30th

REPORT

Collection and recycling of paper and board

Data for the year

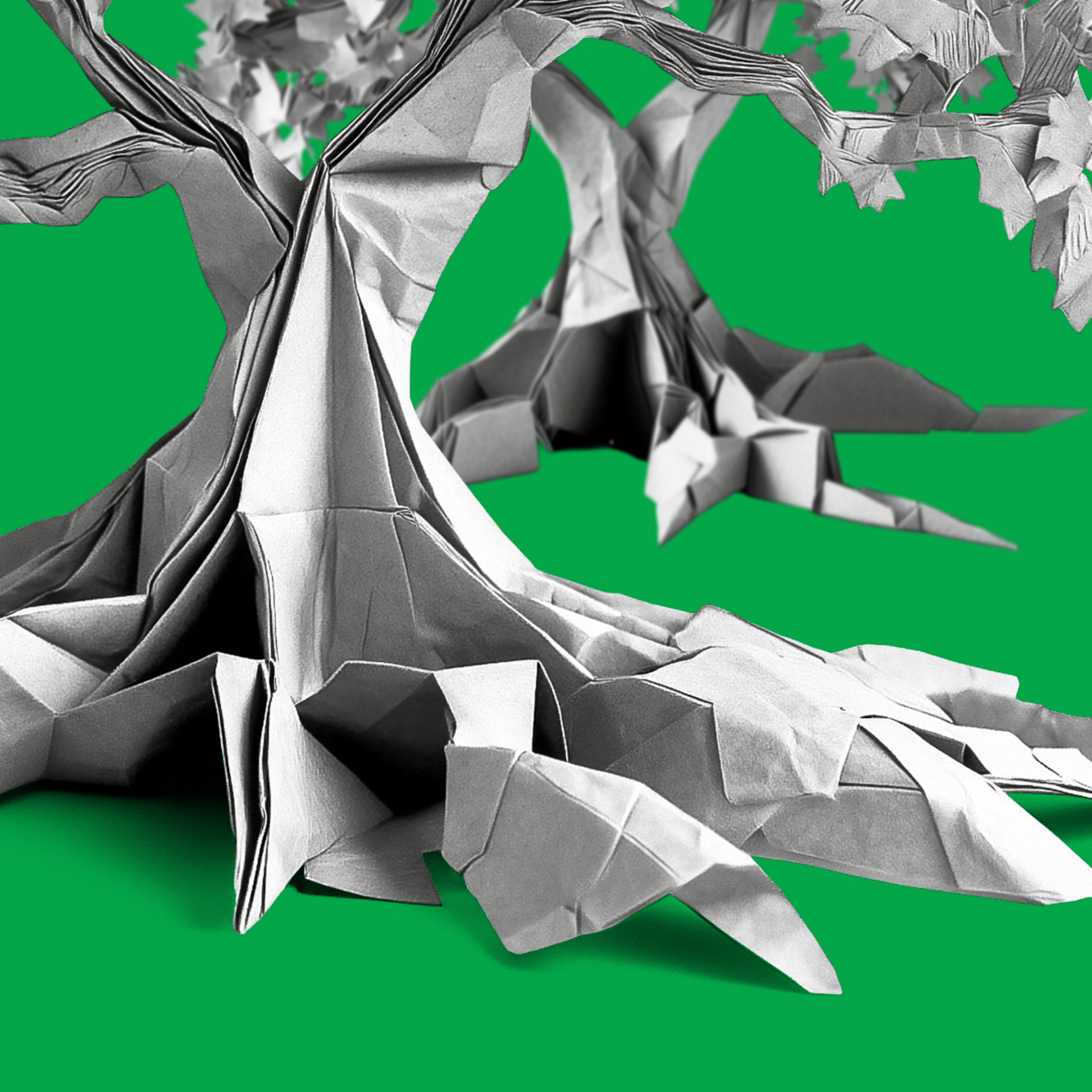
2024

July 2025

30TH ANNIVERSARY SPECIAL EDITION

WITH A COMMENT BY EDO RONCHI

President of the Foundation for Sustainable Development and former Minister of the Environment



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"Plants demonstrate that real strength lies in the community: a forest is not the sum of individual trees, but rather an interconnected network where each element supports the next.

And nothing is wasted in this network: what is waste to us is a fundamental resource for new life to nature".

Stefano Mancuso

INTRODUCTION
AMELIO CECCHINI
CHAIRMAN

Each recoverable and recyclable material has a story of its own. The story of separate collection and recycling of paper and board in Italy is also the story of Comieco. AND COMIECO IS US.

Whatever the numbers, which are broadly detailed on the following pages and in the appendix dedicated to the 30th anniversary of the Report, including a special comment by Edo Ronchi,
I wish to dedicate this introduction to the journey from our roots to our present state.

We are driven by an inspiration that you surely recognized in the image selected for the cover of this edition. A true circular economy reaches far beyond mere technology or numbers and digs its roots into the cultural sharing, regeneration, and restitution mindset. Hence the forest metaphor - a collective and interdependent organism where cooperation and resilience are more crucial than competition - that pervades our narrative: a model where waste becomes nutrition, resources circulate, and true strength is in connections.

This annual report does not just disclose results and statistics, but most of all celebrates the connections that made our progress possible.

Because, like in a forest, each element plays a role, and each role is vital. Each of us - whether a citizen, a student, or a professional operator - like a tree of the same "urban forest", played, plays, and will play a crucial role in the past 40 years of separate paper and board collection and recycling in Italy and in the next.

Back in 1985, when the waste emergency became evident, a small group of private entrepreneurs in the paper business gave life to Comieco, the Committee for Environment-friendly Packaging.

It was the beginning of a silent, yet overwhelming revolution, which transformed our society in terms of economy, of role of the local authorities, of our daily habits, and of the very concept of sustainability. The EC packaging Directive of 1994 and the Ronchi Decree of 1997 outlined a circular system where all the players operate in synergy under the leadership of CONAI and of the Pipeline Consortia.

The Committee then developed into the Consortium as we know it today - a non-manufacturing no-profit facility that operates in a transparent, effective, and efficient manner to support Italy in its progress towards excellence, surpassing all the European paper and board packaging recycling targets ahead of time and thus generating economic, social, and environmental benefits for the community at large.

The recycling economy, and the Italian recycled-paper industry in particular, is among the country’s most dynamic, not just as part of waste management, but also as a crucial component of our industrial and economic fabric.

Comieco was established 40 years ago with this mission, and numbers speak for themselves: it first created the culture and early relations between the Cities and the recycling pipeline; then, with the Agreements with the Italian Cities effective within the CONAI System since 1998, separate paper and board collection increased almost fourfold in Italy, from 1 to over 3.8 million tons/year in 2024. This is even more evident in the South and Islands, where collection was only occasional and related to the presence of local paper mills. On the other hand, services are available everywhere today, and numbers have increased twenty-fold. Collected and recycled paper and board are now, a valuable resource for Italy, as much as they used to be in the past.

The recycling economy, and the Italian recycled-paper industry in particular, is among the country’s most dynamic, not just as part of waste management, but also as a crucial component of our industrial and economic fabric.

This virtuous system generates positive impacts in all respects. In short, paper and board recycling bring profits for everyone. These positive impacts enhance our 40th anniversary. Happy birthday to US as citizens, public administrators, collection service operators, waste management system operators, and managers of paper mills, paper production and packaging usage systems.

THE CIRCULAR PAPER AND BOARD ECOSYSTEM IN ITALY PERFORMANCE AND POTENTIALS

CARLO MONTALBETTI
GENERAL MANAGER

Regeneration. Connections. Trust. For forty hears these three elements have been promoting the national paper and board collection system. Like earth, seeds, and water that time and care have first transformed into buds, then into a luxuriant forest. Starting from the idea of a possible future and representing (in these years) one of the best examples of the all-Italian ability to combine environment, economy, and social development under the umbrella of circularity.

A network that brings together cities, citizens, schools, companies, and institutions, like trees in connection with each other. A true ecosystem that we discuss, with the relevant numbers, in this annual report, now at its thirtieth edition starting, as usual, from the numbers of separate collection, a virtuous habit that is deeply rooted in citizens' life also in 2024.

The care that makes the forest grow in time is a true example of "people's environmentalism."

The Italians and the "blue" dumpster
One of the reasons why the national paper and board recycling system has reached the same heights as a luxuriant forest is that its roots dig deep into the daily life of the citizens through separate waste collection. The quantities conferred to public collection systems in 2024 exceeded 3.8 million tons, with a 3.5% increase over 2023. Each Italian citizen contributed to this achievement by duly sorting out 65 kg of paper and board waste, with the South and Islands surpassing the 50 kg per-capita threshold for the first time.

Separate waste collection is a crucial lever to trigger virtuous circularity - less waste in landfills and more materials introduced into the industrial recycling pipeline.
In its 40 years of life Comieco contributed to strengthen this mechanism by linking together all the parts of the ecosystem - citizens, public administrations, companies - with economic, social, as well as environmental benefits.

According to the researchers of NeXt Economia and Fondazione Symbola, the circular economy developed around paper and board recycling in Italy, and guaranteed by Comieco, produces a return on investments of up to 688%. In short, with the CONAI Environmental Contribution, each euro invested in the pipeline generates a value of just less than seven euros. A resource multiplier, capable to translate good environmental practices into widespread wellbeing for the community at large.

Beyond the EU 2030 target: Italian excellence in paper and board packaging recycling
Like in all forests, in the paper and board recycling one each tree participates in the stability and development of the ecosystem and helps it respond to season-related changes.

Likewise, after a decline in 2023, the paper packaging sector showed some recovery in 2024. Total paper production increased by 6.2% to almost 8 million tons, and domestic recovered-paper consumption grew by 210,000 tons. This translated into an increased demand for material for recycling in Italy, also as a result of a strengthened domestic recycling capacity. The paper and board packaging recycling rate is higher than 90%, far above the 85% EU target (Directive 94/62/EC).

In summary:

- small decline of apparent paper and board packaging consumption (-1%);
- reversal of raw material import (+12.7%) and export (+11.2%) dynamics vs. 2023;
- increase of recovered paper management, with an increase of imports (+7.2%) and domestic consumption (+3.8%), whereas exports declined (-10.6%).
- global domestic collection (apparent collection) remained substantially unchanged (-0.8% vs. 2023);
- increase of domestic recovered paper use by 210,000 tons, which points out to an increased demand for the material in Italy, also as a result of a strengthened domestic recycling capacity;
- recovered paper is still the main source of cellulose fibre for the paper-making industry, and contributes to keep the paper and board packaging recycling rate above 90%, far above the 85% EU target (Directive 2018/852/EC).

The market prices of paper for recycling in 2024 were quite volatile, with a fluctuating trend that continues in early 2025. Gradual convergence of values between cardboard and mixed paper recovered from 1.01+1.02 is recorded, also influenced by an increased content of packaging in household collection and by a higher ratio of mixed recovered paper vs. cardboard, due to a greater amount of fibrous raw materials, crucial for qualitative standards in the recycling industry.

Municipal paper and board collection:
lifeblood nourishing the country's circular economy
As noted above, the roots of the national recycling system dig deep into the daily habits of the Italian

population through separate waste collection, the lifeblood of the circular economy. While separate paper and board collection grows by 3.5% at national level (also due to the accounting of additional similar waste flows originating from households), the picture is more varied at local level. Northern Italy is the leader with a 4.4% increase, mostly attributable to Veneto, Piedmont, and Emilia-Romagna (the best per-capita result with 99.7 kg/inhabitant per year), whereas the South and Islands continue to improve, albeit to a more limited extent, and record a 2.5% increase. While Molise and Sicily record the highest percent and volume increases, Sardinia confirms its best per-capita annual yield (60.5 kg/inhabitant per year).

As indicators of trends in the macro-areas, the six big cities monitored in the report (Turin, Milan, Florence, Rome, Naples, and Palermo) account for almost 12% of the Italian population and generate 13% of the total national volume of waste. Such monitoring highlights encouraging signs for 2024, with an increase of global separate collection and, more specifically, of paper and board collection and a parallel decrease of mixed waste. This is a sign that the gap is gradually shrinking also in big metropolitan areas, which traditionally pose complex waste management challenges. Starting from the data contained in the report, projections for 2024 point out to substantially stable total urban waste production in Italy, estimated at just below 29.7 million tons. Meanwhile, an increase of separate waste collection by over 480,000 tons (+2.5%) is recorded, alongside a small decline of mixed waste (-48,000 tons). The overall effect is a further improvement of separate collection, which now exceeds 67% at national level.

The average paper and board capture rate vs. total urban waste increased by one percent point to 13.5%. In this respect, in 2024 Comieco continued to pursue its strategic mission to give new life to the amounts of paper and board packaging that continue to escape separate collection and to end up in landfills or incinerators, particularly in southern regions and in big urban centres that are, in fact, the main areas for development of nation-wide paper and board collection.

The medium-term target (3-4 years) is to raise the capture rate to at least 14%, thus surpassing 4 million tons of collected material per year, with an increase by more than 200,000 tons vs. the present levels.

In the longer term, the goal is to reach a capture rate between 15% and 16%, with an expected increase by at least 600,000 tons up to the global threshold of 4.5 million tons. This is a strategic environmental and industrial action, which is crucial to respond to the increase of the national recycling capacity and to the national demand for paper for recycling.

In this respect, the activity of Comieco, combining the circularity and the competitiveness of the paper-making sector, is perfectly in line with the spirit of the report by Mario Draghi aimed at revamping productivity in the EU, with the guidance of the Clean Industrial Deal of the European Commission, and with the upcoming Circular Economy Act, expected in 2026.

The agreement-based system: Comieco serving the Cities to achieve excellence in separate collection

According to scholar and naturalist Suzanne Simard, each forest has its “mother trees,” well-rooted specimens that - as she writes - act as “hubs for the forest’s communication, protection, and sensitivity,” while providing nutrition and stability to young plants. Such definition is perfectly fit for the role that Comieco plays in the paper and board recycling system. The Consortium’s guarantee and subsidiarity provide operational support, while acting as lifeblood ensuring continuity and development even in the most challenging areas and in the toughest seasons.

Through agreements and flow management, Comieco allows the younger and less organized parts of the system (the Cities, particularly in the South and Islands) to find nourishment and thrive, thus strengthening the entire circular-economy “forest” of the Country and ensuring that no part is left behind in the journey towards full sustainability.

In 2024 the Consortium provided for the recycling of almost 2.5 million tons of paper and board (including over 1.5 million tons of packaging), i.e. 63.8% of national municipal collection. The allocated considerations - over 220 million EUR - increased by 15.4% vs. 2023, more than managed collection (+4.7%). Despite the high number of agreements in force (almost one thousand, including over three-quarters in the South and Islands), there is still a lot to do to rationalize services and ensure equal standards and cost reductions across the entire country.

As expected, the amounts subject to the agreements in 2023 increased by about 110,000 tons, mostly due to market uncertainties that forced the Cities and the operators to use the agreements according to the windows provided for by the Framework Agreement for the paper sector.

The future is most of all a matter of quality
According to numbers, separate collection is increasingly fit to feed the national recycling system. However, a thriving forest is not just about increasing volumes: these should also grow through responsible management. Collection quality, in fact, is still a huge challenge, considering that wrong conferments result into the presence of unsorted waste that jeopardizes the efficacy and cost-effectiveness of recycling. This makes each player fundamental.

Citizens can do their own share by duly separating paper and board packaging from plastics and metal (such as staples, cellophane, or duct tape). Choosing the right container to prepare packaging for collection is also important: as specified by CAM, dedicated reusable containers or paper bags must be used.

Service operators are, in turn, requested to use effective equipment and to ensure regular emptying and pick-up to minimize initial impurities and reduce process scraps. A paper-making industry like the Italian one, a leader in Europe in terms of circularity and renewability, requires top-quality raw materials deriving from thoughtful collection and recycling.

The Plan for the South and the NRRP

The quality challenge goes hand in hand with the quantity challenge. Significant volumes of paper and board - packaging and similar fractions - escape from national collection, including more than half in southern regions, and to capture these volumes, Comieco operates the Plan for the South with an extraordinary allocation of 3.5 million EUR, strengthening the Consortium's effort in the South.

The plan for the southern regions adds up to several targeted initiatives under way across the national territory, such as the development of separate collection in specific sectors (fast food, large-sized bags, consumption on the move and at big events) and the effort to increase the recycling of composite paper-based packaging, often used by companies and constituting the object of the new European Packaging Regulation (PPWR).

The increase of collection quantity and quality should go hand in hand with the development of Italy's industrial recycling capacity. The construction of plants provided for by the so-called "Flagship Projects" of the National Recovery and Resilience Plan (NRRP), which allocates about 106 million EUR to the paper-making sector and co-funds 58 plants (including 39 in the Centre and South), represents a significant contribution, combined with private investments for about 400 million EUR.

These investments have an extraordinary boosting effect, particularly in the South and Islands: according to estimates, jobs are increasing in Sicily and Campania by 14% and 4%, respectively, every year.

In summary, the numbers contained in this report confirm the appropriateness of the formula by which, with strong stakeholder relations, the Italian pipeline is unrivalled at enhancing renewability and circularity, which are part of the DNA of paper and board.

We are well equipped to consolidate and improve the achieved results, to create an even thicker, healthier, and more thriving paper and board recycling forest, which demonstrated - in the last forty years - its ability to combine environmental protection with economic growth, social benefits, and industrial competitiveness consistently with the reduction and sustainability targets set by the new PPWR and in line with the economic challenges of the Clean Industrial Deal of the European Commission and of the upcoming Circular Economy Act.

3.86 million tons

MUNICIPAL PAPER AND BOARD COLLECTION VOLUME

+131 thousand t

VS. 2023

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

2024: PAPER AND BOARD COLLECTION IS AN URBAN FOREST THAT CONTINUES TO GROW

In 2024, the global volume was close to 3.9 million tons, with a 131thousand ton increase (+3.5% vs. 2023). Such increase is comparable to combined collection in Sardinia, Basilicata, Molise, and Vallée d'Aoste. While the per-capita yield reached 65.4 kg/inhabitant at national level, the 50 kg/per inhabitant threshold was surpassed, as mentioned, in the South and Islands (50.2 kg).

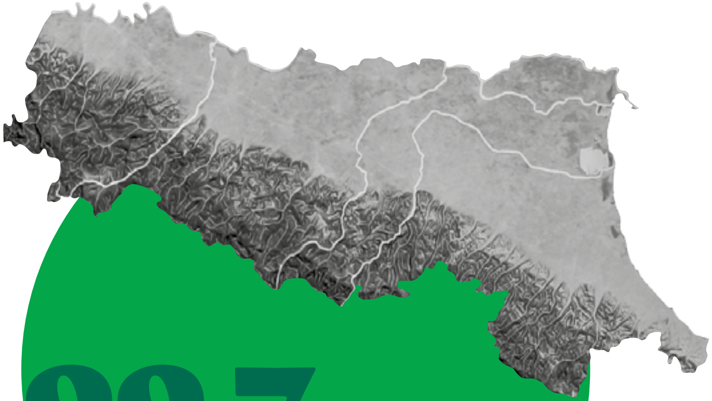
The variation highlights a positive scenario and is the result of increased additional flows and of the new accounting of municipal collection data, which also includes similar waste.

According to estimates, additional flows amount to about 80thousand tons in 2024, with 50thousand tons originating from households, possibly as a result of the inclusion of household-like waste in collection.

In 2024 **Northern** Italy was the leader in municipal paper and board collection, with the following records vs. 2023:

- Largest additional volume at macro-area level (over 83thousand tons).
- Best percent increase among the macro-areas (+4.4%).
- Best regional percent increase (+9.5% in Veneto).
- Highest regional per-capita value (Emilia-Romagna with 99.7 kg/inhabitants-year).
- Region with the highest absolute volumes (Lombardy with over 613thousand tons).

A more detailed analysis highlights the areas with the highest growth rates - Veneto, Emilia-Romagna, and Piedmont - while the other regions record less significant increases or stability. It should be noted, however, that a non-negligible share - at least one-third - of growth in the three "leading" regions derives from the amount of similar waste that is gradually found within municipal collection.



99.7 kg/ab

REGIONE CON MIGLIOR PRO-CAPITE: EMILIA-ROMAGNA

"Free" of this share, the global increase in the North is anyway close to 3% and confirms the region's ability to improve service efficiency.

The 23.7thousand ton increase in the Centre resulted into an even stronger upward trend (+2.8%) than in 2023.

The new volumes mostly come from Latium (+13.5thousand tons), with a significant role of Rome (+10thousand tons) as the result of actions on cardboard collection services. Next come Umbria (+4.9 tons), which shows the highest percent increase (+7.8%), and Tuscany (+2.8 tons), confirmed as the leader in terms of annual per-capita yield (82.8 kg/inhabitant-year). After a three-year decline (2021-2023), Marchess have resumed their growth (+2.4%).

The South and Islands continued to increase, albeit at a somewhat slower pace compared to their potential, but no declines were recorded in any region.

Global collection reached 992thousand tons, just below the one-million threshold, with an additional 23.8thousand tons (+2.5 vs. 2023) constituting the smallest increase among the macro-areas (which, however, include similar waste in their increase). Molise obtained the greatest percent increase (+6.2%), Sicily achieved the best volume increase (+10thousand tons), and Sardinia recorded the best annual per-capita yield (60.5 kg/inhabitant-year).

Positive results are also recorded in Campania (+6.9thousand tons, +3.0%) and other regions, with a stable, yet more limited, upward trend. The data for the South should be considered within the framework of the service development process initiated by Comieco with the Plan for the South, aimed at supporting the Cities in achieving further growth through structural and communication actions.

While other areas in the Country show an advanced performance, the South and the Islands, in particular, display excellent results alongside still untapped potentials.

Overall growth is estimated to surpass at least 500thousand tons per year in this region, equally divided between packaging and other types of paper. This highlights the important role of public and private players in the system that, through infrastructures, skills, and accountability, contribute to overall progress, as in a community of trees.

+9.5%

REGION WITH THE HIGHEST PER-CAPITA INCREASE: VENETO

+4.4%

NORTH MACRO-AREA WITH THE HIGHEST PER-CAPITA INCREASE

Compared to last year's estimates, which pointed out to a widespread decline in urban waste generation, projections to 2024, suggest substantial stability of the total amounts of waste produced in Italy, estimated at approximately 29.7 million tons.

A disaggregation of the figure between separate collection flows and remaining share shows a steady growth by over 480thousand tons (+2.5%) of the materials separated at the origin and a small decline - by half percent point (-48thousand tons) - of mixed waste.

The overall effect is a further improvement of the general separate collection performance, which surpasses 67% at national level. The average paper and board capture rate vs. total urban waste increased by one percent point to 13.5%.

TABLE 1 MUNICIPAL SEPARATE PAPER AND BOARD COLLECTION BY REGIONS. YEARS 2021-2023 AND 2022-2023 VARIATIONS.

SOURCE: COMIECO

Note: data 2023 adjusted by approximately 25,800 tons. Updates concern various regions and the relevant macro-areas.

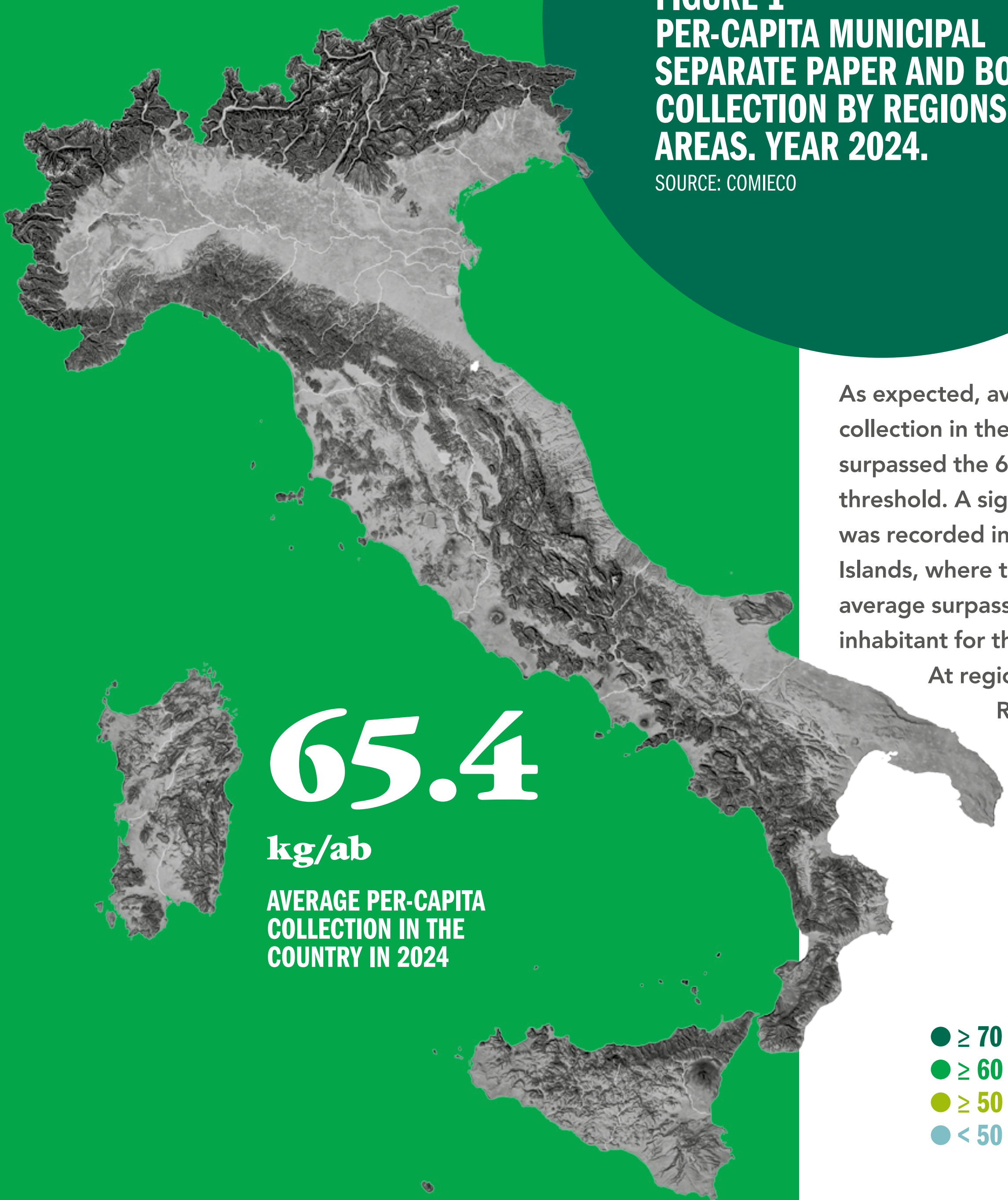
Municipal paper and board collection in the selected regions is historically based on a double-origin system: materials collected by the operator on public surfaces (urban-like household and non-household waste) and waste produced within the City but originating from private surfaces. The estimated ratio is four-fifths from public surfaces and one-fifth from private surfaces

Region	2022	2023	2024	Δ 2023/2024	
	t	t	t	t	%
Piedmont	313,423	308,024	317,422	9,398	3,1
Vallée d'Aoste	9,981	9,914	9,984	69	0,7
Lombardy	584,846	606,320	613,304	6,984	1,2
Trentino-Alto Adige	76,870	78,682	78,227	-454	-0,6
Veneto	287,908	316,447	346,471	30,024	9,5
Friuli-Venezia Giulia	70,333	72,064	75,857	3,793	5,3
Liguria	102,407	110,740	112,939	2,199	2,0
Emilia-Romagna	401,699	412,695	444,093	31,398	7,6
North	**1,847,467**	**1,914,885**	**1,998,297**	**83,411**	**4,4**
Tuscany	323,092	300,504	303,358	2,854	0,9
Umbria	62,826	63,400	68,347	4,947	7,8
Marchess	104,051	101,779	104,224	2,445	2,4
Latium	368,046	378,025	391,493	13,468	3,6
Centre	**858,014**	**843,708**	**867,422**	**23,714**	**2,8**
Abruzzo	70,706	69,769	70,402	634	0,9
Molise	10,973	11,807	12,544	737	6,2
Campania	223,647	230,619	237,543	6,924	3,0
Puglia	198,915	207,827	210,300	2,473	1,2
Basilicata	26,659	27,719	28,351	632	2,3
Calabria	94,299	92,967	95,139	2,172	2,3
Sicily	222,456	233,235	243,233	9,998	4,3
Sardinia	93,215	94,714	94,915	201	0,2
South and Islands	**940,870**	**968,656**	**992,428**	**23,772**	**2,5**
Italy	**3,646,352**	**3,727,249**	**3,858,147**	**130,897**	**3,5**

The South continues to grow and is just a few tons short to reach the symbolic one-million threshold; most additional volumes continue to originate from Sicily. Just more than 18% of new volumes come from the Centre, with an interesting achievement of Umbria. At national level, consistently with housing density, more than 50% of the overall volume and 63% of additional collection vs. 2023 are concentrated in the North.

FIGURE 1
PER-CAPITA MUNICIPAL SEPARATE PAPER AND BOARD COLLECTION BY REGIONS AND AREAS. YEAR 2024.

SOURCE: COMIECO



65.4

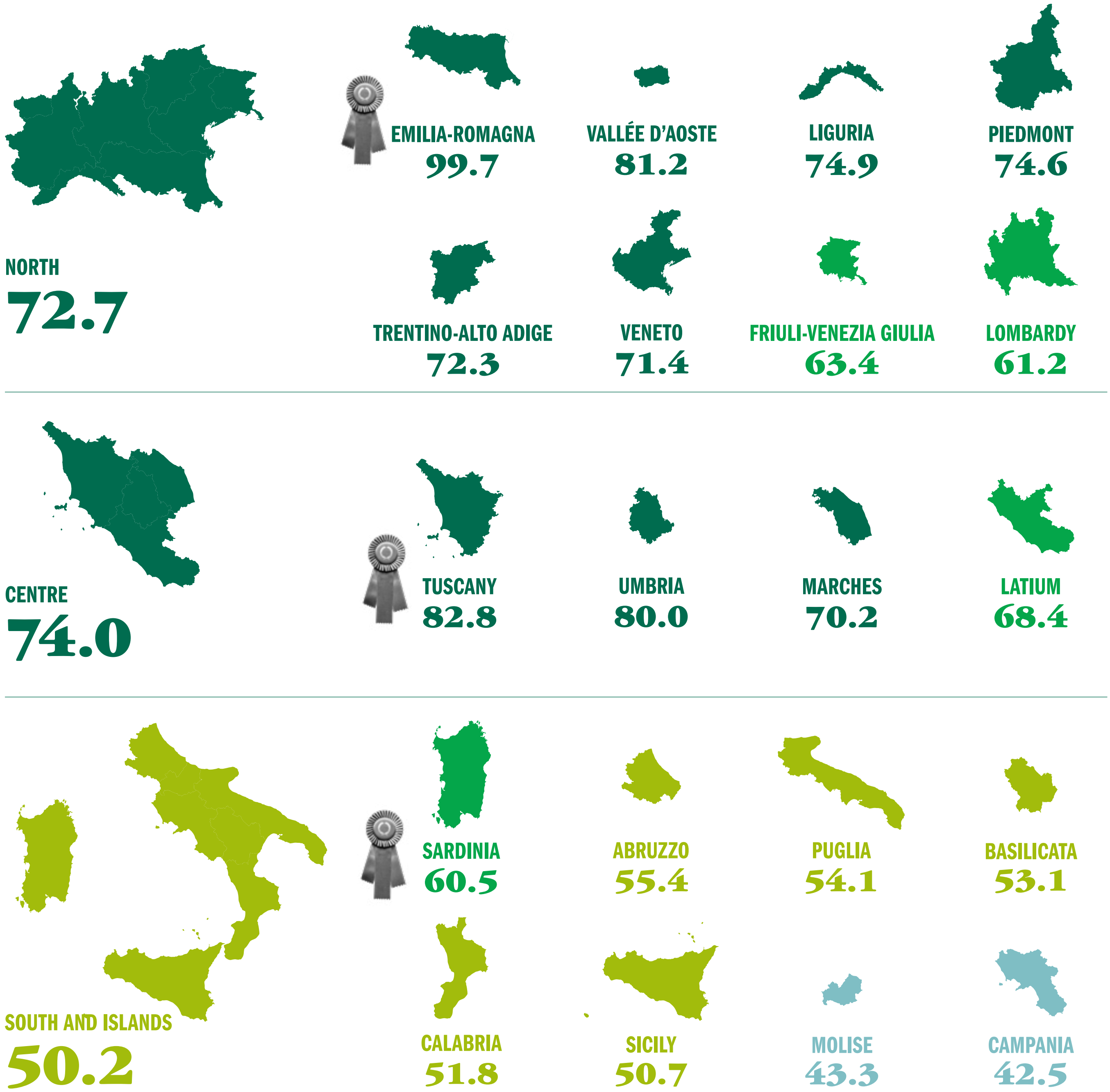
kg/ab

AVERAGE PER-CAPITA COLLECTION IN THE COUNTRY IN 2024

As expected, average per-capita collection in the Country in 2024 surpassed the 65 kg/inhabitant threshold. A significant increase was recorded in the South and Islands, where the per-capita average surpassed 50kg per inhabitant for the first time.

At regional level, Emilia-Romagna, Tuscany, and Sardinia are the leaders in the respective macro-areas for the fourth year in a row.

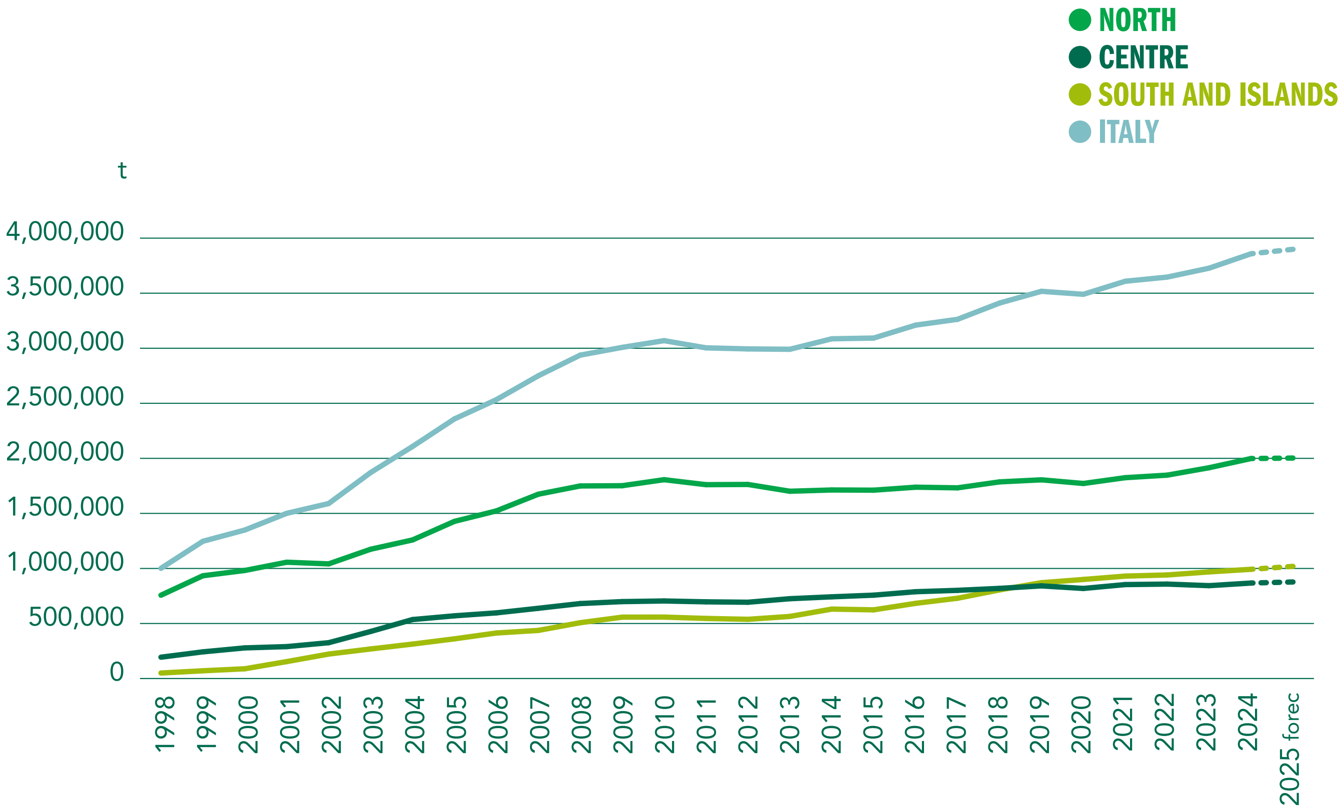
- ≥ 70 KG/AB YEAR
- ≥ 60 – < 70 KG/AB YEAR
- ≥ 50 – < 60 KG/AB YEAR
- < 50 KG/AB YEAR



EMILIA-ROMAGNA
99.7
VALLÉE D'AOSTE
81.2
LIGURIA
74.9
PIEDMONT
74.6
NORTH
72.7
TRENTINO-ALTO ADIGE
72.3
VENETO
71.4
FRIULI-VENEZIA GIULIA
63.4
LOMBARDY
61.2
TUSCANY
82.8
UMBRIA
80.0
MARCHES
70.2
LATIUM
68.4
CENTRE
74.0
SARDINIA
60.5
ABRUZZO
55.4
PUGLIA
54.1
BASILICATA
53.1
SOUTH AND ISLANDS
50.2
CALABRIA
51.8
SICILY
50.7
MOLISE
43.3
CAMPANIA
42.5

FIGURE 2
MUNICIPAL SEPARATE PAPER AND BOARD COLLECTION. 1998-2024 HISTORICAL DATA SET AND 2025 FORECASTS.

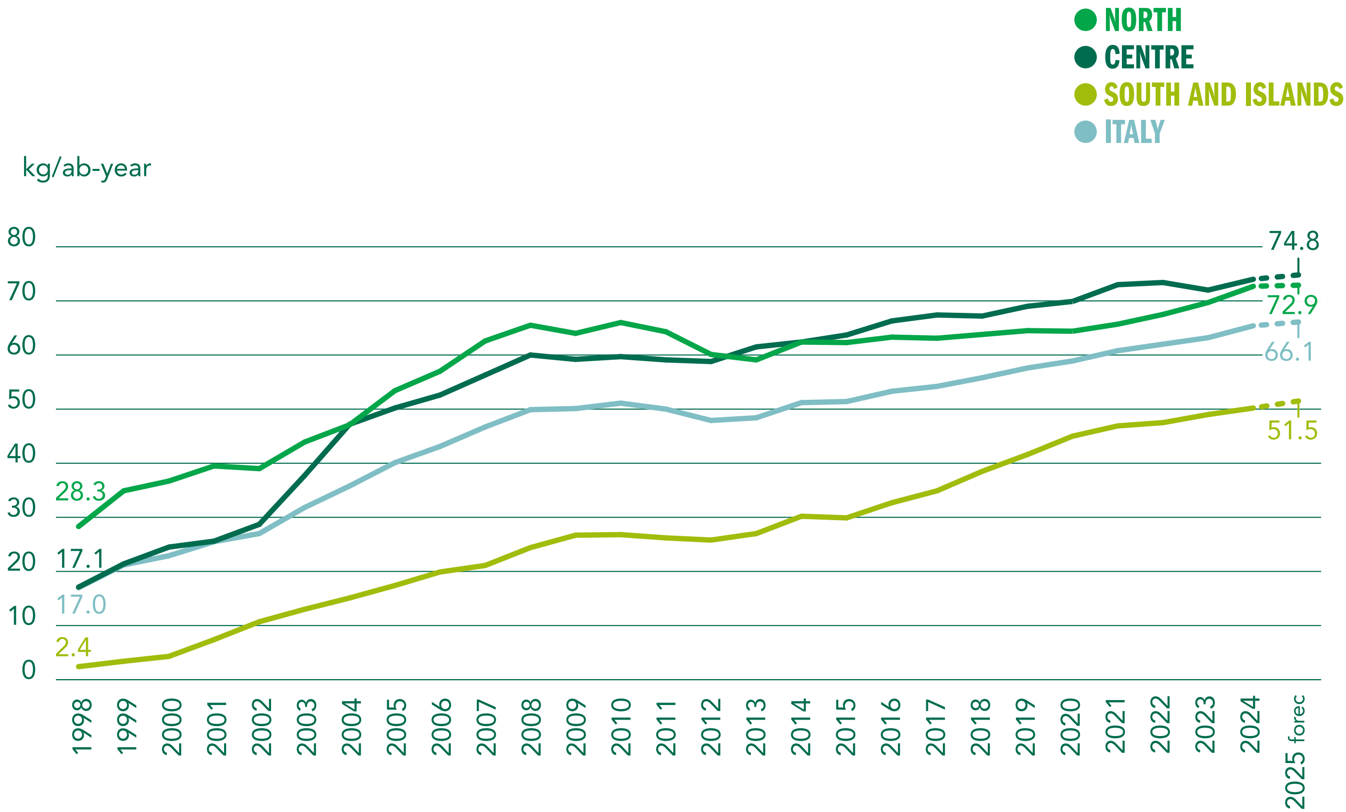
SOURCE: COMIECO



	1998	2024	2025 forecast	Δ 2024-2025 forecast
	t	t	t	t
North	756,813	1,998,297	2,002,723	4,427
Centre	193,958	867,422	877,170	9,748
South and Islands	50,222	992,428	1,018,876	26,448
Italy	**1,000,993**	**3,858,147**	**3,898,769**	**40,623**

FIGURE 3
PER-CAPITA MUNICIPAL SEPARATE PAPER AND BOARD COLLECTION. 1998-2024 HISTORICAL DATA SET AND 2025 FORECASTS.

SOURCE: COMIECO



Based on the above observations, paper and board volumes separated in 2024 on public surfaces can be estimated at approximately 3.5 million tons (with the remaining 300/350thousand tons deriving from private surfaces). However, all the regions have still untapped potentials.

TABLE 2
RATIO OF MUNICIPAL SEPARATE PAPER AND BOARD COLLECTION TO TOTAL URBAN WASTE. 2023 DATA.

SOURCE: ISPRA 2023 DATA

The level of paper capture vs. urban waste and the amount of waste residues - 2023 data - together with the per-capita data, allow better understanding of the actual development of separate collection services. In this table, the regions and the macro-areas are shown in decreasing order by rate of separate paper collection vs. total urban waste. Preliminary data for 2024, albeit very partial, allow to predict that the 11% threshold will be surpassed in the South and Islands, whereas in the Centre-North the value is expected to increase by a few decimals.

Area	Population	Total UW	Mixed UW	Total SC		SC of paper	SC of paper vs. tot UW
	n	kg/ab	kg/ab	kg/ab	%	kg/ab	%
North	27.409.776	516.8	137.6	379.2	73.4	69.9	13.5
Centre	11.740.836	530.2	199.9	330.3	62.3	71.8	13.5
South and Islands	19.832.510	447.7	183.8	263.9	58.9	48.8	10.9
Italy	**58.983.122**	**496.2**	**165.5**	**330.7**	**66.6**	**63.2**	**12.7**

- MORE THAN 14%
- ≥13–14%
- ≥12–13%
- UP TO 12%

Area	Population	Total UW	Mixed UW	Total SC		SC of paper	SC of paper vs. tot UW
	n	kg/ab	kg/ab	kg/ab	%	kg/ab	%
Trentino-Alto Adige	1,075,317	491.8	121.5	370.4	75.3	73,2	14.9
Emilia-Romagna	4,426,929	643.3	147.0	496.2	77.1	93,3	14.5
Piedmont	4,240,736	504.9	162.0	342.9	67.9	72,9	14.4
Basilicata	536,659	354.7	124.5	230.2	64.9	50,8	14.3
Umbria	854,137	522.0	163.0	359.0	68.8	74,2	14.2
Tuscany	3,651,152	587.8	196.2	391.7	66.6	82,0	13.9
Liguria	1,502,624	535.4	223.2	312.2	58.3	73,7	13.8
Vallée d'Aoste	122,955	620.7	189.8	430.9	69.4	84,6	13.6
Marches	1,480,839	518.4	144.4	374.0	72.1	69,1	13.3
Latium	5,707,112	502.0	223.8	278.2	55.4	66,2	13.2
Veneto	4,838,253	499.1	111.5	387.6	77.7	65,4	13.1
Sardinia	1,575,028	453.2	107.3	346.0	76.3	59,1	13.0
Lombardy	9,950,742	474.9	123.9	350.9	73.9	60,9	12.8
Calabria	1,841,300	397.0	178.4	218.6	55.1	50,5	12.7
Abruzzo	1,269,860	456.0	161.4	294.7	64.6	56,0	12.3
Puglia	3,900,852	465.0	190.7	274.3	59.0	53,5	11.5
Friuli-Venezia Giulia	1,192,191	525.6	144.7	381.0	72.5	60,0	11.4
Molise	289,840	379.4	148.7	230.7	60.8	42,4	11.2
Sicily	4,802,016	448.5	200.9	247.6	55.2	48,3	10.8
Campania	5,592,175	462.6	201.0	261.6	56.6	41,3	8.9

BIG CITIES: LIFEBLOOD NOURISHING THE COUNTRY'S CIRCULAR ECONOMY

This report contains an update of 2024 data, with specific focus on the performance of the main Italian cities. For several years, Comieco has been closely monitoring data from Turin, Milan, Florence, Rome, Naples, and Palermo. These six cities, representing the Country's three geographic macro-areas, offer a constant point of observation, as well as a privileged overview over the dynamics of the entire country.

Overall, these cities account for almost 12% of the Italian population (excluding tourist flows) and generate 13% of the total national volume of waste.

This point of observation is, in fact, a small-scale model of the broader national picture, showing all of Italy's urban, productive, and anthropic complexity.

The analysis of the 2024 average reveals encouraging data: total separate collection is increasing, particularly for paper and board, against a decrease of mixed waste. Such increase is greater than the national average.

This is quite comforting, considering that metropolitan areas - particularly Rome, Naples, and Palermo - have been historically identified as the most critical urban centres in terms of waste management and often appeared to lag behind the national average. Current data suggests that the gap is gradually shrinking, also in bigger cities, however with one exception: while Sicily shows a generally positive trend of paper collection, such trend

TOTAL WASTE VS. 2023

+2.0%

is not observed in Palermo, which moves in the opposite direction compared to the other metropolitan areas under scrutiny and to the rest of the region.

Let us imagine that these **six metropolitan areas make up a single entity.** Total per-capita waste production in this macro-city (with a population of almost 7 million generating almost 3.8 million tons of urban waste, including 48% - 1.84 million - collected separately) surpasses national production by over 9%, 2% up vs. 2023. Overall, separate collection has improved by 5.6% vs. 2023.

Paper, in particular, recorded a 4.1% increase, with an average per-capita yield above the national one (70.7 kg/inhabitant-year vs. 65.5 kg/inhabitant-year). At the same time, mixed waste decreased by 1.2%. Focusing on paper and board collection in the six cities, volumes in 2024 surpassed 486thousand tons, equal to approximately 12.6% of the national figure.

FIGURE 4
WASTE COLLECTION IN THE SAMPLE CITIES MILAN, TURIN, FLORENCE, ROME, NAPLES, AND PALERMO. YEAR 2024 AND 2023-2024 VARIATIONS

SOURCE: COMIECO

In this aggregation, the performance of the individual cities shows significant differences:

- **Milan** displays not too significant fluctuations compared to previous years.
- **Turin** is the only city where both mixed waste (+1.9%) and - to the highest extent among all the cities under scrutiny - total separate collection are increasing, the latter with a two-digit result (+10.2%).
- **Florence** stands out the most: total urban waste production (-4thousand tons) is the result of both an increase of separate collection (+8thousand tons) and a combined reduction of waste residues (-12thousand tons). In total separate collection, paper drives the increase with +8.8%, accounting for 29% of total separate collection, with a 2,400 ton increase.
- **Rome** deserves specific scrutiny: overall indicators are positive, partly due to service development. Separate collection in Rome increased by almost 11thousand tons, mostly originating from households and small retail stores.
- **Naples** shows a parallel growth of total separate collection (+7.1%) and of paper collection (+6.3%), vs. stable waste generation and a decrease of mixed waste (-3.9%).
- **Palermo** is the only city that, albeit with minimal differences, sees a decline of paper collection (-1.9%) and an increase of total separate collection (+2.2%).

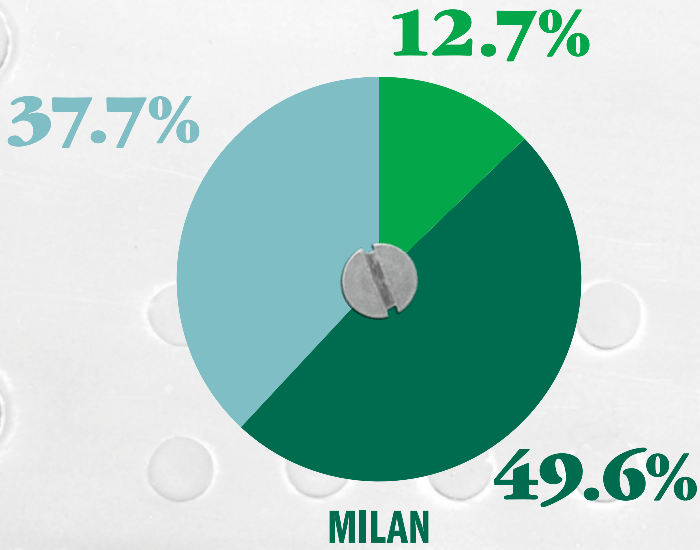
Substantially stable urban waste production is expected in 2025, with a continuous increase of separate collection data.

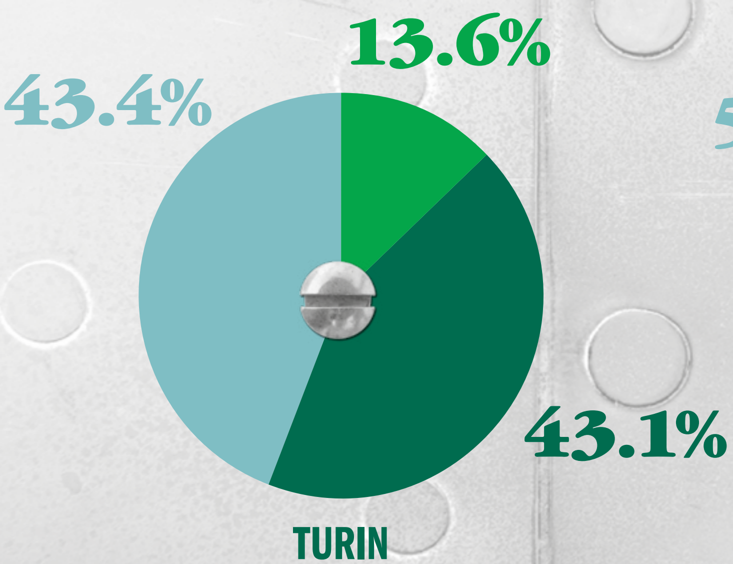
SC of paper and board		Milan	Turin	Florence	Rome	Naples	Palermo	Total
2023	t	79,217	55,775	27,511	247,320	41,712	15,397	**466,932**
2024	t	80,867	57,692	29,925	258,162	44,340	15,107	**486,093**
Δ 2023/2024	t	1,650	1,917	2,414	10,842	2,628	-290	**19,161**
	%	2.1	3.4	8.8	4.4	6.3	-1.9	**4.1**

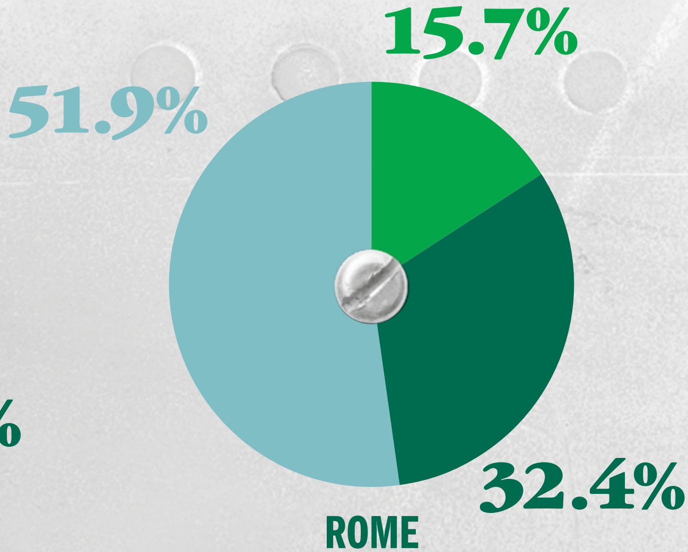
FIGURE 5
WASTE COLLECTION IN THE SAMPLE CITIES MILAN, TURIN, FLORENCE, ROME, NAPLES, AND PALERMO. YEAR 2024.

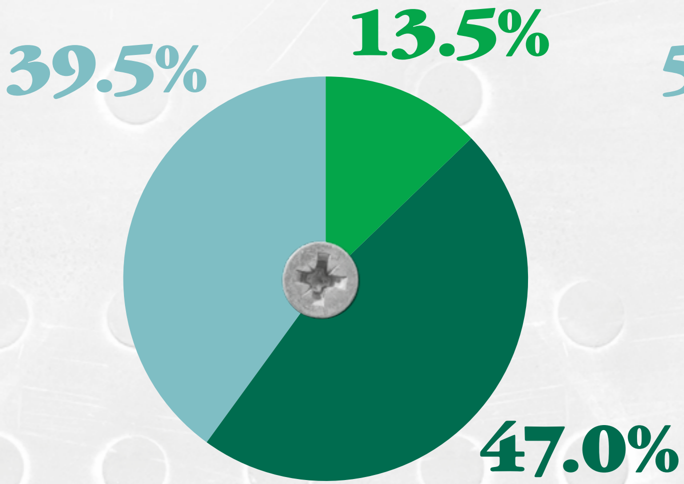
SOURCE: COMIECO

- SC OF PAPER AND BOARD
- SC OF OTHER FRACTIONS
- MIXED UW

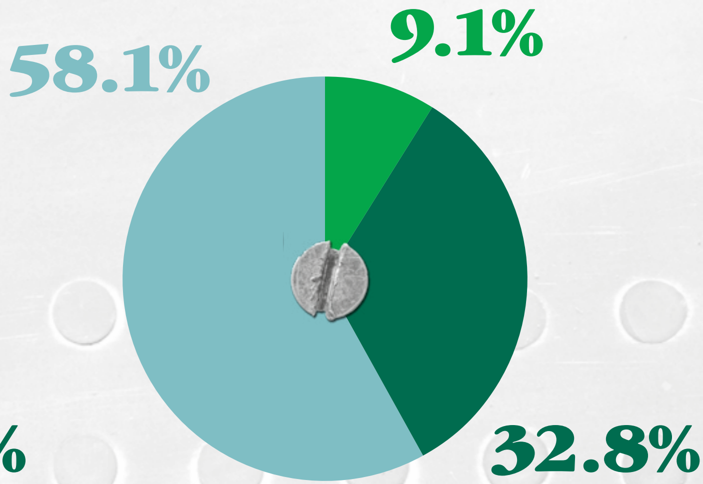




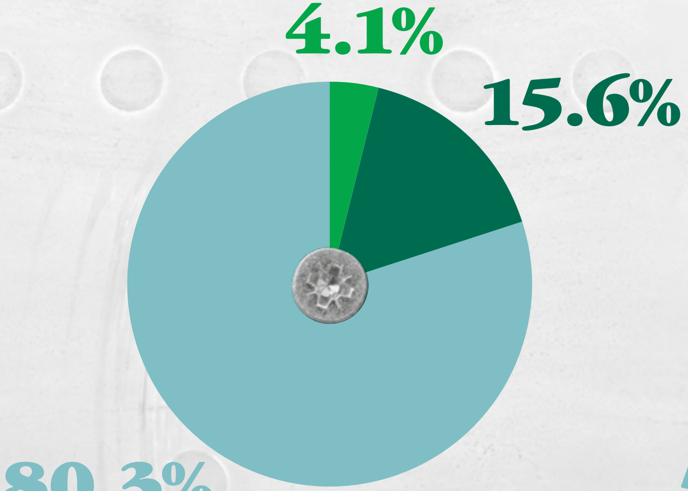




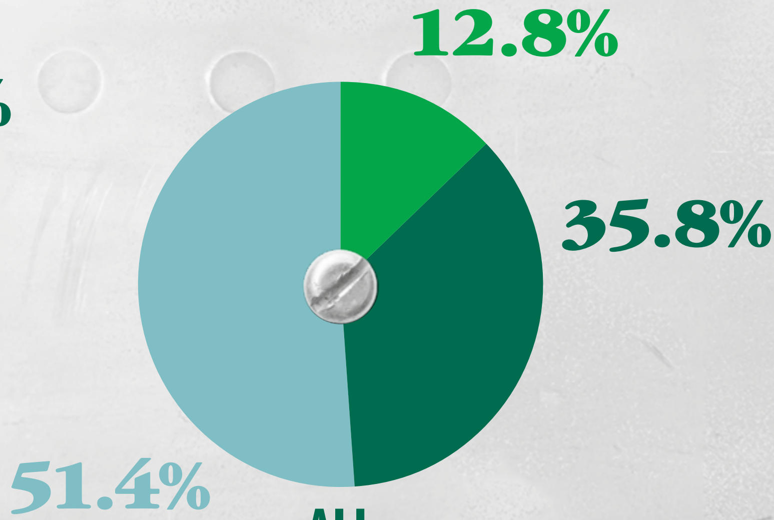
FLORENCE



NAPLES



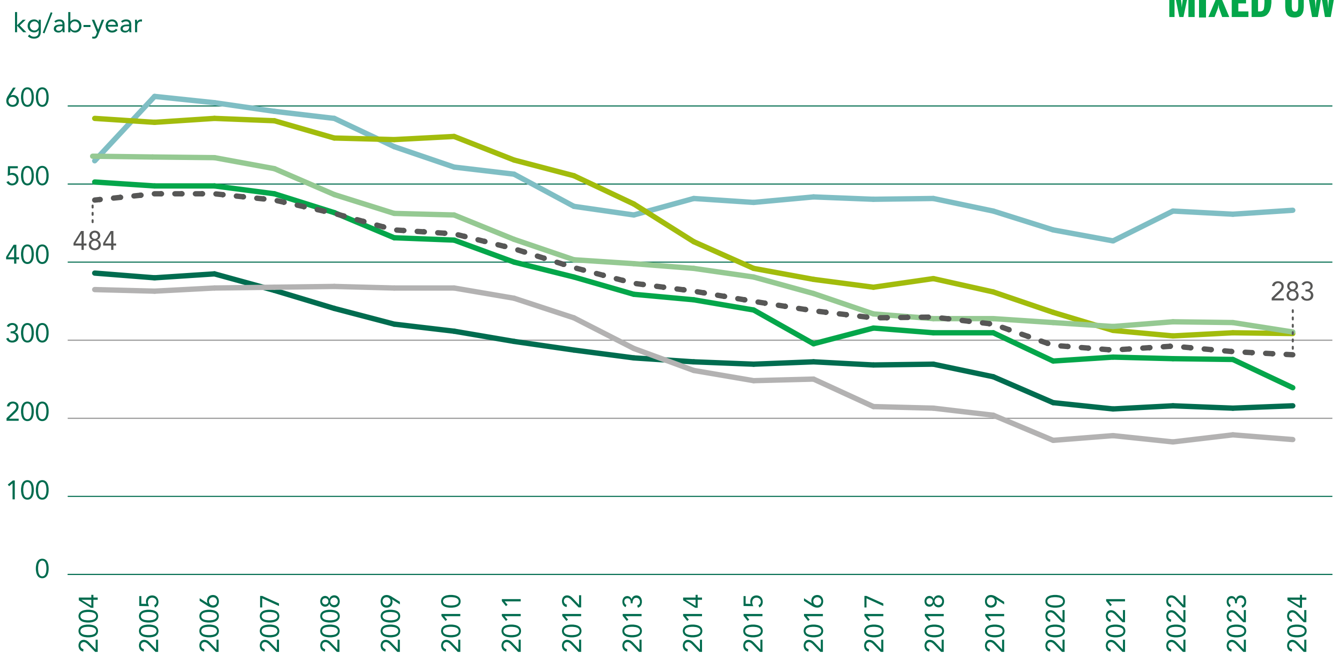
PALERMO



ALL

FIGURE 6
WASTE COLLECTION IN THE SAMPLE CITIES MILAN, TURIN, FLORENCE, ROME, NAPLES, AND PALERMO. PER-CAPITA DATA 2004-2024.
SOURCE: COMIECO

MIXED UW



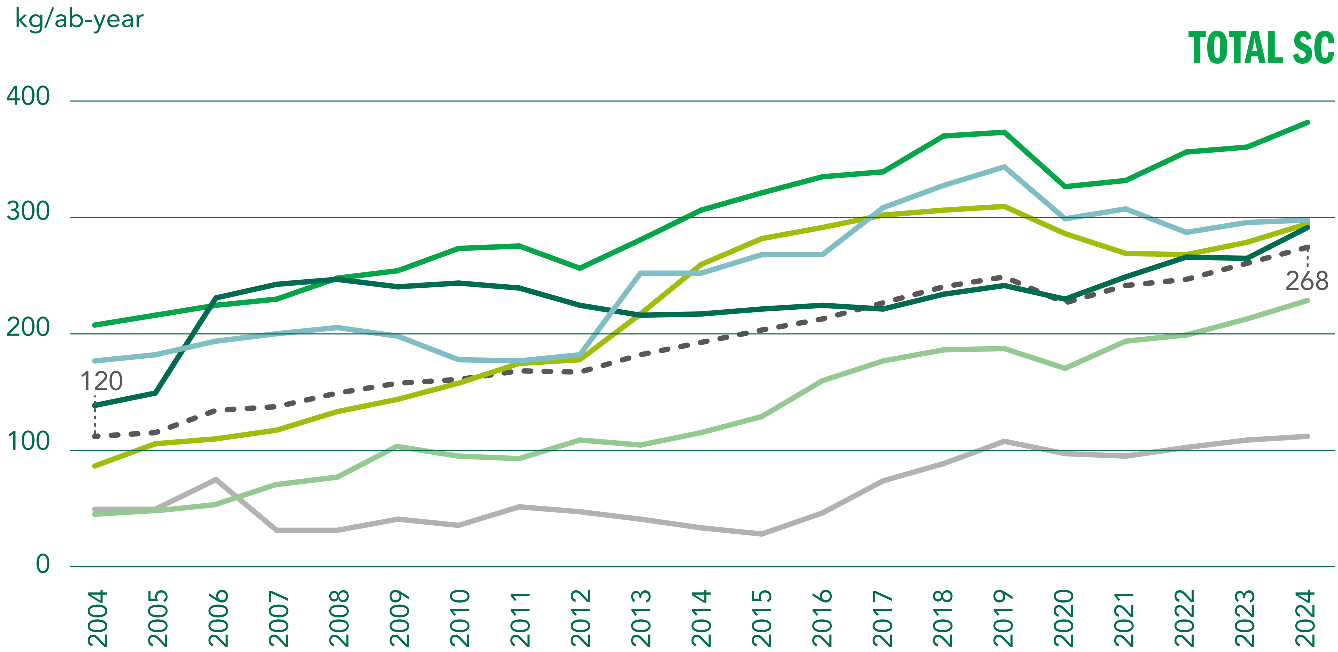
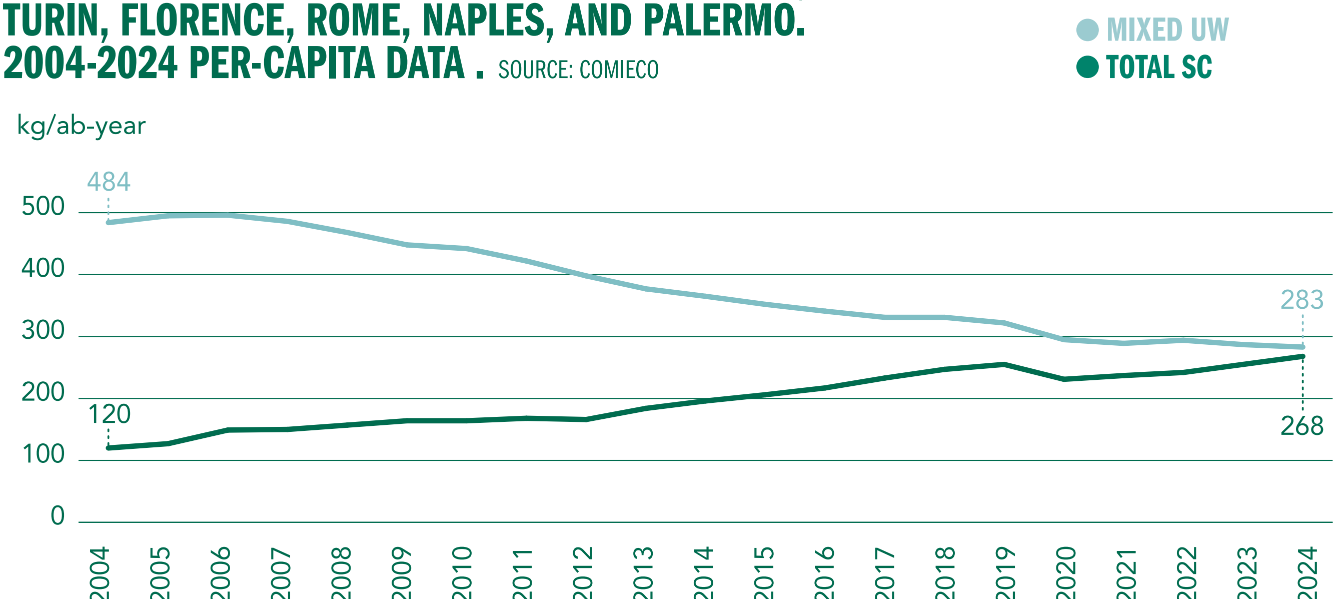
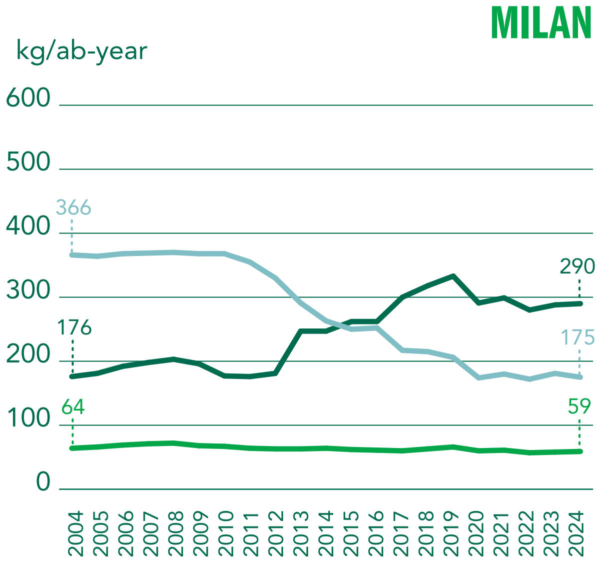
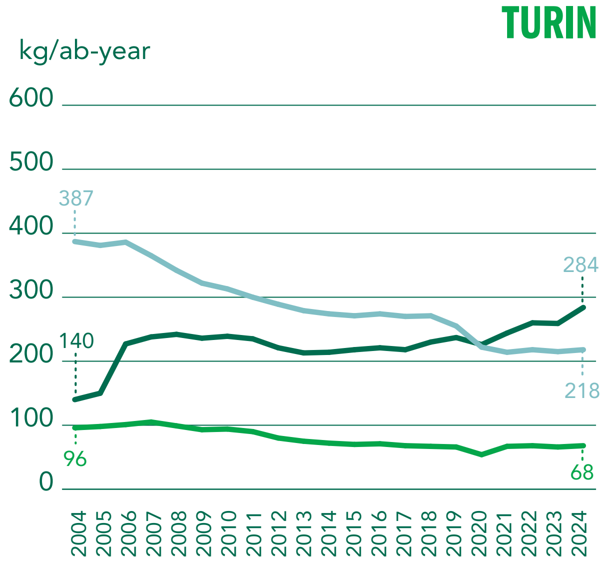
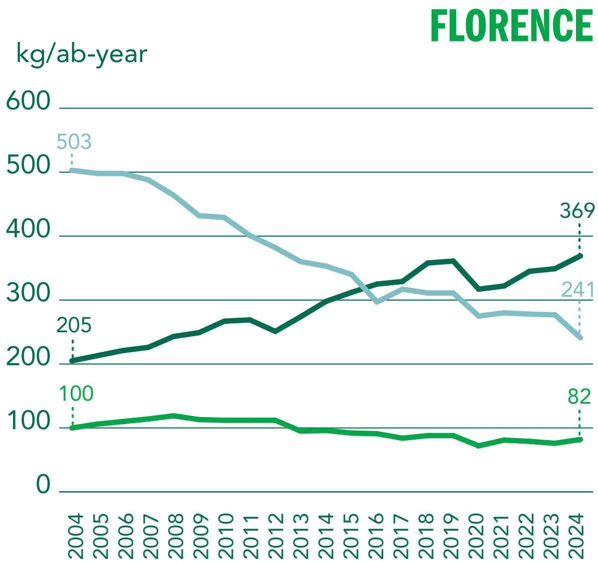


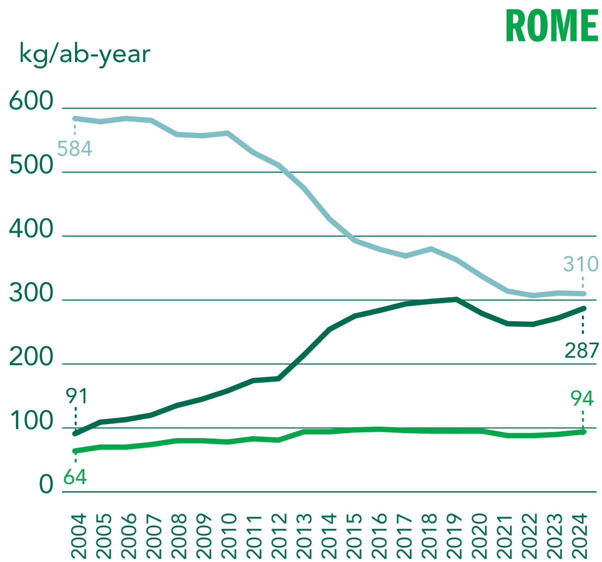
FIGURE 6 BIS
WASTE COLLECTION IN THE SAMPLE CITIES MILAN, TURIN, FLORENCE, ROME, NAPLES, AND PALERMO. 2004-2024 PER-CAPITA DATA . SOURCE: COMIECO



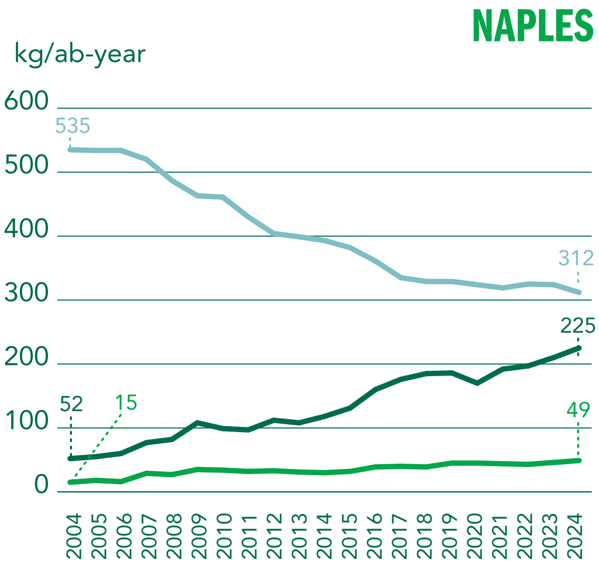

MILAN
kg/ab-year
600
500
400
300
200
100
0
366
290
176
175
64
59
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024

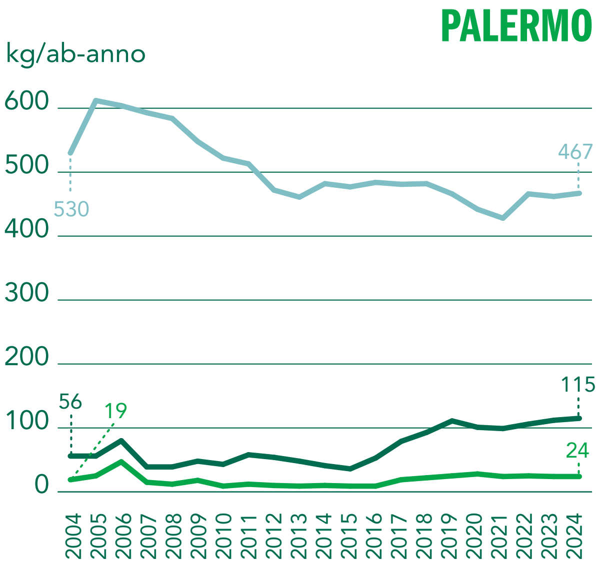

TURIN
kg/ab-year
600
500
400
300
200
100
0
387
284
140
218
96
68
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024


FLORENCE
kg/ab-year
600
500
400
300
200
100
0
503
369
241
205
100
82
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024


ROME
kg/ab-year
600
500
400
300
200
100
0
584
310
287
91
94
64
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024

- MIXED UW
- TOTAL SC
- SC OF PAPER AND BOARD





91.1%

CITIES UNDER THE AGREEMENTS

96.0%

ITALIAN CITIZENS UNDER THE AGREEMENTS

CITIES UNDER THE AGREEMENTS: FIGURES AND RESULTS FOR 2024

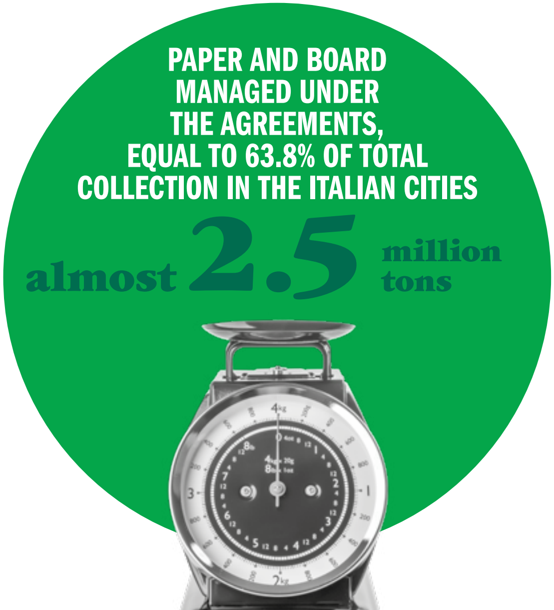
COLLECTION

As at December 31, 2024, 952 agreements were in place with Comieco, either directly or through proxies. These covered 7,195 Cities and served over 56 million citizens. At macro-regional level, 90 agreements are in place in the centre, 156 in the North, and as many as 706 in the South and Islands.

This distribution confirms a chronic agreement management fragmentation in the South and has significant impacts: more coordinated management means more organized supra-municipal administrations, thus increasing efficiency and reducing costs, both for collection and for subsequent recycling. In numbers, the average is one agreement every 3 Cities in the South and Islands, one every 10 in the Centre, and one every 26 in the North.

In 2024 the Consortium provided for the recycling of just less than 2.5 million tons of paper and board, i.e. 63.8% of national municipal collection. As expected, the managed amounts increased by 4.7% vs. 2023. Managed amounts are quite stable, in that few parties acknowledged market uncertainties and used the windows allowed to amend the agreements provided for by the ANCI CONAI Framework Agreement for the paper sector; other parties returned, instead, often upon changes of the market prices of paper for recycling. An analysis of the five-year trend highlights data in line with the last five years, except for 2022, which shows a countertrend.

Therefore, 2024 highlights continuity and consistency with previous years, despite an uncertain market environment. The volumes managed by the Consortium grew quite homogeneously by about 110,000 tons: 70,000 tons from 1.01+1.02 and 40,000 tons from 1.04+1.05.

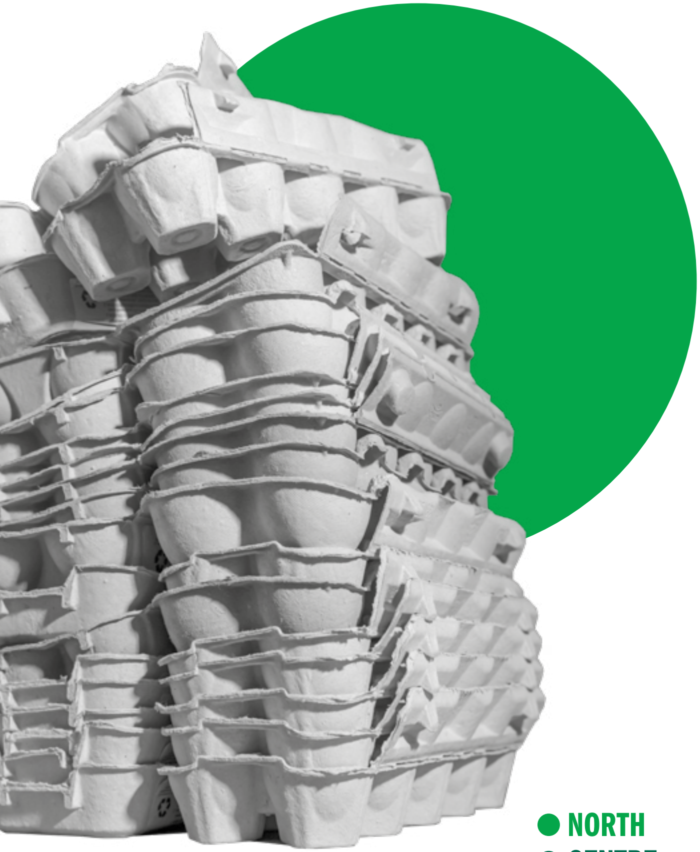


The Consortium acts as a guarantor, ensuring that paper and board are recycled under any market conditions. This function is implemented via the “windows” mechanism provided for by the ANCI-CONAI Agreement and by the Paper Technical Annex.More specifically, volumes managed under the agreements in 2024 refer to 1.59 million tons of paper and board packaging (+4.6% vs. 2023) and over 873thousand tons of similar product fractions (+4.9% vs. 2023) within the handled collection mix. As in a community of trees, where the role of the “mother trees” is to provide lifeblood and stability, Comieco acts as a crucial player in paper and board collection and recycling. Its guarantee and subsidiarity provide operational support, while acting as lifeblood ensuring continuity and development even in more fragmented areas.

TABLE 3
LOCAL COVERAGE BY REGIONS AS AT DECEMBER 31, 2024.
SOURCE: COMIECO

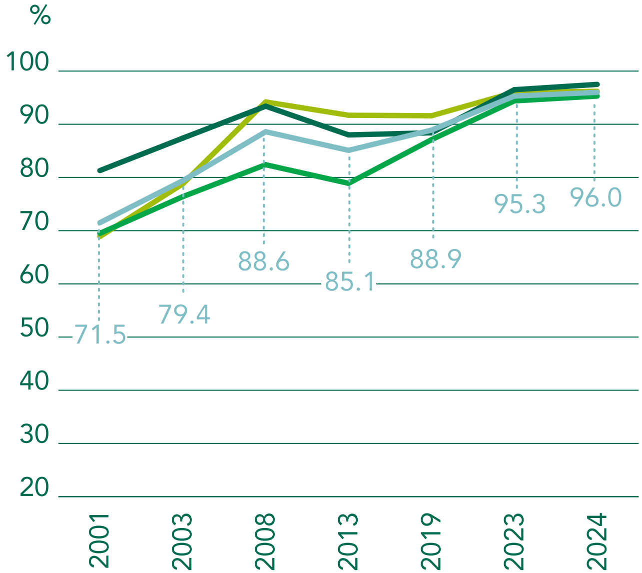
Area	Agreements	Average number of inhabitants per agreement	Average amount managed per agreement
	n	n	t
North	156	167,868	7,545
Centre	90	126,968	5,906
South and Islands	706	26,946	1,065
Italy	**952**	**59,494**	**2,584**

Region	Agreements	Cities under the agreements		Inhabitants under the agreements		Amount manged under the agreements	
		n	%	n	%	t	% vs. total SC of paper
Piedmont	24	1,178	99.8	4,245,180	99.8	198,910	62.7
Vallée d'Aoste	1	74	100.0	123,018	100.0	9,562	95.8
Lombardy	63	1,175	78.2	8,791,296	87.7	331,107	54.0
Trentino-Alto Adige	22	276	97.9	1,070,998	99.0	66,780	85.4
Veneto	22	556	98.8	4,812,295	99.2	244,707	70.6
Friuli-Venezia Giulia	4	214	99.5	1,188,917	99.4	39,020	51.4
Liguria	11	233	99.6	1,508,337	100.0	65,555	58.0
Emilia-Romagna	9	326	98.8	4,447,374	99.8	221,346	49.8
North	**156**	**4,032**	**92.0**	**26,187,415**	**95.3**	**1,176,986**	**58.9**
Tuscany	14	269	98.5	3,651,357	99.6	192,975	63.6
Umbria	7	90	97.8	842,197	98.6	44,115	64.5
Marches	13	211	93.8	1,446,980	97.5	78,768	75.6
Latium	56	315	83.3	5,486,592	95.9	215,658	55.1
Centre	**90**	**885**	**91.4**	**11,427,126**	**97.5**	**531,516**	**61.3**
Abruzzo	26	298	97.7	1,266,008	99.7	66,016	93.8
Molise	7	135	99.3	288,986	99.9	9,182	73.2
Campania	101	462	84.0	5,360,326	95.9	185,405	78.1
Puglia	193	246	95.7	3,863,215	99.3	160,833	76.5
Basilicata	18	113	86.3	499,697	93.6	18,402	64.9
Calabria	59	372	92.1	1,778,997	96.8	60,633	63.7
Sicily	261	354	90.5	4,685,806	97.7	177,544	73.0
Sardinia	41	298	79.0	1,281,016	81.6	73,708	77.7
South and Islands	**706**	**2,278**	**89.3**	**19,024,051**	**96.2**	**751,723**	**75.7**
Italy	**952**	**7,195**	**91.1**	**45,211,466**	**96.0**	**2,460,225**	**63.8**



AGREEMENTS SIGNED

COVERED POPULATION

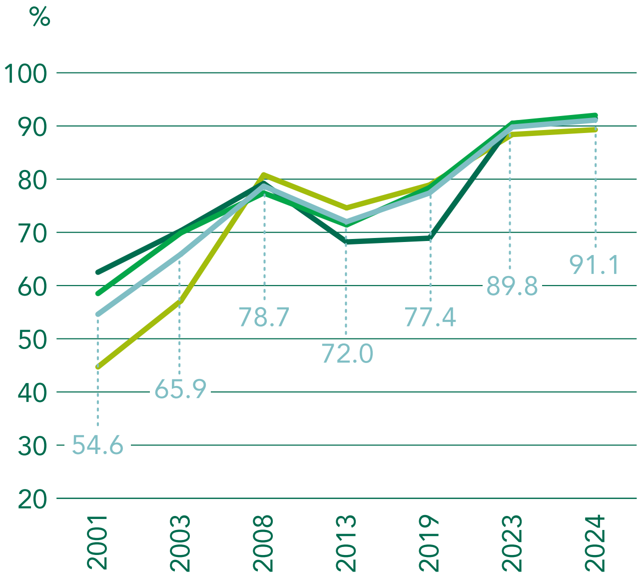


- NORTH
- CENTRE
- SOUTH AND ISLANDS
- ITALY

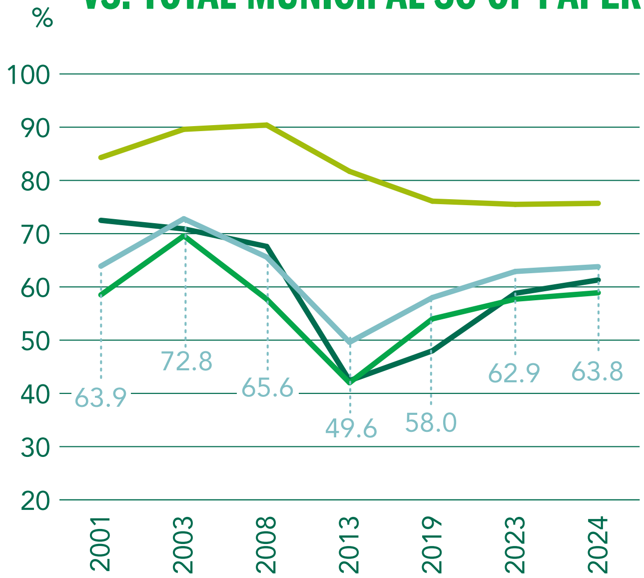
FIGURE 7
STATUS OF THE AGREEMENTS UPON THE EXPIRATION OF EACH FRAMEWORK AGREEMENT AND COVERAGE RATES OF THE AGREEMENTS. 2001-2024 HISTORICAL DATA SET.

SOURCE: COMIECO

COVERED CITIES



AMOUNT MANAGED BY COMIECO VS. TOTAL MUNICIPAL SC OF PAPER



The fragmentation of agreements in the South and Islands is confirmed as a barrier to synergic development. In a fluctuating market environment, Comieco is adjusting its share of managed material (63.8% of municipal collection) consistently with the principle of subsidiarity.

CONSIDERATIONS PAID TO THE PARTIES UNDER THE AGREEMENTS

Over 231.4 million EUR were allocated to the Cities under the agreements in 2024 as a result of the management of over 2.5 million tons of paper and board from municipal collection under the agreements with Comieco.

In this context, Comieco acts as a guarantor and a subsidiary party, enhancing the value of paper and board packaging and supporting a true "community of trees" regenerated through recycling.

These include over 220.5 million EUR of considerations allocated directly by Comieco with reference to the packaging share while, as a result of the value system provided for the similar fraction (graphic paper), considerations for similar product fractions amount to 10.9 million EUR.

The economic investment made by Comieco in 2024 for the valorization of the packaging portion alone recorded a 29.4 million EUR growth vs. 2023 (+15.4%).

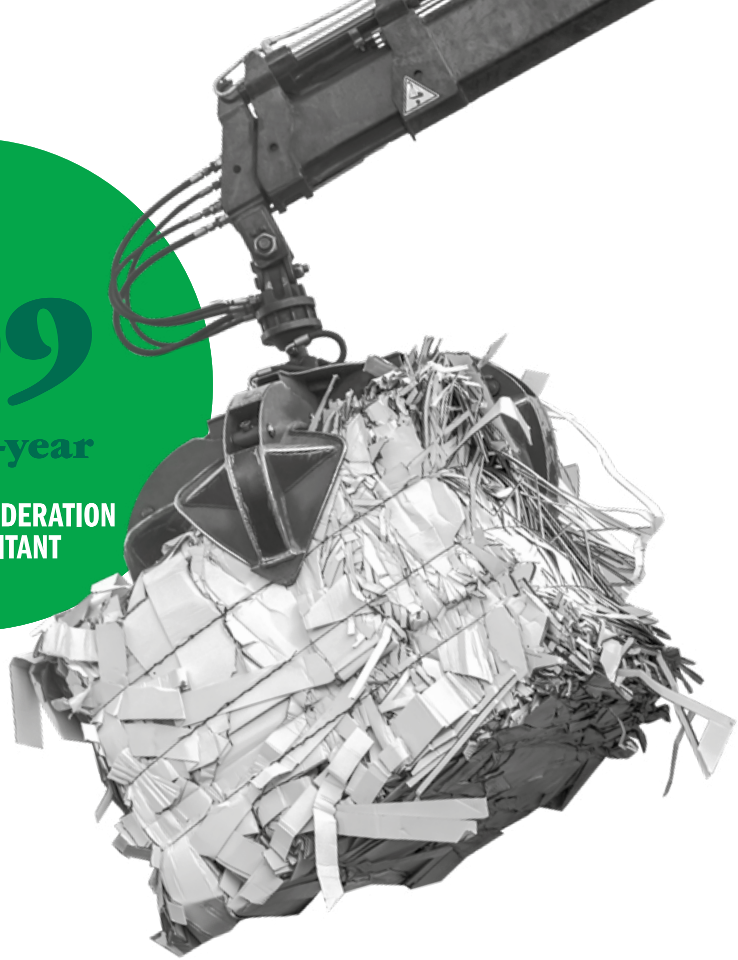
The increase of considerations is due both to the return of 110thousand tons of paper and board (+4.7%) under the agreements and to an upward adjustment to counter inflation, which also impacted on the average value calculated per each inhabitant under the agreements, Growing from 3.4 EUR/ab in 2023 to 4.09 EUR/ab in 2024 (2.6 EUR/ab in 2020). In addition to considerations for collection, Comieco allocates resources for the processing and valorization of paper for recycling.

These amounts, paid to the Parties under the agreements for the processing services provided by the plants operating on their behalf amounted to over 57 million EUR in 2024.

2.75

billion EUR

PAID TO THE ITALIAN CITIES FROM 1998 TO 2024 FOR COLLECTION



4.09

EUR/ab-year

AVERAGE CONSIDERATION PER INHABITANT

This support ensures a comprehensive virtuous cycle, which is crucial for the sustainability of the “community of trees” represented by the recycling pipeline. If all the volumes of municipal paper and board collection from 1998 to 2024 are added up, the total exceeds 74.2 million tons, including over 45 million (60.7%) managed by Comieco.

Overall collection increased from 1 to more than 3.8 million tons per year. Significant growth is observed from 1 to over 3.8 million tons per year, including about 60% (45 million tons) managed directly by Comieco.

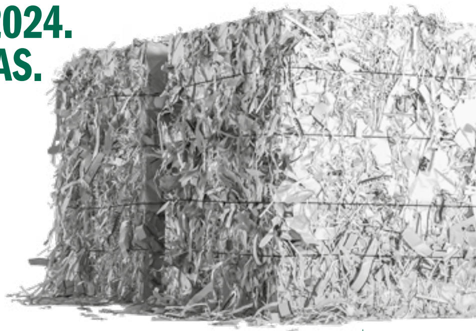
In 27 years of operation (1998-2024) of the ANCI-CONAI agreement, the Consortium paid over 2.75 million EUR to the Italian cities for the collection of paper and board packaging and of similar product fractions (FMS). These add up to over 371 million EUR for in-plant processing activities.

Comieco is still a key player supporting the recycling pipeline and ensuring that the “community of trees” continues to thrive. This demonstrates a guarantee and subsidiary role that promotes circular sustainability in our Country.

The considerations paid to the Cities under the agreements exceed 220 million EUR. The paper for recycling market, which showed fluctuations throughout the year, reintroduced the importance of FMS that amounted to zero for the first time in 2023.

TABLE 4
MANAGED AMOUNTS AND CONSIDERATIONS PAID TO THE PARTIES UNDER THE AGREEMENTS IN 2024. DETAILED BY AREAS.

SOURCE: COMIECO

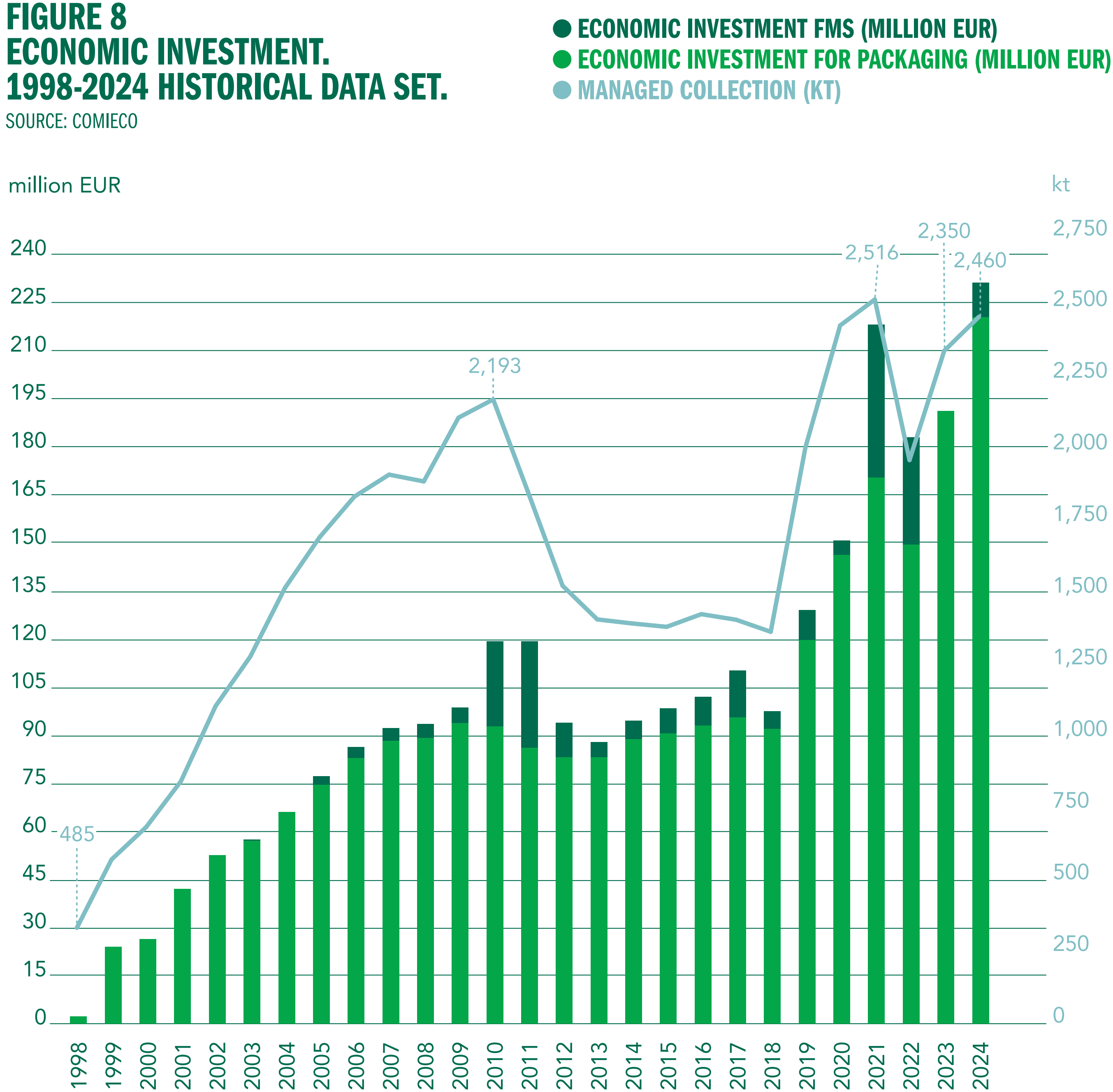


Area	Inhabitants under the agreements	Amount					
		Managed packaging	FMS	Total	Managed packaging	FMS	Total
	n	t	t	t	kg/ab	kg/ab	kg/ab
North	26,187,415	770,473	406,513	1,176,986	29.4	15.5	44.9
Centre	11,427,126	328,265	203,252	531,516	28.7	17.8	46.5
South and Islands	19,024,051	488,190	263,533	751,723	25.7	13.9	39.5
Italy	**56,638,592**	**1,586,927**	**873,298**	**2,460,225**	**28.0**	**15.4**	**43.4**

Area	Inhabitants under the agreements	Considerations for collection					
		Managed packaging	FMS	Total	Managed packaging	FMS	Total
	n	EUR	EUR	EUR	EUR/ab	EUR/ab	EUR/ab
North	26,187,415	110,054,509	5,054,114	115,108,623	4.20	0.19	4.40
Centre	11,427,126	45,579,614	2,535,762	48,115,376	3.99	0.22	4.21
South and Islands	19,024,051	64,912,776	3,290,215	68,202,990	3.41	0.17	3.59
Italy	**56,638,592**	**220,546,898**	**10,880,091**	**231,426,989**	**3.89**	**0.19**	**4.09**

FIGURE 8
ECONOMIC INVESTMENT. 1998-2024 HISTORICAL DATA SET.

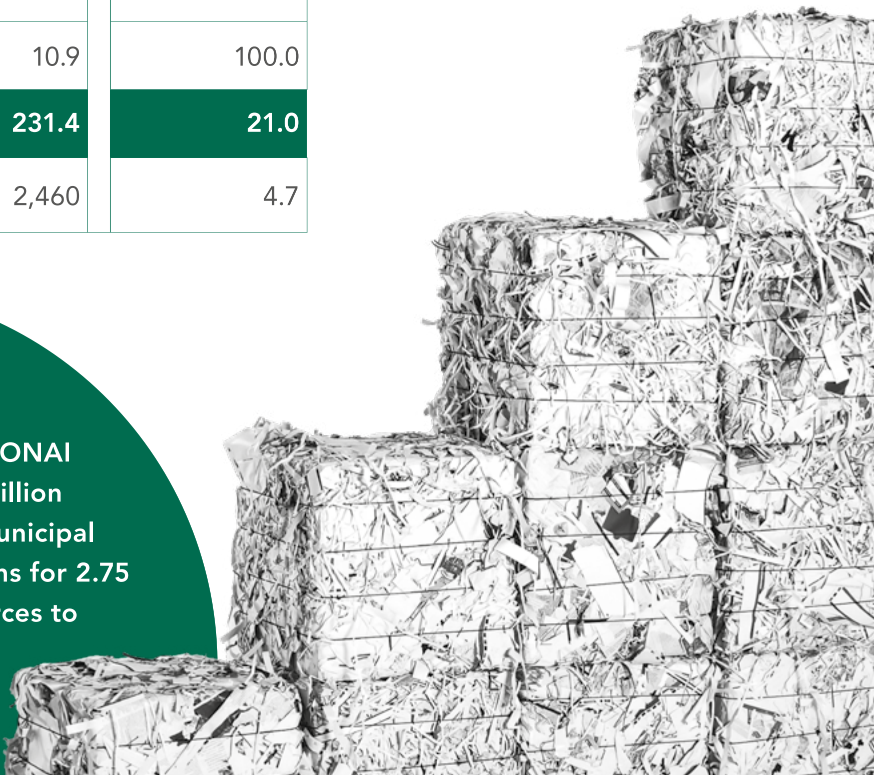
SOURCE: COMIECO

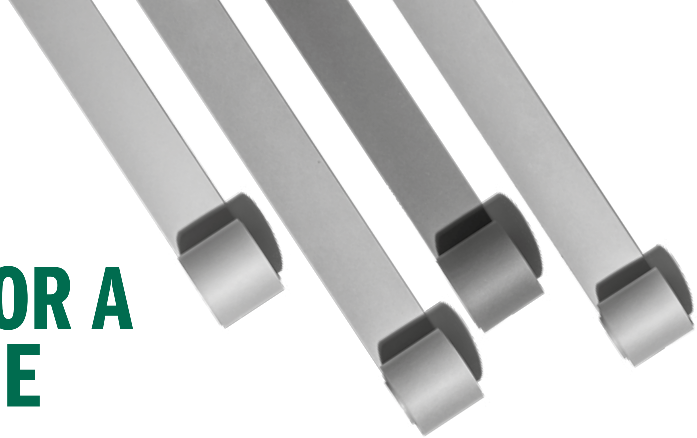


		1st ANCI-CONAI Agreement 1998-2003	2nd ANCI-CONAI Agreement 2004-2008	3rd ANCI-CONAI Agreement 2009-2013	4th ANCI-CONAI Agreement 2014-2019	5th ANCI-CONAI Agreement 2020-2024	Total
Packaging	million EUR	204.2	400.3	439.0	579.6	878.0	**2,501.0**
FMS	million EUR	0.4	15.3	80.2	52.6	96.8	**245.3**
Total	**million EUR**	**204.6**	**415.6**	**519.2**	**632.2**	**974.7**	**2,746.3**
Managed collection	kt	5,524	9,088	9,296	9,387	11,755	**45,050**

		2023	2024	Δ 2023-2024 %
Packaging	million EUR	191.2	220.5	15.4
FMS	million EUR	0.0	10.9	100.0
Total	**million EUR**	**191.2**	**231.4**	**21.0**
Managed collection	kt	2,350	2,460	4.7

In 27 years of operation of the CONAI System, Comieco managed 45 million tons of paper and board from municipal collection and paid considerations for 2.75 billion EUR, in addition to resources to support in-plant processing.





QUALITY: MORE TESTS FOR A MORE RELIABLE PIPELINE

Quantitative tests on paper and board collection highlight, also in 2024, different behaviours between the parties under the agreements in the Country’s macro-areas, both in household 1.01+1.02 and in non-household 1.04+1.05.

The total number of sample collections has decreased to some extent vs. 2023 (-140) to almost one every 1,075 tons of managed volumes. It should be noted that the independence of checks is ensured by a third party identified by ANCI and CONAI.

The baseline quality of collection is crucial to ensure the efficiency of the national recycling system. Fewer impurities at the origin result into reduced waste processing, fewer process scraps, and the recovery of such fractions as plastics that, from scraps in paper, become raw materials if placed in the right dumpster, with subsequently lower costs. A better quality of collection maximizes recycling.

To this end, it is crucial for collection systems to use effective equipment (definitely no plastic bags for paper collection) and to ensure regular emptying and pick-up.

An analysis of the 2024 performance based on the average data of the material delivered to Comieco - and thus of collection for the incoming agreements and processed materials

for the others - show that the national figure continues to improve, with an average content of contaminants in 1.01+1.02 declining from 1.55% to 1.51%. There are small differences among the individual macro-areas.

1.51% AVERAGE CONTAMINANTS IN 1.01+1.02

0.63% AVERAGE CONTAMINANTS IN 1.04+1.05

Contaminants amount to 1.64% in the Centre, with a small increase vs. the previous year. The North sees a decrease to 1.36%, whereas the South and Islands show a significant change of attitude, with average contaminants finally falling below the 2% threshold to 1.79% (vs. 3.60% in 2022 and 2.14% in 2023).

Collection at the origin is better described by the distribution of tests by quality brackets. An analysis of this type of data shows that today, in one case out of four (25%) and in up to 40% of cases in the South and Islands, household collection at national level still does not comply with first-bracket specifications.

Collection improves in the retail sector, where upstream collection is beyond the first bracket in only 10% of cases.

TABLE 5
COLLECTION QUALITY (AVERAGE CONTAMINANTS). 2023-2024 COMPARISON BY MACRO AREAS.
SOURCE: COMIECO

This data shows that the rate of contaminants of non-household door-to-door collection is usually below the first-bracket threshold, whereas for household collection most Cities already reach the first quality bracket (less than 3% of contaminants); however, collection, user information, and actual behaviour monitoring, particularly in the South and Islands, should be improved.

Locally processed data is crucial to direct Comieco's actions, allowing the Consortium to implement focused projects for each local condition and type of collection.

	Year 2023		Year 2024		Δ 2023/2024
	Tests	Contaminants	Tests	Contaminants	Contaminants
	n	%	n	%	%
1.01+1.02	First quality bracket threshold: 3,0%				
North	1,051	1.49	995	1.36	-0.13
Centre	478	1.22	487	1.64	0.42
South and Islands	409	2.14	316	1.79	-0.35
Italy	**1,938**	**1.55**	**1,798**	**1.51**	**-0.04**
1.04+1.05	First quality bracket threshold: 1,5%				
North	122	0.59	112	0.63	0.04
Centre	169	0.46	158	0.59	0.13
South and Islands	265	0.90	218	0.65	-0.25
Italy	**556**	**0.70**	**488**	**0.63**	**-0.07**

1.01+1.02: the average value of 2024 (1.51%) improves vs. the previous year. Since 2019 the flows monitored for the purpose of consideration payment fall within the parameters set for the first quality bracket (3%). 1.04+1.05: small improvement of retail collection, whose average value confirms top quality.

TABLE 5 BIS
DISTRIBUTION BY QUALITY BRACKETS OF THE TESTS PERFORMED ON COLLECTION AT THE ORIGIN IN 2024.

SOURCE: COMIECO

	1.01+1.02 CER200101				1.04+1.05 CER150101			
	Bracket 1	Bracket 2	Bracket 3	Bracket 4	Bracket 1	Bracket 2	Bracket 3	Bracket 4
North	80.4	14.0	2.3	3.3	82.9	7.3	0.0	9.8
Centre	85.5	9.2	3.1	2.3	90.2	4.9	0.0	4.9
South and Islands	58.1	9.5	1.7	30.7	95.4	1.5	0.0	3.1
Italy	**75.0**	**11.6**	**2.3**	**11.1**	**90.5**	**4.1**	**0.0**	**5.4**

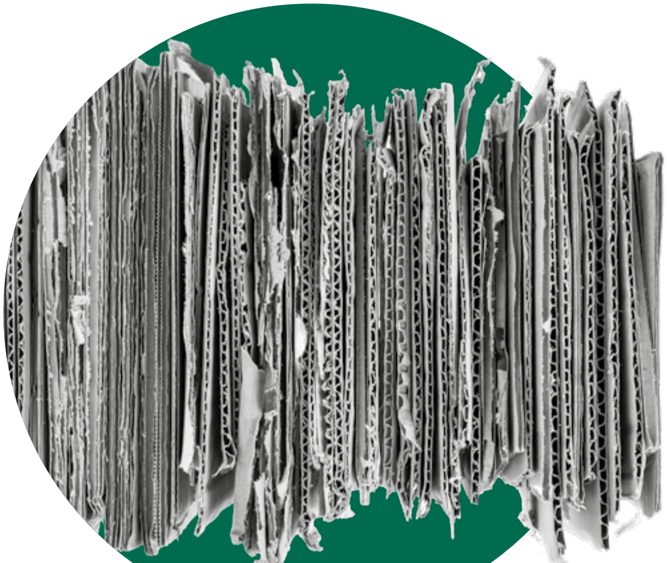
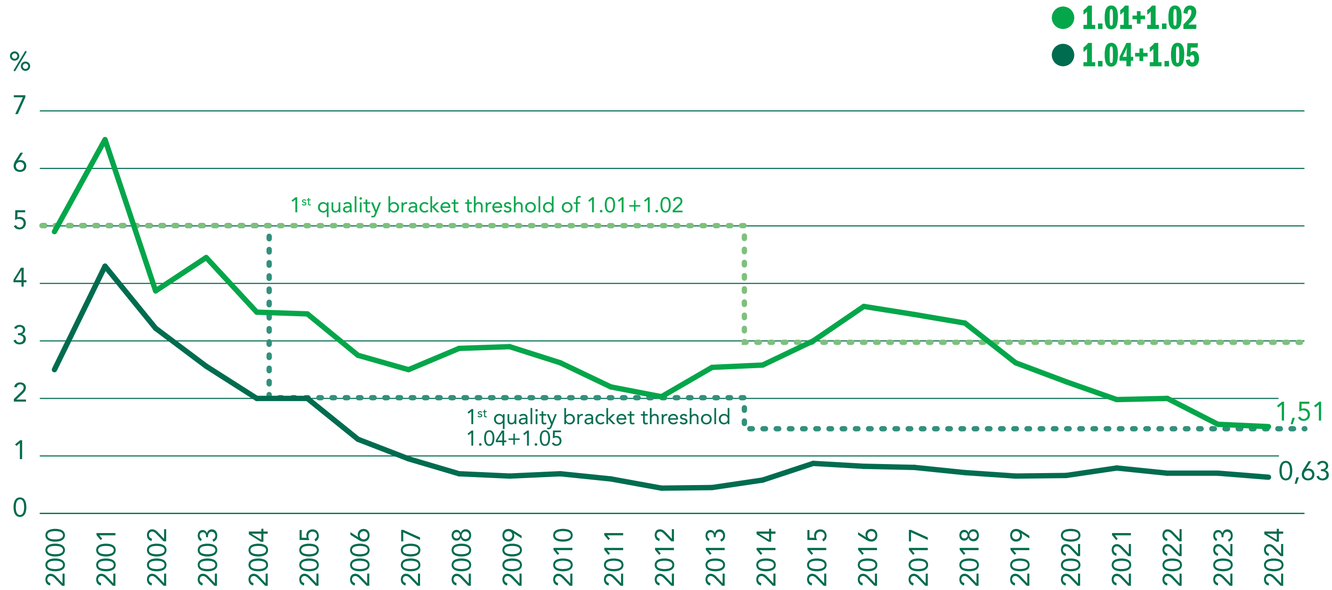


FIGURE 9
COLLECTION QUALITY (MEAN TREND OF CONTAMINANTS). 2000-2024 PERIOD.

SOURCE: COMIECO



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 2020-2024	Total 1998-2024
1.01+1.02	n	1,006	3,456	4,040	4,286	9,220	22,008
1.04+1.05	n	594	3,591	4,204	2,931	2,718	14,038

Note: until June 2014 the above results refer to the total tests performed in recovery plants on both incoming and outgoing materials in order to determine the considerations due to the parties to the agreements. From July 2014 these results only refer to the tests on incoming materials under the so-called IN agreements valid for payment of the collection consideration.

RECYCLING PLANTS, A WIDESPREAD NETWORK

Comieco ensures separate paper and board collection across the national territory. This happens through a network of 346 waste-management plants collecting the material, which is then selected, pressed, and prepared for recycling in 56 paper mills. This widespread infrastructure allows cost containment, while ensuring that collection vehicles can unload the material at a short distance from their origin, with an average distance of a mere 16.7 km.

346 WASTE MANAGEMENT PLANTS

PAPER MILLS IN ITALY RECYCLING PAPER MANAGED BY COMIECO **56**

Logistic optimization is mandatory to maximize recycling. A balance is pursued between the need to confer waste at a short distance and the creation of a critical mass of material to generate scale economies and support investments aimed at improving industrial processes.

The paper thus recovered is fed into the industrial paper-making process in two different ways:

- 60% (almost 1.46 million tons) of the amounts managed by Comieco is entrusted on a pro-quota basis to 56 paper mills;
- the other 40% (just less than one million tons) is awarded to parties via regular auction sales. In 2024, 46 different parties were awarded at least one lot.

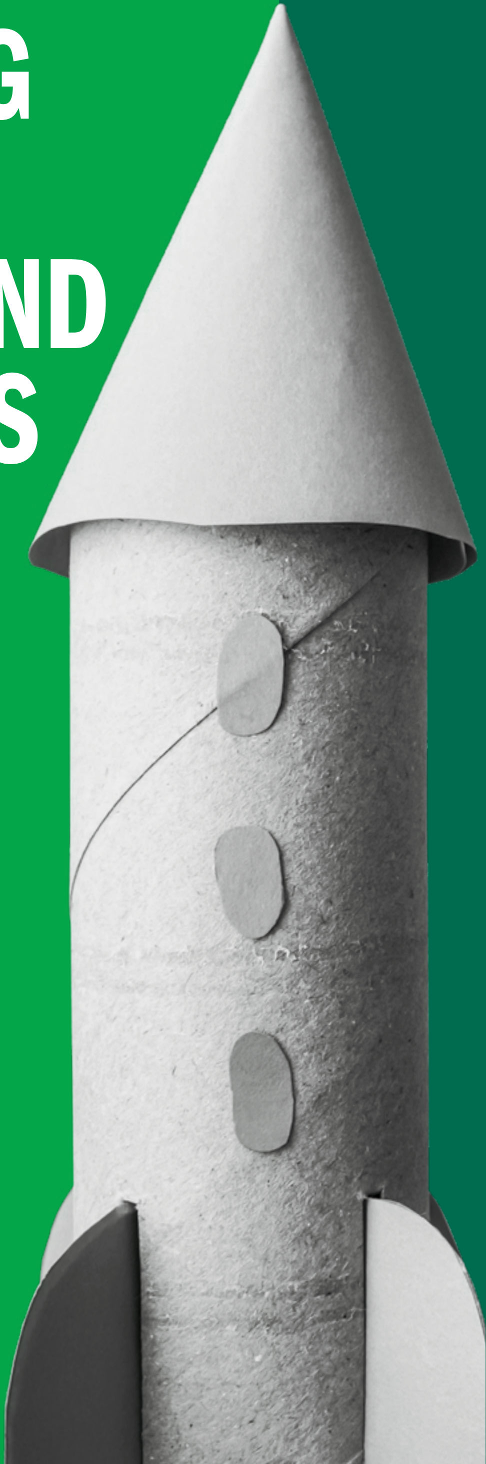
Area	Average conferment distance	Waste management plants	Waste management plants under the agreements with >20thousand t/year of incoming materials	Paper mills
	km	n	n	n
North*	16.5	140	13	31
Centre	16.8	66	6	18
South and Islands	16.7	140	6	7
Total	**16.7**	**346**	**25**	**56**

**one paper mill is located in the Republic of San Marino*

FIGURE 10
THE RECYCLING PLAN NETWORK. YEAR 2024.
SOURCE: COMIECO

● PAPER MILLS
● WASTE MANAGEMENT PLANTS

ITALY AS A RECYCLING MODEL: PAPER AND BOARD STABLE BEYOND THE EU 2030 TARGETS



5 million tons

APPARENT CONSUMPTION OF PAPER AND BOARD PACKAGING

4.6 million tons

RECYCLED PAPER AND BOARD PACKAGING WASTE

92.5%

RECYCLING RATE OF PAPER AND BOARD PACKAGING

In such a complex ecosystem as a community of trees, each plant contributes to stability and to the development of the community, albeit at a varying seasonal pace. Likewise, after a sharp decline of consumptions in 2023 (-6.6% of apparent consumption) due to inflationary pressures, the paper-based packaging sector showed signs of recovery in 2024, albeit with negative results (-1%).

The paper and board packaging recycling rate is still beyond 90% in 2024, surpassing the European 85% target set for 2030.

Market uncertainties have brought about changes in warehouse management with a reduction of physiological stocks and the allocation to distribution points. Raw-material market and consumption volatility in the last three years generated uncertainties and resulted into a stock management approach different from traditional procurement methods.

This anomaly magnified the effects of the normal delay between the actual consumption of a piece of packaging - and its subsequent collection and recycling - and the time in which this is apparently consumed from the accounting viewpoint.

The amount of recycled packaging, originating from 1.04+1.05 and from 1.01+1.02 aimed at the national industry records a 7.2% increase to 3.2 million tons.

The increased internal consumption of recycled paper implied a 13% decline of net exports from 1.9 to 1.6 million tons.

In summary: In 2024 the sector recorded:

- A 6.2% increase of total paper production to almost 8 million tons, vs. a 14% decline in 2023.
- A small decline of apparent paper and board packaging consumption (-1%).
- The reversal of raw-material import (+12.7%) and export (+11.2%) dynamics vs. 2023.
- An increase of recovered paper management, with an increase of imports (+7.2%) and domestic consumption (+3.8%), whereas exports declined (-10.6%). Global domestic collection (apparent collection) remained substantially unchanged (-0.8% vs. 2023).
- An increase of domestic recovered-paper use by 210,000 tons, which points out to an increased demand for the material in Italy, also as a result of a strengthened domestic recycling capacity.

- Recovered paper is still the main source of cellulose fibre for the paper-making industry, and contributes to keep the paper and board packaging recycling rate above 90%, far above the 85% EU target (Directive 2018/852/EC).

Accurate understanding of Chamber of Commerce prices requires an analysis of data from 2023, a year characterized by substantial stability and weakness, which then laid the foundations for the growth and stabilization of managed volumes during the following year.

In 2024, prices followed an arc-shaped trend (growth, stagnation, decline), which was also reflected in the average awarding prices of the auctions:

- January-April: increase
- May-July: stability at peak growth
- August-December: decrease to the minimum price

This trend seems to be confirmed in the early months of 2025, with a limited change of volumes subject to the agreements through six-monthly windows.

The market prices of paper for recycling, analyzed until the beginning of the second quarter of 2025, point out to a shrinking gap between the values of cardboard and of the "wastepaper" originating from 1.01+1.02.

This convergence can be attributed to two main factors:

- The increased amount of packaging in household collection.
- An increasing appreciation of recovered mixed paper vs. cardboard due to the higher rate of raw fibres, which is crucial for qualitative standards in the recycling industry.

TABLE 6
PAPER AND BOARD PACKAGING RECYCLING RESULTS ACHIEVED IN 2024.

SOURCE: COMIECO

Calculation of recycling rates	year 2024 t	Δ 2023/2024 %
Apparent consumption of paper and board packaging	4,965,618	-1.0
Paper and board packaging found in paper and board for recycling from 1.01+1.02, recycled in Italy	890,115	7.4
Paper and board packaging found in paper and board for recycling from 1.04+1.05, recycled in Italy	2,293,249	7.1
Paper and board packaging recycled abroad	1,410,764	-16.0
Total recycled paper and board packaging	**4,594,128**	**-1.2**
Recycling %	**92.5**	

TABLE 7
DIRECT AND INDIRECT BENEFITS OF MANAGED PAPER AND BOARD PACKAGING RECYCLING. 2024 DATA.

SOURCE: CONAI - LCC TOOL (DATA AS AT 31/05/2024)

The benefits generated by managed packaging recycling (1.59 million tons) in 2024 are estimated at 172 million EUR. The 2005-2024 aggregated data points out to benefits for over 2.05 billion EUR, calculated as the value of raw materials and reduced emissions

Indicators within the CONAI boundaries (managed by Comieco)			
Indicator		**2024**	**tot. 2005-2024**
Conferred packaging amount	kt	1,587	22,893
Fractions for recycling	kt	1,587	22,893

Environmental benefits			
Indicator		**2024**	**tot. 2005-2024**
Raw-material saving, paper	kt	1,336	21,525
Primary energy saving from recycling	TWh/year	4,9	-
CO_2 production avoided through recycling	kt CO_2 eq	1,303	19,525
CO_2 production avoided through energy recovery	kt CO_2 eq	0	0

Economic value				
Category			**2024**	**tot. 2005-2024**
Direct benefits	Economic value of the secondary raw material produced from recycling	million EUR	93	1,258
Indirect benefits	Economic value of the avoided CO2	million EUR	72	789
Overall benefits		**million EUR**	**172**	**2,047**

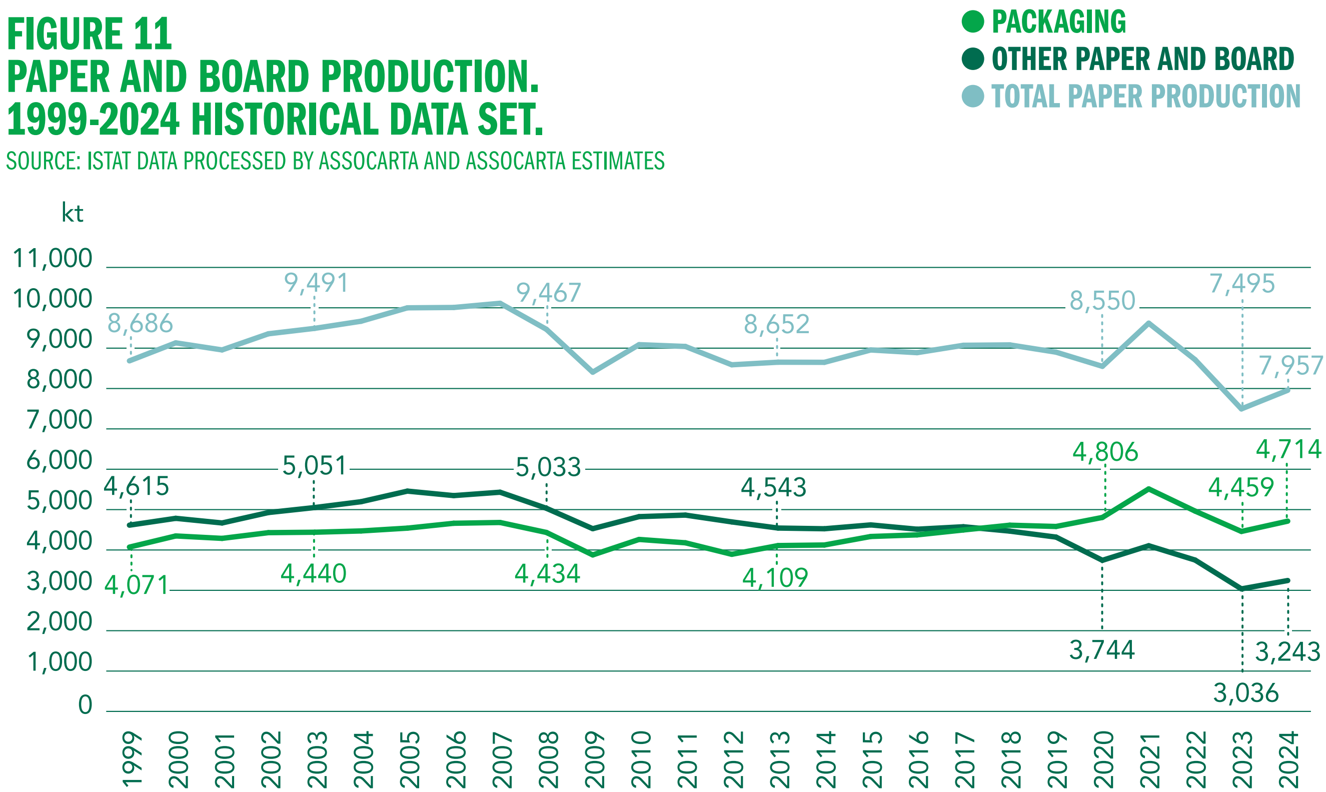
TABLE 8
PAPER AND BOARD PRODUCTION IN 2024.
SOURCE: ISTAT DATA PROCESSED BY ASSOCARTA AND ASSOCARTA ESTIMATES

		Production (A)	Imports (B)	Exports (C)	Apparent consumption (A+B-C)
Paper and board packaging (paper and board & cardboard)	t	4,713,676	3,667,743	1,670,281	6,711,138
Δ 2023/2024	%	5.7	11.0	15.4	6.3
Other paper and board (paper for graphic and hygienic-sanitary use)	t	3,243,170	1,565,156	1,894,607	2,913,719
Δ 2023/2024	%	6.8	16.9	7.7	11.4
Total paper production	**t**	**7,956,846**	**5,232,899**	**3,564,888**	**9,624,857**
Δ 2023/2024	**%**	**6.2**	**12.7**	**11.2**	**7.8**

With over 1.4 million tons more vs. other paper production types, the use of cellulose-based material for packaging production is by all means the main sector of the domestic paper-making industry.

FIGURE 11
PAPER AND BOARD PRODUCTION. 1999-2024 HISTORICAL DATA SET.

SOURCE: ISTAT DATA PROCESSED BY ASSOCARTA AND ASSOCARTA ESTIMATES



		1999	2003	2008	2013	2020	2023	2024	Δ 1999/2024		Δ 2023/2024	
									kt	%	kt	%
Paper and board packaging	kt	4,071	4,440	4,434	4,109	4,806	4,459	4,714	643	15.8	255	5.7
Other paper kt and board	kt	4,615	5,051	5,033	4,543	3,744	3,036	3,243	-1,372	-29.7	207	6.8
Total paper production	**kt**	**8,686**	**9,491**	**9,467**	**8,652**	**8,550**	**7,495**	**7,957**	**-729**	**-8.4**	**462**	**6.2**

TABLE 9
CONSUMPTION, IMPORTS, EXPORTS OF RECOVERED PAPER AND APPARENT COLLECTION*. 2023-2024 VARIATIONS.

SOURCE: ASSOCARTA DATA PROCESSED BY COMIECO

		Imports (A)	Exports (B)	Consumption (C)	Apparent collection* (C+B-A)
2023	t	270,230	2,130,178	5,021,885	6,881,834
2024	t	289,800	1,904,899	5,212,275	6,827,375
Δ 2023-2024	%	7.2	-10.6	3.8	-0.8

Domestic paper for recycling consumption (5.2 million tons) increases (+3.8%) but remains below the 6 million ton threshold, the maximum value recorded in 2021. In parallel, exports decrease (-10.6%) and the net balance (exports minus imports) declines to 1.6 million tons.

FIGURE 12
CONSUMPTION, IMPORTS, EXPORTS OF RECOVERED PAPER AND APPARENT COLLECTION*. 1998-2024 PERIOD.

SOURCE: ASSOCARTA DATA PROCESSED BY COMIECO

	1998	2003	2008	2013	2020	2023	2024	1998/2024		2023/2024	
	kt	kt	kt	kt	kt	kt	kt	Δ kt	Δ %	Δ kt	Δ %
Imports	854	589	520	338	255	270	290	-564	-66.1	20	7.2
Exports	42	528	1,507	1,685	1,851	2,130	1,905	1,863	4,435.5	-225	-10.6
Consumption	4,561	5,288	5,329	4,715	5,212	5,022	5,212	651	14.3	190	3.8
Apparent collection	**3,749**	**5,227**	**6,316**	**6,062**	**6,808**	**6,882**	**6,827**	**3,078**	**82.1**	**-54**	**-0.8**
Net exports	**-812**	**-61**	**987**	**1,347**	**1,596**	**1,860**	**1,615**				

Apparent collection: Consumption + Exports – Imports

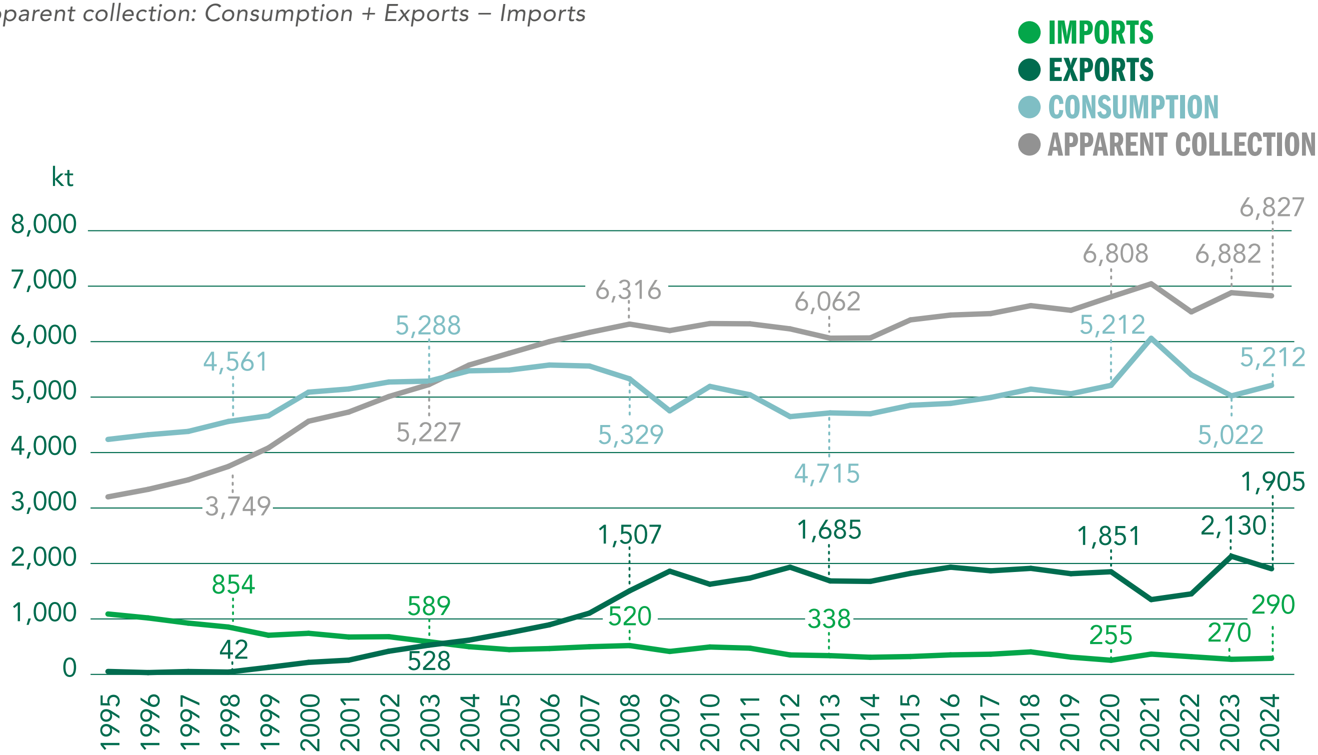
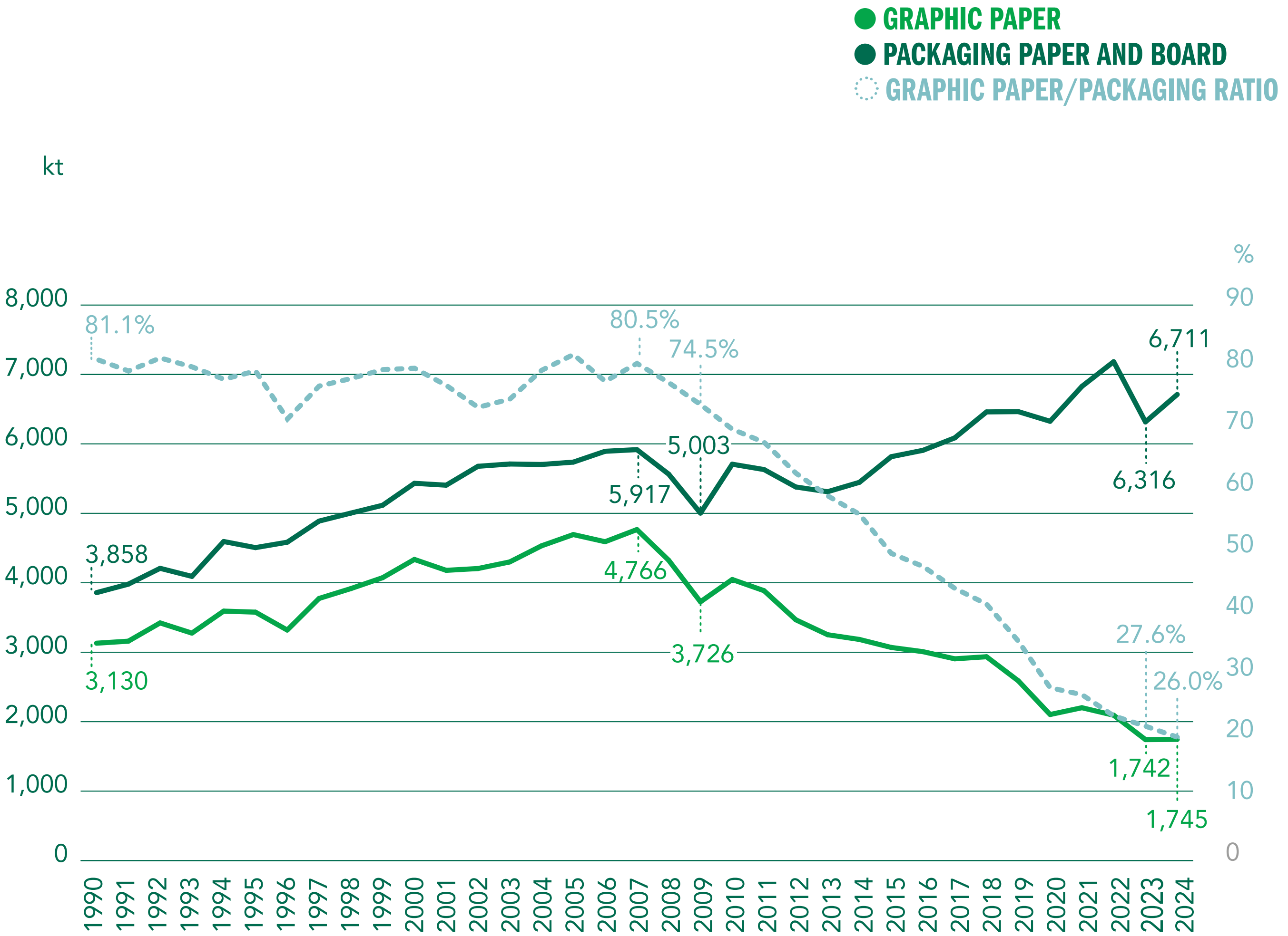


FIGURE 13
RATIO OF APPARENT GRAPHIC PAPER CONSUMPTION TO PACKAGING. 1990-2024 HISTORICAL DATA SET.

SOURCE: ASSOCARTA DATA PROCESSED BY VALUE QUEST



The ratio of graphic paper consumption to packaging paper consumption was gradually reversed in time. This phenomenon started in 2009 and increased for graphic paper, which fell below the 1990 threshold.

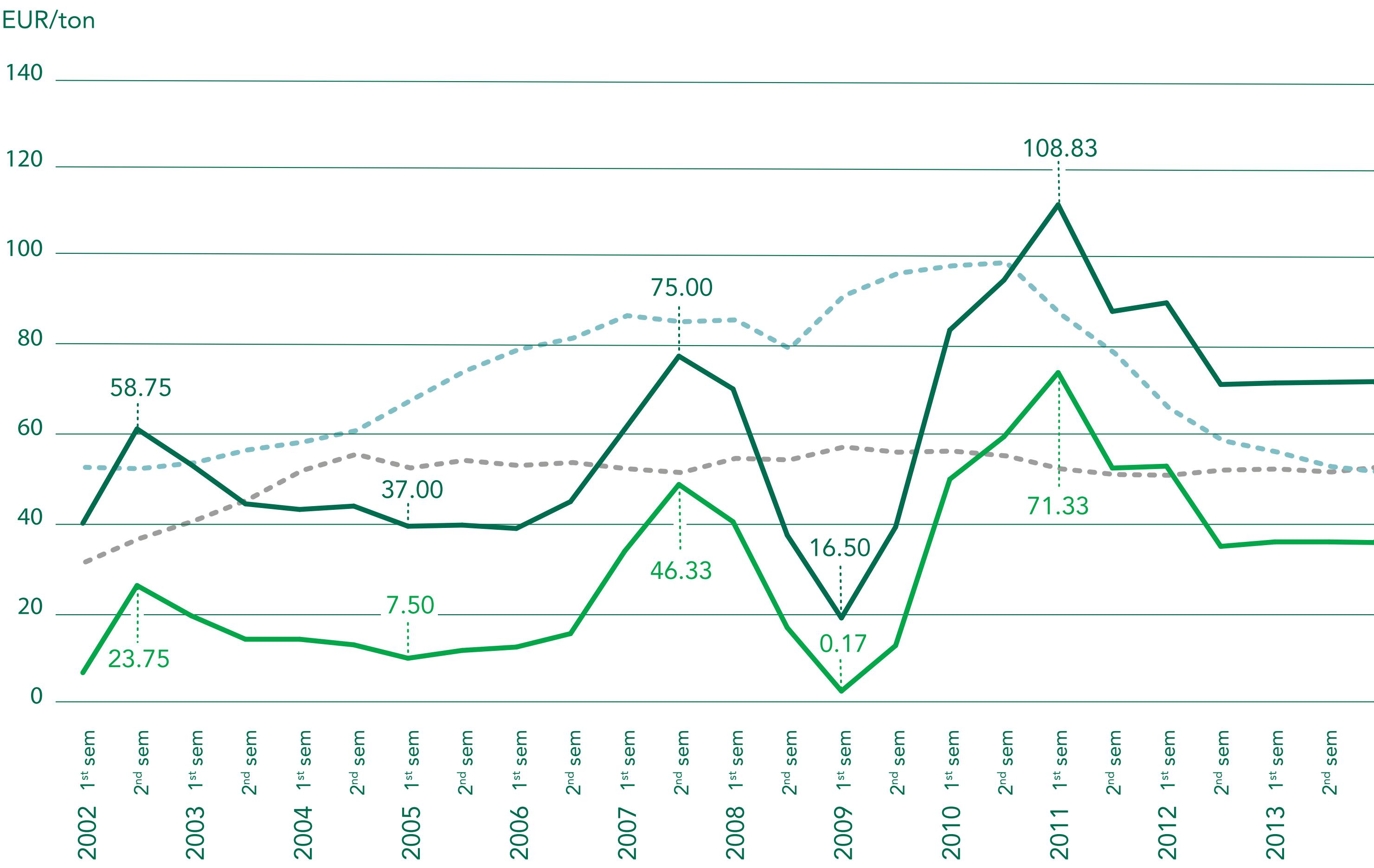
The different composition of the consumption mix also brings about a significant change in the "quality" of the collected material and in subsequent issues related to reprocessing of recovered paper. In 2024, this by-now consolidated trend confirms a ratio of both pipeline data of less than 1:3.

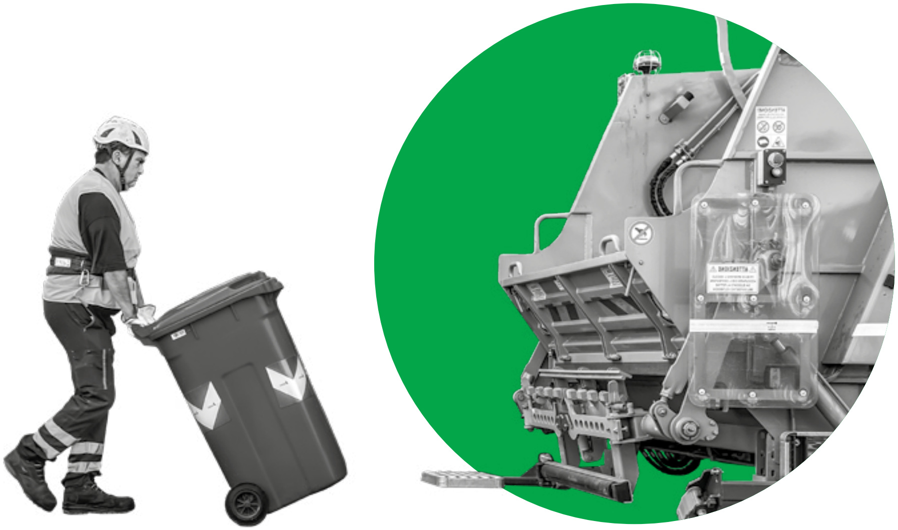
FIGURE 14
SIX-MONTHLY RECORDING OF THE AVERAGE VALUES OF RECOVERED PAPER (EUR/T) AND COMPARISON OF PAPER AND BOARD AMOUNTS MANAGED UNDER THE AGREEMENTS. JANUARY 2002-APRIL 2025 PERIOD.

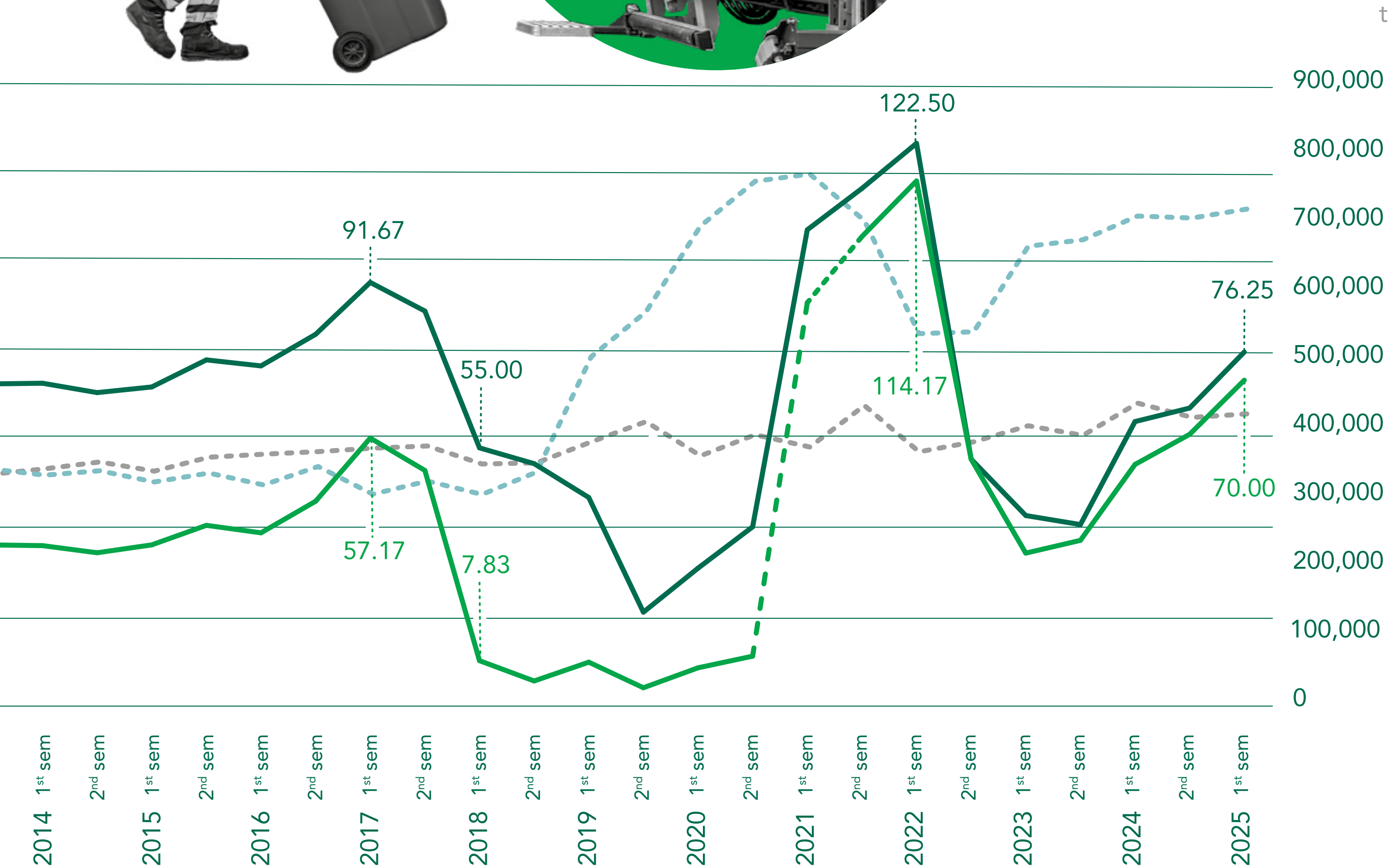
SOURCE: MILAN CHAMBER OF COMMERCE

- 1.01/1.02* MIXED PAPER AND BOARD
- 1.04 PAPER AND CORRUGATED BOARD
- MANAGED 1.01+1.02
- MANAGED 1.04+1.5

*1.02 is considered from the 1st semester of 2021



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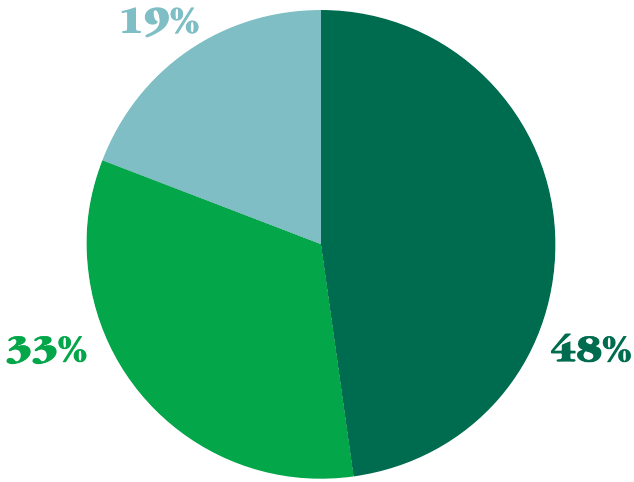
NOTE ON THE METHOD

The processing method adopted for data on national paper and board collection is the same as in the previous years. The data processed by the Entities and/or organizations in charge of data collection, monitoring, and validation, such as ISPRA, Regions, regional agencies (e.g. Arpa Campania), Provinces, Work Groups, ANCI, or those in charge of collection management (Cities, operators, plants, etc.), is mainly used to determine paper and board collection levels.

The data thus acquired, as available at the end of May and, therefore, in practice, still not final and consolidated, is combined with the data available to Comieco within the framework of its activity (management of the agreements) and compared to ensure consistency. Wherever necessary, specific analyses are performed.

Processing is usually carried out at provincial level but, in specific cases and for a more punctual assessment, the analysis is performed at municipal level.



SOURCES AND METHOD.

SOURCE: COMIECO

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

Where "official" sources are not available, Comieco estimates the provincial collection level starting from historical data sets and its own data base (collection by the parties to the agreements). Separate paper and board collection is assumed to be actively in place across the national territory.

As to 2023 assessments, constituting the object of this Report, while the share of estimated data is reduced, it is significant in the South and Islands, where local work groups are still quite slow at processing data.

More specifically, 48% of collection data comes from third-party sources, 33% refers to the amounts managed directly by the Consortium or disclosed by the parties to the agreements as provided for by the Technical Annex (without any other sources), and 19% is based on estimated amounts.

Province-based data verification is also extended to the year preceding the one that constitutes the object of the current report. Where necessary, some data is updated (year 2023) by implementing the values published by ISPRA; the related data (area and national totals, per-capita, etc.) is updated accordingly.
Data processed as at June 2025.

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ACRONYMS

ATC	Paper Technical Annex
FMS	Frazioni Merceologiche Similari (similar product fractions)
SC	Separate Collection
UW	Urban Waste
%	Percent
n	Number
t	Tons
kt	Thousands of tons
ab	Inhabitants
kg	Kilograms
TJ	Terajoule

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