



SUMMARY OF RESULTS

Traceability and certification of glass, plastic, metals and paper recovery chains

PAPER, GLASS,

PLASTICS AND METALS

WASTE CHAINS

DECEMBER 2023
8TH REPORT

Certified in according to the reference practice
UNI/PdR 132:2022

Measure circularity



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PAPER, GLASS,

PLASTICS AND METALS

WASTE CHAINS

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1. INTRODUCTION

The Veritas Group, for about ten years, has been tracking and monitoring the recovery chains of the main fractions of municipal waste, being able to **certify in 2023 91% of the total waste collected in the 45 municipalities served**. This allows us to answer one of the questions frequently asked by citizens "where does the waste we dispose of end up?".

Through the traceability of all the main treatment chains of the collected urban fractions, the Veritas Group annually reports to all stakeholders on its performance in

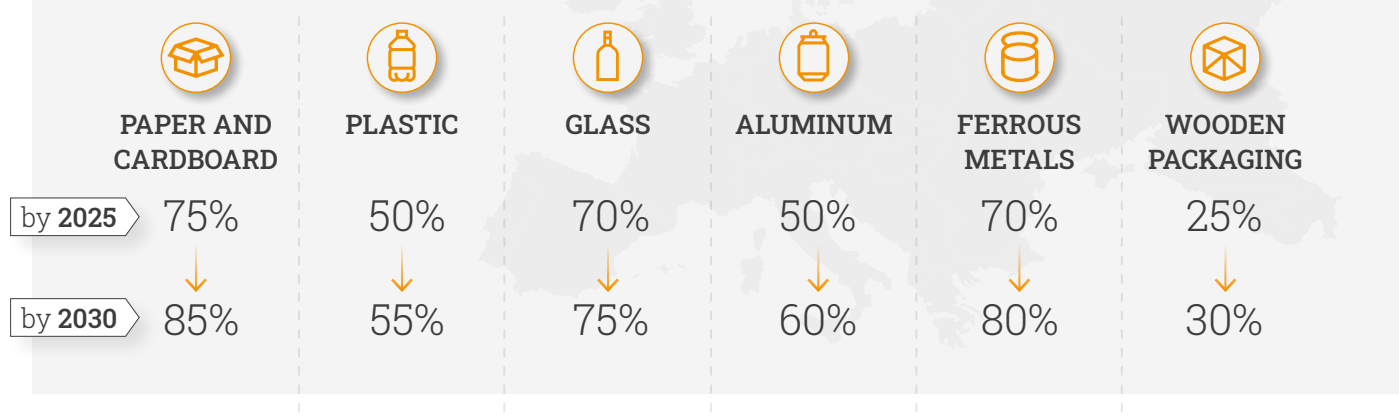
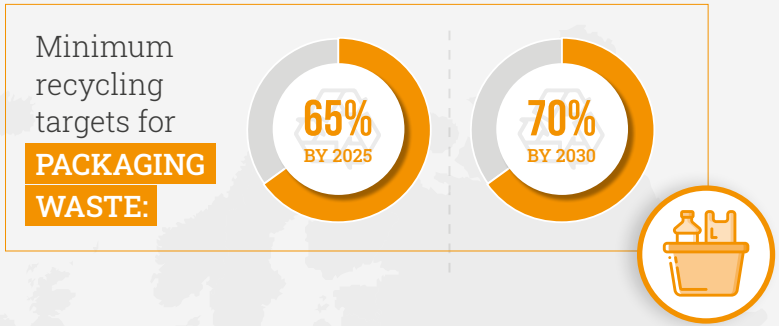
terms of effective recycling and recovery of managed waste, providing objective and certified data.

The analysis covers all stages of the supply chain, from the moment citizens and businesses dispose of household and other similar waste to the collection system, throughout the collection and disposal activities, within the waste recovery plants, and in the production of secondary raw materials. This allows us to assess how the Venetian territory is positioned with

HOW TO MEET EUROPEAN GOALS

pursuant to Legislative Decree 116/2020

Goals set at the EU level with the **Circular Economy Package**:



respect to the recycling objectives set out by European and national legislation on the subject, defined in particular by the set of European Directives on the Circular Economy relating to waste, packaging and packaging waste, and implemented at national level by Legislative Decree 116/2020.

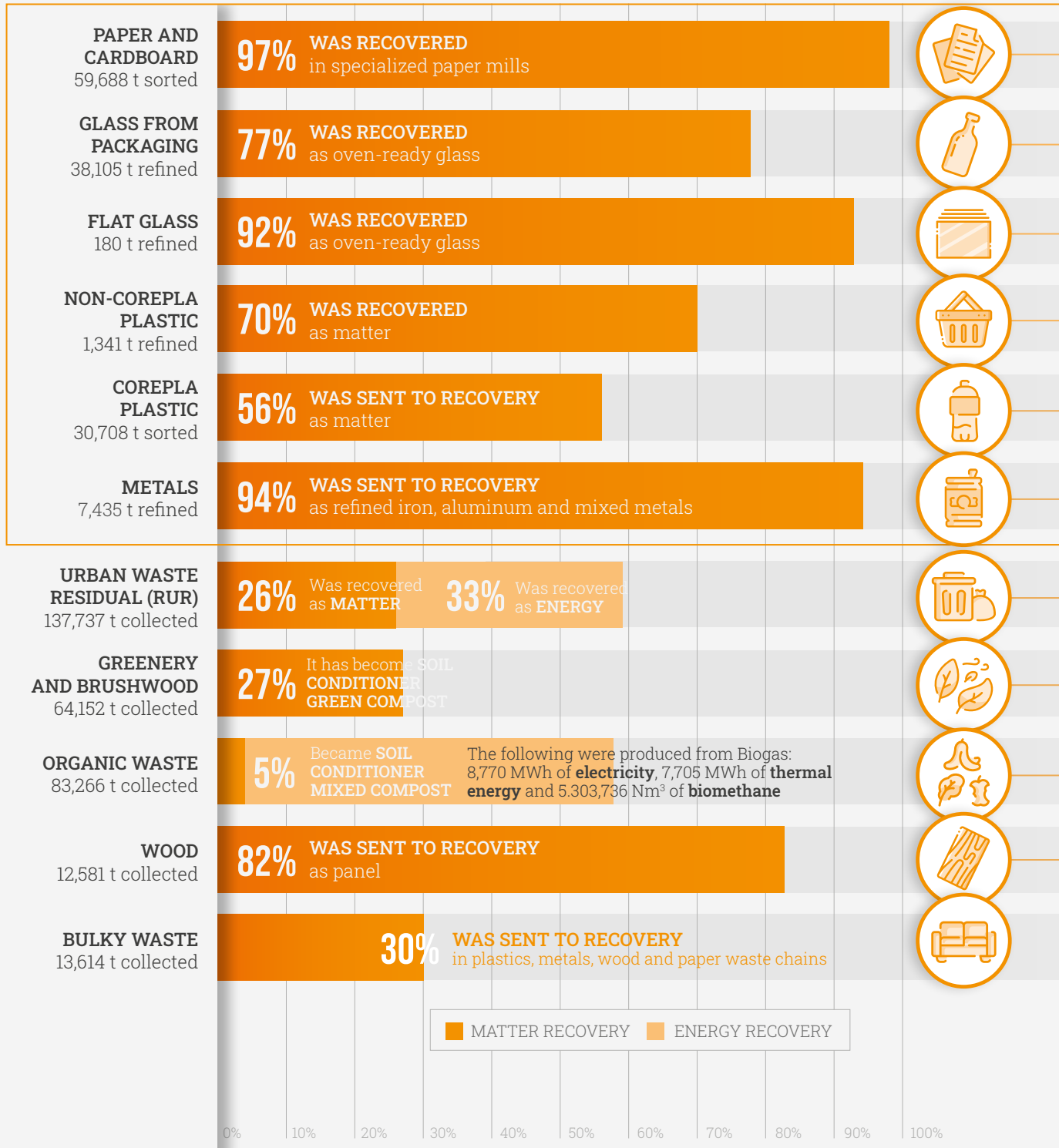
Italy has also defined the recycling and recovery targets for urban waste, both at a general level and, in more detail, with regard to the different product fractions that make up packaging waste, as follows:

Monitoring the flows of sorted and refined waste in the treatment plants and the quantities of secondary raw materials produced by the different processes makes it possible to assess the quantities of waste collected and sent for treatment, but above all the **effective recovery** of the waste delivered, making it possible to communicate recycling results to citizens and stakeholders in a transparent manner and through reliable data.

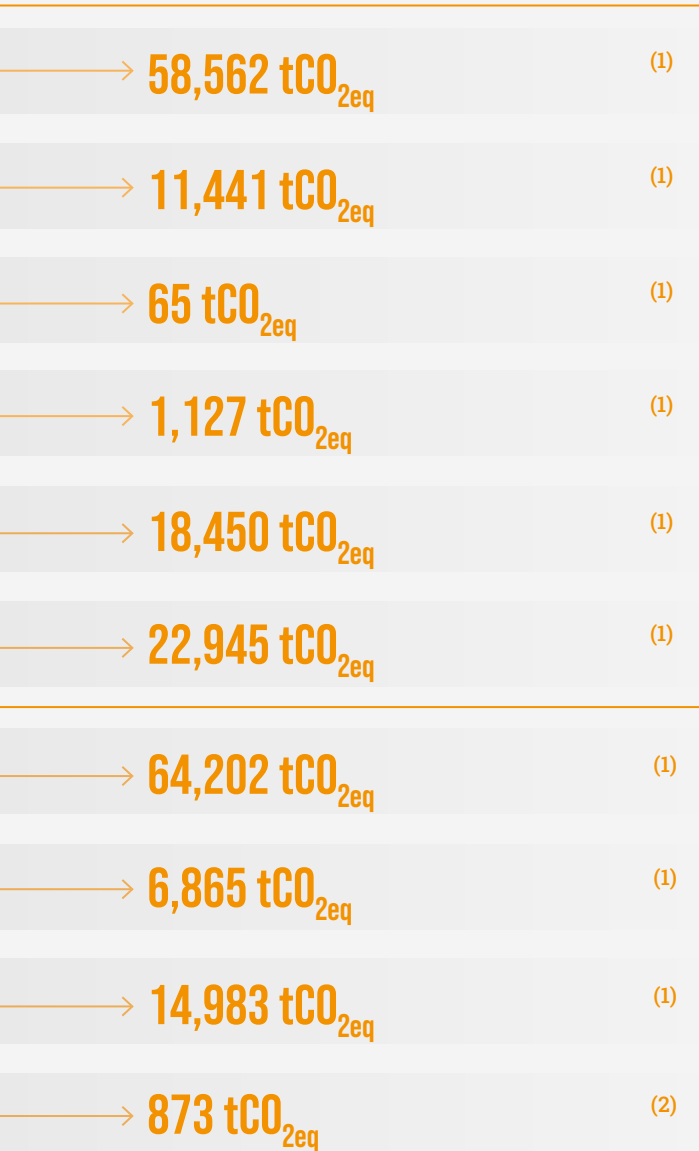


Results obtained through the traceability of urban waste streams, certified by an independent, third-party Entity, show that by 2022:

91% OF THE URBAN WASTE COLLECTED HAS BEEN TRACED AND CERTIFIED, RECOVERING:



AND AVOIDING CO₂ EMISSIONS, DUE TO THE RECOVERY OF MATTER AND ENERGY, AMOUNTING TO:



The emissions avoided are included in plastics, metals, wood and paper waste chains

(1) Source: JRC, *Best Environmental Management Practice for the Waste Management Sector (2018)*.

(2) Source: data processing from CONAI Sustainability Report 2021 (2022).

These results refer to **all urban and similar waste streams collected in 2022 by the Veritas Group in the 45 municipalities served** (44 municipalities of the Metropolitan City of Venice and Mogliano Veneto in the province of Treviso). The traceability concerns waste from the moment citizens and businesses dispose of them, during the collection phase in its different modes (door-to-door, road or mixed), within the collection centres, through the sorting plants and, where possible, during the subsequent refining phase before being sent to the recycling plants.

All the stakeholders involved operate according to rules defined by the companies, as set out in the **technical specifications**, i.e. behaviour protocols necessary for the compliance certification by the Certification Body. Over the year, during all the activities carried out, the data necessary for the monitoring of matter and energy streams were collected, which allowed the timely calculation of the most representative indicators of the different stages of the supply chain. From the experience gained over time, more and more in-depth data collection and analysis methodologies have been implemented, so as to be able to consider the numerous variables that characterize the territory served: the type of collection means (over land and water), the introduction of new treatment plants, variations in the internal processing cycles of the plants, changes in the collection methods in the municipalities served, and so on. All the changes made were introduced into the technical specifications, assessing their possible impact on the summary indicators.

The traceability of the supply chains therefore allows the Urban Hygiene Manager to monitor and report the streams of recoverable waste entering and leaving the treatment plants, as well as the energy consumption necessary to carry out the various processes analysed. Thanks to annual monitoring, it is also possible to evaluate the trend of streams and recovery rates over time, allowing the companies

involved to implement the necessary actions to improve the waste management system.

The methodology applied for drafting the technical specifications, initially defined in detail during the first experimental supply chain traceability, has become an integral part of the Veritas Group's business management systems, fitting into the broader context of the operational management procedures that regulate the various activities carried out.

This methodology complies with the requirements of **National Reference Practices UNI/PdR 132:2022** "Guidelines for the monitoring and verification of municipal waste streams for the purpose of reporting for the calculation of recycling targets", published in September 2022 by the Italian Standards Authority as a result of the roundtable on waste traceability, promoted by Utilitalia and involving several Italian multi-utilities engaged in the field of environmental services, including the Veritas Group.

The consolidation over time of this monitoring system has allowed Eco+Eco srl to be, together with Veritas, **the first company in Italy to certify the compliance of the supply chain traceability with this reference practice**, recognized as a tool for the monitoring and verification of recovery data for the purposes of reporting the objectives of Legislative Decree 152/2006 and Legislative Decree 118/2020, for the benefit of the entire supply chain (producers and managers of the waste cycle, treatment plants, consortia and control bodies).

The traceability results are also very useful for the evaluations necessary for the project of technological updating of existing plants and the implementation of new interventions in place at the **Ecodistrict of Marghera**: the plant pole for the treatment of urban and special

waste in which the Veritas Group aims to implement a real model of industrial symbiosis, with the aim of managing most of the types of urban waste collected, within a limited area, allowing the reduction of distances between one phase and the other also of different supply chains, optimizing the management of flows, thus reducing energy consumption and emissions into the atmosphere and improving overall recovery performance.

The importance of the traceability of urban waste emerges, at the regulatory level, also from the recent publication of the Decree of the Ministry of Environment and Energy Security No. 59 of 4 April 2023, namely the Regulation containing the "Discipline of the waste traceability system and the national electronic register for the traceability of waste pursuant to Article 188-bis of Legislative Decree No. 152 of 3 April 2006", which entered into force on 15 June 2023.

This decree introduces the RENTRI, a digital management model for the fulfilment of obligations such as issuing transport identification forms and keeping loading and unloading records. This tool allows the **traceability of waste** in such a way as to have control over the waste itself, from production to final destination, so as to prevent its dispersion into the environment. In addition to making the transmission and acquisition of environmental data relating to the waste cycle and management functional, RENTRI aims to be an effective tool to combat organized crime operating in the field of waste disposal. This measure is also part of the National Strategy for the circular economy and the related National Waste Management Programme (PNGR).

Through this activity of analysis and research that is the result of the commitment of all the people who work every day in the Veritas



Group companies and in the treatment plants, it becomes clear that our community has decided to place itself in that part of society, economy and politics that continues to guide the world towards more responsible and environmentally conscious cultural horizons. Our lifestyle is fundamental, revealing itself as a set of concrete and effective actions on a local scale, but also as the open gaze of a community that takes charge of global issues.

The outcome of this work shows how important it is to apply **circular economy** to the entire management system of Veritas Group companies, a model in which waste becomes an essential resource for manufacturing products from regenerated raw materials. The companies involved keep renewing and developing, thus placing themselves at the base of those production cycles in which the waste citizens confer by means of separate collection becomes the key resource of a continuous flow of matter.

In this context, waste - whether it is packaging or food waste or other organic substances - is nothing more than matter in a transitional phase of transformation, as happens in biological ecosystems.

Matter, once put back into circulation, no longer impacts the environment nor consumes soils, which can thus be used for agriculture; matter is therefore used to feed life or technological cycles. Materials such as glass, plastic, metals, paper or cardboard of which the packaging is composed thus return to perform the same original functions, saving raw materials, of which the planet is increasingly poor, and reducing energy consumption, a current issue following the crisis between Ukraine and Russia, which has drastically reduced the supply of gas causing a significant increase in fuel and electricity costs; the process of rebuilding packaging from recycled material requires in fact much less resources than the production from virgin raw materials.

On the basis of these principles, the Ministry of Ecological Transition on 24 June 2022 (Ministerial Decree no. 257) approved the **National Programme for Waste Management (PNGR)**. The Programme plays a strategic role in defining waste management policies in the transition towards a circular economy of Italy and its Regions and Autonomous Provinces within the European context and, more generally, also in consideration of the global policy of the 2030 Agenda guidelines.

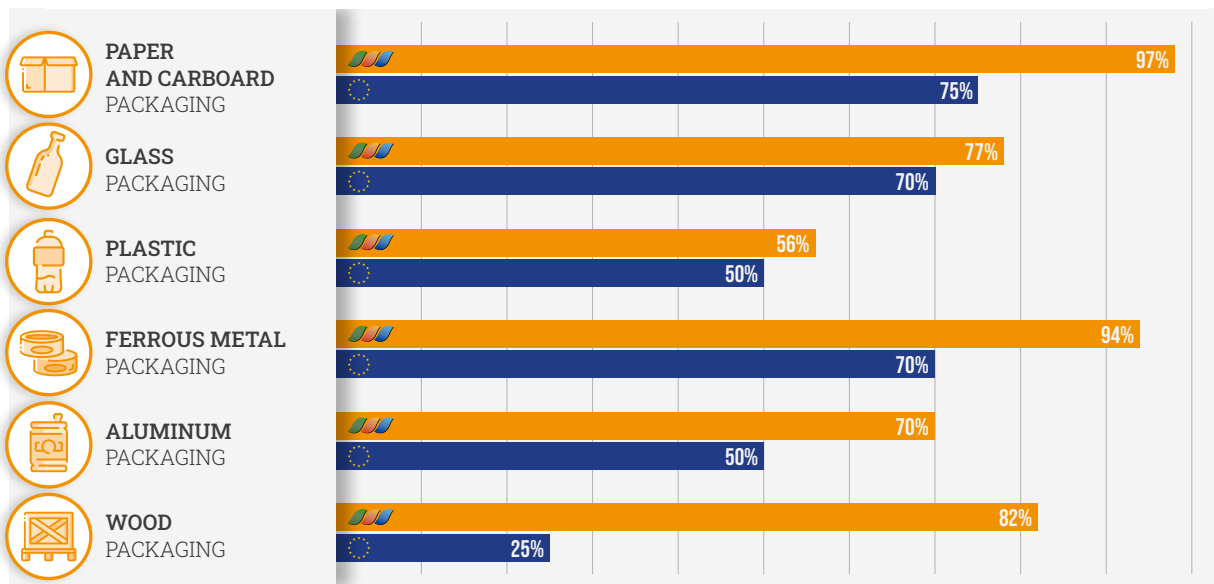
Through macro-objectives, the Programme defines the criteria and strategic lines to which the Regions and Autonomous Provinces must adhere when drawing up Waste Management Plans, with the aim of promoting the reduction, reuse, maintenance of products, extension

of their life cycle, recovery and recycling of materials.

For this year as well the Veritas Group has reached, for all materials, the targets for 2025 and 2030.

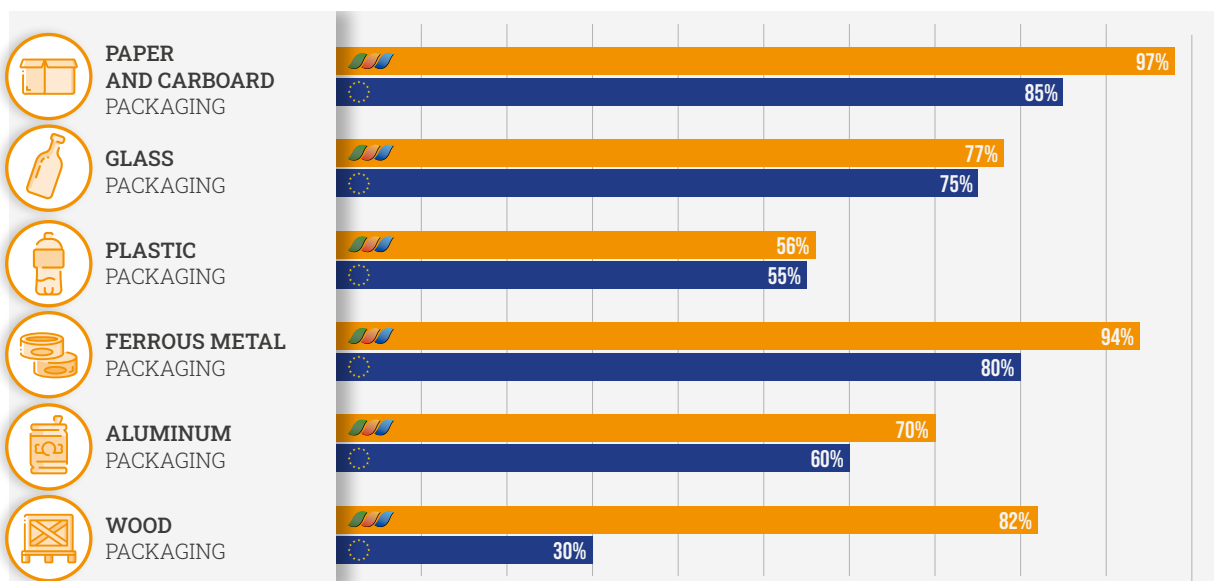
COMPARISON WITH EUROPEAN GOALS BY 2025:

Veritas Group, 3 years ahead in achieving the recycling rate for all packaging.



COMPARISON WITH EUROPEAN GOALS BY 2030:

Veritas Group, 8 years ahead in achieving recycling rate for all packaging.



Although the results achieved are promising, the Group's companies strive to ensure that their performance constantly improves; for example, as far as plastic packaging is concerned, "Eco+Eco - Ricicla" has launched a project to implement advanced plant solutions with the aim of increasing the recovery of different polymers as they are fed into the sorting process. At the end of their useful life, plastics contain valuable resources that should not be wasted, since they can be recycled into new products. The aim is therefore to maximise recovery, contributing to the objective "zero plastic to landfill".

All this also aimed at achieving the European objectives on the separate collection and recycling of single-use plastic, imposed by EU Directive 2019/904, and preparing advanced technological plants suitable for the recovery of these materials, also in view of the definition of the criteria on the termination of waste status **End of Waste for plastic waste** (in particular pet, LDPE, HDPE, mixed plastic waste, polystyrene and PP), expected by March 2024.



Goals for **RECYCLING PLASTIC BOTTLES:**

50% → 55%
by 2025 by 2030



Goals for **SEPARATE COLLECTION OF PLASTIC BOTTLES** placed on the market:

77% → 90%
by 2025 by 2030



Goals related to the **CONTENT OF RECYCLED PLASTICS IN THE BOTTLES:**

25% → 30%
by 2025 by 2030

What arrives at the recovery plants, however, cannot be completely regenerated: together with the recyclable material there is, in fact, still a high amount of improperly delivered waste that, for technical, logistical and economic reasons, cannot reach its respective recovery chain.

The objective, therefore, is to increase the quantity of separately collected materials by reducing landfilling as much as possible, but also to **increase the quality of the materials collected** to obtain as much renewable material as possible from waste, minimising the presence of non-valuable waste. This would allow for greater development of our sustainability, making us able to make the most of raw materials, closing their life cycle without turning them into waste or scrap, and further benefit from their reuse.

This can only bring enormous advantages for current and future generations, including economic pros: the costs of waste management are still too high, both for the communities and for the companies that work to treat them.

This happens for various reasons, but above all because not everyone is aware that collecting waste and sorting it at the plants has a cost inversely proportional to the care and consideration we put in choosing the products we buy and the way in which we transform our consumer goods into waste.

Being transparent about the data collected gives each municipal government the means to inform its citizens: from now on, not being informed is a personal choice, but it comes at a high cost for the community, both in economic and environmental terms, a cost that to be eliminated requires a strong synergy between good civic practices, optimized collection systems and flexible recovery production processes.

PLASTIC SMART CITIES - THE ACTION PLAN OF THE MUNICIPALITY OF VENICE TO ELIMINATE THE USE AND DISPERSION OF PLASTIC

Plastic Smart Cities is a global WWF initiative created to support cities and coastal centres in combating the dispersion of plastic in nature, in line with WWF's "no plastic in nature" objective. The first cities to join the initiative were Amsterdam and Oslo in 2019, but the areas that saw the fastest growth in terms of membership were South East Asia and the Mediterranean.

The Mediterranean Sea, despite its natural beauty and tourist attractions, has record levels of plastic pollution that threaten marine species and human health; there are about half a million tonnes of large and small plastic dispersed every year, about 33,800 bottles thrown into the sea every minute⁽³⁾.

Plastics that end up in the sea have negative, often lethal, effects on marine life, with impacts on the entire ecosystem; plastic pollution also has an impact on the economy, with huge economic losses, estimated at 641 million euros per year in the Mediterranean area.

Furthermore, the improper handling of plastics has significant impacts on the climate, contributing to increased emissions of climate-changing gases: according to estimates, the production of plastic and the incineration of plastic waste generate a total of about 400 million tonnes of CO₂ every year.

Increased use of recycled plastic can reduce dependence on fossil fuel extraction for plastic production and curb greenhouse gas emissions; it is estimated that recycling plastic waste from around the world could result in annual energy savings of 3.5 billion barrels of oil⁽⁴⁾.



(3) Dalberg Advisors, for WWF Mediterranean Marine Initiative (2019). https://www.wwf.it/uploads/fermiamo_inquinamentoplastica_giu2019_con_logo_def.pdf

(4) From "Communication From The Commission To The European Parliament, The Council, The European Economic And Social Committee And The Committee Of The Regions: European Strategy for Plastics in the Circular Economy" [SWD(2018) 16 final].



This is why coastal resort cities are at the heart of WWF's Plastic smart cities Initiative in the Mediterranean. To date, ten cities in six Mediterranean countries have joined the initiative, including Nice, Dubrovnik, Izmir, Tangier; to these was added, in March 2021, Venice, one of the most beloved cities of art in the world. Venice, the first city in Italy to join the Initiative, is twinned with the city of Izmir through the project "Venice and Izmir together against plastic pollution" created with the support of the Blue Planet Virginia Böger Foundation. Thanks to the network of tourism-driven coastal cities being created from the north to the south of the Mediterranean, WWF is developing the largest civic activation in the last decades in defence of the sea. The goal is to collaborate with at least 25 Mediterranean cities or islands by 2022.



By joining the project, Venice will therefore be able to contribute to and benefit from a network of knowledge about methodologies developed for the analysis of plastic

waste management, innovation projects and solutions already implemented in other cities to avoid the consumption of single-use and unnecessary plastic. Public administration action on the specific issues of coastal and maritime pollution prevention, the promotion of a culture of reuse and recycling, as well as the protection and preservation of the marine habitat and environmental education can then be strengthened, in line with the priority goals outlined in the 2030 Agenda for Sustainable Development approved by the United Nations.

With Council Resolution no. 66 of 16 March 2021, the Municipality of Venice joined the initiative, becoming part of a network of cities united in the common intention of **reducing and progressively eliminating the use and dispersion of plastic in surface waters and**



in the Mediterranean, where record levels of microplastics represent a threat to all marine life and human health. The project requires the active involvement of citizens and stakeholders, including the Veritas Group.

The protocol of intent, prepared by the WWF (*Plastic Smart City Commitment*) and signed by the Municipality of Venice, provides in particular for the commitment to:

- take action to **eliminate the dispersion of plastic in nature** (*No plastic in nature*) by 2030;
- develop an **action plan** within six months of signing the declaration of intent and launch a **pilot project** within a designated area with the objective of **reducing plastic pollution by 30% within two years**;
- promote the involvement in the initiative of key sectors and stakeholders for the **evaluation and improvement of policies**, services and funding to prevent the production of plastic waste and promote their management with circular solutions;
- appoint an internal staff member to guide the *Plastic Smart Cities* initiative in Venice;
- develop an **activity monitoring plan** with baseline and annual targets and share progress with WWF through its own reporting activities;
- **involve stakeholders and citizens** in the development and implementation of the policies to be adopted.

In this context, the traceability of the plastics recovery chain is a key element in both the analysis of how the collection and recovery of plastic waste produced in the survey area is managed and the monitoring of plastic flows and dispersion in nature and the evaluation of strategies and best practices implemented.



THE 2022 AND 2023 ACTIVITIES

On 22 June 2022, the first technical meeting between the cities participating in the Mediterranean Plastic Smart Cities project took place in Venice: representatives of the coastal cities of Dubrovnik and Trogir (Croatia), Smyrna and Çeşme (Turkey), Tangier (Morocco) met in the lagoon city to discuss the activities carried out and exchange examples of good practice to combat the dispersion of plastic in nature.

On 13 June 2023, with Executive Provision PG/2023/0284061, the **Action Plan "Plastic Smart Cities" 2022-2024** was approved. With this document, the Municipality of Venice wants to outline the route it intends to take to prevent, manage and monitor the dispersion of plastic in nature. The document, of a voluntary nature, aims to describe the policies for the reduction of plastic waste by determining actions, timelines and objectives.



The guiding principles behind the Plan are:

- Integrate **circularity** in the use of plastic by collaborating with public and private bodies and institutions.



- Stimulate **the elimination** of problematic or unnecessary packaging or plastic items.
- Encourage **reuse patterns**, where applicable, to reduce the need for single-use plastic packaging and/or items.
- Promote and encourage the **use of reusable, recyclable and compostable packaging** and/or articles.
- Support initiatives that aim to **increase the collection, sorting, reuse and recycling rates of plastic materials** and facilitate the creation of infrastructure and related financing mechanisms.
- Optimize means and processes to **reduce the dispersion in the environment** during collection and transport.
- Support initiatives that aim **to stimulate the demand for recycled content** in all packaging and plastic articles used.
- Promote **virtuous behaviours** of citizens and tourists on recycling and reuse.
- **Collaborate with the private sector** and local organizations active in the territory to achieve the objectives of the initiative.
- **Monitor**, report and share annually on the progress made.

The action plan includes some specific actions divided into five macro-areas:

1. Prevention of plastic waste: combating the dispersion of tires in the aquatic environment, cigarette butts and plastic materials related to fishing; Operation Refill, to raise awareness among citizens and tourists of the use of public water, in order to reduce the use and dispersion of plastic bottles in nature; active involvement of tourist and commercial activities.

2. Waste management, from delivery to recycling: experimentation with bins for the collection of Glass, Plastic and Cans (VPL) at the Lido and in the Historic Centre; cleaning of canal beds and lagoon areas; covering of barges for the collection of VPL; replacement of multi-material bins; specific collection and recovery of polystyrene at the Eco+Eco - Ricicla plant; identification of recyclable plastic material entering the Eco+Eco - Valorizza residual urban waste recovery plant; implementation of plant solutions to increase the recovery of polymers entering the Eco+Eco - Ricicla's sorting; circular collaboration projects

on plastics; encouragement of separate collection of plastics and use of increasingly high-performance methods for dispersal in nature.

3. Monitoring of plastic flows and dispersion in nature: definition of specific indicators to monitor the collection and recycling of plastics and the effectiveness of the actions of the action plan; Clean-Up Protocol Venice; activities of environmental inspectors; monitoring of data on waste collected in the VPL baskets in the Old Town and Lido; collection and processing of data on materials collected during the cleaning of the canal beds and lagoon areas.

4. Events and initiatives: development of guidelines for waste management and the elimination of single-use plastic; *Plastic Smart* events to be used as good practice; establishing information points and communication events; educational workshops on the *Plastic Smart* topic.

5. Communication: dissemination of *Plastic Smart Cities* activities; organization of webinars; update of the #EnjoyRespectVenezia campaign; update of the Sustainable Venice page on *VeneziaUnica*; update of the *Scoasse* App.

The Action Plan also includes a pilot project to counteract the effects of the dispersion of tyres in the water environment, starting from the canals of the historic centre of Venice. The goal is to reduce plastic pollution by 30% within 2 years of implementation.



The project involves the development of a program to encourage the use of alternative solutions to the use of tires as fenders and channel bottom cleaning activities with gondoliers.





CHAPTER 2

WASTE PRODUCTION AND SEPARATE COLLECTION TREND

2. THE PRODUCTION OF RECYCLABLE WASTE AND THE DISPOSAL OF SEPARATE COLLECTIONS



35.5 M

TOURISTS IN THE SERVED AREA in 2022



23.6 M

TOURISTS in the coastal municipalities

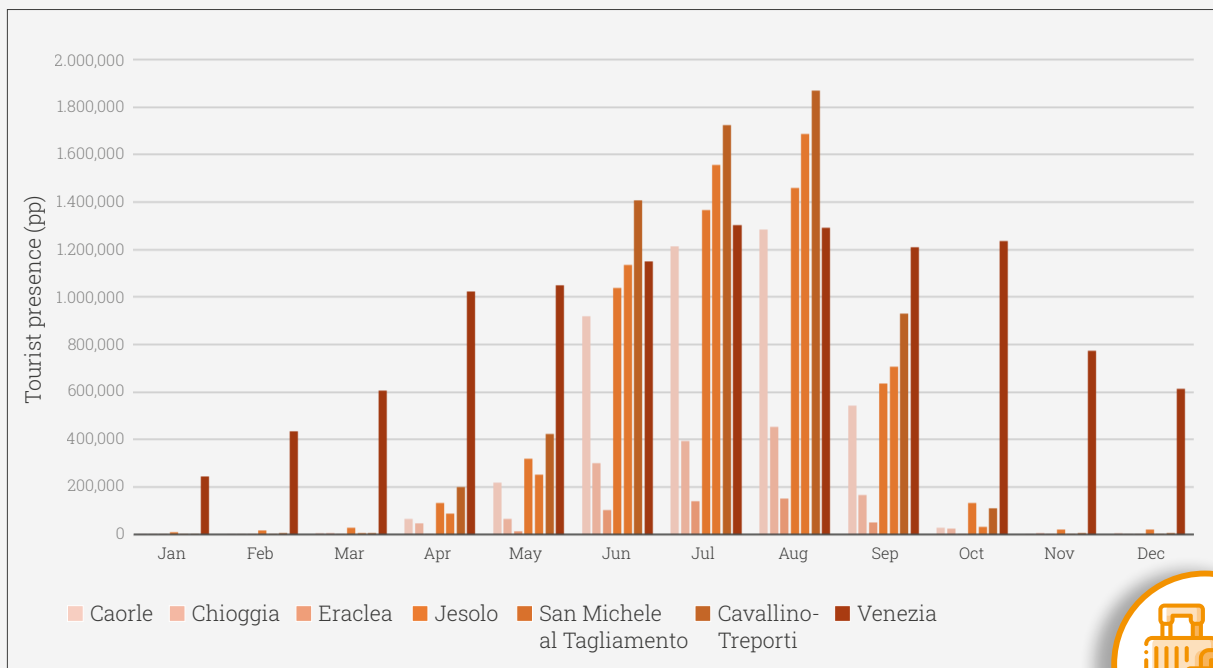


2.1 THE TERRITORY SERVED AND THE IMPACT OF TOURISM

The reference area for the traceability of paper, glass, plastic and metal supply chains corresponds to the entire territory in which the Veritas Group carries out the environmental hygiene service, i.e. all the municipalities of the metropolitan city of Venice and Mogliano Veneto, in the province of Treviso.

A total of 45 municipalities are involved, which are highly diverse from each other, both from the point of view of urban and territorial peculiarities and the significant tourist phenomenon that characterizes the coastal area.

FIGURE 1
TOURIST PRESENCES IN THE VENETIAN COAST BY MUNICIPALITY - YEAR 2022



Data processing Bureau of Statistics of the Veneto Region.



The tourist flow in 2022 registered increasing values compared to previous years, approaching pre-pandemic values; the coastal municipalities and the municipality of Venice recorded a total of over **35 million visitors**. The coastal municipalities of Jesolo, Eraclea, Chioggia, San Michele al Tagliamento, Caorle and Cavallino-Treporti alone recorded about 23,600,000 tourists (up from 20,700,000 tourist presences in 2021) concentrated mostly in the summer months; to these are added almost 11 million tourists in the municipality of Venice, recorded mainly in the period April-October.

Comparing the data for 2021 and 2022, we see an increase in the number of presences in all tourist municipalities, due to the gradual easing of restrictive measures related to the health emergency; overall, the values are getting closer to the pre-pandemic figures, when total presences reached nearly 40 million people.

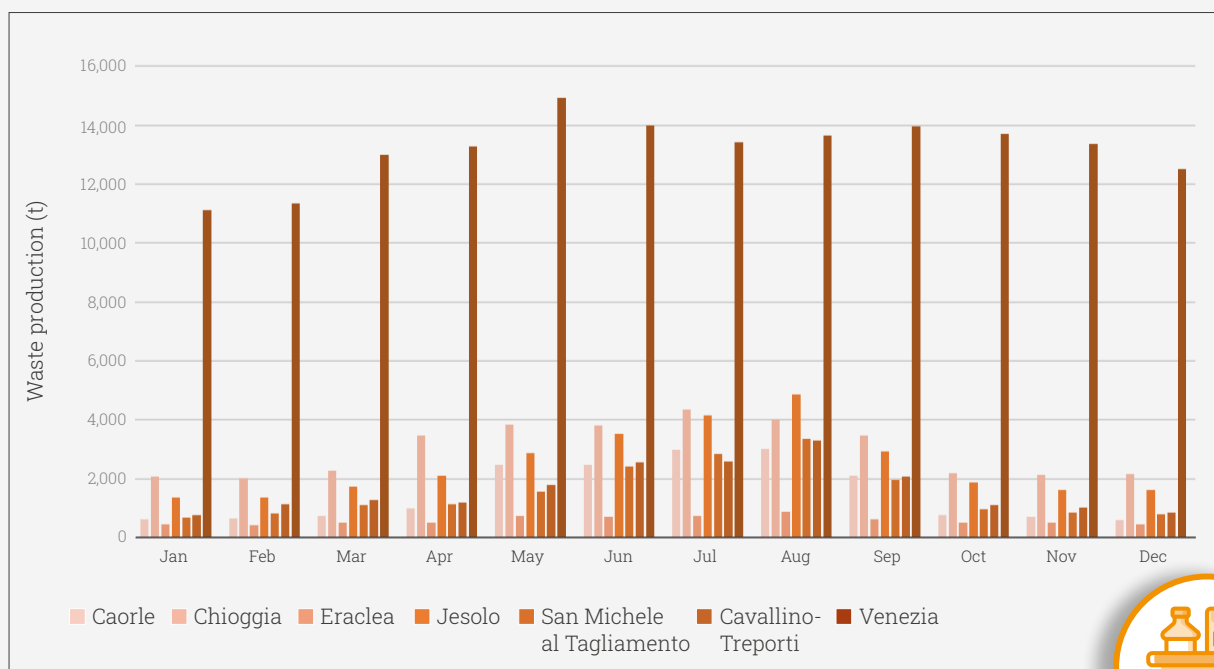
The effects of tourist flows are particularly

visible on waste production, which increases significantly during the summer in coastal municipalities: for example, in the municipalities of Caorle and San Michele al Tagliamento, production in the summer months is up to 5 times that of the winter months. Minor fluctuations are recorded in the municipality of Venice which, thanks to its historic centre, is characterised by a generally more constant tourist phenomenon throughout the year.

The tourist vocation of the Venetian area has a considerable impact on the Group's companies, which must implement specific services to guarantee the collection and recycling of waste at all times of the year, by increasing the frequency of collections or establishing special services. At the same time, the plants must ensure the treatment of the collected waste and the recovery of the different sorted materials, to ensure the continuity of the recycling chain.

FIGURE 2

WASTE PRODUCTION IN THE VENETIAN COAST BY MUNICIPALITY - YEAR 2022



Data processing by Veritas Group.



2.2 THE PRODUCTION OF URBAN WASTE IN THE METROPOLITAN CITY OF VENICE

In 2022, in the 45 municipalities served by the Veritas Group, **509,564.97 t of urban waste were produced**, of which 349,802.57 t of differentiated waste. Total production registered a 2% decrease compared to 2021, although there was a progressive increase in tourist flows in 2022. Waste production per capita also decreased in 2022, reaching 528 kg/inhabitant*year, considering both residents and tourist attendance (compared to 549 kg/inhabitant*year in 2021).

The decrease in quantities is observed in almost all the main product fractions collected: -1.83% for organic waste, -3.20% for green waste and twigs, -7.55% for wood waste and -7.58% for bulky waste; paper and cardboard waste, on the other hand, remains stable compared to 2021. On the contrary, glass-plastic-cans and residual urban waste suffer an increase of 4.08% and 5.05% respectively.

The percentage of **separate collection** also slightly decreased, from 72.94% in 2021 to 71.77% in 2022, still remaining above the target of 65% set by national legislation for 2035.

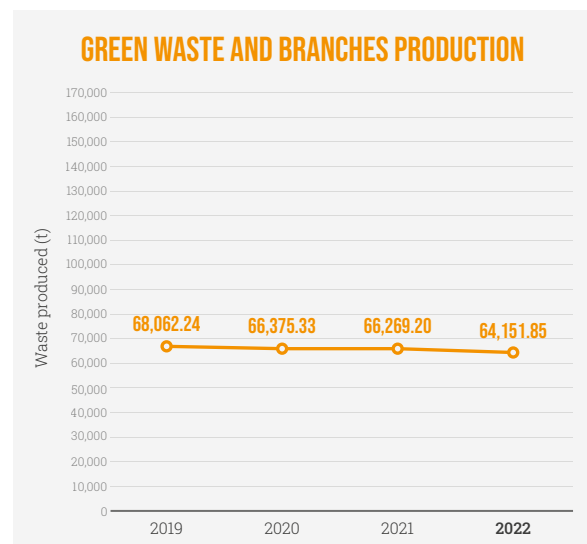
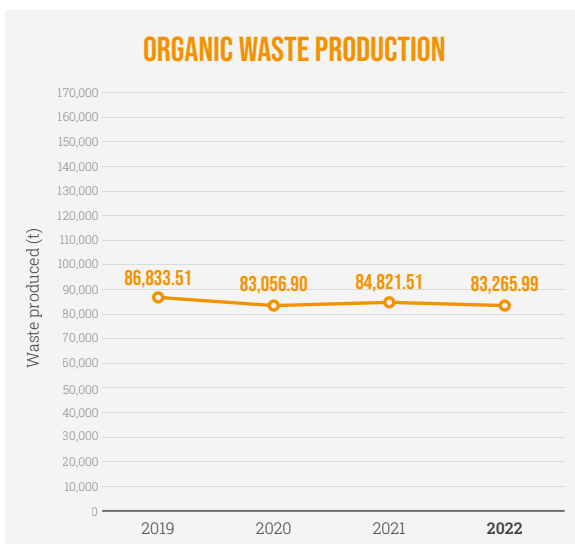
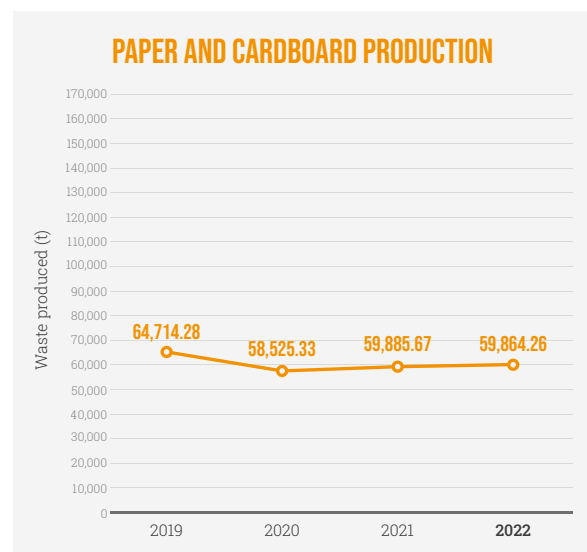
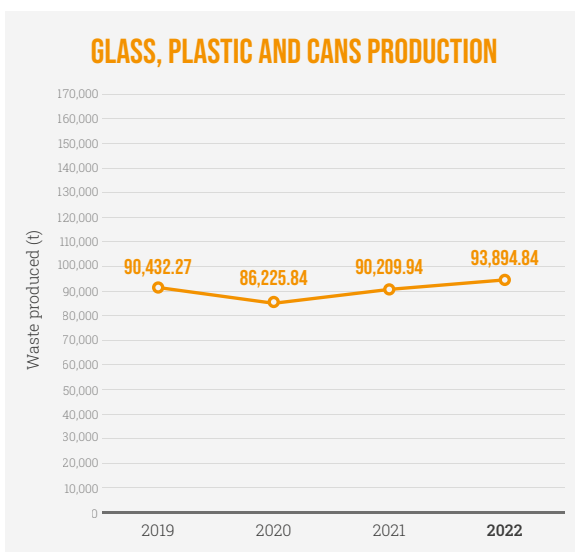
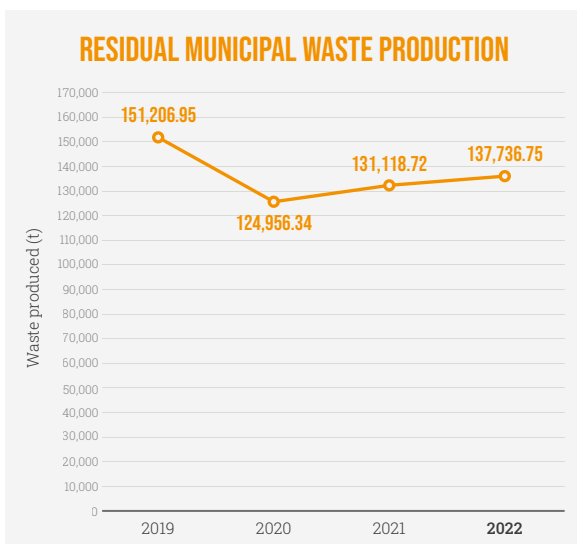
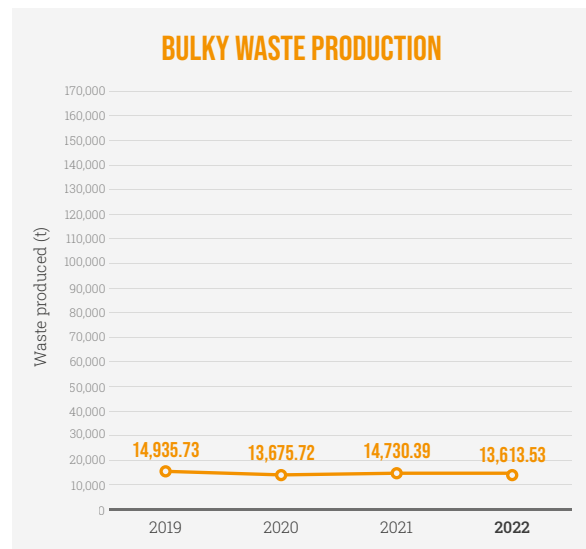
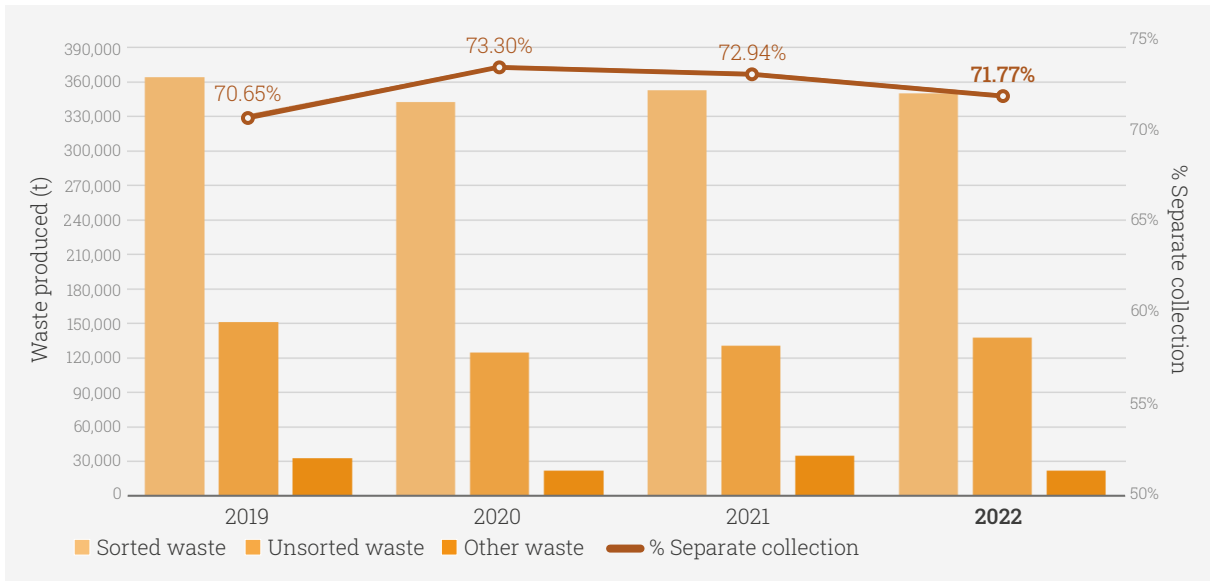


FIGURE 3

TRENDS IN THE PERCENTAGE OF SEPARATE WASTE COLLECTION - YEARS 2019-2022

(according to Ministerial Decree of 26 May 2016)





CHAPTER 3

PAPER, GLASS, PLASTICS AND METALS TRACEABILITY

3. TRACEABILITY OF PAPER, GLASS, PLASTIC AND METAL SUPPLY CHAINS

3.1 METHODOLOGY OF ANALYSIS AND MONITORING OF SUPPLY CHAINS

In accordance with the validated technical specifications, this year again all flows of glass, plastic, metals and paper waste collected in the territory served by the Veritas Group in 2022 were tracked and certified. All stages of the supply chain were analysed, from the delivery of waste by citizens and businesses, during the collection activities up to the sorting and refining treatments in subsequent plants.

Similar to previous years, **all urban and similar waste has been tracked**, considering only the materials conferred by domestic utilities and businesses, or the quantities that contribute to the calculation of separate collection and that represent almost all of the waste managed; therefore, the flows of special waste conferred by different utilities on the basis of specific contracts have been omitted, which are managed in the same way as urban waste and can therefore also be tracked.

To analyse in detail the different waste flows, the territory under analysis was divided into **8 collection areas**. This organization takes into account the different methods in which the service is carried out in the various areas, by monitoring the flows in and out of the transfer stations, assessing their storage, monitoring the energy consumption of the different means used, both on land and water.

The territory served by the Veritas Group is highly diverse and includes both small-



medium-sized municipalities, characterized mostly by residential and artisanal utilities with constant production throughout the year, and highly tourist-driven municipalities in which the production of waste increases considerably during the summer periods. These differences do not allow for a standard urban hygiene service over the whole territory served; according to the specific territorial needs, the provision of the service must be adapted.

Therefore, different collection methods are used and different fractions are collected even within the same municipality. Also to be highlighted is the particular situation of the historic centre of Venice, a unique territory where specific methods of carrying out the service are necessary: the waste is collected by hand, door-to-door, by the operators or taken by citizens to the defined delivery points; then it is moved through the canals using watercrafts for transport to the operational headquarters and, finally, transferred to the Fusina transfer station by means of a special barge.

TABLE 1
COLLECTION AREAS OF THE VERITAS GROUP

 COLLECTION AREAS	 SERVED MUNICIPALITIES/AREAS
A 1.1 VENICE EAST AREA (FORMER ALISEA)	Cavallino-Treporti, Ceggia, Eraclea, Fossalta di Piave, Musile di Piave, Noventa di Piave, Jesolo, San Donà di Piave, Torre di Mosto
A 1.2 ASVO SPA	Annone Veneto, Caorle, Cinto Caomaggiore, Concordia Sagittaria, Fossalta di Portogruaro, Gruaro, Portogruaro, Pramaggiore, San Michele al Tagliamento, San Stino di Livenza, Teglio Veneto
A 1.3 CAVARZERE AND CONA	Cavarzere and Cona
A 1.4 CHIOGGIA	Chioggia
A 1.5 RIVIERA DEL BRENTA AND MIRANESE	Campagna Lupia, Campolongo Maggiore, Camponogara, Dolo, Fiesso d'Artico, Fossò, Martellago, Mira, Mirano, Noale, Pianiga, Salzano, Santa Maria di Sala, Scorzè, Spinea, Stra, Vigonovo
A 1.6 VENICE <i>historic center</i>	Venezia, Burano, Murano
A 1.7 VENICE <i>estuary</i>	Lido di Venezia, Pellestrina
A 1.8 METROPOLITAN CITY OF VENICE <i>mainland</i>	Chirignago-Zelarino, Favaro Veneto, Mestre Carpenedo, Marghera, Marcon, Meolo, Mogliano Veneto, Quarto d'Altino

The technical specifications define the procedures necessary to monitor the collection activities of all the companies that carry out the service (Veritas spa, Asvo spa, Eco+Eco srl), with specific considerations for the different collection methods (door-to-door with land vehicles, door-to-door with water means, over land with direct transport to the transfer station or sorting plant, over land with water transport to the transfer station); the waste storage and bundling activities are then verified in the 5 transfer stations involved (Chioggia, Mirano, Jesolo, Portogruaro and Fusina).

The analysis of waste streams is carried out with reference to the EWC code assigned to the waste itself, and in some cases also considering the specific type of fraction collected: the waste classified with EWC 150106, which represents the multimaterial, is in fact analysed separately. The joint collections of glass-plastic-cans are separated from the flows of glass-cans and plastic-cans, in order to monitor the progress of the production of the different fractions and any changes in the collection methods in the municipalities served.

All the companies involved collect data on their activities annually, which are used to monitor the flows of the entire supply chain and to calculate material and energy indicators. The reference period chosen for data reporting is the **calendar year**: this allows seasonal variations in flows to be taken into account and an effective comparison with indicators for the previous period. This also makes it possible to align the supply chain information to the processing normally carried out by companies to communicate data to the Control Bodies (for example, MUD declaration), for the preparation of the annual production budgets, for the monitoring of the indicators defined within the company management systems (for example, the environmental management system compliant with ISO 14001). The validated indicators, illustrated in this document, relate to the **period 1 January 2022 - 31 December 2022**.

In September 2023, audits were carried out by the Bureau Veritas certification body to maintain the certificate of compliance with the technical specifications and to verify compliance with the requirements of the **UNI/PdR 132:2022 reference practice**. The audits were aimed at ascertaining the compliance of the activities carried out, verifying in the field all types of collection for each fraction in each of the 8 areas identified.

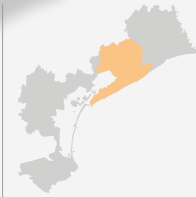
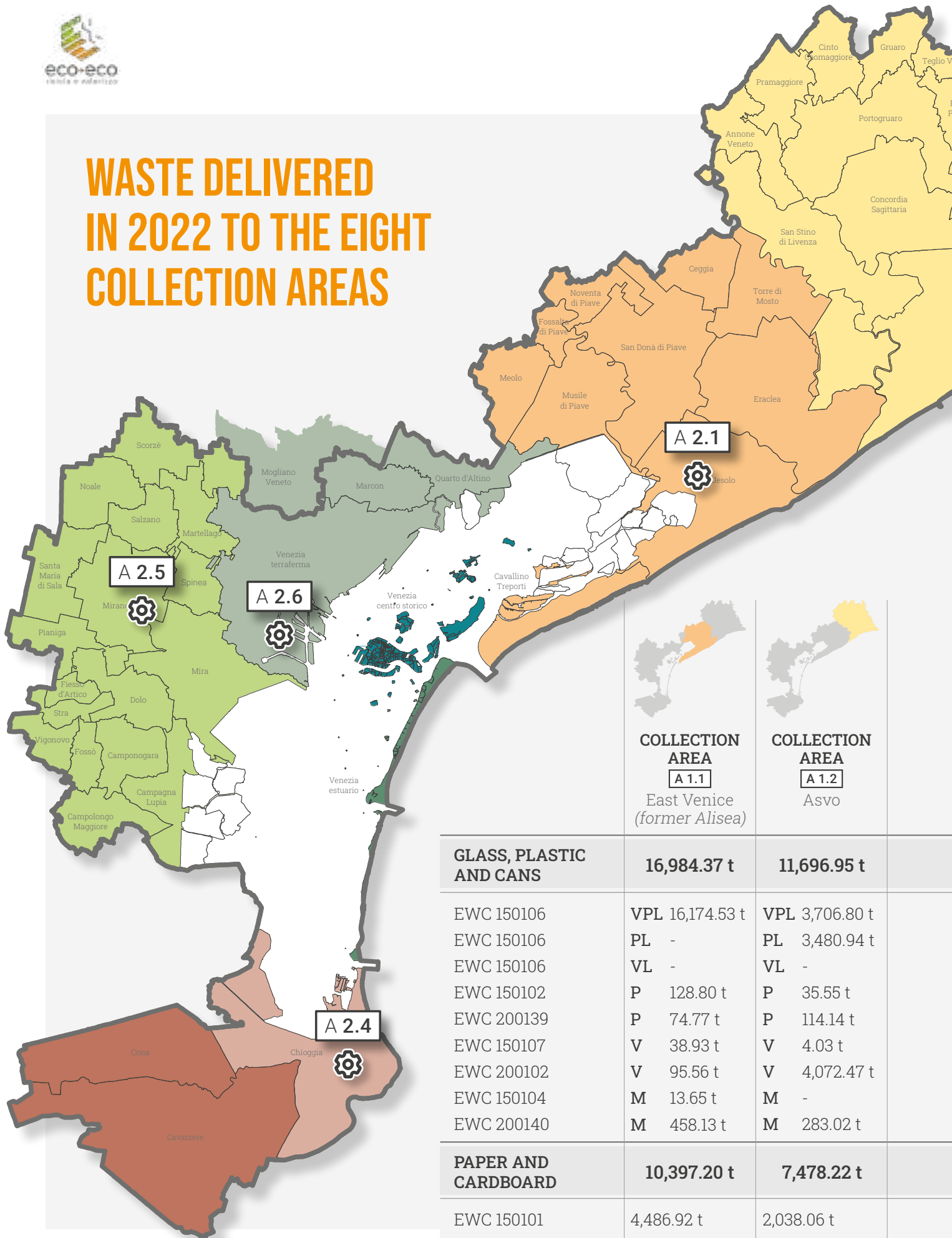
The waste was then traced from the door-to-door container or from the road dumpster, during the collection phase and in the storage activities inside the transfer stations, until the treatment carried out in the sorting and refining plants. In addition, all the documents certifying the path of the material were verified, both those normally produced for the traceability required by current regulations, and those more specific, defined within the scope of the

supply chain specifications. Finally, all the data entered in the monitoring tables of the supply chains were checked, verifying the sources and procedures for calculating the indicators.

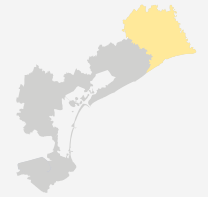
 45 MUNICIPALITIES served in the provinces of Venice and Treviso	 Street, door-to-door, and mixed COLLECTION SYSTEM
 8 Veritas Group's COLLECTION AREAS	 5 TRANSFER STATIONS for storage



WASTE DELIVERED IN 2022 TO THE EIGHT COLLECTION AREAS

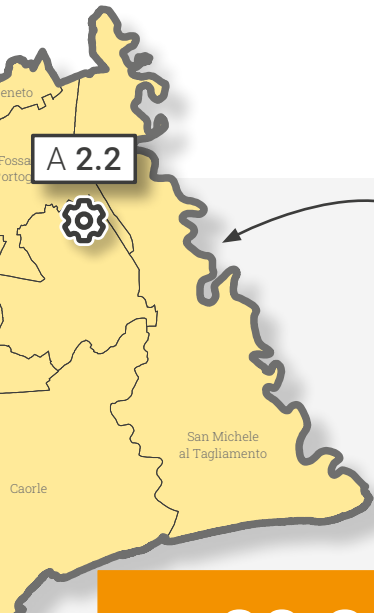


COLLECTION AREA
A 1.1
East Venice
(former Alisea)



COLLECTION AREA
A 1.2
Asvo

	16,984.37 t	11,696.95 t
GLASS, PLASTIC AND CANS		
EWC 150106	VPL 16,174.53 t	VPL 3,706.80 t
EWC 150106	PL -	PL 3,480.94 t
EWC 150106	VL -	VL -
EWC 150102	P 128.80 t	P 35.55 t
EWC 200139	P 74.77 t	P 114.14 t
EWC 150107	V 38.93 t	V 4.03 t
EWC 200102	V 95.56 t	V 4,072.47 t
EWC 150104	M 13.65 t	M -
EWC 200140	M 458.13 t	M 283.02 t
PAPER AND CARDBOARD	10,397.20 t	7,478.22 t
EWC 150101	4,486.92 t	2,038.06 t
EWC 200101	5,910.28 t	5,440.16 t



5 TRANSFER STATIONS

- A 2.1 Jesolo A 2.5 Mirano
- A 2.2 Portogruaro A 2.6 Fusina
- A 2.4 Chioggia



93,894.84 t



OF GLASS, PLASTIC AND CANS
DELIVERED IN 2022

59,864.26 t



OF PAPER AND CARDBOARD
DELIVERED IN 2022

COLLECTION AREA A 1.3 Cavarzere and Cona	COLLECTION AREA A 1.4 Chioggia	COLLECTION AREA A 1.5 Riviera del Brenta and Miranese	COLLECTION AREA A 1.6 Venice historic center	COLLECTION AREA A 1.7 Venice estuary	COLLECTION AREA A 1.8 Venice mainland
1,413.53 t	5,385.42 t	23,639.72 t	8,335.76 t	2,485.02 t	23,954.08 t
VPL 1,154.63 t PL - VL 119.34 t P 109.95 t P - V - V - M - M 29.61 t	VPL 4,493.11 t PL - VL - P 770.41 t P - V - V - M - M 121.90 t	VPL 14,322.14 t PL 469.74 t VL 4,343.15 t P 3,369.93 t P - V 392.96 t V 110.32 t M - M 631.48 t	VPL 8,331.38 t PL - VL - P 1.66 t P 0.12 t V - V - M - M 2.60 t	VPL 2,391.42 t PL - VL - P 5.12 t P 0.88 t V - V 10.12 t M - M 77.48 t	VPL 20,063.67 t PL 164,21 t VL 1,224.19 t P 1,391.89 t P 40.73 t V 287.59 t V 113.18 t M 56.88 t M 611.74 t
885.30 t	3,016.39 t	14,522.19 t	5,893.46 t	1,643.00 t	16,028.50 t
175.58 t 709.72 t	1,109.92 t 1,906.47 t	3,743.93 t 10,778.26 t	- 5,893.46 t	- 1,643.00 t	3,856.60 t 12,171.90 t



3.2 WASTE PAPER, GLASS, PLASTIC AND METALS PRODUCED IN 2022

To quantify the weight of the four supply chains traced on the Venetian collection system, it is useful to frame the overall situation in the territory under analysis.

In 2022, in the 45 municipalities served by the Veritas Group, **509,564.97 t of municipal waste were produced** (sum of all types of waste provided, including home composting). On average, in an area of about 2,015 km² and 868,645 residents, with 35,454,846 tourists, the **production per capita was 528 kg/inhabitant*year**.

Of the total waste delivered, almost 12% consists of **paper and cardboard waste** (EWC 150101 paper and cardboard packaging and EWC 200101 paper and cardboard), equal to **59,864.26 t**. The largest amount of paper and cardboard was delivered in the mainland Venice area (about 27% of the total) and in the area of the Riviera del Brenta and Miranese (over 24% of the total); followed by the "Venice East" area (about 17%), the area managed by Asvo (over 12%) and Venice historic center (almost 10%). The distribution by area of the productions is in line with that recorded in previous years.

The **per capita production of paper and cardboard waste** in 2022 was equal to **61.99 kg/inhabitant*year**, a slight decrease compared to the previous year (63.39 kg/inhabitant*year) and higher than the last available regional average (59.51 kg/inhabitant*year referring to 2022). The Venetian figure is higher than both that of Northern Italy (67.63 kg/inhabitant*year) and the Italian average (62.04 kg/inhabitant*year)⁽⁵⁾.

(5) Source: ISPRA, Urban Waste Report – 2023 Edition.

The **total production of glass, plastic and metal waste** in 2022 was equal to **93,894.84 t**, registering an increase of 4.1% compared to 2021. This quantity includes all fractions containing glass, plastic and metal waste: packaging in mixed materials EWC 150106 (VPL glass-plastic-cans, VL glass-cans and PL plastic-cans), monomaterial glass (EWC 150107 glass packaging and EWC 200102 glass), monomaterial plastic (EWC 150102 plastic packaging and EWC 200139 plastic) and metals (EWC 150104 metal packaging and EWC 200140 metal). These fractions represent more than 18% of the total waste produced.

Most of the glass, plastic and metal waste was disposed of in the municipalities of the Riviera del Brenta and Miranese and the Venetian mainland (altogether almost 51% of the total). They are followed by the "Venice East" area (18%) and Asvo (12%). Regarding

the type of fractions collected, over 75% of the waste consists of VPL multimaterial, about 4% of PL (collected mainly in the Asvo territory and in smaller quantities in the Brenta Riviera and in the Venetian mainland) and 6% of VL (collected mainly in the municipalities of the Brenta Riviera and in smaller quantities in the Venetian mainland). The materials collected separately consist of 6% of EWC 150102 plastic packaging, almost 5% of EWC 200102 glass and more than 2% of EWC 200140 metal.

The **per capita production of glass, plastic and metal waste** was equal to **97.22 kg/inhabitant** in 2022, up from 95.49 kg/inhabitant in 2021; in this case as well the Venetian territory exceeds the national average (74.57 kg/inhabitant*year in 2022), the average of Northern Italy (86.55 kg/inhabitant*year in 2022) and the regional average (90.69 kg/inhabitant*year in 2022).

3.3 THE COMPANIES INVOLVED IN THE TRACEABILITY OF THE SUPPLY CHAIN

In the context of this study, in addition to Veritas spa and Asvo spa, which carry out the collection activities, the following plants play a fundamental role in the waste sorting and refining phases:



- **ECO+ECO SRL**, which sorts glass, plastic and metal waste;
- **CARTIERA DI CARBONERA SPA** and **BADIA RECYCLING SRL**, part of the Pro-Gest spa Group, which sort paper and cardboard;
- **SIBELCO GREEN SOLUTIONS SRL**, which refines sorted glass;
- **MYREPLAST INDUSTRIES SRL** that refines NON-COREPLA plastic;
- **METALRECYCLING VENICE SRL**, which refines metals.

ECO+ECO SRL

Eco+Eco srl is a company founded on 1 November 2022 following the merger by incorporation of the company Eco-ricicli Veritas srl, specialised in the collection and recovery of VPL (glass, plastic and cans), with the company Ecoprogetto Venezia srl, specialised in the treatment of residual urban waste and waste from the treatment of separate collections with the production of CSS (secondary solid fuel).

The Eco+Eco srl plant in which the management and treatment of recyclable dry fractions from separate collection takes place, in particular glass, plastic, metals, bulky waste and wood, is now called "Eco+Eco - Ricicla".



ECO+ECO RICICLA

The Company has a mixed mechanical-manual sorting plant, built between 2007 and 2008 in an area owned by the Municipality of Venice used in the past as a landfill for industrial waste by the petrochemical companies of Porto Marghera; this area has therefore gone from being a place destined for abandonment to becoming a reference point for the territory of Northern Italy for urban waste recovery activities.

Eco+Eco srl, in fact, receives waste from the separate collection of six Venetian provinces and also from Friuli-Venezia Giulia and Trentino-Alto Adige at its own plant. In the plant lines, it sorts about 40% of the heavy multi-material waste collected in the Veneto region, obtaining semi-processed glass matrix waste to be sent to refining plants for the production of oven-ready glass, as well as semi-processed plastic and metal waste to be transferred to the relevant recovery operators. The use of different and advanced technologies, such as electromagnetic and eddy-current separations, screening and suction, also allows materials from low-quality differentiated collections to be recovered, minimising the use of landfills, optimising recovery cycles and guaranteeing treatment even in peak seasonal periods due to the particular area served (high-tourist-impact areas such as the historic centre of Venice and the Venetian coast).

The Company also operates a plant for the treatment of bulky waste, which allows the recovery of still valuable materials, such as wood, metals and plastics, for subsequent recovery.

The Eco+Eco srl plant that treats Residual Urban Waste by transforming it into CSS, dedicated to initiatives such as waste recovery, energy saving and the production of energy from renewable sources is called "Eco+Eco



- Valorizza". The main activity of Eco+Eco - Valorizza is therefore the valorization of residual urban waste from recycling with the production of secondary solid fuel, to be processed for energy recovery at its own incineration plant or at third-party plants, minimizing the waste to be disposed of in landfill.

The company has a plant consisting of two secondary solid fuel (CSS) production lines and a co-combustion line for the production of electricity to be used within the pole itself or to be sold to the grid.

The continuous improvement in the quantity and quality of waste coming from the separate collection of the catchment area served by Eco+Eco srl means that the Company, which already implements the best techniques available for the execution of its production processes, is continually upgrading its plant to ensure ever better output products; the Company's choice is therefore to enhance the value of the waste by making it suitable for use by production plants downstream in the supply chain and thus minimize landfilling.

Precisely with a view to continuous improvement, the optimisation of recycling processes and the progressive reduction of environmental impact, the Company is

planning interventions to upgrade existing lines and create new lines for the sorting of further product fractions such as single-material plastics, polyolefin plastics etc. which will be part of the development plan of the Ecodistrict of Marghera. A pole, which also includes Metalrecycling Venice srl (which carries out the activity of refining scrap metal).

This model of environmental sustainability, implemented by the Company and consistent with the objectives of the entire Veritas Group, is reflected in the application of a cultural, organizational, design and technological path in which the issues of environmental protection, the containment of the use of primary resources, energy saving and efficiency and the exploitation of renewable energies are, together with the economic and financial sustainability of the initiatives, always placed in the first place.

This is attested by the certifications obtained by Eco+Eco srl for its Quality and Environmental Management Systems (ISO 9001 and ISO 14001), for the *End of Waste* of glass and metal scrap (Reg. EU No. 1179/2012 and Reg. EU no. 333/2011), as well as those obtained for the traceability of paper, plastic, glass and metal supply chains, CSS and bulky waste.

PRO-GEST GROUP

Pro-Gest is a private group, one of the largest players in Europe, in the vertically integrated production of paper, cardboard, and packaging. Founded in 1973, the Group has a network of 26 operating production plants in 7 Italian regions and "Let's bring paper back to life" is their philosophy. The entire production cycle, which involves all the Group's companies, begins inside the waste collection platforms and in the paper mills, where millions of square metres of paper are produced every day through the recycling of paper and cellulose fibre.

The types of paper, which differ according to weight, colour and performance, are then delivered to the corrugators to be transformed into sheets of corrugated cardboard, necessary for the production of various types of packaging both for the industrial sector and for the food sector. The division in charge of the production and conversion of tissue paper, which has always been the flagship of the Italian paper industry, plays a key role. The various operating locations are divided into 4 Business Units that together constitute a complete integrated supply chain.



Environmental responsibility is a fundamental commitment for Pro-Gest. All the Group's plants pay the utmost attention to energy saving, improving environmental impact and promoting sustainability in the area. Pro-Gest collaborates with Bodies and Schools so that paper recycling is a shared supported virtuous practice. Pro-Gest gives new life to paper fibres, reducing the percentage of water and energy consumption. Since the late 1980s, Pro-Gest paper mills have been among the first to have cogeneration plants that allow the production of electricity and steam through high efficiency turbo gas and recovery boilers with the least possible impact on the environment. Over the last ten years, several Group plants have been completely independent from the energy point of view, through the installation of photovoltaic systems that produce renewable energy.

The Group researches and activates strategic cutting-edge solutions in all sectors that characterise the working environment and processes. From the robotic storage of products, to the use of procedures that allow to track what is produced, promoting the possibility of timely supplies thanks to the vertical integration of the Group, guaranteeing products with constant characteristics over time and constantly investing to improve the plants from the point of view of performance, emissions and environmental impact.

Pro-Gest is the first Group in Italy to have certified the entire supply chain of the production process according to FSC® and PEFC standards, forest conservation certifications that underline the attention that the Group pays not only to the quality of products, but also to environmental protection. Additional certifications such as ISO 9001, ISO 14001, OHSAS 18001 (quality, environment, safety), and BRC have been achieved over the years by some Group plants.

SIBELCO GREEN SOLUTIONS SRL

For over 25 years, **Sibelco Green Solutions** has established itself as a leader in the collection and recycling of all types of glass, managing its plants with the aim of promoting sustainable development and closed-loop recycling. To minimise the environmental impact of its industrial activities, the Company is actively working to recover production waste, optimise energy use and continuously improve production processes.

The Sibelco Green Solutions srl plant in Musile di Piave (VE), managed by an international partnership between Eco+Eco srl and the French company Patè sas, receives "raw" glass from a significant user basin, mainly located in the Triveneto region but with waste from all over Italy; the plant treats both flows of glass from single-material separate collection and glass scrap from multi-material sorting plants (in particular that of Eco+Eco - Ricicla).

Further sorting and more stringent treatments are carried out on these streams, aimed at eliminating all materials that may hinder glass recycling or reduce the efficiency of the process (organic residues, metal parts, non-recoverable scraps, small-sized glass and inert materials such as ceramics, stones and pebbles). The kiln-ready glass thus obtained, having very high quality and purity characteristics, complies with current regulations, and in particular with the strict protocols of the glassworks. The materials processed by the Sibelco Green Solutions srl plant are in fact classified as *End of Waste* of glass scrap in accordance with EU Regulation no. 1179/2012. The kiln-ready glass produced by the plant is then sent to glassworks for subsequent melting and production of new bottles, which can also be used for food purposes.

The Company also enhances all types of flat glass (laminated, tempered, reinforced and



double-glazed glass), including the sheet glass provided by citizens at urban collection centres. In the Antegnate (BG) plant, after the phases of removal of ferrous metals, grinding, optical sorting, the slabs become a scrap of pure glass, suitable for the needs of the next plants that use it for the production of flat glass or other glass products.

The Company has been active since 2012 in the traceability project of the glass recovery chain from separate collections, participating in the first experimentation relating only to glass sorted by Eco+Eco - Ricicla and coming from the municipality of Venice, and then extending traceability to all flows from the Veritas Group basin. The Company has always been oriented towards sustainability and the protection of the environment and workers' health, and has a Quality, Environment and Safety Management System certified according to ISO 9001, ISO 14001 and ISO 45001 standards.

MYREPLAST INDUSTRIES SRL

MyReplast Industries srl is a subsidiary of NextChem, the Maire Tecnimont Group company that is managing 24 technology initiatives to accelerate the industrialisation of green chemistry. The new plant, managed by MyReplast Industries, is the most advanced and efficient in Europe in the recycling of plastic material, and is part of the Group's *Green Acceleration* project.

The plant, located in Bedizzole in the province of Brescia, is based on an economically sustainable business model and is unique in Europe for its production capacity, processing flexibility and quality of the finished product.

The plant, in fact, is able to produce over 40,000 t per year of recycled polymers, treating various types of incoming plastic waste, both in the field of industrial post-consumer (car components, production waste of packaging food and industrial), and in the urban post-

consumer field (material from sorting of urban separate collection). The technological treatment process ensures a finished product - the recycled polymer - of the highest quality, with a recycling efficiency of 95%. Through an innovative approach based on product development, the MyReplast Industries plant improves the properties of the incoming plastic material (*up-cycling*) enabling its use for manufactured goods that can access high value-added "premium" markets.

The approach followed by Maire Tecnimont thus aims to implement the "from product to waste management" logic: in fact, starting from the needs of the downstream market, the goal is to produce a secondary raw material with chemical-physical characteristics and mechanical properties capable of bridging the usual quality gap between it and virgin plastic (coming directly from fossil-derived hydrocarbons).



METALRECYCLING VENICE SRL

Metalrecycling Venice srl is the company founded in 2014 as a transfer of the Demont srl business branch and controlled by Eco+Eco srl, which carries out the refining and marketing of metal scrap; it is also engaged in the implementation processes of the Ecodistrict of Marghera and equipped with an Integrated Management System for the Environment and Quality certified according to ISO 14001 and ISO 9001 standards.

This company, an operator of the Recrea Supply Chain (National Steel Packaging Recycling and Recovery Consortium) with reference to the recovery of the ferrous metal fraction of urban waste deriving from separate collection, acquires the material from demolishers, municipalities and national collectors and, thanks to the workforce of highly specialized personnel, sorts and prepares them in different combinations to provide foundries with ready bases and low content of slag for melting into different alloys (nickel, titanium, copper, tungsten, vanadium, chromium).

The activity of Metalrecycling Venice srl, like that of its parent company Eco+Eco srl, promotes the constant improvement of services to its customers (steel mills, foundries, refineries and other traders), and continuously monitors its activity in order to protect the environment through the evaluation of its environmental and quality performance and implement improvement actions to optimize its production cycles.





CHAPTER 4

PAPER AND CARDBOARD RECOVERY WASTE CHAIN

4. THE PAPER AND CARDBOARD SUPPLY CHAIN



The **paper and cardboard chain** follows all cellulosic waste collected in the 45 municipalities served by the Veritas Group, both

cardboard packaging collected separately from commercial users (EWC 150101) and domestic paper and cardboard collected jointly (EWC 200101).

The supply chain **PHASES** analysed and the related companies are:



①

**PAPER AND CARDBOARD
WASTE DELIVERY BY CITIZENS
AND BUSINESSES**



②

**COLLECTION AND
TRANSPORTATION BY
VERITAS SPA, ASVO SPA,
ECO+ECO SRL**



③

**SORTING BY PRO-GEST
GROUP COMPANIES: BADIA
RECYCLING SRL AND CARTIERA
DI CARBONERA SPA**

4.1 WASTE DISPOSAL

EWC 200101 paper and cardboard waste is a mixed material, consisting of newspapers, magazines, leaflets, sheets of paper, cardboard packaging and boxes, tetra Pak containers for food and beverages. In the 45 municipalities served by the Veritas Group in 2022, **44,453.25 t of EWC 200101 paper and cardboard** were delivered, in addition to **15,411.01 t of EWC 150101 paper and cardboard packaging** mainly from non-domestic users (collections made at shopping centres, supermarkets, shops, etc.).

The total quantity, equal to 59,864.26 t, constitutes almost 12% of the total waste produced and recorded a decrease of 0.04% compared to 2021 (about 21 t less); the average **production per capita is equal to 61.99 kg/inhabitant*year**, considering both residents and tourist attendance.



4.2 WASTE COLLECTION

Paper and cardboard waste was tracked and monitored separately in the eight defined territorial areas: for each of them, the amount of total waste collected was assessed (EWC 150101 and EWC 200101) and the energy consumption related to the collection was calculated, based on the type of service carried out (door-to-door, road) and the different means used (land, water). For the five transfer stations, the inflows and outflows and energy consumption related to internal movements were analysed. Finally, the consumption of the vehicles leaving the transfer stations, which transported the waste to the sorting plants, was collected. Throughout the territory managed in 2022, **59,864.26 t of paper and cardboard were collected**, of which 74% consisted of mixed EWC 200101 paper and 26% of cardboard packaging.

A total of 895,436 litres of diesel, 5,573 litres of petrol, 1,368 l of LPG, 49,578 kg of methane and 8,584 kg of biomethane were consumed to collect, handle and transport the waste. These data were provided by the companies that carry out the collection service and manage the transfer stations and depend on the specific collection method adopted in each

municipality (door to door or road) and the type of vehicles used. There is an increasing trend in the consumption of methane and biomethane, due to the introduction of new vehicles powered by these fuels. Electricity consumption for waste management at transfer stations and for washing vehicles at operational sites was 153 MWh; of these, 24 MWh deriving from renewable energy sources. The average primary energy consumption for waste collection, internal handling and transport was 166 kWh_p per tonne of waste collected, about 5 kWh_p less than the previous year.

The CO₂ emissions of the collection phase were on average 0.04 tCO₂ per tonne of waste collected, calculated considering both the consumption of the means of collection/transport and the consumption of the transfer stations.



59,864.3 t

**OF PAPER AND
CARDBOARD
WASTE collected**
in 2022



0.04 tCO₂

**EMITTED
PER TONNE**
of waste
collected

4.3 WASTE SORTING

Almost 100% of the paper and cardboard waste collected in the 45 municipalities served was transported to the Pro-Gest Group plants for sorting. In particular:

- the Badia Recycling srl plant in Badia Polesine (RO) received 2,993.10 t, of which 1,080.70 t of

EWC 150101 packaging and 1,912.40 t of EWC 200101 paper and cardboard;

- the Cartiera di Carbonera spa plant in Meolo (VE) received 45,489.16 t, of which 10,583.33 t of EWC 150101 packaging and 34,905.84 t of EWC 200101 paper and cardboard;
- the Cartiera di Carbonera spa plant in Istrana (TV) received 11,205.31 t, of which 3,750.69 t of EWC 150101 packaging and 7,454.62 t of EWC 200101 paper and cardboard.

Finally, 37.38 t of paper and cardboard were delivered to the Trevisan spa plant, on the basis of specific contracts.

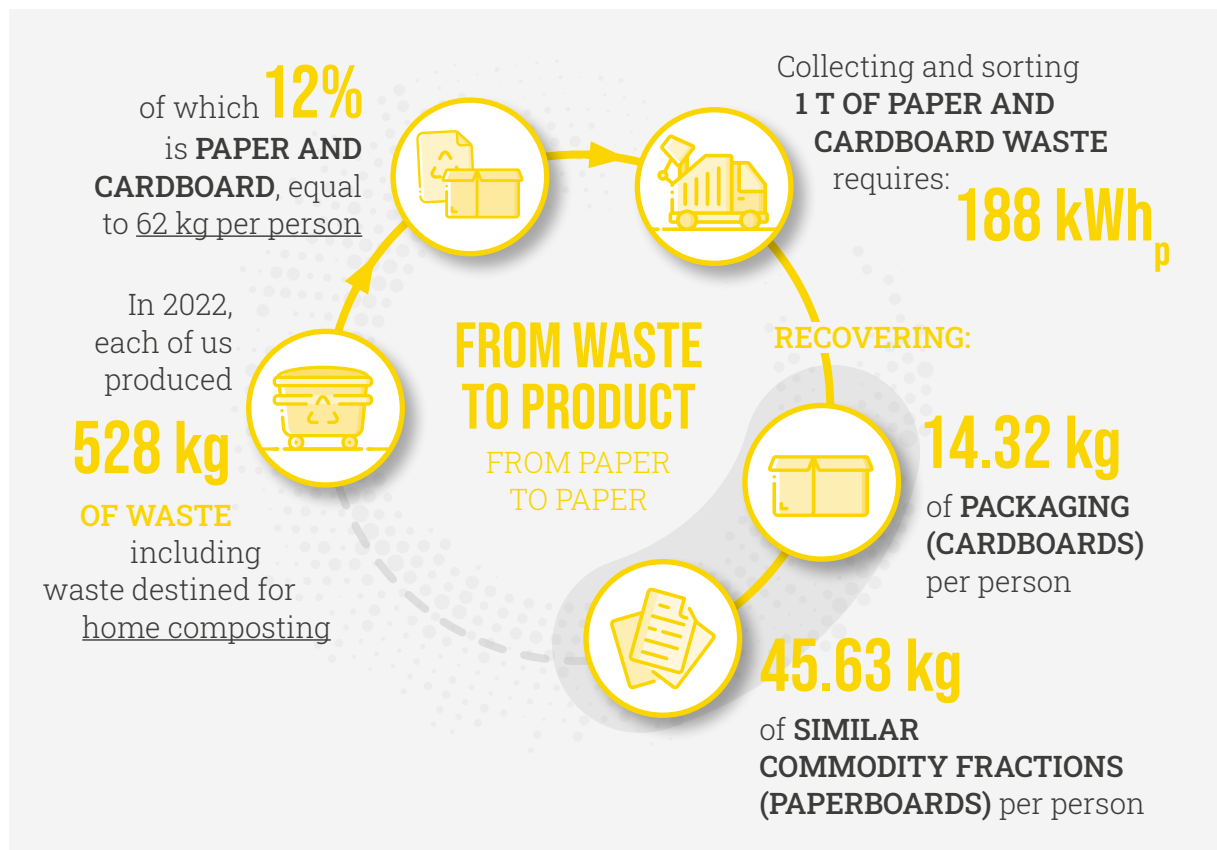
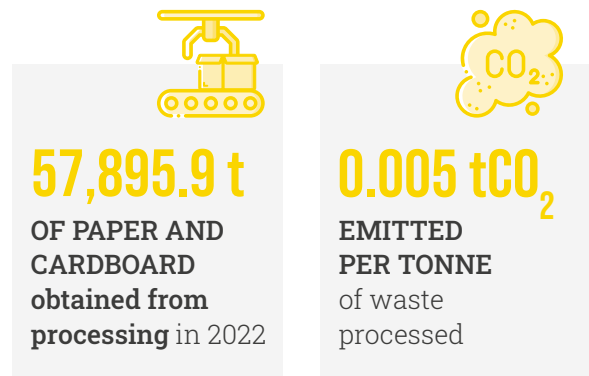
From the 59,687.58 t of processed waste, **57,895.92 t of paper and cardboard were obtained**: 13,828.78 t consisting of sorted packaging and 44,067.18 t of similar product fractions, called "waste paper". The remaining 1,791.65 t, equal to 3% of the total processed, consist of non-recyclable subsidies intended for energy recovery.

The data obtained show an **increase of percentage of paper and cardboard recovery, which stands at in 2022 to 97.00%** (95.75% in 2021).

44,494 litres of diesel and 332 MWh of electricity were used to sort waste. For each

tonne of waste sorted, 21 kWh_p of energy were therefore needed, including both the operations carried out in the sorting lines and the handling activities of the different materials within the site.

The carbon dioxide emissions of the sorting phase amounted to 0.005 tCO₂ per tonne of waste processed.

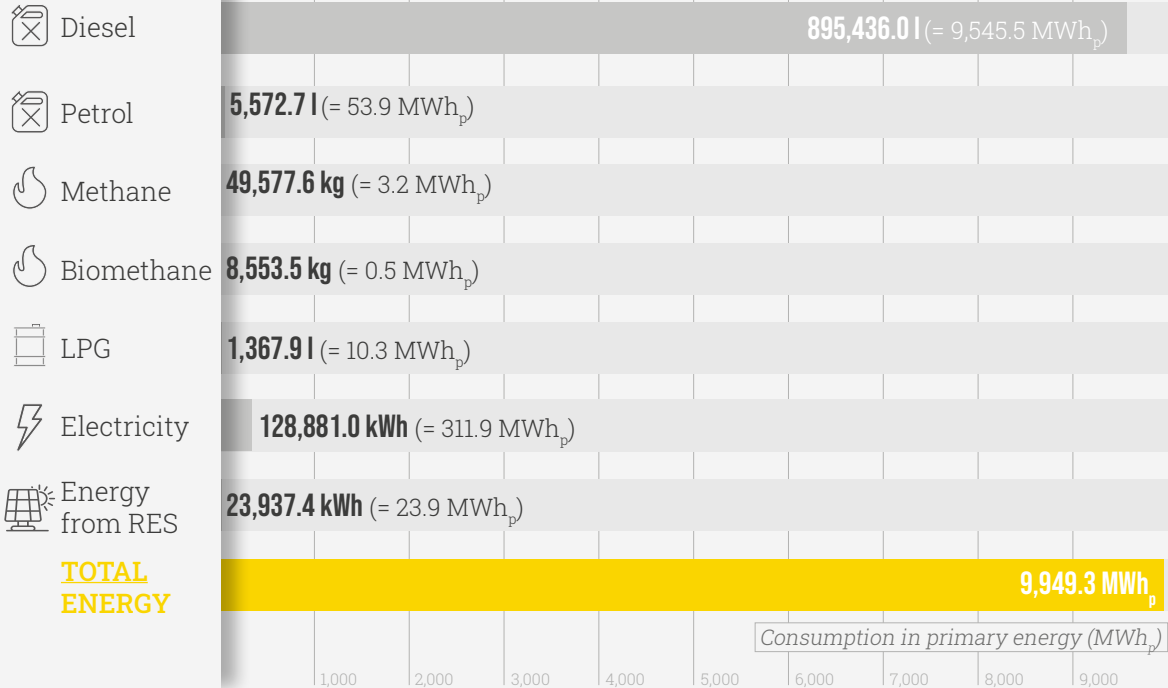


SUMMARY OF ELECTRICITY AND FUEL CONSUMPTION BY OPERATING PHASE:



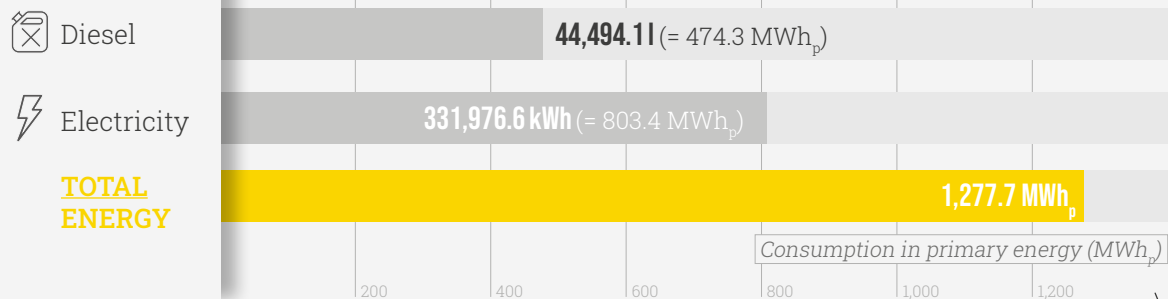
FOR THE COLLECTION, TRANSFER AND TRANSPORT PHASES OF PAPER AND CARDBOARD WASTE ARE REQUIRED:

9,949.3
TOTAL MWh_p



FOR THE SORTING PHASE OF PAPER AND CARDBOARD WASTE ARE NEEDED:

1,277.7
TOTAL MWh_p



FOR THE MANAGEMENT OF PAPER AND CARDBOARD WASTE ALONG THE ENTIRE TRACEABLE CHAIN* WERE CONSUMED:

11,227.0 MWh_p

*From collection to sorting.

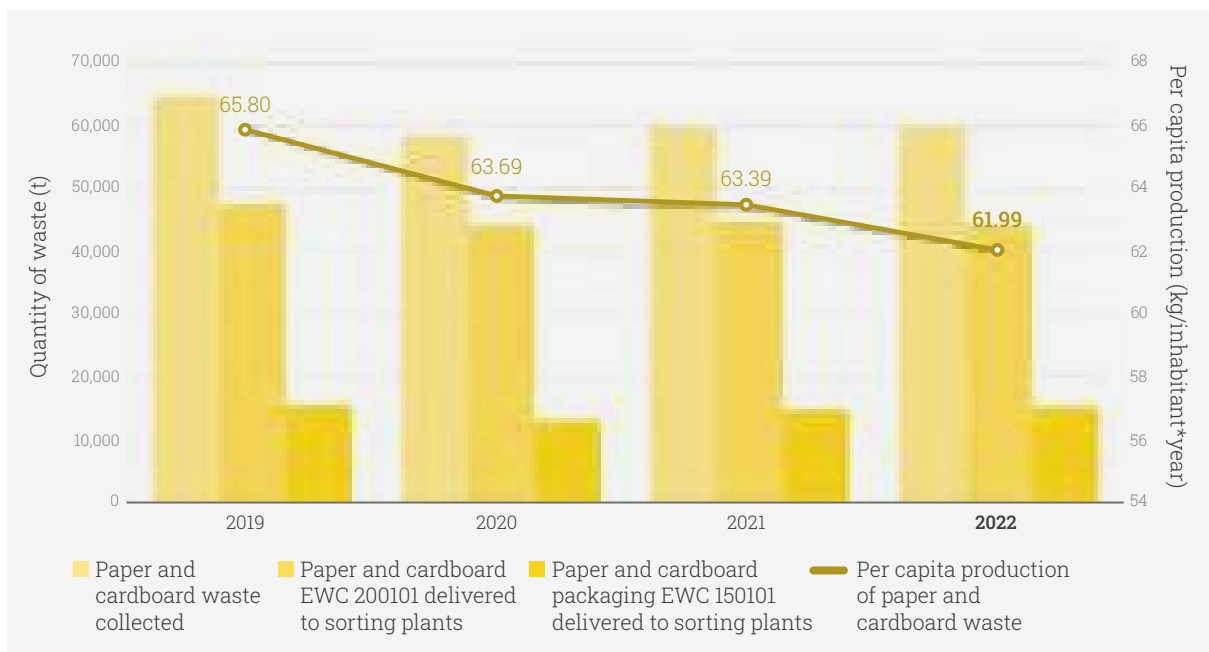
4.4 THE PAPER AND CARDBOARD RECOVERY TREND

The analysis of the trend of the main indicators of the paper and cardboard supply chain, referring to the period from 2019 to 2022, shows an increase in the quantities of paper and cardboard collected in the territory served until 2019 (64,714 t), with a decrease in 2020 (58,534 t) due to the reduction in tourist flows due to the Covid-19 health emergency, and a subsequent increase in 2021 (59,886 t) and 2022 (59,864 t). With a similar trend, both the quantities of packaging collected selectively

(EWC 150101) and the paper and cardboard collected jointly (EWC 200101) vary.

Per capita production, calculated considering both residents and non-residents, is equal to 65.80 kg/inhabitant*year in 2019, decreasing to 63.69 kg/inhabitant*year in 2020; it is equal to 63.39 kg/inhabitant*year in 2021 and 61.99 kg/inhabitant* year in 2022, with a progressively decreasing trend.

FIGURE 4
TRENDS IN PAPER AND CARDBOARD COLLECTION - YEARS 2019-2022



With regard to the actual recovery of cellulosic waste, there is an increase in the percentage of recovery from 94.78% in 2018 to 98.02% in 2020, then falling to 95.75% in 2021 and increasing to 97.00% in 2022. Although the data vary due to the quantities of extraneous fractions in the paper and cardboard containers and separated from the plants of the Pro-Gest Group, it should be noted that, based on the results achieved,

the territory served by the Veritas Group is well in advance of the European recovery targets, which provide for a recycling rate of 85% by 2030. The graph does not show the year 2019, as on this occasion the traceability of the paper and cardboard stopped at the entrance gate of the sorting plant and the data relating to this phase of the supply chain were not made available.

The consumption required for the collection, storage and transport of waste increases between 2019 and 2020, ranging from 10,114 MWh_p to 11,061 MWh_p, with a specific consumption ranging from 156 to 189 kWh_p/t of waste collected. In 2021, the consumption of the collection phase fell again, reaching a

value of 10,248 MWh_p, with a value per tonne of 171 kWh_p; it continued to fall slightly in 2022, reaching 9,949 MWh_p, equal to 166 kWh_p per tonne. The consumption of the sorting phase maintains a similar value in the last three years, equal to a specific consumption of 21 kWh_p/t in 2022.

FIGURE 5
TRENDS IN PAPER AND CARDBOARD RECOVERY - YEARS 2019-2022

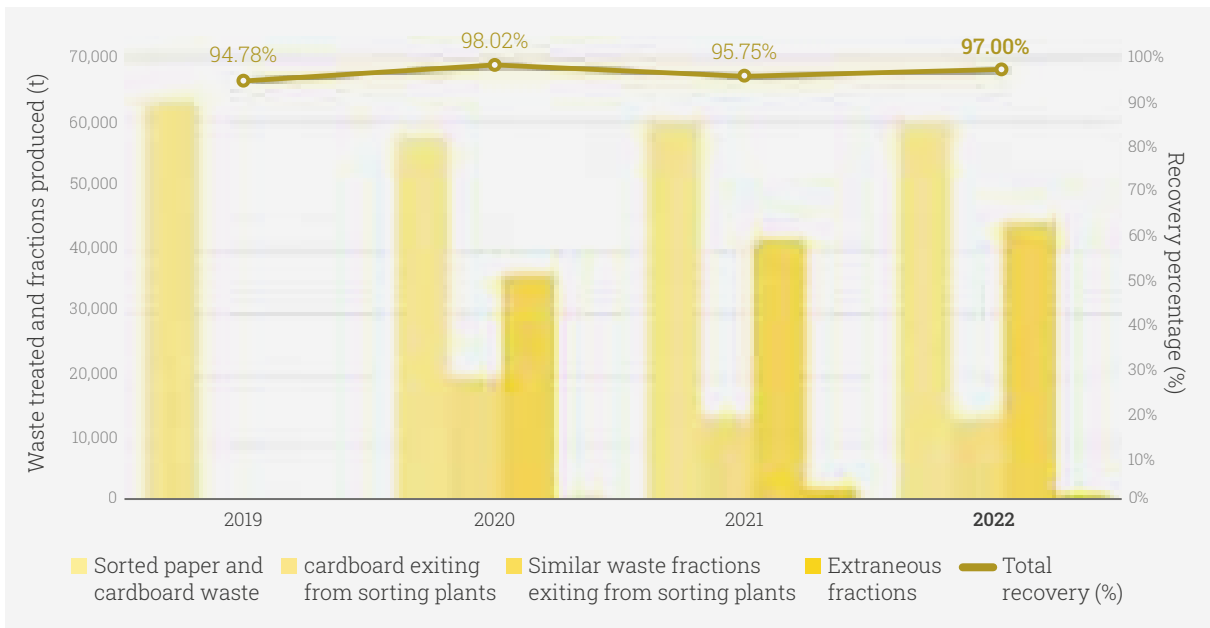
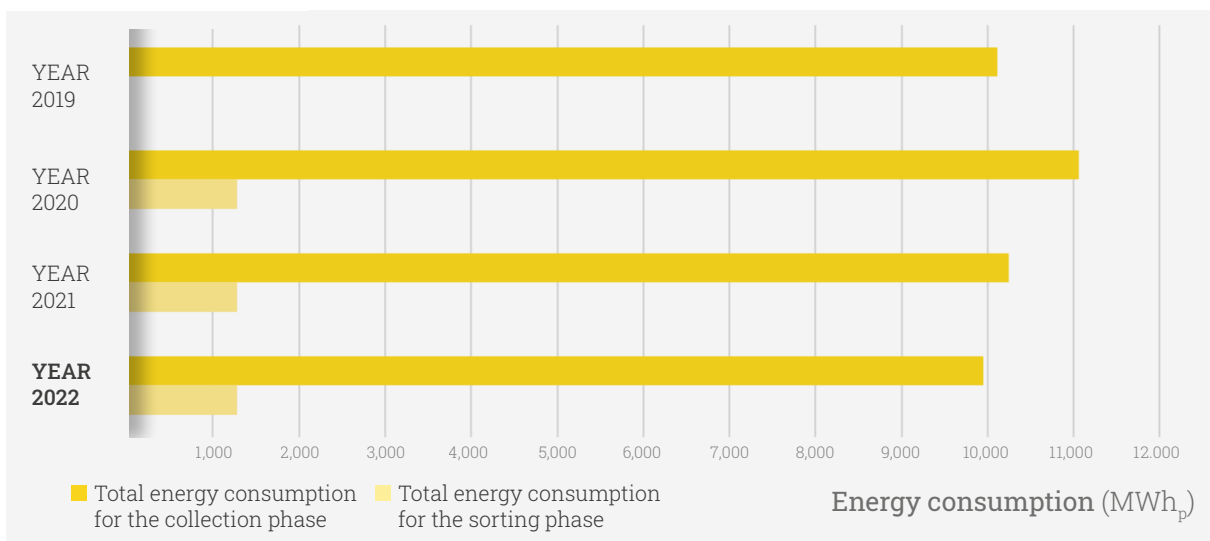


FIGURE 6
ENERGY CONSUMPTION TRENDS OF THE VARIOUS STAGES OF THE PAPER RECOVERY CHAIN - YEARS 2019-2022





CHAPTER 5

GLASS RECOVERY WASTE CHAIN

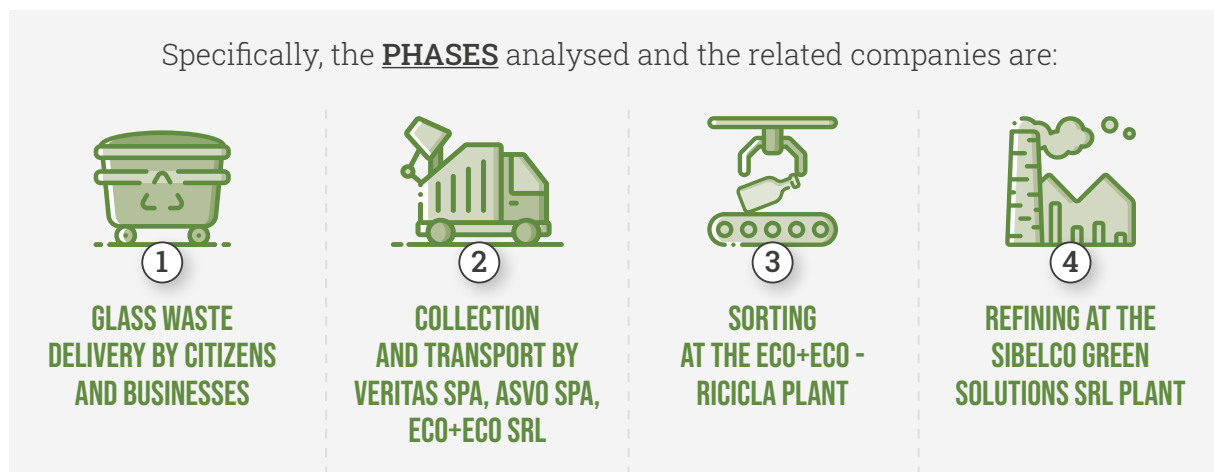
5. THE GLASS SUPPLY CHAIN



The **glass supply chain** follows all the flows containing glass waste, from the moment they are conferred by citizens and businesses, during

the collection phase, within the sorting plant, to the refining of glass scrap to obtain ready-made glass sent to the glassworks for the production of new bottles and new products.

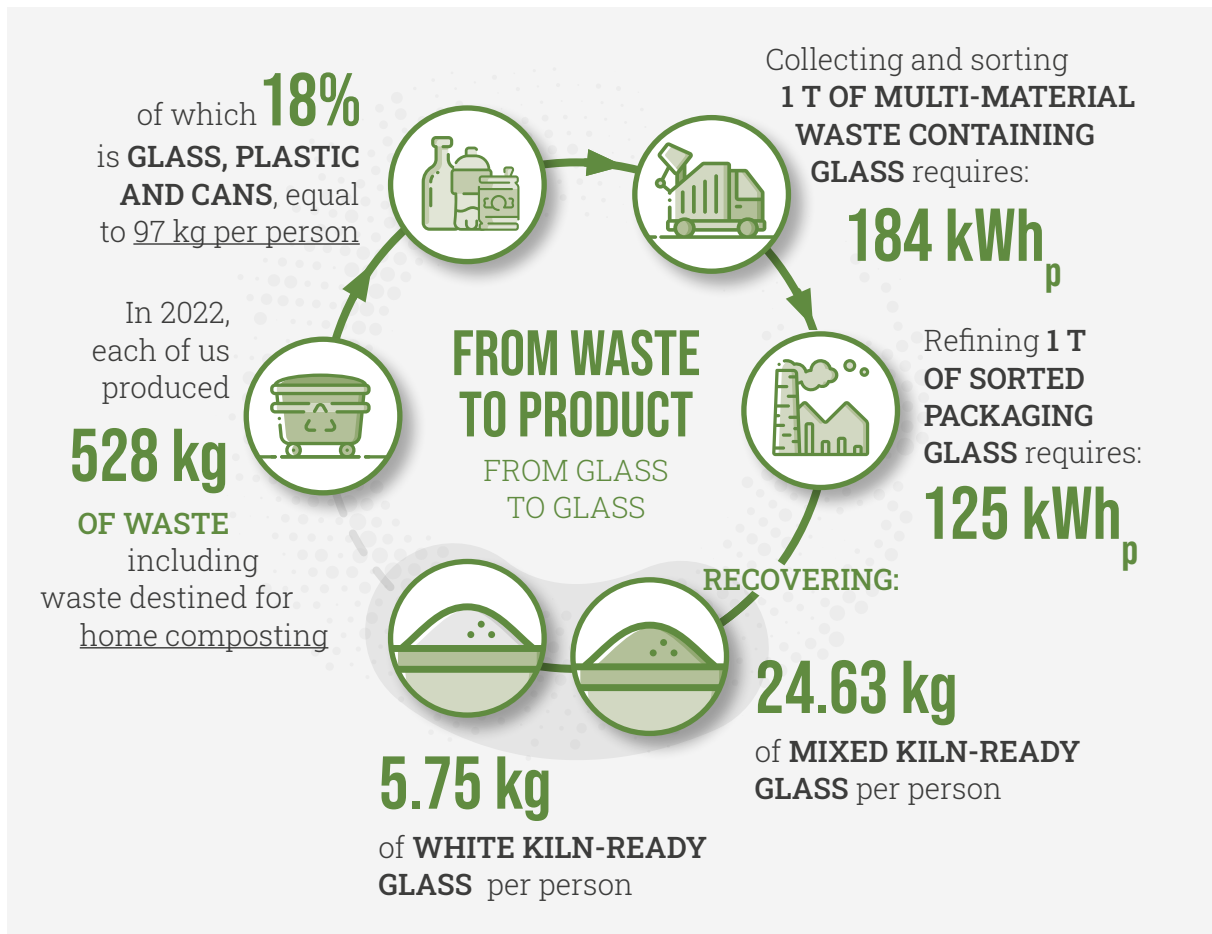
Specifically, the **PHASES** analysed and the related companies are:



Given the very diverse collection systems, the different fractions containing glass are monitored separately: the VPL multimaterial (glass-plastic-cans), the VL multimaterial (glass-cans) and the monomaterial flows. Therefore, both the flows of VPL and VL, classified with EWC 150106 (mixed material packaging), and the flows of monomaterial glass EWC 150107 (glass packaging) and EWC 200102 (glass) are traced.

The collected waste is transported from

the transfer stations or directly from the collections to the Eco+Eco - Ricicla sorting plant, where, within the MULTI 1 and MULTI 2 lines, the glass is separated from the plastic and metals and any extraneous fractions present are eliminated. The sorted glass output is then sent to the plant of Sibelco Green Solutions srl, where it is further refined in order to produce ready glass mixed furnace and white packaging, to be sent to glassworks for the production of new packaging and manufactured goods.



5.1 WASTE DISPOSAL

The first phase of the supply chain concerns the domestic separation of glass waste and its delivery into the appropriate containers, according to the procedures defined in the different territories. In 2022, the citizens and businesses of the 45 municipalities served by the Veritas Group conferred **93,894.84 t of glass, plastic and can waste**, equal to an average **per capita production of 97.22 kg glass-plastic cans per year** (considering all waste fractions containing glass, plastic and metals and calculating the value on the basis of resident citizens and tourist attendance).



5.2 WASTE COLLECTION

In 2022 a total of **81,449.51 t of waste containing glass was collected**. This value is lower than the data reported during the disposal phase as it includes only the fractions of multimaterial VPL and VL (EWC 150106) and monomaterial glass (EWC 150107 and EWC 200102), so as to consider only the waste streams actually containing glassy material. The difference consists of monomaterial plastic (EWC 150102 and EWC 200139), plastic-multi-material PL cans (EWC 150106) and metal collected separately (EWC 150104 and EWC 200140), not considered in this supply chain but traced in plastic and metal supply chains.

A total of 852,081 litres of diesel, 6,748 litres of petrol, 39,172 kg of methane, 7,357 kg of biomethane and 1,256 l of LPG were used to collect, handle and transport the waste. The consumption of electricity from the grid of transfer stations and operating offices in

the reference year was 85 MWh, while the consumption of electricity from renewable sources was 25 MWh. The unit consumption of primary energy was therefore equal to 115 kWh_p per tonne of waste collected, about 9 kWh_p more than in 2021.

The CO₂ emissions of the collection phase amounted to 0.03 tCO₂ per tonne of waste containing collected glass, calculated considering both the consumption of the means of collection/transport and the consumption of the transfer stations.



5.3 WASTE SORTING

The waste containing glass packaging collected by the different companies and transported to the Eco+Eco - Ricicla sorting plant amounts to a total amount of 79,206.30 t. The quantity sent to the sorting plant is lower than the collection figure as 1,658.58 t of monomaterial glass collected in the municipalities served by Asvo were taken directly to the plant of Sibelco Green Solutions srl in Musile di Piave (VE); in addition, approximately 100.96 t of waste did not have characteristics such that they could be recycled and were sent to the Eco+Eco - Valorizza plant for the production of secondary solid fuel. Finally, 35.92 t were

stored in the 5 transfer stations managed by the Group and started to be recovered during the following year.

During the acceptance phase at the Eco+Eco - Ricicla plant, 359 samples were carried out on the incoming multimaterial: the analyses carried out show that the percentage of glass from packaging present (glass >10*10 mm and fine fraction <10*10 mm) is 47.59%. The analyses also indicate the presence of 31.53% of plastics and metals and 20.88% of extraneous fractions in the VPL collected, a slightly decrease compared to the previous year.

All the delivered waste was fed into the sorting lines in order to obtain a clean glassy waste

to be sent subsequently to the refining plants: from waste sorting, **34,439.57 t of sorted glass were obtained**, equal to 43.48% of the processed waste.

As of 2020, the Eco+Eco - Ricicla plant has also begun to sort the glass sheets; to the quantity reported above, **438.80 t of flat glass** obtained from sorting 447.75 t of sheet glass from the collection centers of the Veritas Group must therefore be added. In addition to these two fractions, the sorting plant produced **3,531.73 t of glass grain**, that is, glass from packaging that has a smaller particle size than kiln-ready glass and which is also sent to the Sibelco Green Solutions plant in Musile for subsequent treatment and recovery.

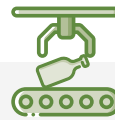
On the sorted packaging glass, 269 analyses were carried out before the start of the refining plant, from which a percentage of extraneous fractions equal to 7% emerges, higher than the 5% detected in 2021.

109,896 litres of diesel and 1,180 MWh of electricity were used for sorting the multimaterial in the Eco+Eco - Ricicla plant.

The unit consumption of primary energy for waste sorting was therefore equal to about 62 kWh_p per tonne of waste processed, a slightly lower value than the previous year.

The carbon dioxide emissions of the sorting phase amounted to approximately 0.01 tCO₂ per tonne of waste processed.

The glass from the packaging sorting was transported to the Sibelco Green Solutions srl plant in Musile di Piave, together with 2,620.41 t of glass granules. The sorted slab glass was instead started for subsequent refining at the Sibelco Green Solutions plant in Antegnate (BG).



34,439.6 t

**OF SELECTED
GLASS obtained
in 2022**



0.01 tCO₂

**EMITTED
PER TONNE of
waste processed**

5.4 WASTE REFINING

The Sibelco Green Solutions plant in Musile di Piave (VE) receives the glass scrap from packaging and the grain produced by the Eco+Eco - Ricicla sorting to produce mixed and white ready-made glass to be recycled in glassworks. While the Sibelco Green Solutions plant in Antegnate (BG) refines the glass resulting from the sorting of the slabs.

In 2022, the Musile di Piave plant received 34,079.20 t of glass from packaging sorting,

1,658.58 t of monomaterial glass waste from municipalities managed by Asvo spa and 2,620.41 t of grain, for a total of 38,358.19 t. Of these, 38,105.03 t were refined while 253.16 t remained stored in the plant and treated in 2023.

From refining, **29,335.80 t of ready glass were obtained**, equal to **76.99% of the total treated glass**. Compared to 2021, the quantity of ready-made glass obtained from the Sibelco Green Solutions plant decreased by 2,852.10 t; in fact, the plant's yield decreased in 2022 due to the worse quality of the waste entering the plant.

The remaining material leaving the refining lines consists of glassy waste, i.e. grain and sheet glass (5,547.45 t), ceramics and porcelain (1,557.89 t) and non-recyclable waste (208.67 t). There is also a further fraction of material (1,455.21 t), consisting of iron, aluminium and plastic, which is sent for further sorting, with a recovery of about 80%. Inert materials (EWC 191209) and glass waste (fine glass grit and glass plate EWC 191205) are waste fractions in the production of ready-made glass but are sent to subsequent treatments aimed at their recovery in dedicated supply chains (recycled aggregates for construction/products); the recovery of these materials is 70%.

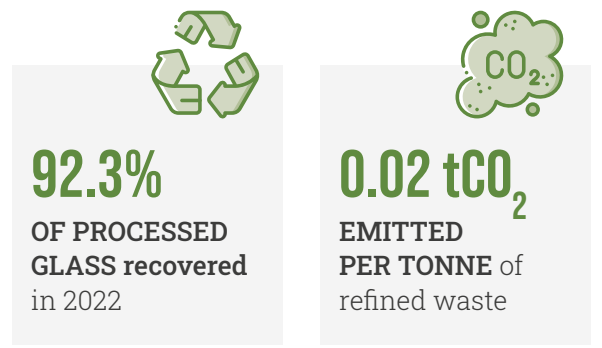
Of the furnace-ready glass produced, **23,786.80 t** consist of **mixed furnace-ready glass**, while **5,549.00 t** consist of **white furnace-ready glass**, sent to other glassworks.

The Antegnate plant received 179.52 t of glass from Eco+Eco - Ricicla from the slab sorting. From their refining, 165.74 t of ready-made glass were obtained for the production of other glass products.

The **recovery rate, in this case, is 92.33%**. The remaining outgoing material consists of glassy waste, i.e. grain (10.38 t), non-recyclable waste (3.11 t) and a further fraction of material (0.29 t), consisting of iron, aluminium and plastic, which is sent for further sorting.

For the refining phase of glass from packaging, 159,218 m³ of methane, 18,634 litres of diesel and 561 MWh of electricity were consumed. The primary energy consumption of the refining phase was 83 kWh_p per tonne of refined waste, in line with the data of the previous year. The carbon dioxide emissions produced by the refining phase are approximately 0.02 tCO₂ per tonne of glass from refined sorted glass. In 2022 there was a slight decrease in methane gas consumption and a consequent increase in electricity consumption from the grid.

For the production of glass from virgin material, CO₂ emissions are equal to 1.754 tCO_{2eq}/t of glass produced. Of these, 0.31 tCO_{2eq}/t of glass produced are related to the supply of raw materials, that is, the transport from the storage place of the materials to the glassworks; the data, in addition to being estimated, is still a partial value as it does not consider the extraction phase of the raw materials.



SUMMARY OF ELECTRICITY AND FUEL CONSUMPTION BY OPERATIONAL PHASE:



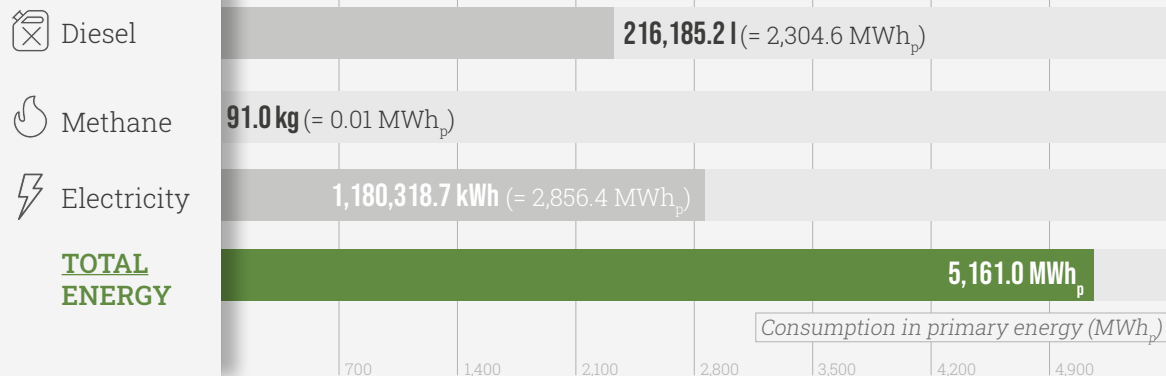
FOR THE COLLECTION, TRANSFER AND TRANSPORT PHASES OF THE GLASS WASTE ARE REQUIRED:

9,390.9
TOTAL MWh_p



FOR THE SORTING AND TRANSPORT PHASES OF THE GLASS WASTE ARE REQUIRED:

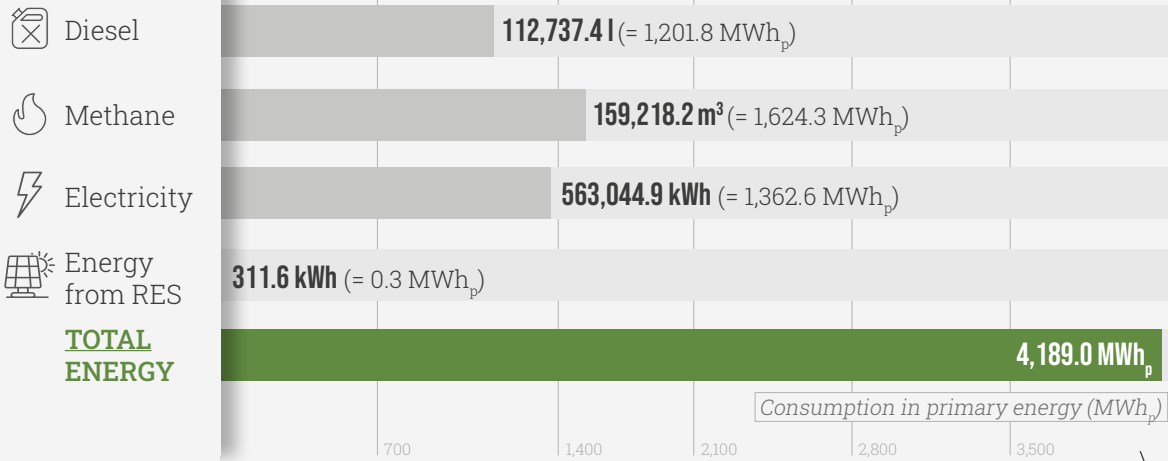
5,161.0
TOTAL MWh_p





FOR THE REFINING⁽⁶⁾ AND TRANSPORT⁽⁷⁾ PHASES OF GLASS WASTE ARE REQUIRED:

4,189.0
TOTAL MWh_p



FOR THE MANAGEMENT OF WASTE CONTAINING GLASS ALONG THE ENTIRE TRACEABLE CHAIN* WERE CONSUMED:

 **18,740.9 MWh_p**

*From collection to start in the glassworks.

5.5 THE GLASS WASTE RECOVERY TREND

The analysis of the trend of the main chain indicators, relating to the period from 2019 to 2022, shows a quantity of waste of glass, plastic and metals delivered equal to 90,432 t in 2019, which drops to 86,226 t in 2020 and rises again to 90,210 t in 2021 and 93,895 t in 2022.

The per capita production of such waste maintains its growing trend that goes from 91.95 kg/inhabitant*year in 2019 to 97.22 kg/inhabitant*year in 2022.

As for the fractions containing glass collected, a similar trend is observed; overall over the 4 years there is an increase, going from 79,017 t in 2019 to 81,450 t in 2022. A similar trend is recorded with regard to the quantities of waste containing glass sorted in the Eco+Eco - Ricicla plant; as regards the percentage of glass in the multimaterial, after a decrease between 2019 and 2020, there is an increase in 2021, reaching a percentage of 51.05% to slightly fall again in 2022 to 47.59%.

(6) Of glass packaging and glass plate.

(7) Of Mixed VPF and refined sheet glass at the glassworks.

Waste containing glass from packaging exiting the Eco+Eco - Ricicla sorting lines returns in 2022 to decrease after the increase recorded in 2021, always remaining lower than the 2019 figure. The amount of sorted glass obtained compared to that processed went from 49% in 2021 to 44% in 2022. Even the flat glass coming out of the Eco+Eco - Ricicla sorting registers a slight decrease compared to the values of 2020 and 2021.

Regarding the waste of glass treated at the Sibelco Green Solutions plant in Musile di Piave, there is a decrease of 4.56% compared to 2021, due to the decrease in glass sorted by Eco+Eco - Ricicla. The kiln-ready glass produced by the Musile di Piave plant amounted to 29,336 t in 2022, thus registering a decrease of about 9% compared to 2021 and thus registering a decrease in process yield: 79.66% in 2019, 79.18% in 2020, 80.54% in 2021 and 76.99% in 2022; values that in any case always exceed the recycling target for this material, which envisages a rate of 75% by 2030.

The consumption necessary for waste collection, storage and transport progressively

decreases until 2021 and then returns to growth in 2022, reaching 9,391 MWh_p, with specific consumption ranging from 100 kWh_p/t in 2019 to 115 kWh_p/t in 2022.

The consumption necessary for the sorting phase has fluctuated over the years: from 4,849 MWh_p in 2019 it decreased to 4,304 MWh_p in 2020, and then increases to 4,690 MWh_p in 2021 and 4,891 in 2022; in this case, however, the specific consumption decreases to 61 kWh_p/t of sorted waste, a sign of an efficiency improvement in the sorting processes. With regard to the consumption of the refining phase of glass from packaging, there is an increase in diesel and electricity energy carriers while there is a slight decrease for methane, registering a total consumption of 3,680 MWh_p in 2019 and 3,180 MWh_p in 2022 (equal to 87 kWh_p/t and 83 kWh_p/t respectively).

The specific energy consumption, necessary for the management of glass waste at all stages of the supply chain, from collection to refining in the plants of Sibelco Green Solutions srl, goes from 293 kWh_p/t in 2019 to 340 kWh_p/t in 2022.

FIGURE 7
TRENDS IN THE COLLECTION OF WASTE CONTAINING GLASS - YEARS 2019-2022

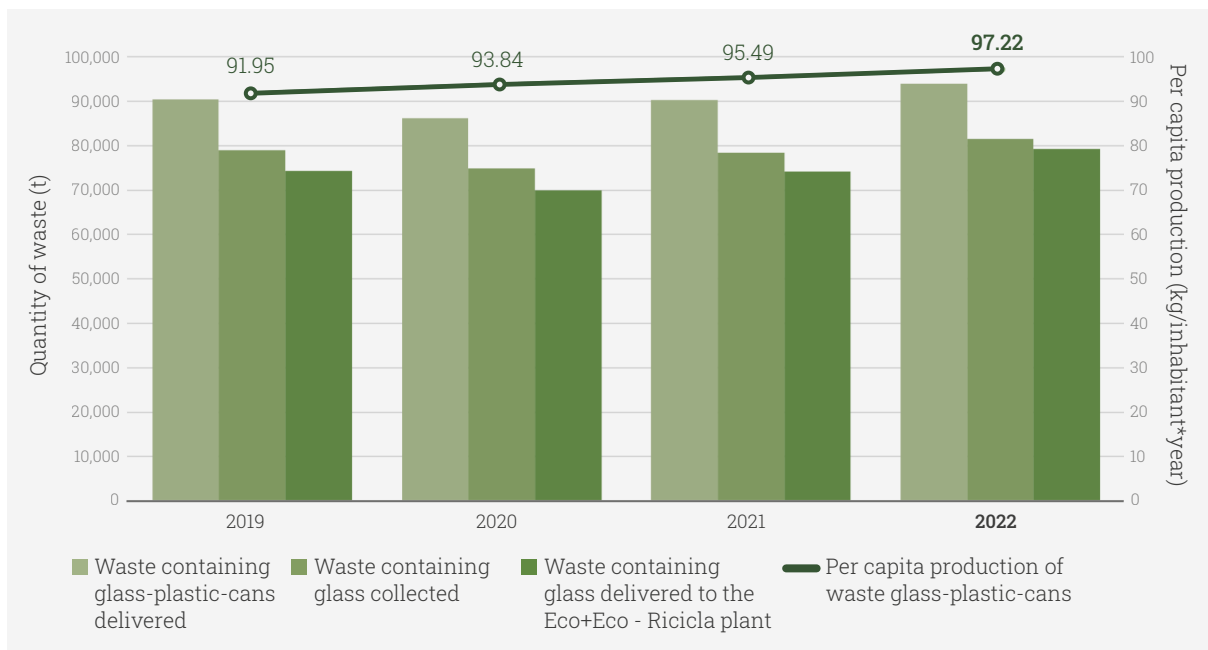


FIGURE 8
TRENDS IN GLASS WASTE RECOVERY - YEARS 2019-2022

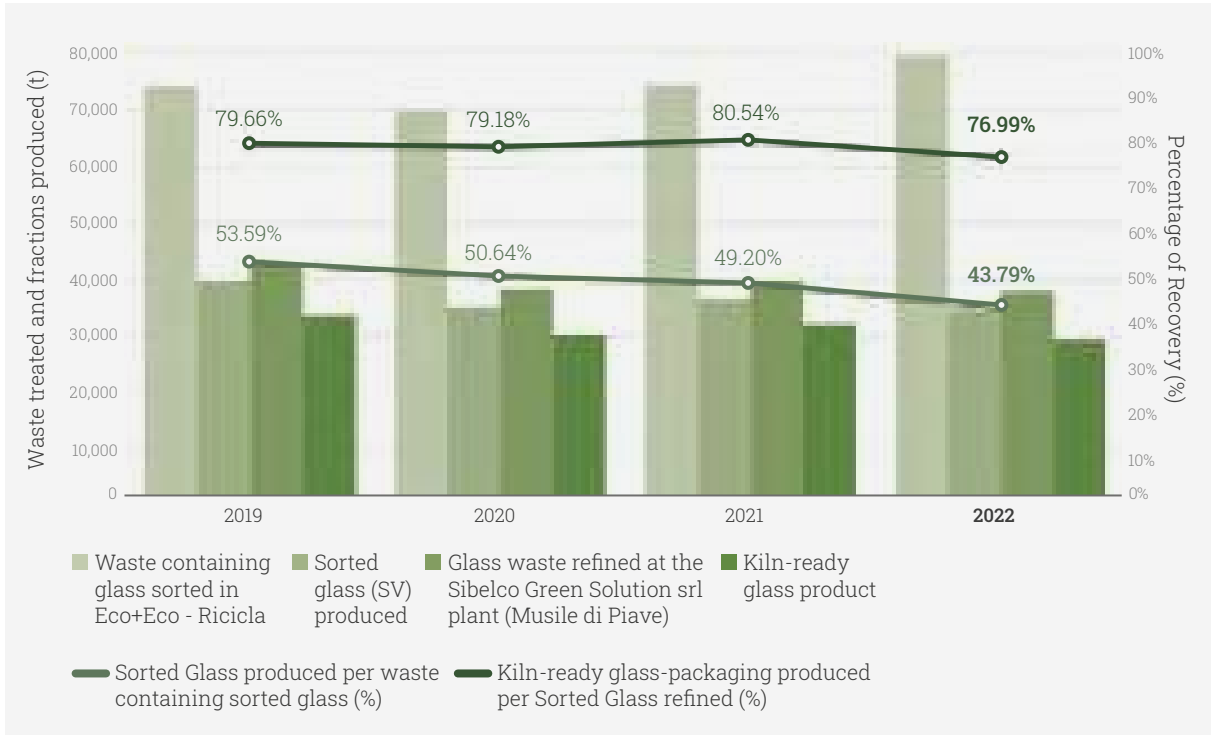
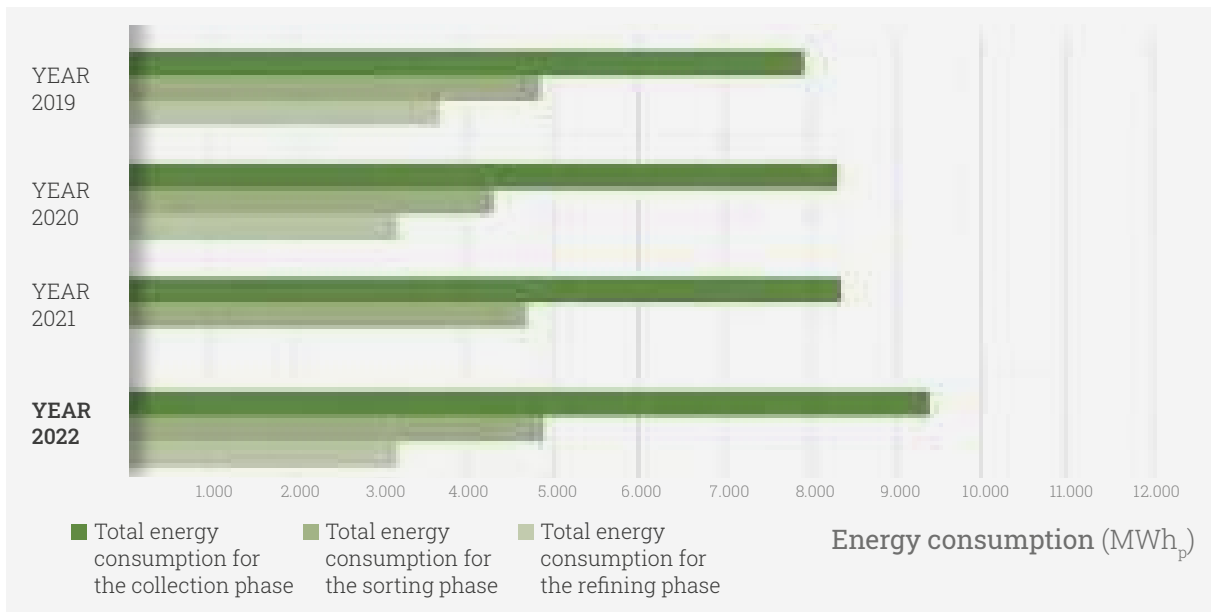


FIGURE 9
ENERGY CONSUMPTION TRENDS OF THE VARIOUS STAGES OF THE GLASS RECOVERY CHAIN - YEARS 2019-2022





CHAPTER 6

PLASTIC RECOVERY WASTE CHAIN

6. THE PLASTIC SUPPLY CHAIN



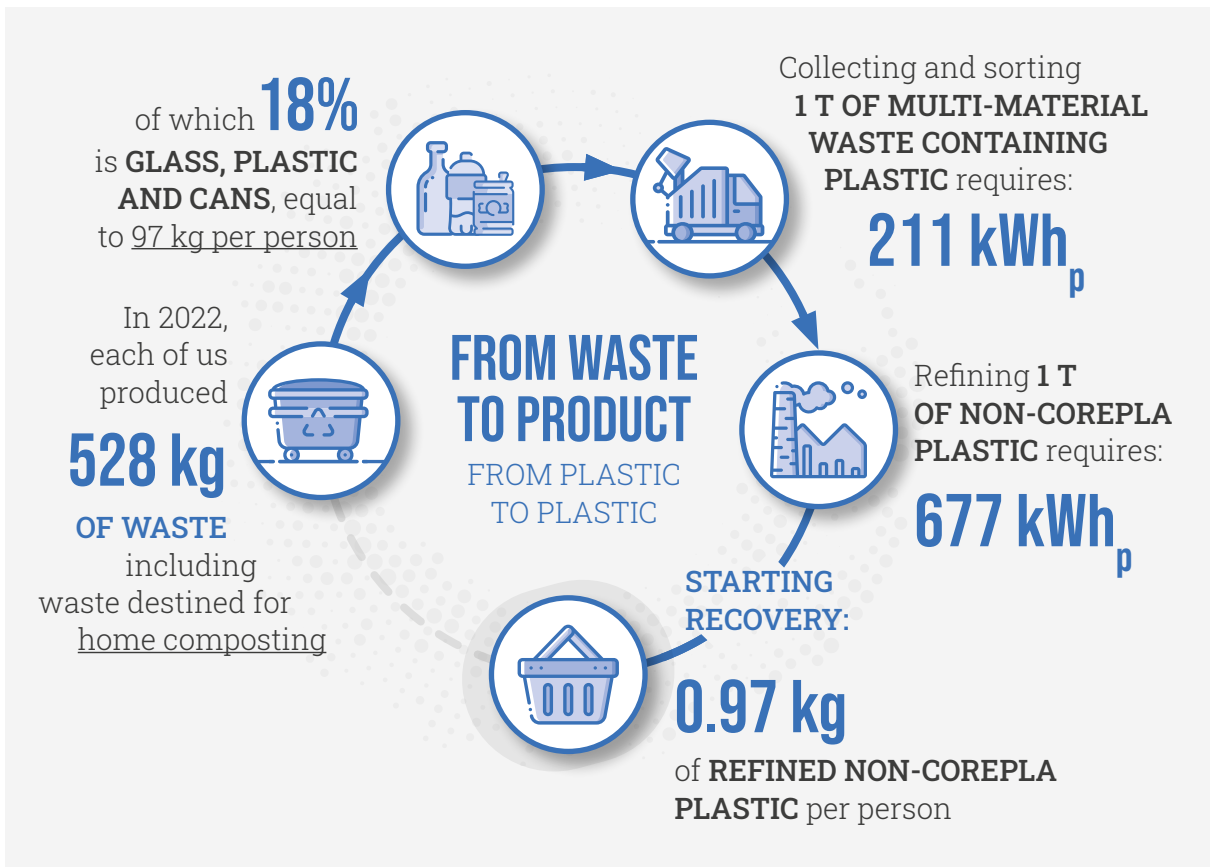
The **plastic recovery chain** follows the path of plastic waste from separate collection from the moment it is delivered by citizens and businesses, during collection, inside the Eco+Eco - Ricicla sorting plant, where plastic packaging is separated from glass and metal packaging, to the refinement of NON-COREPLA plastic in the MyReplast Industries srl plant to obtain secondary raw material for recycling in specialized plants.

In fact, there are two streams of sorted plastic material leaving the Eco+Eco - Ricicla plant: the first is plastic packaging, sent to COREPLA sorting centres, where it is further separated by polymer and colour; the second is NON-COREPLA plastic, (e.g., CONIP boxes and polyethylene and polypropylene rigid packaging), which are sent to specialized plants to be processed and become new material that complies with the specifications of UNIPLAST-UNI 10667.

The **PHASES** traced and the related companies are:



To consider all waste fractions containing plastic, both the VPL and PL multimaterial waste streams (EWC 150106 mixed material packaging) and the EWC 150102 mono-material plastic streams (plastic packaging) and EWC 200139 (plastic) are tracked.



6.1 WASTE DISPOSAL

Plastic waste disposal by citizens and businesses represents the first phase of the supply chain.

In 2022, the citizens and businesses of the 45 municipalities served by the Veritas Group **conferred 93,894.84 t of glass, plastic and can waste**, with an average **per capita production of 97.22 kg of glass-plastic cans per year** (considering all waste fractions containing glass, plastic and metals).



6.2 WASTE COLLECTION

The analysis of the flows in the eight defined areas made it possible to identify the quantities collected in the different municipalities and the relative routes for transport to the sorting plant. For each flow, the consumption of the means used for both collection and transport was monitored. For the five transfer stations, the inflows and outflows, the quantities of materials stored and the relative energy consumption for the handling and management of waste within them were analysed.

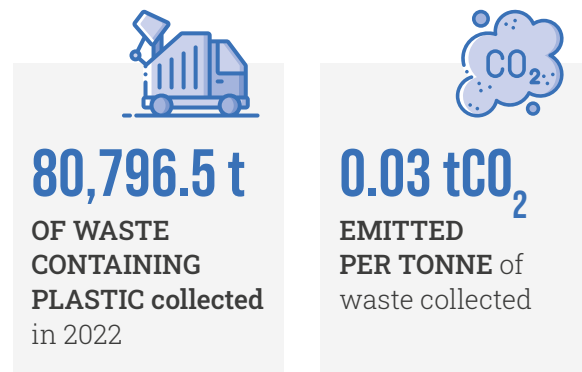
In 2022, a total of **80,796.52 t of waste containing plastic were collected** in the 45 municipalities served by the Veritas Group, an increase of 5% compared to 2021. In more detail, 70,637.68 t of VPL multi-material (glass-plastic-cans), 4,114.89 t of PL (plastic-cans), 5,813.31 t of plastic packaging EWC 150102 and 230.64 t of plastic EWC 200139 were collected.

Of all the waste containing plastic collected, 80,466.72 t were transported to the Eco+Eco - Ricicla plant for subsequent processing; 101.96 t of waste containing plastic were sent for recovery at other plants and 227.84 t remained

stored in the transfer stations and transported to the treatment plants during 2023.

A total of 860,110 l of diesel, 5,376 l of petrol, 40,480 kg of methane, 7,357 kg of biomethane and 1,227 l of LPG were consumed to collect, handle and transport waste. In addition, 107 MWh of grid electricity was consumed in the transfer stations, in addition to 25 MWh from renewable energy sources. 118 kWh_p were therefore consumed for each tonne of waste collected.

The CO₂ emissions of the collection phase were on average equal to 0.03 tCO₂ per tonne of waste containing collected plastic, calculated considering both the consumption of the collection/transport vehicles and the consumption of the transfer stations.



6.3 WASTE SORTING

The sorting of plastic waste from separate collection is carried out within the Eco+Eco - Ricicla plant in two separate plant sections. The multimaterial is treated within the two sorting lines MULTI 1 and MULTI 2 in order

to eliminate the extraneous fractions present and separate the glassy waste from metal and aluminium. Mono-material plastics, in particular hard plastics, are instead treated within the bulky waste sorting line, active since February 2021; in fact, bulky waste and plastic waste are sorted alternately in this line.

Prior to entering the multimaterial lines, the waste is subjected to commodity analysis: 448 such analyses were conducted in 2022, from which a plastic percentage of 41.75% and an extraneous fraction percentage of 22.03% were found.

Within the multimaterial lines, **79,763.20 t of waste containing plastic** were sorted, from which **30,708.23 t of COREPLA plastic**, equal to 38.50% of the processed material, were obtained.

From the 582 analyses carried out on the outgoing material, it emerges that this flow consists of 57.76% of miscellaneous packaging, 18.42% of plastic containers for liquids with a capacity of up to 5 litres and 9.97% of "tracers", i.e. polyethylene packaging films, expanded polystyrene packaging, big bags, etc.; 13.58%, on the other hand, is represented by extraneous fractions, slightly worse than in 2021.

The sorting also resulted in **813.71 t of NON-COREPLA plastic**, or 1.02% of the total processed, a figure that marks an increase compared to 2021, which saw a percentage of 0.74% compared to the total processed.

173,214 litres of diesel and about 886 MWh of electricity were used for waste sorting in the multimaterial lines. Therefore, about 50 kWh_p of energy was consumed for each tonne of waste treated. The carbon dioxide emissions of the sorting process amounted to approximately 0.01 tCO₂ per tonne of waste processed.

The COREPLA plastics thus produced were sent for further sorting at the COREPLA second sorting centres of I.Blu srl and Montello spa, where they were further sorted by polymer and colour to be subsequently sent for recycling or energy recovery.

COREPLA platforms break down waste into **9 DIFFERENT FRACTIONS:**



TRANSPARENT PET

consisting of bottles and trays



BLUE PET

consisting of bottles



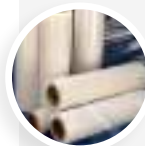
COLOURED PET

consisting of bottles



HDPE

consisting of jerry cans, buckets and other rigid containers



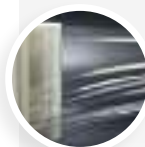
LDPE

consisting of films



PP

consisting of cans, bottles and films



POLYOLEFINS

consisting of flexible packaging and films



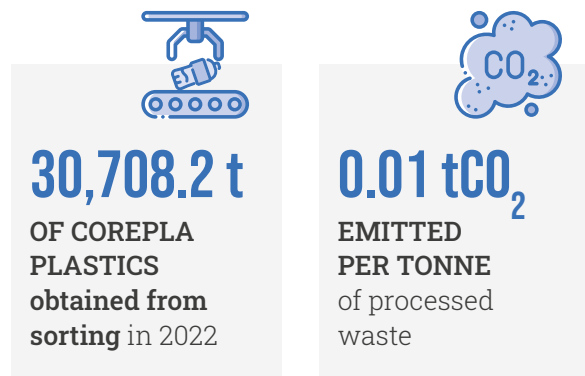
PLASMIX

Non-reusable fractions consisting of a mixture of heterogeneous plastics included in packaging

The latter category, precisely because of its diverse characteristics, is the least suitable for material recovery and is generally sent to waste-to-energy. Based on the data published by COREPLA in the annual management report, it is possible to estimate a material recovery percentage of 55.63%, while the flow started for energy recovery constitutes 35.16% of the sorted plastics. The remaining 9.21% consists of foreign material sent for disposal.

The NON-COREPLA plastic exiting the multimaterial sorting lines, together with 663.50 t of monomaterial plastic EWC 150102 (of which 613.75 t of polystyrene EWC 150102 EPS) and 224.14 t of EWC 200139 plastic directly delivered from the collections, was subjected to sorting within the bulky waste treatment line, for a total quantity of 1,701.35 t. From the sorting of this flow, 1,050.73 t of NON-COREPLA plastic were produced, equal to about 97% of the treated input flow.

As you will read in the summary document of the results of the tracking of the bulky waste supply chain, plastic material can also be recovered from this fraction for further recovery. The sorting of bulky waste collected in the territory served by the Veritas Group has in fact originated 474.99 t of NON-COREPLA plastics; in total, therefore, there were 1,525.72 t of non-packaging plastics leaving the Eco+Eco - Ricicla plant and sent to the subsequent refining plants.



6.4 WASTE REFINING

The NON-COREPLA sorting plastic produced by the Eco+Eco - Ricicla plant was sent for recovery at several plants; the main flow was given to MyReplast Industries srl, a plant specialising in the recycling of plastic waste.

In 2022, 1,341.24 t of NON-COREPLA plastic were delivered to this plant from the sorting of plastic waste and bulky waste collected in the Venetian territory. The plastic was refined in the plant lines, with an electricity consumption of 362 MWh and using 3,057 l of diesel. From processing, **938.87 t of refined plastic were obtained from second raw material**, which were subsequently recycled in specialized

plants. Based on the average composition of the treated waste, it can be estimated that the plastic material output consists of 385.78 t of polypropylene, 278.35 t of polyethylene, 219.42 t of mixed polyolefins, and 55.31 t of other types of plastics. On the other hand, 402.37 t of scrap produced by refining, as this material did not have characteristics to become a secondary raw material.

The actual recovery of NON-COREPLA plastic in 2022 was therefore 70%, a value slightly lower than the 2021 result, but always higher than the European plastic recovery target.

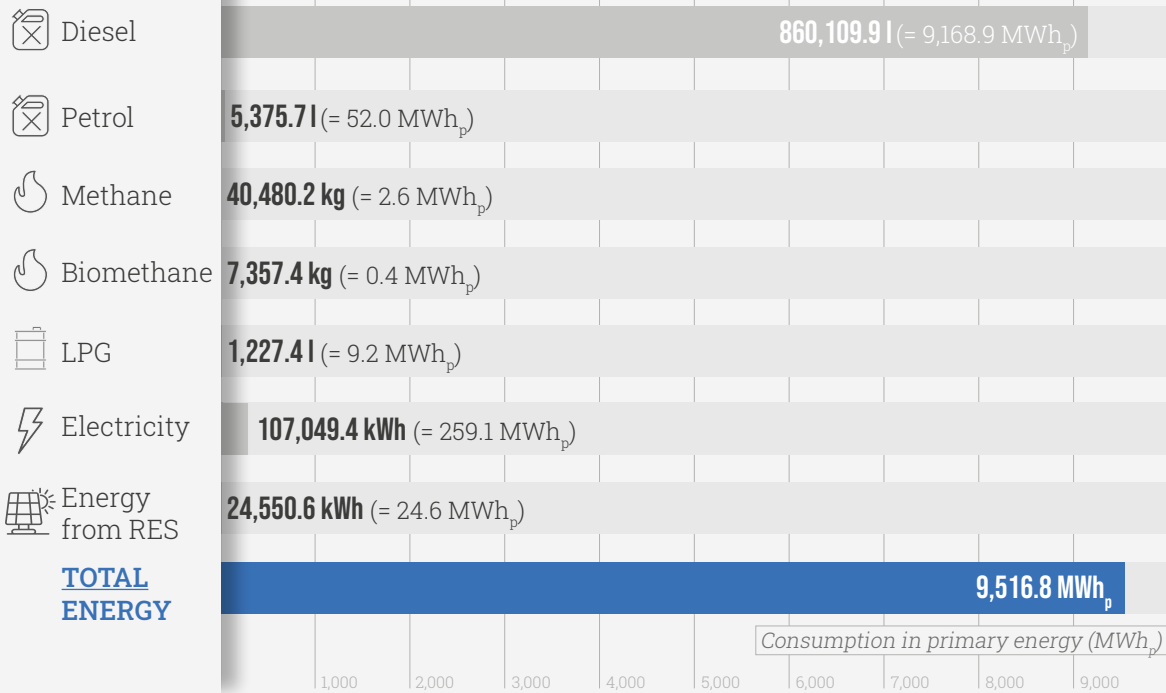
The average energy consumption was 678 kWh_p per tonne of processed material, while 0.13 tCO₂/t of refined waste was emitted.

SUMMARY OF ELECTRICITY AND FUEL CONSUMPTION BY OPERATIONAL PHASE:



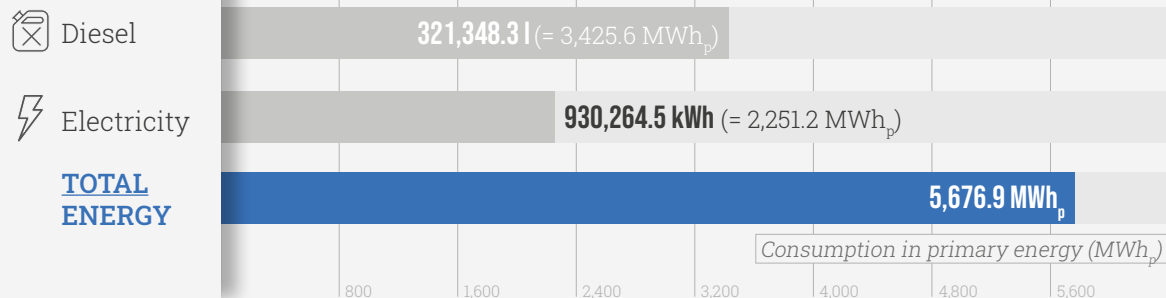
FOR THE COLLECTION, TRANSFER AND TRANSPORT PHASES OF THE PLASTIC WASTE ARE REQUIRED:

9,516.8
TOTAL MWh_p



FOR THE SORTING AND TRANSPORT PHASES OF THE PLASTIC WASTE ARE REQUIRED:

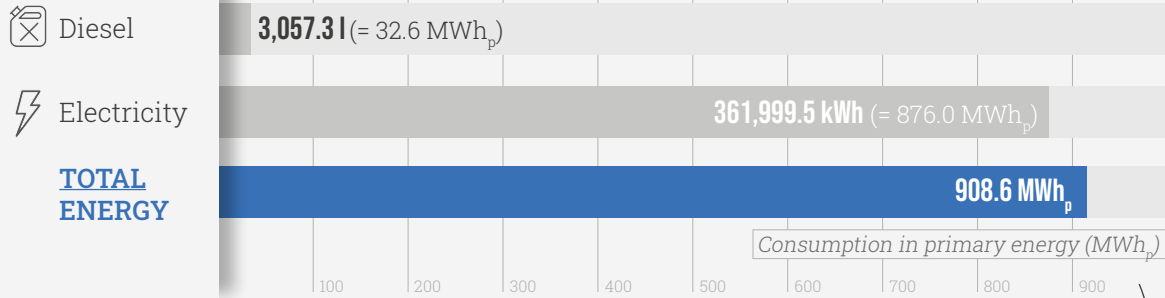
5,676.9
TOTAL MWh_p





FOR THE REFINING PHASE OF NON-COREPLA PLASTIC WASTE ARE REQUIRED:

908.6
TOTAL MWh_p



FOR THE MANAGEMENT OF PLASTIC WASTE ALONG THE ENTIRE TRACEABLE CHAIN* WERE CONSUMED:

16,102.3 MWh_p

*From collection to refining of NON-COREPLA plastic.

6.5 THE PLASTIC WASTE RECOVERY TREND

The trend of the main indicators of the plastic recovery chain shows an increase in the quantities of waste containing collected plastic, which varies from 79,958 t in 2019 to 80,797 t in 2022; after the reduction recorded in 2020, production in fact increases again, exceeding pre-pandemic levels. The increase in the quantities collected is due to the progressive improvement of separate collections and changes in collection methods, which have seen a progressive expansion of municipalities in which plastic packaging is delivered separately.

Similarly, the quantities of waste containing plastic sorted in the Eco+Eco - Ricicla plant vary from 73,451 t in 2019 to 80,467 t in 2022, registering a decline in the year 2020 alone.

The quantity of COREPLA sorting plastic obtained went from 24,361 t in 2019 to 30,892 t in 2022, an increase of 27% in weight in four years; this is also evidenced by the product analyses, which over the years show an increase in the quantity of plastic in the waste delivered, which stands at 42% in 2022. Of the total waste processed in the Eco+Eco - Ricicla

plant, the percentage of COREPLA plastic sorted has increased from 33% to 38% in the last four years.

As for the sorted NON-COREPLA plastic, the quantities vary considerably. In 2019 the tons produced were 294 t while in 2022 they were 1,525.72 t, going from 0.40% to 1.90% compared to the waste processed. The non-Corepla plastic exiting Eco+Eco - Ricicla is sent for refining at the MyReplast Industries srl plant from 2019.

The trend of the refined quantities follows that of the waste obtained from the sorting, progressively increasing over time; from 2021 the quantity of non-Corepla plastics sent to the plant increases further due to the flow deriving from the sorting of bulky waste, suffering a slight decrease in 2022, the year in which a

total of 938.87 t of refined plastic were obtained, with a process yield that is reduced over time due to the greater amount of separated waste fractions.

The consumption analysis shows a stable figure for the specific consumption of the collection phase in the last 4 years, with values going from 119 kWh_p/t in 2019 to 118 kWh_p/t in 2022. The consumption of the sorting phase is also progressively reduced, ranging from 65 kWh_p/t in 2019 to 50 kWh_p/t in 2022.

Consumption pertaining to the NON-COREPLA plastics refining phase decreased between 2019 and 2020 from 476 kWh_p/t to 365 kWh_p/t; it increased in 2021 to 623 kWh_p/t and reached 677 kWh_p/t in 2022 due to a higher electricity consumption of the refining phase.

FIGURE 10
TRENDS IN PLASTIC WASTE COLLECTION - YEARS 2019-2022

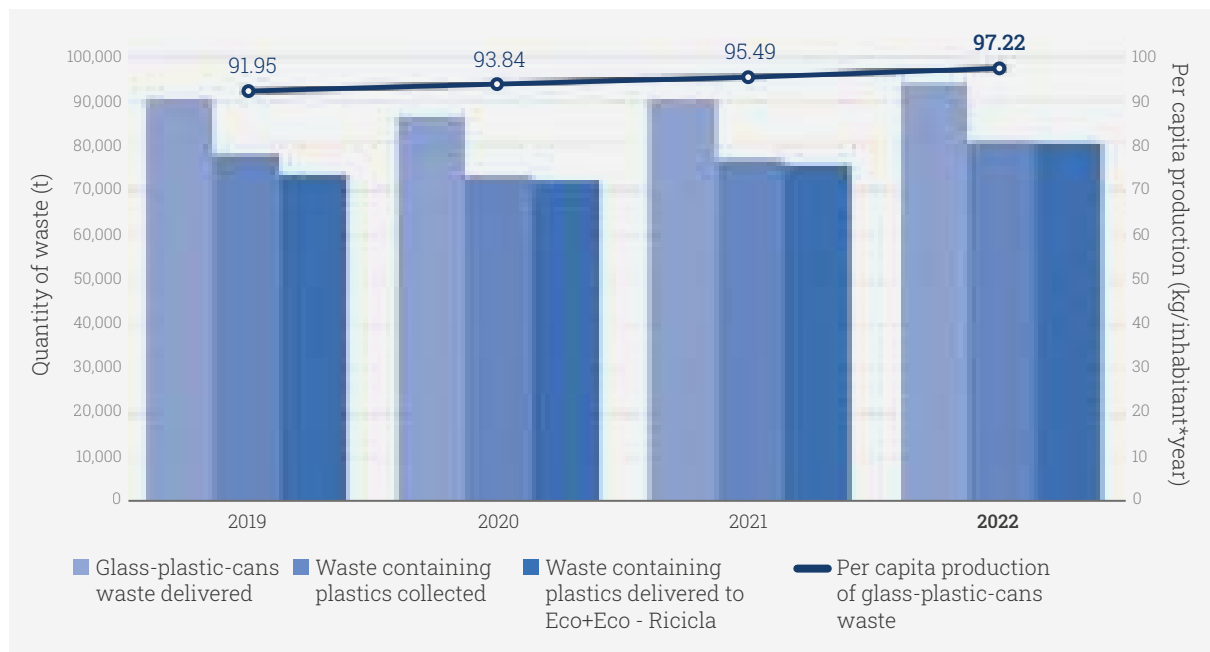


FIGURE 11
PLASTIC WASTE SORTING TREND - YEARS 2019-2022

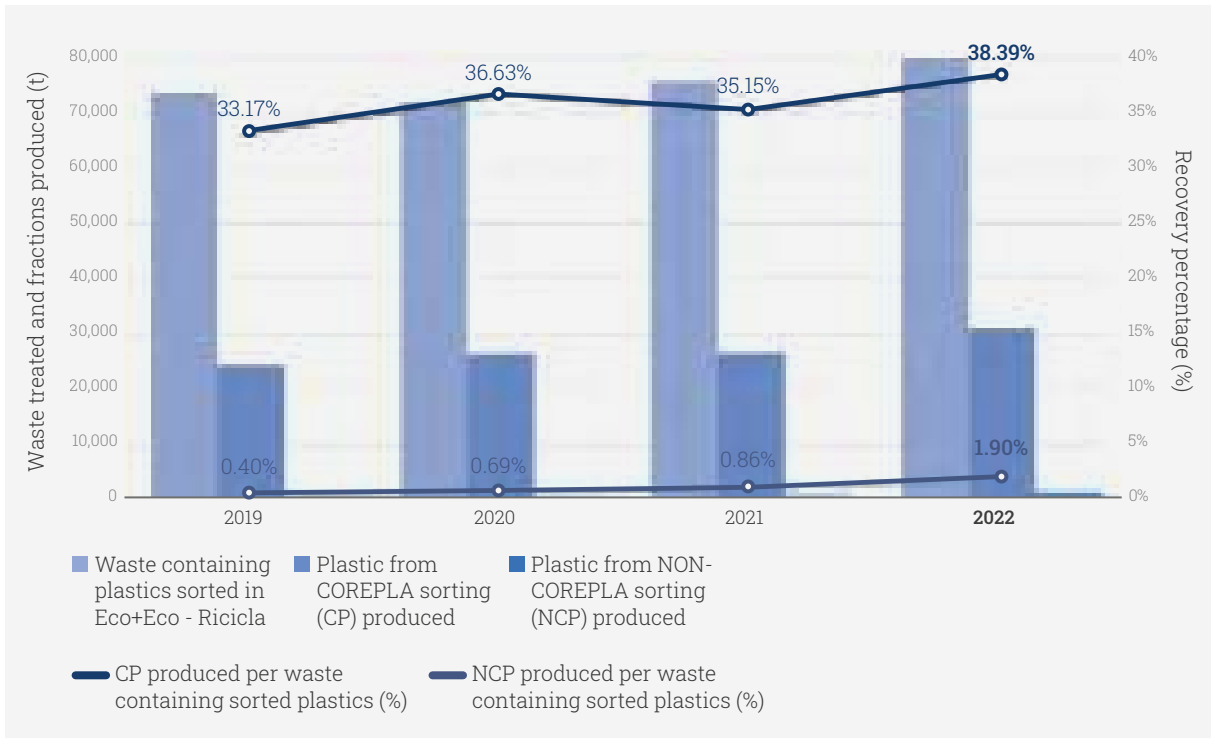


FIGURE 12
TRENDS IN NON-COREPLA PLASTIC REFINING - YEARS 2019-2022

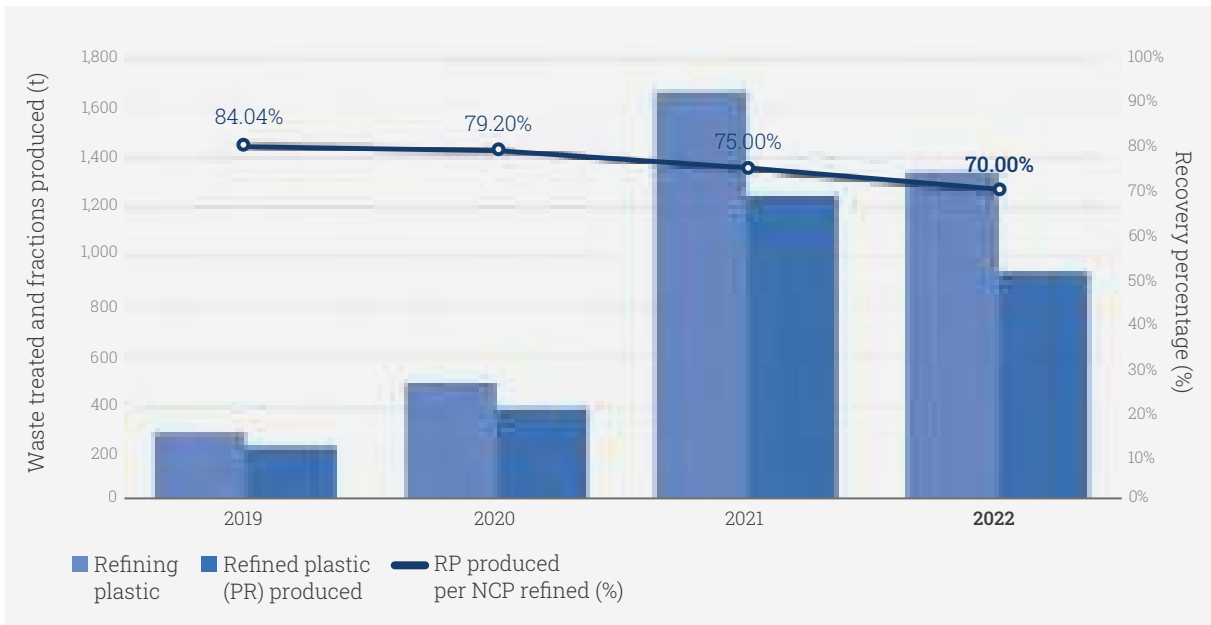
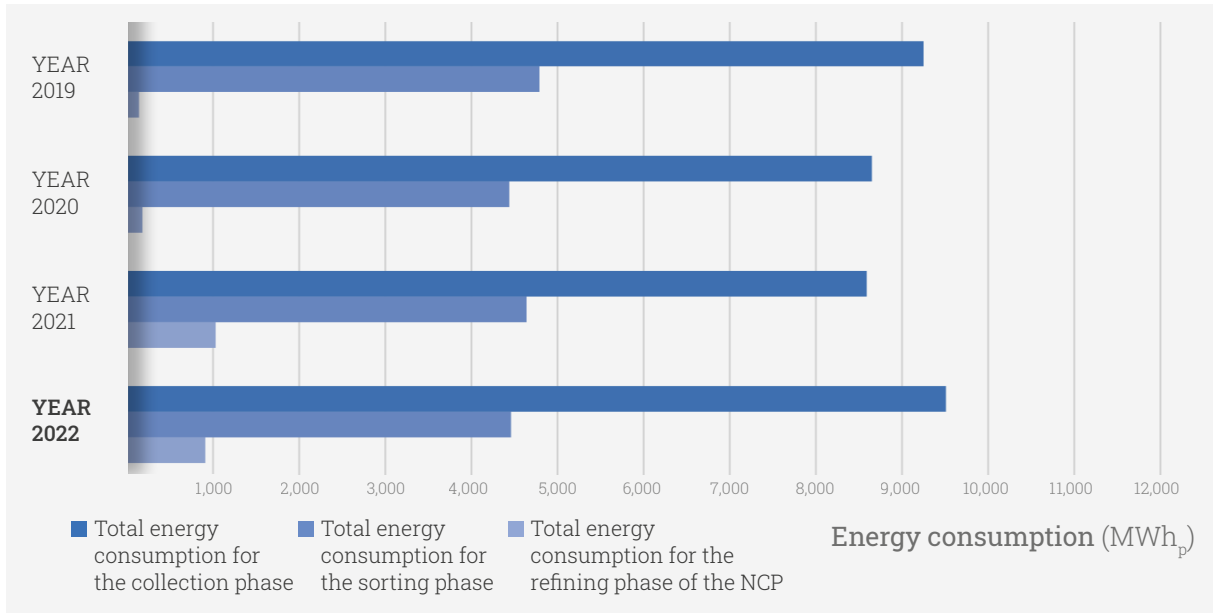


FIGURE 13
ENERGY CONSUMPTION TRENDS OF THE VARIOUS STAGES
OF THE PLASTICS RECOVERY CHAIN - YEARS 2019-2022





CHAPTER 7

METAL RECOVERY WASTE CHAIN

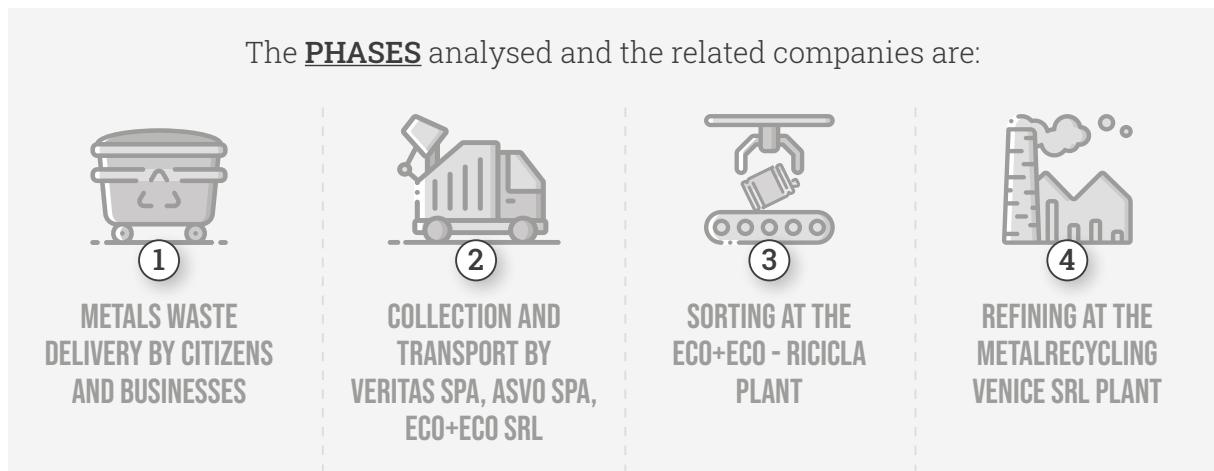
7. THE METALS SUPPLY CHAIN



The **metals chain** traces the path of ferrous and aluminium packaging from the separate collection of the Venetian territory, from the moment of the delivery made by citizens and businesses, during the collection phase, inside the sorting plant of Eco+Eco - Ricicla, in which

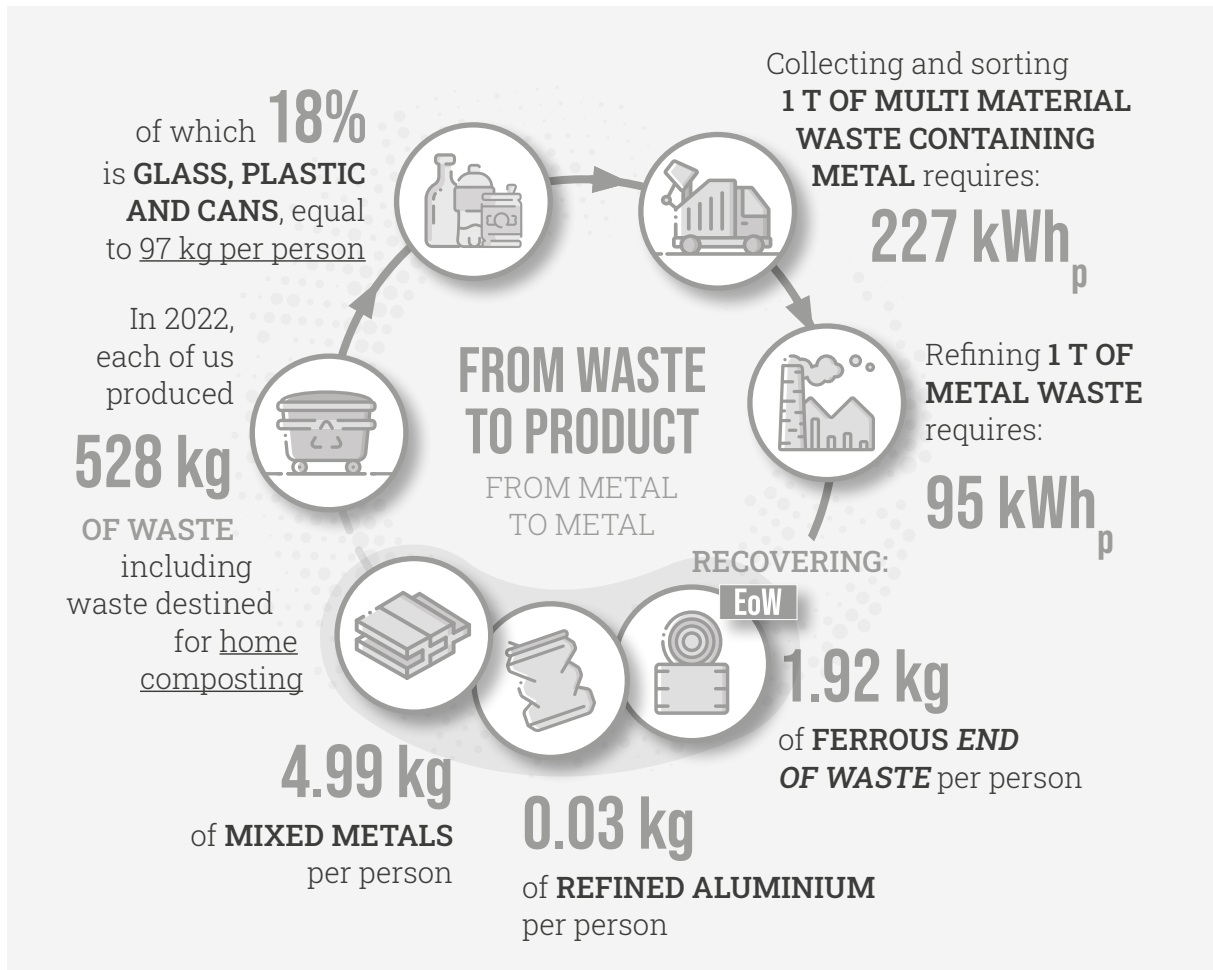
the metal materials are separated from the other commodity fractions and divided into iron and aluminium. The aluminium and iron flows exiting the Eco+Eco - Ricicla plant are further refined at the Metalrecycling Venice srl plant, to finally be recycled in the foundry.

The **PHASES** analysed and the related companies are:



Therefore, all waste fractions containing metals or glass-plastic-cans multi-material VPL are analysed, in cases where metal waste is delivered together with plastic and glass packaging, plastic-multi-material-PL cans and glass-multi-material-VL cans, when metal packaging is delivered together with plastic alone or glass alone, respectively.

In addition, selectively collected metal packaging EWC 150104 and mixed metals delivered to EWC 200140 collection centres are traced.



7.1 WASTE DISPOSAL

The **total amount of glass, plastic and can waste delivered in 2022 is 93,894.84 t**; of these, the main fraction consists of mixed material packaging (80,439.25 t, 86% of the total waste delivered); 2,215.97 t (2% of the total) consist of metals collected separately from municipal collection centres (EWC 200140), while 70.53 t (0.08% of the total) consist of metal packaging collected separately (EWC 150104).

The remaining approximately 12% is instead represented by plastic and glass collected in monomaterial fractions. On average, the actual **per capita production is 97.22 kg of glass-plastic-cans per year**.



7.2 WASTE COLLECTION

The second phase of the supply chain concerns the collection of waste containing metals delivered by citizens and businesses in the territory served by the Veritas Group. The waste collection is carried out by the companies Veritas spa, Asvo spa and Eco+Eco srl. From the analysis of all the flows, it is observed that in 2022 **a total of 82,725.75 t of waste containing metal were collected**, about 2,640 t more than the previous year: the majority was collected in the municipalities of the Riviera del Brenta (24%), in the mainland of Venice (27%) and in the municipalities of the Venice East area (20%). Of the total collected, 80,253.16 t of metal-containing waste were transported to the Eco+Eco - Ricicla plant for subsequent processing; 364.89 t were sent for recovery at other treatment plants while 2,015.30 t of metal EWC 200140 were taken directly to the refining plant of Metalrecycling Venice srl.

A total of 816,162 litres of diesel, 4,647 litres of petrol, 40,756 kg of methane, 7,357 kg of

biomethane and 1,227 l of LPG were consumed to collect, handle and transport the waste.

In addition, 127 MWh of electricity was consumed in the transfer stations, of which 24 MWh came from renewable energy sources. On average, 109 kWh_p of energy was consumed for each tonne of waste collected.

The CO₂ emissions of the collection phase were on average equal to 0.03 tCO₂ per tonne of glass-plastic-can waste collected, calculated considering both the consumption of collection/transport vehicles and the consumption of the transfer stations.



7.3 WASTE SORTING

Of the 80,253.16 t of multimaterial waste containing metal entering the Eco+Eco - Ricicla plant, 406 product analyses were carried out; the results show that the waste consists of 5.35% by weight of iron and aluminium, 73.78% of glass and plastic and 20.87% of extraneous fractions.

All incoming waste was processed in the plant's sorting lines; from treatment, **3,436.42 t of sorting iron were obtained**, equal to 4.28% of the processed material.

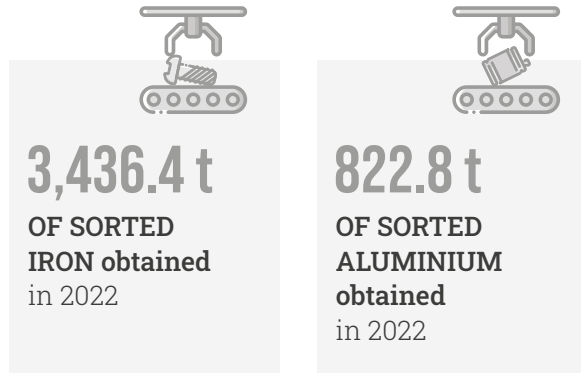
The 15 analyses carried out on the outgoing

sorting iron show that this flow consists mainly of iron (93.67%), in a smaller percentage of glass (0.60%), plastic (2.62%) and aluminium (0.23%). On the other hand, the extraneous fractions still present are 2.88%.

In addition **822.80 t of aluminium was obtained** from sorting, a percentage of 1.03% with respect to the total processed. The 19 samplings carried out show a percentage of 96.54% of aluminium, 1.17% of plastic, 0.56% of iron, 0.36% of glass and 1.37% of extraneous fractions.

180,663 litres of diesel and 1,080 MWh of electricity were used for the sorting of the multimaterial in the plant.

57 kWh_p were therefore consumed for each tonne of sorted waste. The carbon dioxide emissions of the sorting process were approximately 0.01 tCO₂ per tonne of waste processed.



7.4 WASTE REFINING

Iron and aluminium from sorting coming out of the Eco+Eco - Ricicla plant were sent for further refining at authorized treatment plants. With regard to ferrous metals, the main flow was refined in the Metalrecycling Venice srl plant, controlled by Eco+Eco srl and part of the Veritas Group. Aluminium from sorting, on the other hand, has been sent for further processing, mostly to external plants; starting from April 2021, the aluminium is in fact pressed and sold directly by Eco+Eco srl, as the quality of the output material is such that it can be placed directly on the market without further sorting operations.

In detail, 3,402.84 t of iron EWC 191202 and 40.40 t of aluminium EWC 191203 were sent to this plant, which also treated 1,976.60 t of iron from the sorting of bulky waste collected in the territory served by the Veritas Group.

Overall, therefore, the Fusina plant refined 7,435.13 t of metals from the separate collections of the Venetian territory.

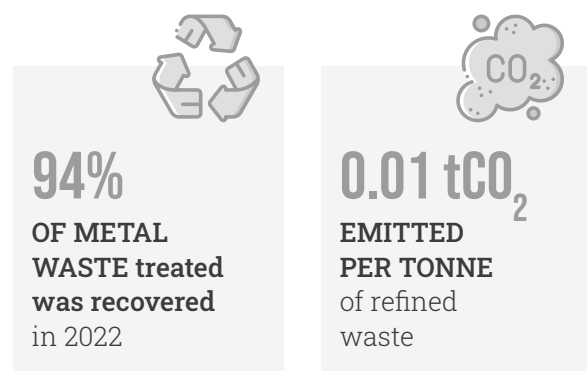
From the grinding and sorting carried out on the ferrous packaging by EWC 191202 sorting, **1,852.30 t of End of Waste ferrous** was obtained, a second raw material sent for recycling at a steel plant with an electric furnace specialized in the production of long steels.

The refining of the mixed metals from the collection centres and the metals produced by sorting bulky waste has instead given rise to **4,821.90 t of ferrous metals** EWC 191202, sent for subsequent treatment at plants authorised for the recovery of metal scrap, in addition to **250.42 t of precious metals** EWC 191202 and EWC 191203.

Finally, **28.28 t of refined aluminium** was obtained from the sorting aluminium, which was subsequently recycled at a specialised plant.

Overall, **the recovery of metal waste in the Metalrecycling Venice srl plant in 2022 amounted to 93.51%**.

The refining activities consumed a total of 440 MWh_p of primary energy, with an average consumption of 59 kWh_p per tonne processed; for each tonne of waste processed, 0.01 t of CO₂ was released into the atmosphere. The transport of metals to the recovery plants involved the consumption of 23,472 l of diesel and 221 kg of methane, equal to 250 MWh_p of primary energy.



SUMMARY OF ELECTRICITY AND FUEL CONSUMPTION BY OPERATIONAL PHASE:



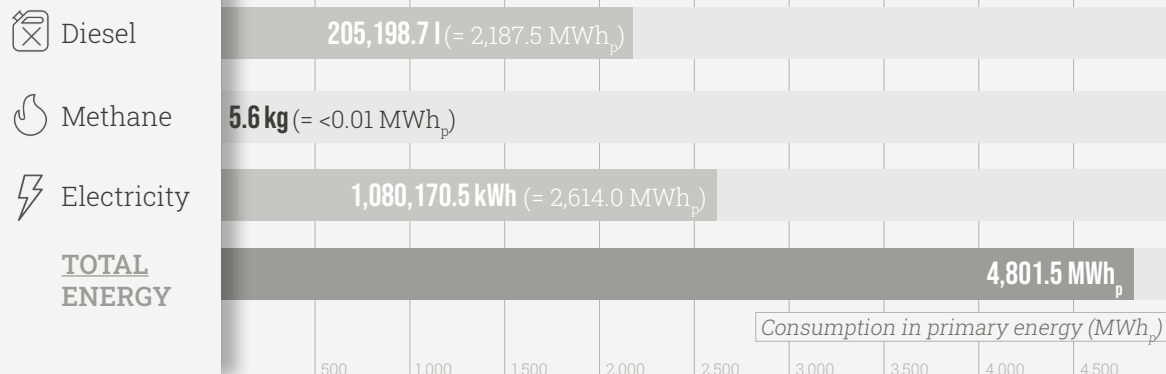
FOR THE COLLECTION, TRANSFER AND TRANSPORT PHASES OF THE METAL WASTE ARE REQUIRED:

9,031.9
TOTAL MWh_p



FOR THE SORTING AND TRANSPORT PHASES OF THE METAL WASTE ARE REQUIRED:

4,801.5
TOTAL MWh_p





FOR THE REFINING AND TRANSPORT PHASES OF THE METAL WASTE ARE REQUIRED:

698.8
TOTAL MWh_p



FOR THE MANAGEMENT OF METAL WASTE ALONG THE ENTIRE TRACEABLE CHAIN* WERE CONSUMED:

14,523.2 MWh_p

*From collection to transport of iron, aluminium and refined metals to recovery plants.

7.5 THE RECOVERY TREND OF METAL WASTE

The annual monitoring of the recovery chain of metals from separate collection shows a progressive increase in the quantities of waste containing collected metal, which goes from 81,128 t in 2019 to 82,726 t in 2022, 2% more in four years. It should be noted that, as with the other fractions treated, after the decrease recorded in 2020, there has been an increase in quantities since 2021.

A similar trend is recorded with regard to the amount of metal waste sorted in Eco+Eco - Ricicla, which goes from 73,208 t in 2019 to 80,253 t in 2022.

On the other hand, the amount of iron from EWC 191202 sorting obtained shows an upward trend from 2019 to 2020, rising from 3,867 t to 4,412 t; however, in 2021 there is a reversal of the trend, with an amount of 2,910 t produced to increase again in 2022 with 3,436 t. Of the total waste containing metal processed in the Eco+Eco - Ricicla plant, the percentage of iron from sorting obtained increased from 5.28% in 2019 to 4.28% in 2022. The product analyses carried out on the iron from sorting show a constant value of iron in the output material, which is around 94%.

As for the aluminium from sorting obtained, the quantities increase progressively over time, going from 218 t in 2019 to 823 t in 2022. In particular, there was a significant increase in both 2021 and 2022; if 3.0 kg of aluminium were obtained in 2019 for each tonne of waste containing metal, 10.3 kg were obtained in 2022. In the case of aluminium, the outgoing product analyses show increasing purity: in 2019 93.85% of the outgoing material consisted of aluminium, in 2022 this percentage rose to 96.54%.

With regard to the refining carried out in the Venice Metalrecycling plant, there is a progressive increase in the quantities treated from 2019 to 2020, going from 6,297 t to 6,741 t; the total inflows decreased in 2021 reaching 6,052 t to increase again in 2022 with 7.435 t.

It should be noted that in recent years some interventions have been carried out

in the Metalrecycling plant, which make it difficult to compare the quantities processed and produced. In fact, in 2019 there was no production of ferrous *End of Waste*, which only resumed in 2020. The overall recovery rate shows a fluctuating trend, going from 90.30% in 2019, then increasing to 95.79% in 2020 and 98.34% in 2021, then decreasing in 2022 to 93.51%.

From the analysis of the energy data, a stability of the specific consumption of the collection phase is observed. The consumption of the sorting phase decreases, going from 65 kWh_p/t in 2019 to 57 kWh_p/t in 2022, as a result of the progressive decrease in electricity consumption. Finally, the consumption of the refining phase increased, from 31 kWh_p/t in 2019 to 86 kWh_p/t in 2021, due to the reactivation of the metal milling sector, to slightly decrease in 2022 to 61 kWh_p/t.

FIGURE 14

TRENDS IN THE COLLECTION OF METAL-CONTAINING WASTE - YEARS 2019-2022

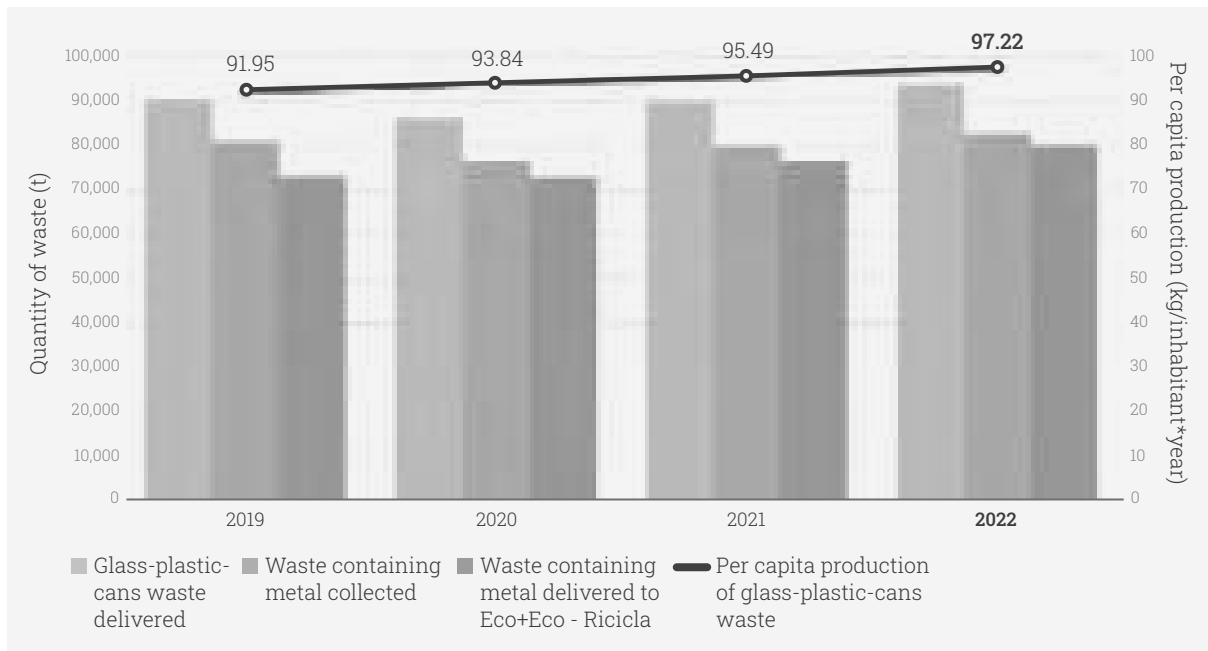


FIGURE 15
WASTE METAL SORTING TREND - YEARS 2019-2022

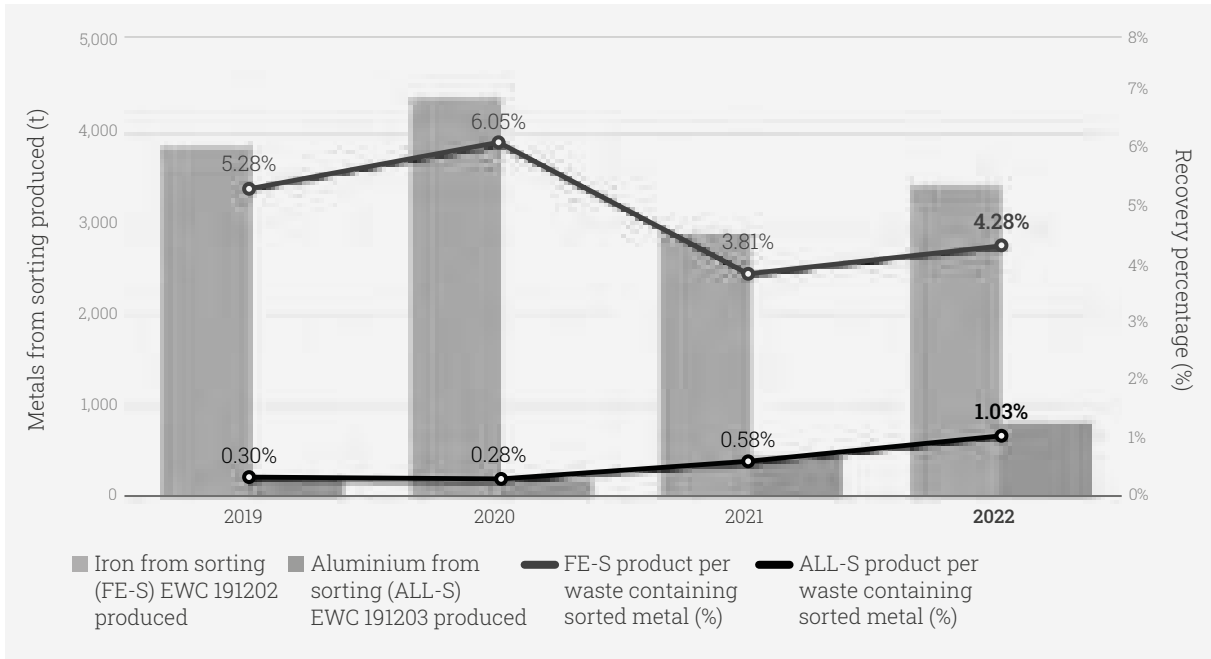


FIGURE 16
TRENDS IN REFINING OF WASTE METAL - YEARS 2019-2022

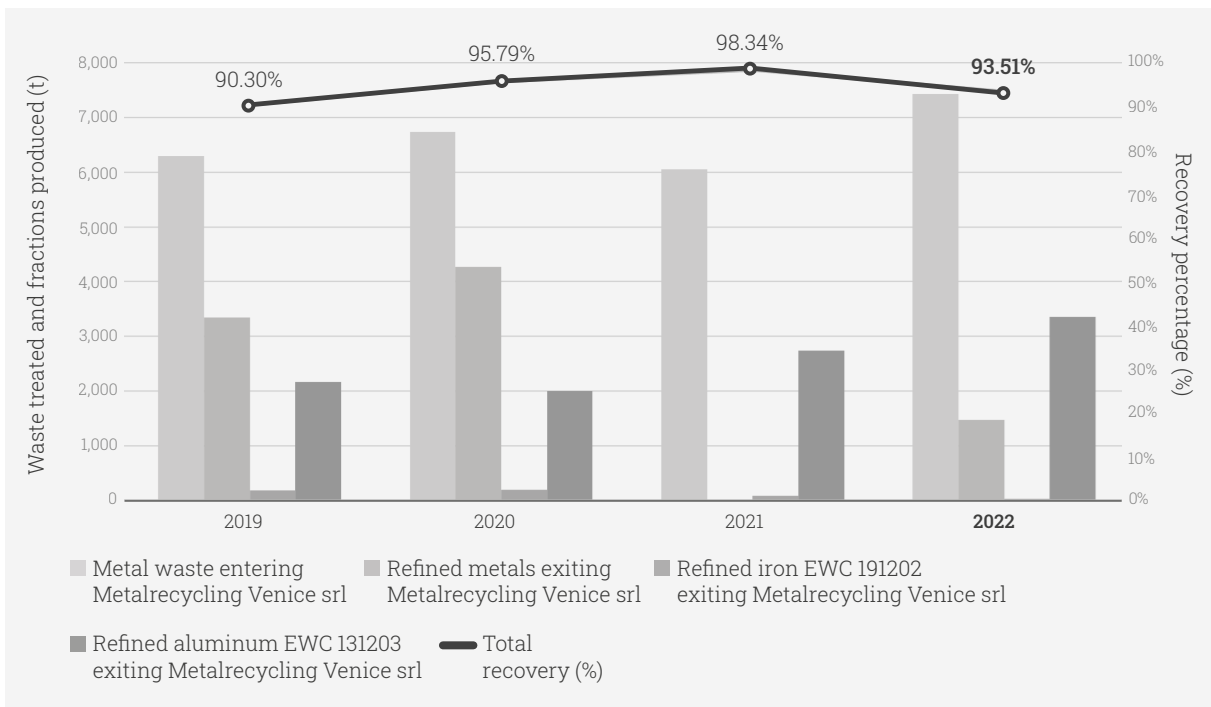
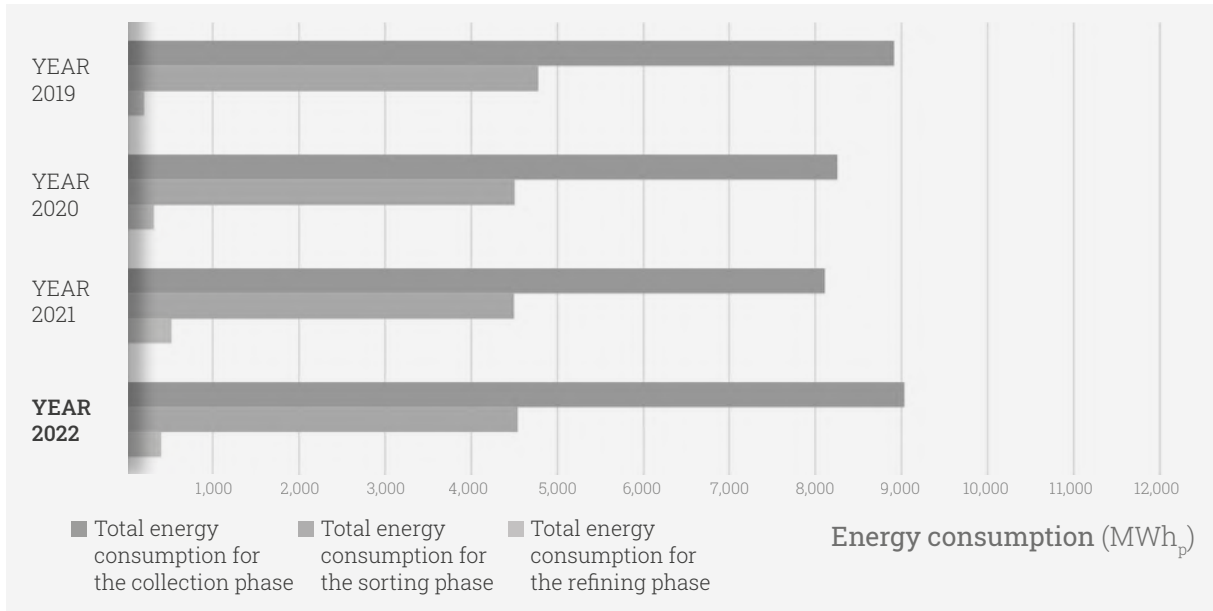


FIGURE 17
**ENERGY CONSUMPTION TRENDS OF THE VARIOUS PHASES
OF THE METAL RECOVERY CHAIN - YEARS 2019-2022**



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Attestato di Conformità

Rilasciato a

ECO+ECO S.R.L.

Sede Legale:

Via della Geologia, 31 - Fraz. Marghera – 30176 VENEZIA (VE)

Sede Operativa:

Via della Geologia "Area 43 ettari" Fraz. Malcontenta – 30176 VENEZIA (VE)

Bureau Veritas Italia S.p.A. certifica che l'organizzazione sopra indicata è stata valutata e giudicata conforme ai requisiti della norma seguente

PdR 132:2022

Linee guida per il monitoraggio e la verifica dei flussi di rifiuti urbani ai fini della rendicontazione per il calcolo degli obiettivi di riciclaggio

Bureau Veritas Italia S.p.A. attesta che l'azienda applica quanto stabilito nel disciplinare di
ECO+ECO S.R.L.

Tracciabilità filiera della Carta
in versione 07 del 06.07.2023

Tracciabilità filiera della carta in merito alla rintracciabilità e controllo della carta/cartone riciclati provenienti dalla raccolta differenziata di rifiuti post-consumo, fino all'impianto di recupero.

Data della certificazione originale: **02 maggio 2016**

Data di scadenza precedente ciclo di certificazione: **01 novembre 2022**

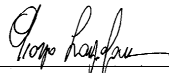
Data dell'Audit di certificazione / rinnovo: **27 settembre 2022**

Data d'inizio del presente ciclo di certificazione **03 gennaio 2023**

Soggetto al continuo e soddisfacente mantenimento del sistema di gestione questo certificato è valido fino al: **01 maggio 2025**

Attestato N. IT267559

Revisione 3 del: **31 gennaio 2024**



GIORGIO LANZAFAME – Local Technical Manager

Indirizzo dell'organismo di certificazione: Bureau Veritas Italia spa, Viale Monza, 347, 20126 Milano, Italia

Ulteriori chiarimenti riguardanti l'oggetto di questo attestato possono essere acquisiti contattando l'intestatario del presente attestato. La validità del presente attestato è triennale ed è subordinata a sorveglianza periodica.



CERTIFICATE OF COMPLIANCE issued for the **traceability of paper waste** coming from Veritas Group's separate waste collections.

BUREAU VERITAS
Certification



Attestato di Conformità

Rilasciato a

ECO+ECO S.R.L.

Sede Legale:

Via della Geologia, 31 - Fraz. Marghera – 30176 VENEZIA (VE)

Sede Operativa:

Via della Geologia "Area 43 ettari" Fraz. Malcontenta – 30176 VENEZIA (VE)

Bureau Veritas Italia S.p.A. certifica che l'organizzazione sopra indicata è stata valutata e giudicata conforme ai requisiti della norma seguente

PdR 132:2022

Linee guida per il monitoraggio e la verifica dei flussi di rifiuti urbani ai fini della rendicontazione per il calcolo degli obiettivi di riciclaggio

Bureau Veritas Italia S.p.A. attesta che l'azienda applica quanto stabilito nel disciplinare di
ECO+ECO S.R.L.

Tracciabilità filiera del vetro in versione 09 del 28/08/2023

Tracciabilità filiera del vetro in merito alla garanzia di rintracciabilità del vetro riciclato dalla raccolta differenziata post-consumo, fino all'impianto di recupero.

Data della certificazione originale: **28 novembre 2014**

Data di scadenza precedente ciclo di certificazione: **27 novembre 2021**

Data dell'Audit di certificazione / rinnovo: **19 novembre 2021**

Data d'inizio del presente ciclo di certificazione **25 marzo 2022**

Soggetto al continuo e soddisfacente mantenimento del sistema di gestione questo certificato è valido fino al: **27 novembre 2024**

Attestato N. IT258130

Revisione 4 del: **31 gennaio 2024**

GIORGIO LANZAFAME – Local Technical Manager

Indirizzo dell'organismo di certificazione:
Bureau Veritas Italia S.p.A., Viale Monza, 347 - 20126 Milano, Italia

Ulteriori chiarimenti riguardanti l'oggetto di questo attestato possono essere acquisiti contattando l'intestatario del presente attestato. La validità del presente attestato è triennale ed è subordinata a sorveglianza periodica.



CERTIFICATE OF COMPLIANCE issued for the traceability of glass waste coming from Veritas Group's separate waste collections.

BUREAU VERITAS
Certification



Attestato di Conformità

Rilasciato a

ECO+ECO S.R.L.

Sede Legale:

Via della Geologia, 31 - Fraz. Marghera – 30176 VENEZIA (VE)

Sede Operativa:

Via della Geologia "Area 43 ettari" Fraz. Malcontenta – 30176 VENEZIA (VE)

Bureau Veritas Italia S.p.A. certifica che l'organizzazione sopra indicata è stata valutata e giudicata conforme ai requisiti della norma seguente

PdR 132:2022

Linee guida per il monitoraggio e la verifica dei flussi di rifiuti urbani ai fini della rendicontazione per il calcolo degli obiettivi di riciclaggio

Bureau Veritas Italia S.p.A. attesta che l'azienda applica quanto stabilito nel disciplinare di
ECO+ECO S.R.L.

Tracciabilità filiera della Plastica in versione 07 del 02.08.2023

Tracciabilità filiera della plastica in merito alla garanzia di rintracciabilità della plastica riciclata dalla raccolta differenziata post-consumo, fino all'impianto di recupero.

Data della certificazione originale: **05 maggio 2016**

Data di scadenza precedente ciclo di certificazione: **04 novembre 2022**

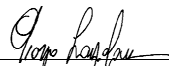
Data dell'Audit di certificazione / rinnovo: **21 settembre 2022**

Data d'inizio del presente ciclo di certificazione **03 gennaio 2023**

Soggetto al continuo e soddisfacente mantenimento del sistema di gestione questo certificato è valido fino al: **04 maggio 2025**

Attestato N. IT267580

Revisione 3 del: **31 gennaio 2024**



GIORGIO LANZAFAME Local Technical Manager

Indirizzo dell'organismo di certificazione: Bureau Veritas Italia spa, Viale Monza, 347, 20126 Milano, Italia

Ulteriori chiarimenti riguardanti l'oggetto di questo attestato possono essere acquisiti contattando l'intestatario del presente attestato. La validità del presente attestato è triennale ed è subordinata a sorveglianza periodica.



CERTIFICATE OF COMPLIANCE issued for the **traceability of plastic waste** coming from Veritas Group's separate waste collections.

BUREAU VERITAS
Certification



Attestato di Conformità

Rilasciato a

ECO+ECO S.R.L.

Sede Legale:

Via della Geologia, 31 - Fraz. Marghera – 30176 VENEZIA (VE)

Sede Operativa:

Via della Geologia "Area 43 ettari" Fraz. Malcontenta – 30176 VENEZIA (VE)

Bureau Veritas Italia S.p.A. certifica che l'organizzazione sopra indicata è stata valutata e giudicata conforme ai requisiti della norma seguente

PdR 132:2022

Linee guida per il monitoraggio e la verifica dei flussi di rifiuti urbani ai fini della rendicontazione per il calcolo degli obiettivi di riciclaggio

Bureau Veritas Italia S.p.A. attesta che l'azienda applica quanto stabilito nel disciplinare di
ECO+ECO S.R.L.

Tracciabilità filiera dei Metalli

in versione 07 del 04.09.2023

Tracciabilità filiera dei metalli in merito alla garanzia di rintracciabilità del ferro e dell'alluminio riciclato dalla raccolta differenziata post-consumo, fino all'impianto di recupero.

Data della certificazione originale: **05 maggio 2016**

Data di scadenza precedente ciclo di certificazione: **04 novembre 2022**

Data dell'Audit di certificazione / rinnovo: **14 settembre 2022**

Data d'inizio del presente ciclo di certificazione **03 gennaio 2023**

Soggetto al continuo e soddisfacente mantenimento del sistema di gestione questo certificato è valido fino al: **04 maggio 2025**

Attestato N. IT267601

Revisione 3 del: **31 gennaio 2024**

GIORGIO LANZAFAME – Local Technical Manager

Indirizzo dell'organismo di certificazione: Bureau Veritas Italia spa, Viale Monza, 347, 20126 Milano, Italia

Ulteriori chiarimenti riguardanti l'oggetto di questo attestato possono essere acquisiti contattando l'intestatario del presente attestato. La validità del presente attestato è triennale ed è subordinata a sorveglianza periodica.



CERTIFICATE OF COMPLIANCE issued for the traceability of metal waste coming from Veritas Group's separate waste collections.

PAPER, GLASS, PLASTICS AND METALS WASTE CHAINS

SUMMARY OF RESULTS

In collaboration with
De Materia srl

