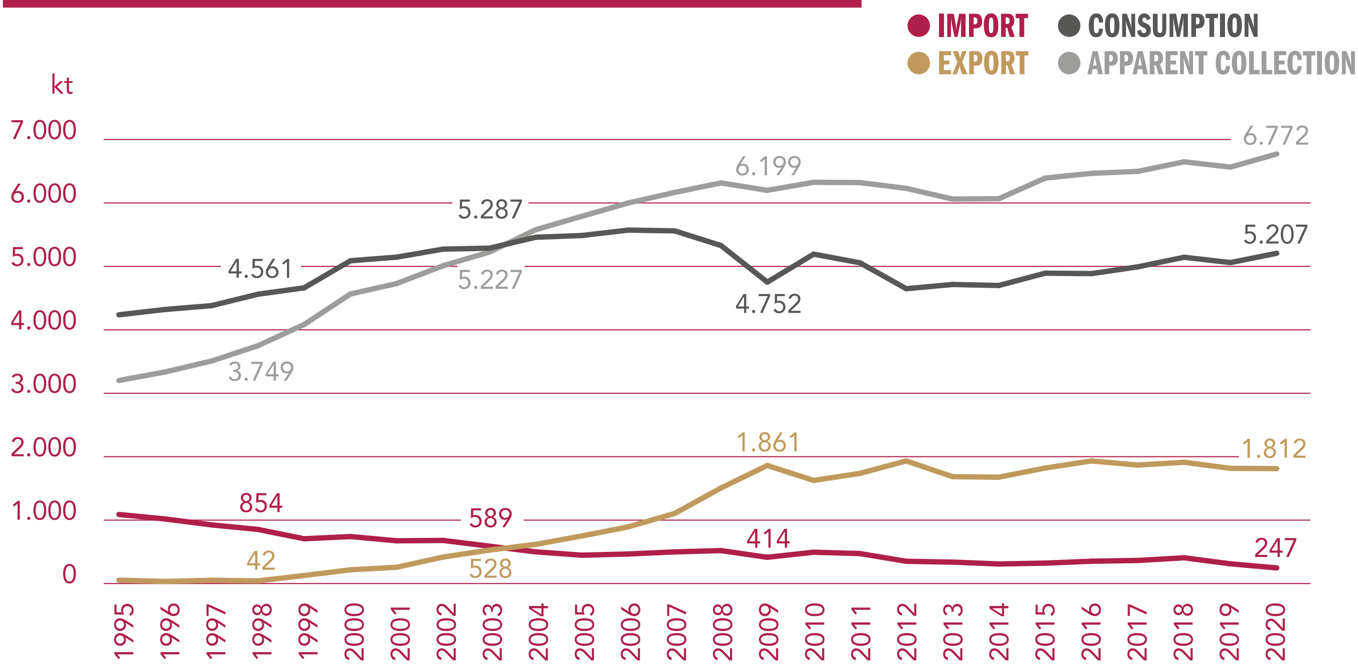
									1999/2020		2019/2020	
		1999	2003	2008	2013	2018	2019	2020	Δ kt	Δ %	Δ kt	Δ %
Paper and board Packaging	kt	4,071	4,440	4,434	4,109	4,614	4,582	4,799	729	17.9%	217	4.7%
Other paper and board	kt	4,615	5,051	5,033	4,543	4,467	4,319	3,736	-879	-19.0%	-583	-13.5%
Total paper production	**kt**	**8,686**	**9,491**	**9,467**	**8,652**	**9,081**	**8,901**	**8,535**	**-150**	**-1.7%**	**-365**	**-4.1%**

FIGURE 14
CONSUMPTION, IMPORT, EXPORT OF PAPER FOR RECYCLING AND APPARENT COLLECTION* - 1998-2020 PERIOD.

SOURCE: ASSOCARTA DATA PROCESSED BY COMIECO

The domestic consumption of paper for recycling is increasing above 5.2 million tons. Net exports confirm a balance of more than 1.5 million tons.

								1999/2020		2019/2020	
		1998	2003	2008	2013	2019	2020	Δ kt	Δ %	Δ kt	Δ %
Import	kt	854	589	520	338	311	247	-607	-71.1	-64	-20.5
Export	kt	42	528	1,507	1,685	1,816	1,812	1,770	4,214.5	-4	-0.2
Consumption	kt	4,561	5,288	5,329	4,715	5,060	5,207	646	14.2	147	2.9
Apparent collection	kt	3,749	5,227	6,316	6,062	6,565	6,772	3,023	80.6	207	3.2
Net export	kt	-812	-61	987	1,347	1,505	1,565				

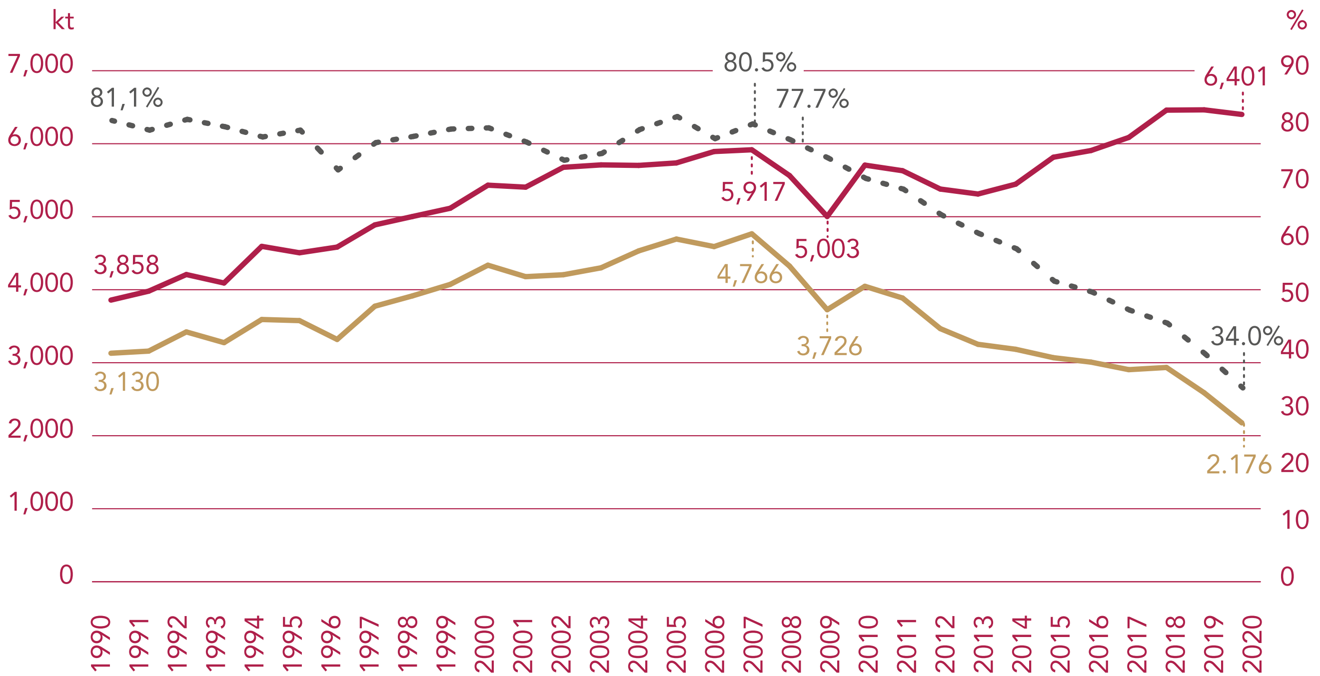


*Apparent collection: Consumption - Import + Export.

FIGURE 15
RATIO OF APPARENT GRAPHIC PAPER CONSUMPTION AND PACKAGING. 1990-2020 HISTORICAL DATA SET.

SOURCE: ASSOCARTA DATA PROCESSED BY VALUE QUEST

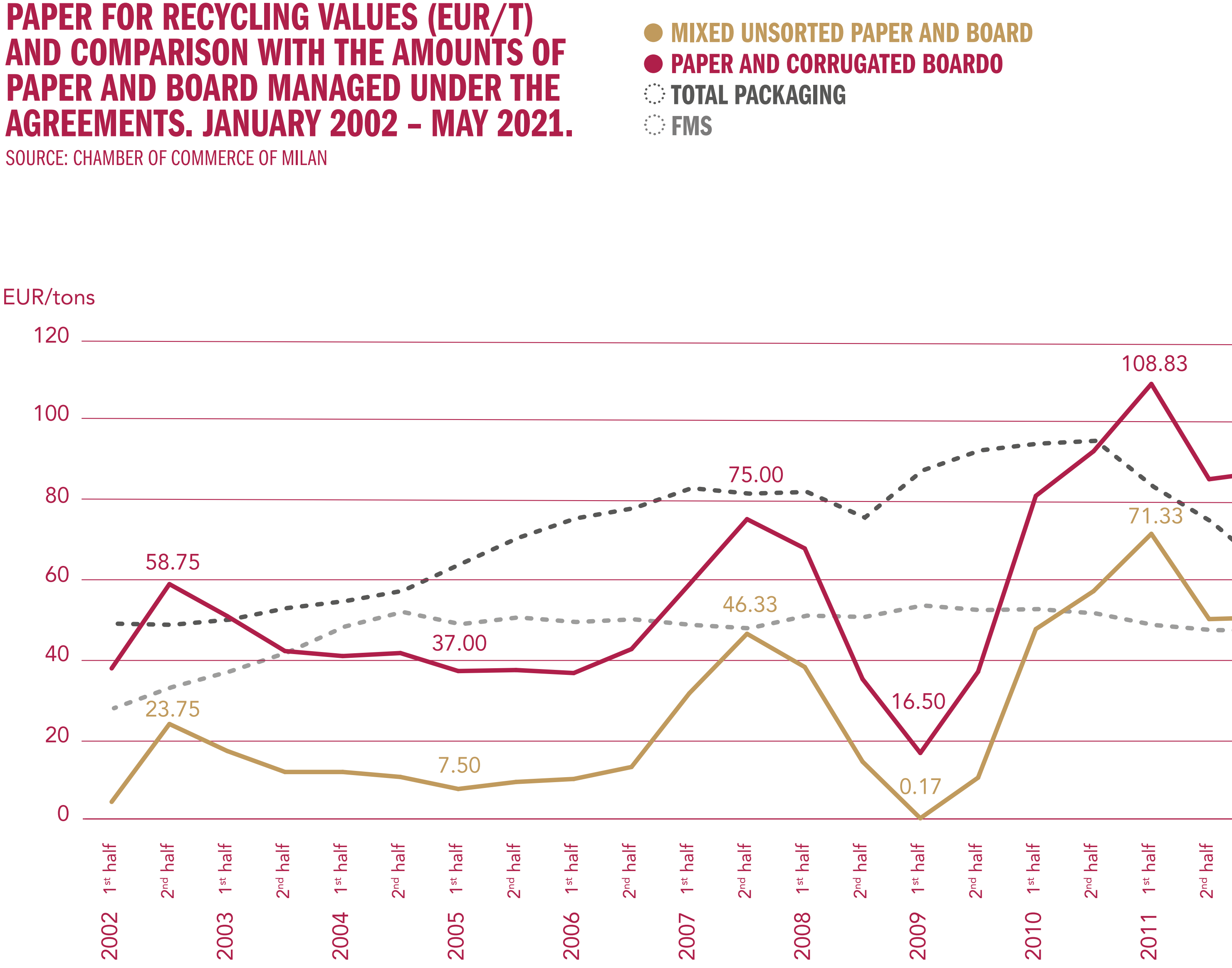
● GRAPHIC PAPER
● PACKAGING PAPER AND BOARD
◌ GRAPHIC PAPER/PACKAGING RATIO

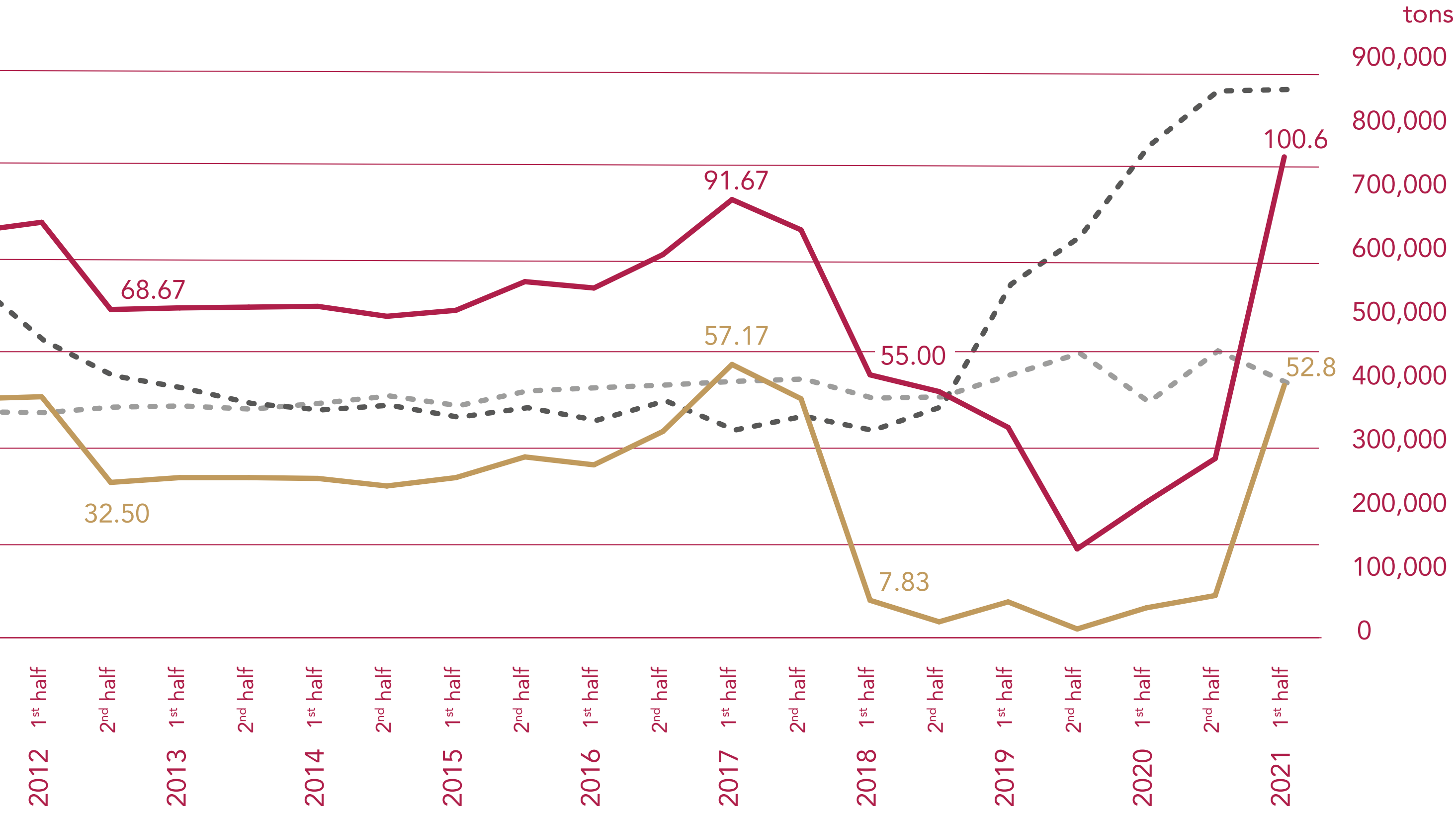


The ratio of graphic paper consumption to packaging paper consumption was gradually reversed over time. This phenomenon emerged in 2009 and developed for graphic paper, in particular, until values fell below the 1990 threshold. The different composition of the consumption mix also brings about a significant change in the "quality" of collection and in subsequent issues connected with the reprocessing of paper for recycling. This misalignment was exacerbated in 2020.

FIGURE 16
PERIODICAL RECORDING OF AVERAGE PAPER FOR RECYCLING VALUES (EUR/T) AND COMPARISON WITH THE AMOUNTS OF PAPER AND BOARD MANAGED UNDER THE AGREEMENTS. JANUARY 2002 – MAY 2021.

SOURCE: CHAMBER OF COMMERCE OF MILAN





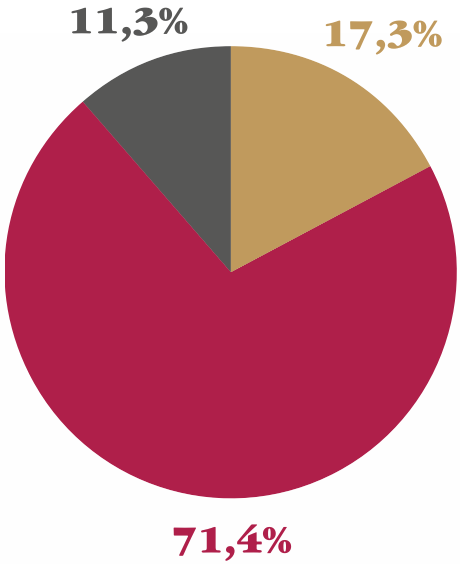
tons
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
100.6
91.67
68.67
57.17
55.00
52.8
32.50
7.83
2012 1st half
2nd half
2013 1st half
2nd half
2014 1st half
2nd half
2015 1st half
2nd half
2016 1st half
2nd half
2017 1st half
2nd half
2018 1st half
2nd half
2019 1st half
2nd half
2020 1st half
2nd half
2021 1st half

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 2019 data is updated on the ground of the ISPRA data for the provinces; the related data (area and national totals, per-capita, etc.) is updated accordingly.

Data processed by the Entities and/or organizations in charge of monitoring or managing waste flows (ISPRA, Regions, Agencies, Provinces and Work Groups, ANCI, Cities, operators, plants, etc.) is mainly used to determine separate paper and board collection levels.

The data thus acquired is overlapped with and compared to the data available to Comieco within the framework of its activity (management of the agreements) to ensure consistency and, if necessary,



to carry out further focused reviews. Processing is usually carried out at province level but, in specific cases, a more in-depth analysis is performed (e.g. Cities) for an assessment as accurate as possible.

Where "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 2020 evaluations, constituting the object of this Report, the share of estimated data increases: 71.4% of collection data comes from third-party sources, 17.3% refers to the amounts managed directly by the Consortium, i.e. disclosed by the parties to the agreements as provided for by the Technical Annex (without any other sources), and 11.3% is based on estimated amounts.

Data processed as at June 2021.

SOURCES AND METHOD.
SOURCE: COMIECO

- ESTIMATED BY COMIECO
- MANAGED UNDER THE AGREEMENTS
- OTHER SOURCES

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National Consortium for Recovery and Recycling of Paper and Board Packaging

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